

STANFORD UNIVERSITY

STANFORD BULLETIN 2014-15



ACCREDITATION

Stanford University is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), 985 Atlantic Avenue, Suite 100, Alameda, CA 94501; (510) 748-9001. In addition, certain programs of the University have specialized accreditation. For information, contact the Office of the University Registrar.

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Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

GOVERNING DOCUMENT/RESERVATION OF RIGHTS

Every effort is made to ensure that the degree requirement and course information, applicable policies, and other materials contained in the Stanford Bulletin are accurate and current. The University reserves the right to make changes at any time without prior notice. The Bulletin in the form as it exists online at Stanford Bulletin web site and ExploreCourses web site is therefore the governing document, and contains the then currently applicable policies and information. The University no longer produces an official hard copy version of the Bulletin.

ADDITIONAL INFORMATION

Additional information on Stanford University can be obtained through Stanford's web site at <http://www.stanford.edu>.

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Academic Calendar

This calendar is also available at the University Registrar's web site (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). All dates are subject to change at the discretion of the University.

Autumn Quarter 2014-15

Date(s)	Day/Time	Description
August 1	Fri	Axess opens for course enrollment.
August 25	Mon	1st-year M.D. instruction begins.
August 28	Thu	2nd-year M.D. instruction begins.
September 2	Tue	Law School instruction begins for 1st-year J.D. students.
September 12	Fri, 5:00 p.m.	At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
September 15	Mon	MBA first-year instruction begins.
September 16	Tue	New undergraduates arrive; Convocation.
September 18	Thu	Undergraduate housing opens for returning students.
September 22	Mon	First day of quarter; instruction begins.
September 22	Mon, 5:00 p.m.	Preliminary Study List deadline. Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status. The late study list fee is \$200.
September 22	Mon, 5:00 p.m.	Deadline to submit Leave of Absence for full refund.
September 22	Mon	Law School instruction begins for 2nd- & 3rd-year J.D. & advanced degree students.
September 25	Thu	Conferral of degrees, Summer Quarter, 2012-13
September 26	Fri	GSB course add/drop deadline (GSB courses only).
October 10	Fri, 5:00 p.m.	Final Study List deadline. Last day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.
November 5	Wed, 5:00 p.m.	Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
November 14	Fri, 5:00 p.m.	Change of grading basis deadline, except GSB.
November 14	Fri, 5:00 p.m.	Course withdrawal deadline, except GSB, Law, and M.D.
November 14	Fri, 5:00 p.m.	Application deadline for Autumn Quarter degree conferral.
November 24-28	Mon-Fri	Thanksgiving Recess (no classes).
December 1-7	Mon-Sun	End-Quarter Period.
December 5	Fri	Last day of classes (unless class meets on Sat.)
December 5	Fri	Last opportunity to arrange Incomplete in a course, at last class.

December 5	Fri, noon	University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.
December 5	Fri, 5:00 p.m.	Late application deadline for Autumn Quarter degree conferral (\$50 fee).
December 5-12	Fri-Fri	Law School examinations.
December 8-12	Mon-Fri	End-Quarter examinations.
December 13	Sat, noon	Undergraduate housing closes for Winter Break.
December 16	Tue, 11:59 p.m.	Grades due.
January 8	Thu	Conferral of degrees, Autumn Quarter.

Winter Quarter 2014-15

Date(s)	Day/Time	Description
October 26	Sun	Axess opens for course enrollment.
December 26	Fri	At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
January 3	Sat, 8:00 a.m.	Undergraduate housing opens for Winter Quarter.
January 5	Mon	First day of quarter; instruction begins for all students.
January 5	Mon, 5:00 p.m.	Preliminary Study List deadline. Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status.
January 5	Mon, 5:00 p.m.	Deadline to submit Leave of Absence for full refund.
January 9	Fri	GSB course add/drop deadline (GSB courses only).
January 19	Mon	Martin Luther King, Jr., Day (holiday, no classes).
January 23	Fri, 5:00 p.m.	Final Study List deadline. Final day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.
February 16	Mon	Presidents' Day (holiday, no classes; Law School does hold classes).
February 19	Thu, 5:00 p.m.	Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
February 27	Fri, 5:00 p.m.	Change of grading basis deadline, except GSB.
February 27	Fri, 5:00 p.m.	Course withdrawal deadline, except GSB, Law, and M.D.
February 27	Fri, 5:00 p.m.	Application deadline for Winter Quarter degree conferral.
March 9-15	Mon-Sun	End-Quarter Period.
March 13	Fri	Last day of classes (unless class meets on Sat.)
March 13	Fri	Last opportunity to arrange Incomplete in a course, at last class.
March 13	Fri, noon	University thesis, D.M.A. final project, Ph.D. dissertation, last day to submit.

March 13	Fri, 5:00 p.m.	Late application deadline for Winter Quarter degree conferral (\$50 fee).
March 13-20	Fri-Fri	Law School examinations.
March 16-20	Mon-Fri	End-Quarter examinations.
March 21	Sat	Undergrad housing move-out (if depending Winter Quarter).
March 24	Tue, 11:59 p.m.	Grades due.
April 2	Thu	Conferral of degrees, Winter Quarter.

Spring Quarter 2014-15

Date(s)	Day/Time	Description
February 8	Sun	Axess opens for course enrollment.
March 20	Fri	At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
March 28	Sat	Undergraduate housing move-in date for Spring Quarter.
March 30	Mon	First day of quarter; instruction begins.
March 30	Mon, 5:00 p.m.	Preliminary Study List deadline. Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status.
March 30	Mon, 5:00 p.m.	Deadline to submit Leave of Absence for full refund.
April 2	Thu	MBA first-year instruction begins.
April 7	Tue	GSB course add/drop deadline (GSB courses only).
April 10	Fri, 5:00 p.m.	Application deadline for Spring Quarter degree conferral.
April 17	Fri, 5:00 p.m.	Final Study List deadline. Last day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.
May 12	Tue, 5:00 p.m.	Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
May 22	Fri, 5:00 p.m.	Change of grading basis deadline, except GSB..
May 22	Fri, 5:00 p.m.	Course withdrawal deadline, except GSB, Law, and M.D.
May 25	Mon	Memorial Day (holiday, no classes).
May 29	Fri	Last day of Law classes.
May 29-June 4	Fri-Thu	End-Quarter Period.
June 1-5	Mon-Fri	Law School examinations.
June 3	Wed	Last day of classes.
June 3	Wed	Last opportunity to arrange Incomplete in a course, at last class.
June 3	Wed, noon	University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.
June 3	Wed, 5:00 p.m.	Late application deadline for Spring Quarter degree conferral (\$50 fee).
June 4	Thu	Day before finals, no classes.
June 5-10	Fri-Wed	End-Quarter examinations.

June 11	Thu, noon	Grades for graduating students due.
June 12	Fri	Undergraduate housing move-out date (for all students not involved in Commencement).
June 13	Sat	Senior Class Day.
June 13	Sat	Baccalaureate Saturday.
June 14	Sun	Commencement. Conferral of degrees, Spring Quarter.
June 15	Mon	Undergraduate Housing move-out date (for graduates and others involved in Commencement with permission).
June 16	Tue, 11:59 p.m.	Grades for non-graduating students due.

Summer Quarter 2014-15

Date(s)	Day/Time	Description
April 12	Sun	Axess opens for course enrollment.
June 12	Fri	At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
June 22	Mon	First day of quarter; instruction begins.
June 22	Mon, 5:00 p.m.	Preliminary Study List deadline.
June 22	Mon	Deadline to submit Leave of Absence for full refund.
July 3	Fri	Independence Day celebrated (holiday, no classes).
July 6	Mon, 5:00 p.m.	Final Study List deadline. Final day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.
July 24	Fri, 5:00 p.m.	Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
July 31	Fri, 5:00 p.m.	Change of grading basis deadline.
July 31	Fri, 5:00 p.m.	Course withdrawal deadline.
July 31	Fri, 5:00 p.m.	Application deadline for Summer Quarter degree conferral.
August 8-13	Sat-Thu	End-Quarter Period.
August 13	Thu	Last day of classes.
August 13	Thu	Last opportunity to arrange Incomplete in a course, at last class.
August 15-16	Fri-Sat	End-Quarter examinations.
August 18	Tue, 11:59 p.m.	Grades due.
August 28	Fri, noon	University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.
August 28	Fri, 5:00 p.m.	Late application deadline for Summer Quarter degree conferral (\$50 fee).
September 24	Thu	Conferral of degrees, Summer Quarter.

Academic Calendar 2015-16

First day of classes and last day of finals

- Autumn 2015-16: September 21 and December 11
- Winter 2015-16: January 4 and March 18

- Spring 2015-16: March 28 and June 8 (Commencement June 12)
- Summer 2015-16: June 20 and August 13

Stanford University

The Stanford Bulletin is Stanford University's official catalog of courses, degrees, policies, and University and degree requirements.

- **ExploreDegrees** publishes degree requirements, University requirements, and academic and nonacademic policies and regulations, as well as information on Stanford's schools, departments, and interdisciplinary programs.
- **ExploreCourses** publishes courses and class scheduling for the entire University.

Use the links in the Table of Contents on the left to navigate through the bulletin. Or use the search box to look for specific material.

- For degree requirements in the Graduate School of Business, see the GSB web site (<http://www.gsb.stanford.edu>).
- For M.D. programs in the School of Medicine, see the School of Medicine web site (<http://med.stanford.edu/education>).
- For Law degree programs, see the School of Law web site (<http://www.law.stanford.edu/program/degrees>).

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Courses of Instruction are available at the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site.

Your feedback is valuable. Send email to reg-webmaster@stanford.edu.

Stanford Bulletins from Earlier Years

See the Previous Stanford Bulletins (<http://exploreddegrees.stanford.edu/archive/#text>) page for Bulletins prior to 2015-16.

Accreditation

Stanford University (<http://www.stanford.edu>) is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), 985 Atlantic Avenue, Suite 100, Alameda, CA 94501; (510) 748-9001. In addition, certain programs of the University have specialized accreditation. For information, contact the Office of the University Registrar (<http://studentaffairs.stanford.edu/registrar>).

Stanford University is committed to complying with the following requirements enumerated by the Western Association of Schools and Colleges (WASC) in its accreditation process:

"Core Commitment to Institutional Capacity

"The institution functions with clear purposes, high levels of institutional integrity, fiscal stability, and organizational structures to fulfill its purposes.

"Commitment to Educational Effectiveness

"The institution evidences clear and appropriate educational objectives and design at the institutional and program level. The institution employs processes of review, including the collection and use of data, which ensure delivery of programs and learner accomplishments at a level of performance appropriate for the degree or certificate awarded."

For more information, see the University's WASC Accreditation (<http://wasc.stanford.edu>) web site.

Also, see President Hennessy's statement (<http://exploreddegrees.stanford.edu/%20https://sites.stanford.edu/wasc2011/system/files/Institutional%2520Stipulations.pdf>) (pdf) on Stanford's fulfillment of the Core Commitments to Institutional Capacity and Educational Effectiveness.

Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

Honor Code and Fundamental Standard

Student life at Stanford is governed by the Honor Code and the Fundamental Standard. More information on these policies is available from the Office of Community Standards (<http://studentaffairs.stanford.edu/communitystandards>) and in the Student Affairs (p.) section of this bulletin.

Honor Code

"1. The Honor Code is an undertaking of the students, individually and collectively:

- a. that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
- b. that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.

2. The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.

3. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work."

Fundamental Standard

"Students are expected to show both within and without the University such respect for order, morality, personal honor, and the rights of others as is demanded of good citizens. Failure to do this will be sufficient cause for removal from the University."

Registrar's Office

The Stanford Bulletin is an online publication of the Office of the University Registrar (<http://registrar.stanford.edu>), Stanford University.

Address:

Office of the University Registrar
482 Galvez Mall, Suite 120
Stanford University
Stanford, California 94305-6032

Students with questions or issues should contact the Student Services Center (<http://studentservicescenter.stanford.edu>) or file a help ticket (<https://remedyweb.stanford.edu/helpsu/helpsu?pcat=ssc>) with Stanford's HelpSU system. Alumni, staff, or the general public may also file a help ticket (<https://remedyweb.stanford.edu/helpsu/helpsu?pcat=ssc>) to request the Registrar's Office assistance or to ask for information.

Additional information on Stanford University can be obtained through Stanford's (<http://www.stanford.edu>) web site.

Telephone number for all University departments: Area code: (650) 723-2300.

Stanford's Mission

The Stanford University Founding Grant (https://wasc.stanford.edu/system/files/FoundingGrant_2.pdf) (pdf), dated November 11, 1885, outlines the founding principles of the University. The Founding Grant describes the "Nature, Object, and Purposes of the Institution" founded by Leland Stanford and Jane Lathrop Stanford in these terms:

Its nature, that of a university with such seminaries of learning as shall make it of the highest grade, including mechanical institutes, museums, galleries of art, laboratories, and conservatories, together with all things necessary for the study of agriculture in all its branches, and for mechanical training, and the studies and exercises directed to the cultivation and enlargement of the mind;

Its object, to qualify its students for personal success, and direct usefulness in life;

And its purposes, to promote the public welfare by exercising an influence in behalf of humanity and civilization, teaching the blessings of liberty regulated by law, and inculcating love and reverence for the great principles of government as derived from the inalienable rights of man to life, liberty, and the pursuit of happiness.

Each of Stanford's seven schools has its own mission statement and those can be found by following the links below:

- School of Earth Sciences Mission Statement (<http://pangea.stanford.edu/about>)
- Graduate School of Business Mission Statement (<http://www.gsb.stanford.edu/about/mission.html>)
- School of Humanities and Sciences Mission Statement (<http://www.stanford.edu/dept/humsci/external/about>)
- School of Engineering Mission Statement (<http://soe.stanford.edu/about>)
- School of Medicine Mission Statement (<http://med.stanford.edu/about/vision.html>)

- Graduate School of Education Mission Statement (<http://ed.stanford.edu/suse/aboutsuse/mission.html>)
- Stanford Law School Mission Statement (<http://www.law.stanford.edu/school>)

A Brief History of Stanford

On October 1, 1891, more than 400 enthusiastic young men and women were on hand for opening day ceremonies at Leland Stanford Junior University. They came from all over: many from California, some who followed professors hired from other colleges and universities, and some simply seeking adventure in the West. They came to seize a special opportunity, to be part of the pioneer class in a brand new university. They stayed to help turn an ambitious dream into a thriving reality. As a pioneer faculty member recalled, "Hope was in every heart, and the presiding spirit of freedom prompted us to dare greatly."

For Leland and Jane Stanford on that day, the University was the realization of a dream and a fitting tribute to the memory of their only son, who died of typhoid fever weeks before his 16th birthday, at an age when many young men and women were planning their college education.

From the beginning, it was clear that Stanford would be different. It was coeducational at a time when single-sex colleges were the norm. It was non-sectarian when most private colleges were still affiliated with a church. And it offered a broad, flexible program of study while most schools insisted on a rigid curriculum of classical studies. Though there were many difficulties during the first months (housing was inadequate, microscopes and books were late in arriving from the East), the first year foretold greatness. As Jane Stanford wrote in the summer of 1892, "Even our fondest hopes have been realized."

What manner of people were this man and this woman who had the intelligence, the means, the faith, and the daring to plan a major university in Pacific soil, far from the nation's center of culture?

Leland and Jane Stanford

Although he was trained as a lawyer, Leland Stanford came to California in 1852 to join his five brothers in their mercantile business in the gold fields; Jane Stanford followed in 1855. They established large-scale operations in Sacramento, where Mr. Stanford became a leading figure in California business and politics. One of the "Big Four" who built the western link of the first transcontinental railroad, he was elected Governor of California and later United States Senator. One of the founders of the Republican Party in California, he was an ardent follower of Abraham Lincoln and is credited with keeping California in the Union during the Civil War.

The Case for a Liberal Education

Despite the enormous success they achieved in their lives, Governor and Mrs. Stanford had come from families of modest means and rose to prominence and wealth through a life of hard work. So it was natural that their first thoughts were to establish an institution where young men and women could "grapple successfully with the practicalities of life." As their thoughts matured, however, these ideas of "practical education" enlarged to the concept of producing cultured and useful citizens who were well prepared for professional success. In a statement of the case for liberal education that was remarkable for its time, Leland Stanford wrote, "I attach great importance to general literature for the enlargement of the mind and for giving business capacity. I think I have noticed that technically educated boys do not make the most successful businessmen. The imagination needs to be cultivated and developed to assure success in life. A man will never construct anything he cannot conceive."

Stanford Lands and Architecture

The campus occupies what was once Leland Stanford's Palo Alto Stock Farm and the favorite residence of the Stanford family. The Stanfords purchased an existing estate in 1876 and later acquired much of the land in the local watershed for their stock farm, orchards, and vineyards.

The name of the farm came from the tree El Palo Alto, a coast redwood (*Sequoia sempervirens*), that still stands near the northwest corner of the property on the edge of San Francisquito Creek. Many years ago, one of the winter floods that periodically rushed down the arroyo tore off one of its twin trunks, but half of the venerable old tree lives on, a gaunt and time-scared monument. Named in 1769 by Spanish explorers, El Palo Alto has been the University's symbol and the centerpiece of its official seal.

The Stanfords gave their farm to the University in the Founding Grant of 1885. They personally financed the entire cost of the construction and operation of the University until 1903, when surviving founder Jane Stanford, who performed heroically in keeping the University functioning during difficult times following Leland Senior's death in 1893, turned over control to the Board of Trustees. The founding gift has been estimated at \$25 million, not including the land and buildings.

The general concept for the University grounds and buildings was conceived by Frederick Law Olmsted, the designer of Central Park in New York. A brilliant young Boston architect, Charles Allerton Coolidge, further developed the concept in the style of his late mentor, Henry Hobson Richardson. The style, called Richardsonian Romanesque, is a blend of Romanesque and Mission Revival architecture. It is characterized by rectilinear sandstone buildings joined by covered arcades formed of successive half-circle arches, the latter supported by short columns with decorated capitals.

More than one hundred years later, the University still enjoys 8,180 acres (almost 13 square miles) of grassy fields, eucalyptus groves, and rolling hills that were the Stanfords' generous legacy, as well as the Quadrangle of "long corridors with their stately pillars" at the center of campus. It is still true, as the philosopher William James said, during his stint as a visiting professor, that the climate is "so friendly . . . that every morning wakes one fresh for new amounts of work."

Current Perspectives

In other ways, the University has changed tremendously on its way to recognition as one of the world's great universities. At the hub of a vital and diverse Bay Area, Stanford is less than an hour's drive or Caltrain trip south of San Francisco and just a few miles north of Silicon Valley, an area dotted with computer and high technology firms largely spawned by the University's faculty and graduates. On campus, students and faculty enjoy new libraries, modern laboratories, sports facilities, and comfortable residences. Contemporary sculpture, as well as pieces from the Iris and B. Gerald Cantor Center for Visual Arts (<http://museum.stanford.edu>) at Stanford University's extensive collection of sculpture by Auguste Rodin, can be found throughout the campus, providing unexpected pleasures at many turns.

The Cantor Center opened in January 1999. The center includes the historic Leland Stanford Junior Museum building, the Rodin Sculpture Garden and a new wing with spacious galleries, auditorium, cafe, and bookshop. At the Stanford University Medical Center (<http://stanfordmedicine.org>), world-renowned for its research, teaching, and patient care, scientists and physicians are searching for answers to fundamental questions about health and disease. Ninety miles down the coast, at Stanford's Hopkins Marine Station (<http://hopkins.stanford.edu>) on the Monterey Bay, scientists are working to better understand the mechanisms of evolution and ecological systems.

The University is organized into seven schools: Earth Sciences, Education, Engineering, the Graduate School of Business, Humanities and Sciences, Law, and Medicine. In addition, there are more than 30 interdisciplinary centers, programs, and research laboratories (p.) including: the Hoover Institution on War, Revolution and Peace (<http://www.hoover.org>); the Freeman Spogli Institute for International Studies (<http://fsi.stanford.edu>); the Woods Institute for the Environment (<http://woods.stanford.edu>); the SLAC National Accelerator Laboratory (<http://www.slac.stanford.edu>); and the Stanford Program for Bioengineering, Biomedicine, and Biosciences (Bio-X) (<http://biox.stanford.edu>), where faculty from many fields bring different perspectives to bear on issues and problems. Stanford's Bing Overseas Studies Program (<http://bosp.stanford.edu>) offers undergraduates in all fields remarkable opportunities for study abroad, with campuses in Australia, Barcelona, Beijing, Berlin, Cape Town, Florence, Kyoto, Madrid, Oxford, Paris, and Santiago.

Stanford People

By any measure, Stanford's faculty, which numbers more than 2,000, is one of the most distinguished in the world. It includes 22 living Nobel laureates, 5 Pulitzer Prize winners, 20 National Medal of Science winners, 158 members of the National Academy of Sciences, 277 members of the American Academy of Arts and Sciences, 104 members of the National Academy of Engineering, and 32 members of the National Academy of Education. Yet beyond their array of honors, what truly distinguishes Stanford faculty is their commitment to sharing knowledge with their students. The great majority of professors teach undergraduates both in introductory lecture classes and in small freshman, sophomore, and advanced seminars.

Enrollment in Autumn Quarter 2013 totaled 15,877, of whom 6,980 were undergraduates and 8,897 were graduate students. Like the faculty, the Stanford student body is distinguished. Approximately 17 people apply to Stanford for every student who enters the freshman class. 112 Stanford students have been named Rhodes Scholars and 86 have been named Marshall Scholars. The six-year graduation rate for freshmen who entered Stanford University full-time in 2008 was 90.8 percent. Stanford awarded 5,025 degrees in 2012-13, of which 1,660 were baccalaureate and 5,025 were advanced degrees.

Stanford students also shine in an array of activities outside the classroom, from student government to music, theater, and journalism. Through the Haas Center for Public Service, students participate in dozens of community service activities, such as tutoring programs for children in nearby East Palo Alto, the Hunger Project, and the Arbor Free Clinic.

In the athletic arena, Stanford students have enjoyed tremendous success as well. Stanford fields teams in 36 Division I varsity sports. The Cardinal has won at least one national team championship 37 consecutive years, which leads the NCAA. Stanford has won the Director's Cup, which honors the most successful program in NCAA Division I sports, the last 18 years. Stanford scholar-athletes have earned 151 NCAA Postgraduate Scholarships—a national best.

Stanford graduates can be found in an extraordinary variety of places: in space (the late Sally Ride, '73, Ph.D. '78, was the first American woman in space); on the news (Ted Koppel, M.A. '62, created the successful program Nightline); Broadway (David Henry Hwang, '79, received a Tony Award for his celebrated work, *M. Butterfly*); in San Francisco live theater (Carey Perloff, '80, artistic director of the American Conservatory Theater); at the helm of major corporations (Scott McNealy, '80, founded Sun Microsystems, Sergey Brin, M.S. '95, and Larry Page, M.S. '98, founded Google, and Chih-yuan (Jerry) Yang, '94, and David Filo, '90, founded Yahoo); and on the U.S. Supreme Court (two Stanford graduates, Anthony Kennedy, '58, and Stephen Breyer, '59, currently sit on the high court; Sandra Day O'Connor, '50, J.D. '52, recently retired from the high court, and William Rehnquist, '48, J.D. '52, served until his death in 2005).

Looking Ahead

In her address to the Board of Trustees in July 1904, Jane Stanford said, "Let us not be afraid to outgrow old thoughts and ways, and dare to think on new lines as to the future of the work under our care." Her thoughts echo in the words of Stanford President John Hennessy, who said in his message in the 2002 Annual Report, "Our bold entrepreneurial spirit has its roots in the founders and our location in the pioneering West. In 1904, Jane Stanford defined the challenge for the young University ... Each generation at Stanford has taken this to heart and boldly launched new efforts, from the classroom to the laboratory ... We will continue to innovate and invest in the future ... The pioneering spirit that led the founders and early leaders to 'dare to think on new lines' continues to guide us."

University Governance and Organization

Web Sites: <http://www.stanford.edu/about/administration/> and <http://facts.stanford.edu/administration/>

Stanford University is a trust with corporate powers under the laws of the State of California. The University is a tax-exempt entity under section 501(c)3 of the Internal Revenue Code. Under the provisions of the Founding Grant, the Board of Trustees (with a maximum membership of 38) is custodian of the endowment and all the properties of Stanford University. The board administers the invested funds, sets the annual budget and determines policies for operation and control of the university. Among the powers given to the trustees by the Founding Grant is the power to appoint a president. The board delegates broad authority to the president to operate the university and to the faculty on certain academic matters. The formal legal name is "The Board of Trustees of the Leland Stanford Junior University."

Accreditation

Stanford University is accredited by the Accrediting Commission of Senior Colleges and Universities of the Western Association of Schools and Colleges. (<http://directory.wascenior.org/stanford-university/#zoom=15&lat=3742964&lon=-12217294&layers=TF0BT>)

Executive Officers

Stanford Administration

- John Hennessy, President
- John Etchemendy, Provost
- David Demarest, Vice President for Public Affairs
- David A. Jones, Vice President for Human Resources
- Randall S. Livingston, Vice President for Business Affairs and Chief Financial Officer
- William J. Madia, Vice President, SLAC National Accelerator Laboratory
- Robert Reidy, Vice President for Land, Buildings and Real Estate
- Martin Shell, Vice President for Development
- Howard Wolf, Vice President for Alumni Affairs and President, Stanford Alumni Association
- Debra Zumwalt, Vice President and General Counsel

Cabinet

- Ann Arvin, Vice Provost and Dean of Research
- Harry Elam, Vice Provost for Undergraduate Education
- Chi-Chang Kao, Director, SLAC National Accelerator Laboratory
- Patricia Gumpert, Vice Provost for Graduate Education
- M. Elizabeth Magill, Dean, School of Law
- Pamela Matson, Dean, School of Earth Sciences
- Lloyd Minor, Dean, School of Medicine
- John Mitchell, Vice Provost for Online Learning
- Persis Drell, Dean, School of Engineering
- John Raisian, Director, Hoover Institution on War, Revolution and Peace
- Richard Saller, Dean, School of Humanities and Sciences
- Garth Saloner, Dean, Graduate School of Business
- Deborah Stipek, Dean, Graduate School of Education

The Board of Trustees Powers and Duties

The Board of Trustees is custodian of the endowment and all properties of the University. The Board administers the invested funds, sets the annual budget, and determines policies for the operation and control of the University. The powers and duties of the Board of Trustees derive from the Founding Grant, amendments, legislation, and court decrees. In addition, the Board operates under its own bylaws and a series of resolutions on major policy.

Membership

Board membership is set at 38, including the President of the University who serves ex officio and with vote. Trustees serve a five-year term and are eligible for appointment to one additional five-year term. At the conclusion of that term, a Trustee is not eligible for reelection until after a lapse of one year. Eight of the Trustees are elected or appointed in accordance with the Rules Governing the Election or Appointment of Alumni Nominated Trustees. They serve a five-year term.

Officers of the Board

The officers of the board are a chair, one or more vice chairs, a secretary, and an associate secretary. Officers are elected to one-year terms at the annual meeting in June, with the exception of the chair, who serves a two-year term. Their terms of office begin July 1.

Committees

Standing committees of the Board are Academic Policy, Planning, and Management; Alumni and External Affairs; Audit and Compliance; Development; Finance; Land and Buildings; the Medical Center; and Trusteeship. Special committees include Athletics, Compensation, Investment Responsibility, and Litigation.

Meetings

The Board generally meets five times each year.

Members of the Board of Trustees as of December 1, 2014

- Fred W. Alvarez, Partner, Jones Day, Palo Alto, CA
- Robert M. Bass, President, Keystone Group LP, Fort Worth, TX
- Brook H. Byers, Partner, Kleiner Perkins Caufield & Byers, Menlo Park, CA
- James E. Canales, President, Barr Foundation, Boston, MA
- Bret E. Comolli, Chairman, Asurion Corporation, Atherton, CA
- RoAnn Costin, President, Wilderness Point Investments, Boston, MA
- James G. Coulter, Founding Partner, TPG Capital, LP, San Francisco, CA
- Deborah A. DeCotis, Private Investor, D Squared Holdings LLC, New York, NY
- Steven A. Denning, Chairman, General Atlantic LLC, Greenwich, CT
- Bruce W. Dunlevie, General Partner, Benchmark Capital, Woodside, CA
- Angela S. Filo, Co-Founder, Yellow Chair Foundation, Palo Alto, CA
- Armando Garza, Chairman, Alfa, Garza Garcia, NL, MX
- John A. Gunn, Chairman Emeritus and Director, Dodge and Cox, San Francisco, CA
- Gail B. Harris, Retired Partner, Simpson Thacher & Bartlett LLP, New York, NY
- Christine U. Hazy, Co-Founder and Managing Director, Sketch Foundation, Los Angeles, CA
- John L. Hennessy, President, Stanford University, Stanford, CA
- Ronald B. Johnson, Founder & CEO, Enjoy, Menlo Park, CA
- Tonia G. Karr, San Francisco, CA
- Frank D. Lee, CEO, Dragonfly Sciences, Inc., Wellesley, MA
- Bernard Liautaud, General Partner, Balderton Capital, London, UK
- Susan R. McCaw, President, COM Investments, Santa Barbara, CA
- Lloyd M. Metz, Managing Director, ICV Partners, New York, NY
- Hamid R. Moghadam, Chairman & CEO, Prologis, Inc., San Francisco, CA
- Kenneth E. Olivier, Chairman Emeritus, Dodge and Cox, San Francisco, CA
- Paul A. Ormond, Chairman, President, CEO, HCR ManorCare, Inc., Toledo, OH
- Ruth M. Porat, Exec. Vice President & Chief Financial Officer, Morgan Stanley, New York, NY
- Laurene Powell Jobs, Founder/Chair, Emerson Collective, Palo Alto, CA
- Jeffrey S. Raikes, Co-Founder, the Raikes Foundation, Seattle, WA
- Mindy B. Rogers, Atherton, CA
- Victoria B. Rogers, President, Rose Hills Foundation, Los Angeles, CA
- Kavitar Ram Shriram, Founder, Sheralo Ventures, Menlo Park, CA
- Ronald P. Spogli, Founding Partner, Freeman Spogli & Co., Los Angeles, CA
- Srinija Srinivasan, Palo Alto, CA
- Isaac Stein, President, Waverley Associates, Atherton, CA
- Thomas F. Steyer, Founder & CEO, NextGen Action, San Francisco, CA
- Gene T. Sykes, Global Co-Head of M&A & Chairman, Goldman Sachs Group, Inc., Los Angeles, CA

- Vaughn C. Williams, Of Counsel, Skadden Arps Slate Meagher & Flom, New York, NY
- Jerry Yang, AME Cloud Ventures, Palo Alto, CA

The President

The Founding Grant prescribes that the Board of Trustees shall appoint the President of the University and that the Board shall give to the President the following powers:

- To prescribe the duties of the professors and teachers.
- To prescribe and enforce the course of study and the mode and manner of teaching.
- Such other powers as will enable the President to control the educational part of the University to such an extent that the President may justly be held responsible for the course of study therein and for the good conduct and capacity of the professors and teachers.

The President is also responsible for the management of financial and business affairs of the University, including operation of the physical plant.

The President is responsible for the safety of the campus and may take reasonable steps to protect the University including, but not limited to, barring people from campus who disrupt the normal business operations of the University or who present a threat to the safety of the University community. In extraordinary circumstances, the President may permanently discontinue students who present a threat to the health and safety of the University community.

The President appoints the following, subject to confirmation by the Board: Provost, Vice President for Business Affairs and Chief Financial Officer, Chief Executive Officer of Stanford Management Company, Vice President for Alumni Affairs and President of Stanford Alumni Association, Vice President for Development, Vice President for Public Affairs, Vice President and General Counsel, Vice President for the SLAC National Accelerator Laboratory, and Vice President for Land, Buildings, and Real Estate.

For additional information, see the Office of the President web (<http://www.stanford.edu/dept/president>) site.

Committees and Panels Appointed by the President

University Committees are appointed by and are primarily responsible to the President. Such committees deal with matters on which the responsibility for recommendation or action is clearly diffused among different constituencies of the University. In accordance with the Report on the Committee Structure of the University, Academic Council members are appointed to University Committees on nomination of the Senate Committee on Committees and student members on nomination of the Associated Students of Stanford University (ASSU) Committee on Nominations. The President takes the initiative in the appointment of staff members to such committees. Although immediately responsible to the President, University Committees may be called upon to report to the Senate of the Academic Council or the ASSU. Charges to such committees are set by the President on recommendation of the Committee on Committees and others. There are five University Committees, as follows:

- Advisory Panel on Investment Responsibility and Licensing (APIR-L)
- Committee on Athletics, Physical Education, and Recreation (C-APER)
- Committee on Environmental Health and Safety (C-EH&S)
- Committee on Faculty Staff Human Resources (C-FSHR)
- Panel on Outdoor Art (P-OA)

Additionally there are eleven standing administrative panels which are appointed by the Vice Provost and Dean of Research, and which report through him/her to the President:

- Administrative Panel on Biosafety
- Administrative Panel on Human Subjects in Medical Research-01
- Administrative Panel on Human Subjects in Medical Research-03
- Administrative Panel on Human Subjects in Medical Research-04
- Administrative Panel on Human Subjects in Medical Research-05
- Administrative Panel on Human Subjects in Medical Research-06
- Administrative Panel on Human Subjects in Medical Research-07
- Administrative Panel on Human Subjects in Medical Research-08
- Administrative Panel on Human Subjects in Non-Medical Research-02
- Administrative Panel on Laboratory Animal Care
- Administrative Panel on Radiological Safety

The Provost

The Provost, as the chief academic and budget officer, administers the academic program (instruction and research in schools and other academic units) and University services in support of the academic program (including budgeting and planning, land and buildings, libraries and information resources, and student affairs). In the absence or inability of the President to act, the Provost becomes the Acting President of the University. The Provost shares with the President conduct of the University's relations with other educational institutions, groups, and associations.

Schools of the University

The program of instruction in the University is organized into seven schools:

- Graduate School of Business
- School of Earth Sciences
- Graduate School of Education
- School of Engineering
- School of Humanities and Sciences
- Stanford Law School
- School of Medicine

The deans of the schools report to the Provost.

The Academic Council

Stanford Academic Council (<http://academiccouncil.stanford.edu>) web site.

According to the Articles of Organization of the Faculty, originally adopted by the Board of Trustees in 1904 and revised in 1977, the powers and authority of the faculty are vested in the Academic Council consisting of:

1. the President of the University
2. tenure-line faculty: Assistant, Associate, and Full Professor
3. nontenure-line faculty: Associate and Full Professor followed by the parenthetical notation (Teaching), (Performance), (Applied Research), or (Clinical)
4. nontenure-line research faculty: Assistant Professor (Research), Associate Professor (Research), Professor (Research)
5. Senior Fellows in specified policy centers and institutes
6. certain specified officers of academic administration.

In the Spring of 1968, the Academic Council approved the charter for a Senate to be composed of 55 representatives elected by the Hare System of Proportional Representation and, as ex officio nonvoting members, deans of the academic schools and certain major officers of academic administration.

In the allocation of representation, each school constitutes a major constituency. The Senate may create from time to time other major constituencies as conditions warrant. Approximately one-half of the representatives are allocated to constituencies on the basis of the number of students in those constituencies and the remainder on the basis of the number of members of the Academic Council from each constituency.

Committees of the Academic Council

Committees of the Academic Council are created by and responsible to the Senate of the Academic Council and are appointed by the Committee on Committees of the Senate. Such committees deal with academic policy matters on which the primary responsibility for action and decision lies with the Academic Council or, by delegation, the Senate. Pursuant to the Senate's acceptance on September 25, 1969 of the Report from the Committee on Committees on the Committee Structure of the University and subsequent Senate action, the Senate has established seven standing Committees of the Academic Council, as follows:

- Committee on Academic Computing and Information Systems (C-ACIS)
- Committee on Graduate Studies (C-GS)
- Committee on Libraries (C-Lib)
- Committee on Research (C-Res)
- Committee on Review of Undergraduate Majors (C-RUM)
- Committee on Undergraduate Admissions and Financial Aid (C-UAFA)
- Committee on Undergraduate Standards and Policy (C-USP)

The Senate has also created a Planning and Policy Board of the Senate to consider long-range strategic issues of concern to the faculty. Information regarding charges to these committees is available from the Office of the Academic Secretary to the University.

Associated Students of Stanford University (ASSU)

Web Site: <http://assu.stanford.edu>

All registered undergraduates and graduate students are members of the ASSU. They are governed by the ASSU Constitution and Bylaws, which was last revised and approved by student vote in April 2013.

Executive

The President and Vice President serve as the chief executives and representatives for the Association. The Financial Manager acts as business manager of the ASSU, CEO of Stanford Student Enterprises (SSE), and controller of the Students' Organizations Fund in which ASSU and student organization funds are deposited.

Legislative

There are two legislative bodies, an Undergraduate Senate and a Graduate Student Council, that work together to determine the Association's budgetary, financial, investment, business, and operating policies. In addition, each entity provides funding for student organizations, participates in recommending student appointments to University Committees and advocates on behalf of its constituents. Each body has 15 elected representatives and an elected chair. Both meet regularly to conduct Association business and discuss and act on issues pertinent to student life at Stanford.

University Requirements

Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

University Communication with Students

Stanford University uses electronic means (such as email, texts, and the Internet) as a primary method of communication and of providing billing, payment, and enrollment services. Signatures or acknowledgments provided by the student electronically to Stanford via Stanford systems and/or @stanford.edu email are valid and legally binding. Additionally, by accepting Stanford's offer of admission and enrolling in classes, each student accepts responsibility for paying all debts to the University, including tuition and fees, for which he or she is liable. An individual's registration as a Stanford student constitutes his or her agreement to make timely payment of all amounts due.

Notification/Obligation to Read Email

For many University communications, email to a student's Stanford email account is the official form of notification to the student, and emails sent by University officials to such email addresses will be presumed to have been received and read by the student. Emails and forms delivered through a SUNet account by a student to the University may likewise constitute a formal communication, with the use of this password-protected account constituting the student's electronic signature.

Admission and Financial Aid

Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex,

age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

Visas

In order to register as students, Stanford University requires that all those who are not U.S. citizens or U.S. registered permanent residents must obtain and maintain an appropriate visa status for their stay in the United States. The types of student visas sponsored by Stanford include the following:

1. Student Visa (F-1), obtained with an I-20 Certificate of Eligibility issued by Stanford University. The graduate student on an F-1 visa must enroll in a full course of study. The accompanying spouse or child enters on an F-2 visa. F-2 visa holders may not hold employment or engage in business under any circumstances. The F-2 spouse of an F-1 student may not engage in full-time study, and the F-2 child may only engage if the study is in an elementary or secondary school (kindergarten through twelfth grade). The F-2 spouse and child may engage in study that is avocational or recreational in nature.
2. Exchange Visitor Visa (J-1), obtained with a DS-2019 Certificate of Eligibility issued by Stanford University or a sponsoring agency. This visa is required for graduate students sponsored by certain agencies, foundations, and governments. In some cases, exchange visitors must leave the United States at the conclusion of their programs, may not change to non-student visa status, and may not apply for permanent residency in the United States until they have returned to their home countries for at least two years. The accompanying spouse or child of an exchange visitor enters on a J-2 visa and may, in some cases, obtain permission to work. J-2 dependents can apply for an Employment Authorization document from U.S. Citizenship and Immigration Services in order to be employed in the U.S. There is no regulatory restriction on study for J-2 dependents.

The Certificate of Eligibility (I-20/DS-2019) is issued to an admitted student after receipt of certification of adequate financial support. An F-1 student transferring from another U.S. school must obtain a new I-20 document from Stanford and complete a transfer process at the Bechtel International Center no later than 15 days after the effective date of the transfer. A J-1 student transferring from another U.S. school must obtain a new DS-2019 document from Stanford and complete a transfer process at the Bechtel International Center no later than 30 days after the effective date of the transfer.

For academic programs that require work authorization in the United States (such as to serve as a teaching assistant or research assistant), Stanford University reserves the right to rescind the admission and terminate the student status of any student who fails to timely obtain and maintain that work authorization status.

Rescission

By applying for admission to Stanford University academic programs, applicants certify that the information they provide in their applications is their own work and, to the best of their knowledge, is complete and accurate. As also noted in the application materials, Stanford reserves the right to withdraw an offer of admission under certain circumstances, including:

1. if there is a significant drop in academic performance, a failure to graduate (in the applicant's current program), or a failure to satisfy a prerequisite or condition of admission;
2. if there has been a misrepresentation in or a violation of any of the terms of the application process; or
3. if the University learns that an applicant has engaged in behavior prior to the first day of Stanford attendance that indicates a serious lack of judgment or integrity.

Indeed (and for example), Stanford may rescind an applicant's admission at any time, including after attendance and after degree conferral, if it determines, for example, that an individual has been admitted to Stanford on the basis of having provided false information or has withheld requested information. The University further reserves the right to require applicants to provide additional information and/or authorization for the release of information about any such matter, and to place a hold on registration and/or the conferral of a degree during the investigation into any such matter.

Similarly, Stanford University awards degrees on the basis of successful completion of all program requirements in accordance with Stanford's Honor Code requiring academic honesty and integrity. The University reserves the right to rescind any degree or honors designation (even after conferral) if the program requirements have not been so completed, and to place a hold on issuing a degree during the investigation into any such matter.

For academic programs that require work authorization in the United States (such as to serve as a teaching assistant or research assistant), Stanford University reserves the right to rescind the admission and terminate the student status of any student who fails to timely obtain and maintain that work authorization status.

Holds

Students with unmet financial (or other University) obligations resulting in the placement of a hold on their registration cannot receive a transcript, statement of completion, degree certificate, or diploma until the hold is released; as a condition of attending Stanford, students accept this provision.

Undergraduate Admission

Stanford's undergraduate community is drawn from throughout the United States and the world. It includes students whose abilities, intellectual interests, and personal qualities allow them to benefit from and contribute to the University's wide range of teaching and research programs in the humanities, natural sciences, social sciences, and engineering. The University admits students who derive pleasure from learning for its own sake; who exhibit energy, creativity, and curiosity; and who have distinguished themselves in and out of the classroom.

Stanford welcomes a diverse community that cuts across many dimensions. The University does not use quotas of any kind in its admission process: it does not favor particular schools or types of schools, nor any geographic region, nor does it have any racial, religious, ethnic, or gender-related quotas. The University believes that a student body that is both highly qualified and diverse in terms of culture, socioeconomic status, race, ethnicity, gender, work and life experiences, skills, and interests is essential to the educational process. Applications are encouraged from those who would take the initiative and responsibility for their own education and who would provide additional dimensions to the University and its programs.

In order to preserve the residential character of the University and to maintain a favorable student-faculty ratio, Stanford has a limited undergraduate enrollment. The anticipated size of the freshman class is approximately 1,600-1,700 students who are admitted for Autumn Quarter enrollment. Approximately 20-40 transfer students, entering either the sophomore or junior class, are also typically admitted for Autumn

enrollment if space allows. Each year, the University receives many more applications from qualified students than there are places available.

Stanford is committed to meeting the University-computed financial need of each admitted student, and admission decisions are made without regard to the applicant's financial status, except in the case of international students who are neither U.S. citizens nor U.S. registered permanent residents.

Application procedures, requirements, and deadlines vary from year to year. See the Undergraduate Admission (<http://admission.stanford.edu>) web site for the most recent information and to begin an application online; or call the Office of Undergraduate Admission at (650) 723-2091.

Nonmatriculated Study (Undergraduate)

Permission to enroll at Stanford as a nonmatriculated student during Autumn, Winter, and Spring quarters is not routinely approved except under extenuating circumstances. Nonmatriculated students authorized to enroll at Stanford University are not admitted to any Stanford degree program and are permitted to register for a specific period, usually one, two, or three quarters. Financial assistance from Stanford University is not available. Permission to enroll as a nonmatriculated student does not imply subsequent admission as a matriculated student.

Nonmatriculated status is a privilege and not a right. The University reserves the right, at its discretion, to withhold registration from, or require withdrawal for the program by, any student or applicant. In addition, nonmatriculated status may be revoked at the University's discretion (and after consideration of such factors as the University considers relevant in the particular case) at the end of any quarter of enrollment.

Students interested in nonmatriculated status during the Autumn, Winter, and Spring quarters should contact the Office of the University Registrar, not the Office of Undergraduate Admission. Note: newly admitted Stanford students (that is, those admitted to a Stanford degree program) are not eligible to enroll for nonmatriculated study for any quarter, except with the permission of the Vice Provost for Undergraduate Education (or his or her designee) under extenuating circumstances.

High School Nonmatriculated Students

Local high school students are eligible to be considered to attend Stanford as nonmatriculated students on a limited basis when they have exhausted all of the courses in a given discipline offered by their high school. Nonmatriculated high school students are permitted to enroll in one course per quarter and are required to pay the applicable tuition. Permission from the academic department and the University Registrar is required. The Language Center does not allow high school students to enroll in language courses during the academic year. High school students who are accepted to participate in High School Summer College may enroll in language courses as part of Summer Session, space permitting.

Summer Session

Students wishing to enroll as nonmatriculated students during Summer Quarter should contact the Summer Session Office (<http://summer.stanford.edu>) for more information about the Summer Visitor Program (<http://summer.stanford.edu/programs/program/undergraduate-graduate-students-from-other-universities>). Admission to the Summer Visitor Program does not imply regular admission to Stanford for subsequent quarters or to one of Stanford's regular degree programs.

Graduate Admission Matriculated Study (Graduate Students)

Applicants from colleges and universities of recognized standing who hold a U.S. bachelor's degree or its equivalent are eligible to be considered for admission for graduate study. Details regarding degrees offered in specific departments are given on the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. The number of applicants who can be admitted for work in a particular field of study at any time is limited by the facilities and programs of the school or department and by the number of matriculated students who continue their work in that field.

As with its undergraduate program, Stanford believes that a graduate student body that is both highly qualified and diverse in terms of culture, socioeconomic status, race, ethnicity, gender, work and life experience, skills, and interests is essential to the graduate educational process. It particularly welcomes applications from African Americans, Latinos, and Native Americans, as well as from others whose backgrounds and experiences would add additional dimensions to the University's educational programs.

Honors Cooperative Program

The Honors Cooperative Program (HCP) is a part-time graduate program offered by Stanford University. It allows working professionals, who may be eligible for tuition support through their employer, an opportunity to earn a graduate degree in any of the engineering programs, applied physics, statistics, or biomedical informatics, on a part-time basis.

Prospective HCP students apply to the department in which they would like to pursue a graduate degree through the normal graduate admissions process, and compete with all other applicants for admission to the program. Once admitted, HCP students arrange their part-time status and tuition payment options through the Stanford Center for Professional Development (SCPD). Courses are delivered online and broadcast locally. HCP students are also welcome to attend certain classes on campus, and some on-campus attendance may be required depending on the degree track.

To participate, HCP students must have the support of their employer as a participating company of the Stanford Center for Professional Development. For more information, see <http://scpd.stanford.edu>, or phone (650) 725-3000.

The Coterminal Degree Program

This program permits matriculated Stanford undergraduates to study for bachelor's and master's degrees simultaneously in the same or different departments. Application policies and procedures are established by each master's department. Applicants must have earned a minimum of 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit their application no later than the quarter prior to the expected completion of their undergraduate degree. This is normally the Winter Quarter prior to Spring Quarter graduation. Interested Stanford undergraduates should contact directly the department in which they wish to pursue a master's degree and must adhere to the application deadlines. Students who decide to apply for admission to master's programs after these deadlines are not eligible for the coterminal program and must apply through the regular graduate admission process. For more information, see the Coterminal Degrees (p. 41) section of this bulletin.

Application Process

Specific information regarding test requirements, other application procedures and requirements, and closing dates for filing applications and supporting credentials for admission and financial aid are listed on the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Graduate fellowship funds and assistantships are generally committed in March for the entire period comprising Autumn, Winter, and Spring quarters of the next academic year. Awards are seldom made to students who enter the University in Winter, Spring, and Summer quarters; such applicants must meet the same financial aid application requirements as those entering in Autumn Quarter.

Applications are to be submitted electronically for graduate programs in the schools of Business, Earth Sciences, Education, Engineering, Humanities and Sciences, and the Biosciences (non-M.D. programs in Medicine). Application instructions may be found at the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

For admission to the following programs, apply directly via the web sites below.

Business

Admission information is available for the M.B.A., MSx Program, and Ph.D. programs at the Stanford Graduate School of Business Admissions (<http://www.gsb.stanford.edu/admissions>) web site. All applications must be submitted electronically.

Law

Applicants for the JD degree should see the Law School Admissions (http://www.law.stanford.edu/program/degrees/jd/jd_application) web site. Applicants for LLM, JSM, JSD, and MLS degrees can find instructions at the Advanced Degree Programs (<http://www.law.stanford.edu/program/degrees/advanced/application>) web site. These applications are submitted to the Director of Admissions, School of Law, Stanford University, Stanford, CA 94305-8610. The Law School Admissions Test is required.

M.D. Program

Applicants should see the M.D. admissions (<http://med.stanford.edu/md/admissions>) web site or, for additional information about the M.D. program, write to Stanford University School of Medicine, Office of M.D. Admissions, 251 Campus Drive, MSOB X3C01, Stanford, CA 94305-5404. The American Medical College Application Service (AMCAS) application is available at the AMCAS (<http://aamc.org>) web site. Applications and transcripts must be received by AMCAS by October 15. The Medical College Admissions Test is required.

Rescission

By applying for admission to Stanford University academic programs, applicants certify that the information they provide in their applications is their own work and, to the best of their knowledge, is complete and accurate. As also noted in the application materials, Stanford reserves the right to withdraw an offer of admission under certain circumstances, including:

1. if there is a significant drop in academic performance, a failure to graduate (in the applicant's current program), or a failure to satisfy a prerequisite or condition of admission;
2. if there has been a misrepresentation in or a violation of any of the terms of the application process; or
3. if the University learns that an applicant has engaged in behavior prior to the first day of Stanford attendance that indicates a serious lack of judgment or integrity.

Indeed (and for example), Stanford may rescind an applicant's admission at any time, including after attendance and after degree conferral, if it

determines, for example, that an individual has been admitted to Stanford on the basis of having provided false information or has withheld requested information. The University further reserves the right to require applicants to provide additional information and/or authorization for the release of information about any such matter, and to place a hold on registration and/or the conferral of a degree during the investigation into any such matter.

Similarly, Stanford University awards degrees on the basis of successful completion of all program requirements in accordance with Stanford's Honor Code requiring academic honesty and integrity. The University reserves the right to rescind any degree or honors designation (even after conferral) if the program requirements have not been so completed, and to place a hold on issuing a degree during the investigation into any such matter.

For academic programs that require work authorization in the United States (such as to serve as a teaching assistant or research assistant), Stanford University reserves the right to rescind the admission and terminate the student status of any student who fails to timely obtain and maintain that work authorization status.

Holds

Students with unmet financial (or other University) obligations resulting in the placement of a hold on their registration cannot receive a transcript, statement of completion, degree certificate, or diploma until the hold is released; as a condition of attending Stanford, students accept this provision.

Nonmatriculated Study (Graduate Students)

Eligibility for consideration for nonmatriculated enrollment is restricted to two groups of applicants:

1. Stanford alumni who wish to return to Stanford to take courses that are prerequisites for Medical School admission, such as undergraduate Biology or Chemistry courses, are eligible to apply for nonmatriculated status. An application form, application fee, statement of purpose, and three letters of recommendation are required. The decision to admit or deny is made by the Director of Graduate Admissions on the basis of relevant factors, including a 3.0 GPA and positive letters of recommendation.
 - a. Applicants who graduated from other universities are not eligible to take the prerequisites for Medical School at Stanford.
2. Individuals who hold a bachelor's degree or equivalent and wish to take courses in a specific department that allows non-degree students are eligible to apply for nonmatriculated status. An application form, application fee, statement of purpose, original transcripts, and three letters of recommendation are required. The decision to admit or deny is made by the chair of the department in which they wish to take courses and conveyed in writing to the Graduate Admissions Office. Applicants are notified of the decision by Graduate Admissions in the Office of the University Registrar.

Students who are granted nonmatriculated status are charged the 8-10 unit rate for each quarter in which they are enrolled, and may enroll for a maximum of a total of one academic year. Nonmatriculated status is a privilege and not a right; the nonmatriculated status may be revoked at the University's discretion (and after consideration of such factors as the University considers relevant in the particular case) at the end of any quarter of enrollment.

Nonmatriculated students are not permitted to enroll in certain courses, such as those in the following departments or programs: film and broadcasting courses in Art; all courses in Computer Science, Economics, Electrical Engineering, International Policy Studies, and the School of Medicine. Nonmatriculated students must limit their enrollment to classes in the

department in which they have been admitted. Nonmatriculated students receive academic credit for courses satisfactorily completed and may obtain an official transcript. As a general proposition, they may use University facilities and services. In classes of limited enrollment, students in degree programs have priority. Nonmatriculated students may apply for housing but have a low priority for assignment and are not guaranteed housing. No fellowships, assistantships, or Stanford loans are available for nonmatriculated students. Nonmatriculated students are not eligible for a leave of absence.

Nonmatriculated students who later apply for admission to a degree program must meet the standard admission requirements and should not anticipate special priority because of work completed as a nonmatriculated student. Students who are admitted to a degree program may apply a maximum of 15 units of nonmatriculated study toward the residency requirement for a master's degree and 30 units for the Engineer or Ph.D. degree, subject to the approval of the degree granting department.

Application forms for nonmatriculated status during the regular academic year are available from Graduate Admissions (<https://studentaffairs.stanford.edu/gradadmissions/programs/nondegree>), Office of the University Registrar. Deadlines for applying are included with the forms and are generally required two months before the start of the quarter.

Applicants interested in nonmatriculated student status for the Summer Quarter only should explore the Summer Session website (<http://summer.stanford.edu>).

Non-Degree-Granting Programs

Stanford University has established a limited number of formal non-degree-granting programs within individual departments. These include the Knight Fellowship Program for mid-career journalists (Communication Department), and the Stegner Fellows Program for selected authors (Creative Writing Program, within the English Department).

Individuals may apply to these programs directly. Application requirements, admissions decisions, tuition requirements and financial support are all handled by the specific program. Individuals who are admitted to these programs will be registered at Stanford as nonmatriculated graduate students in the appropriate program. Upon completion of their program, they will receive a transcript and certificate of program completion.

Individuals who commit violations of University policy, the Honor Code, or the Fundamental Standard are subject to termination. Individuals in non-degree granting programs are subject to removal or discipline according to the program's policies or practices, not through the Office of Community Standards.

Stanford Center for Professional Development

Qualified individuals may pursue graduate and professional certificates or take individual graduate and professional courses through the Stanford Center for Professional Development. Nonmatriculated students taking individual graduate courses for credit, or towards earning a graduate certificate, are charged tuition on a per-unit basis. For more information on available courses, applications, and deadlines visit <http://scpd.stanford.edu> or phone (650) 725-3000.

Postdoctoral Scholars

Postdoctoral scholars are trainees in residence at Stanford University pursuing advanced studies beyond the doctoral level in preparation for an independent career. Postdoctoral scholars are appointed for a limited period of time and may participate in Stanford research projects and/or may be supported by external awards or fellowships. In all cases, their appointment

at Stanford is for the purpose of advanced studies and training under the sponsorship of a Stanford faculty member.

Postdoctoral appointments require initial full-time engagement in the designated research or study and are generally restricted to those who have earned a terminal degree such as Ph.D. or J.D. within the last three years or a medical degree such as M.D., M.B.B.S., or D.D.S. within the last six years. Requests for exceptions for individuals who are beyond these limits, or have not been actively engaged in research as their primary effort, must include a written statement from the sponsoring faculty member indicating what additional training outside the primary area of effort the individual plans to receive, and the reasons for which the exception is requested. Postdoctoral scholars are appointed at Stanford for fixed terms, typically one year but that may eventually total up to four years, and are subject to a strict five-year rule (that is, that the total postdoctoral appointment period is not to exceed a total of five years of postdoctoral research experience at all institutions combined). In cases of combined training, only the years of active research at the postdoctoral level are counted for salary and other purposes. Postdoctoral scholars who begin a second postdoctoral appointment in a new field may have training extended to a maximum total of up to six years. Postdoctoral scholars may request temporary reductions in effort and pay due to temporary family or other conditions.

All postdoctoral scholars appointed at Stanford must be supported by Stanford grants and contracts, training grants, departmental or school fellowship funds, or external fellowships, or by a combination of these sources. Scholars may not be self-supporting. In addition, all postdoctoral scholars are eligible for a benefits package including medical, dental, life, and disability insurance. Postdoctoral scholars are normally appointed for 100% time.

Postdoctoral scholars must be registered at Stanford during every academic quarter of their appointment. Registration entails payment of a quarterly postdoctoral fee by the academic department or school appointing the scholar.

Prospective postdoctoral scholars should write directly to the department in which they wish to study or check for postdoctoral openings at <http://postdocs.stanford.edu/prospects/index.html>. For more information, see <http://postdocs.stanford.edu>.

Visiting Student Researchers

In limited instances, it is to the benefit of Stanford faculty to permit graduate students who have not yet obtained a Ph.D. (or its foreign equivalent) to engage in research on the Stanford campus. This could include students from other universities who are engaged in graduate-level research in a field of interest to the faculty member, or students doing a research rotation as part of a larger research study or grant.

These students must be registered as Visiting Student Researchers if they are in residence at Stanford for more than 30 days; they may be registered as Visiting Student Researchers if they are in residence for fewer than 30 days in order to receive the services available to Visiting Student Researchers. Visiting Student Researcher appointments are limited to one year in duration. Invited persons must be qualified to conduct research at a level comparable to that of other Stanford graduate students, and the research must be of benefit to Stanford as well as to the visitor. Forms for the appointment of Visiting Student Researchers are submitted to Graduate Admissions, Office of the University Registrar by the department issuing the invitation.

Under limited circumstances, the faculty sponsor may request an extension of the Visiting Student Researcher's appointment beyond one year. Such extensions require the concurrence of the student's home institution. Extensions beyond the second year are extremely rare, and require approval in advance from the office of the Vice Provost for Graduate Education

Visiting Student Researchers are charged a monthly Visiting Student Researcher fee for each month in which they hold this appointment at Stanford, including partial months. They may waive the University's student medical insurance plan only if they have comparable coverage with another carrier and submit proof of the comparable coverage prior to the term start date. Visiting Student Researchers are not entitled to any financial support from Stanford University. They may not be appointed to any assistantship positions nor hold any named Stanford fellowships. Funds intended for the support of matriculated Stanford students may not be used to support Visiting Student Researchers. Stanford cannot certify visiting researchers for deferment of U.S. educational loans.

Visiting Student Researchers are not permitted to enroll in or audit any courses, but in quarters in which they are registered as Visiting Student Researchers, they are eligible for the usual student benefits of nonmatriculated student status. Students in this status are eligible for graduate on-campus housing on a space-available basis. They are also eligible for participation in the programs offered by the Graduate Life Office (<http://studentaffairs.stanford.edu/glo>).

Visiting Student Researchers are subject to the rules and regulations of Stanford University. These include:

- *Intellectual Property*—Visiting Student Researchers are required to sign an SU-18 Stanford Patent and Copyright Agreement
- *The Honor Code and Fundamental Standard*—Visiting Student Researchers who commit violations of these behavioral standards as reasonably determined by the sponsoring department are subject to termination of their Stanford appointment
- *Required Training*—The faculty member who invited the Visiting Student Researcher is responsible to assure that they receive any required training in order to be able to carry out their research at Stanford, including appropriate privacy and data security training for the protection of personally identifying information and Stanford data, health and safety training, instruction in the protection of human subjects, or any other instruction required by the work that the student will do here.

Citizens of other countries who enter the United States to be Visiting Student Researchers at Stanford must have a DS-2019 Certificate (to apply for a J-1 visa) issued by the Bechtel International Center and must be registered each quarter, including Summer Quarter, to maintain their visa status.

See also the Graduate Academic Policies and Procedures Handbook, Activating Nonmatriculated Graduate Students (GAP 2.3 (<http://gap.stanford.edu/2-3.html>)) and the Research Policy Handbook, Section 10.7 (<http://doresearch.stanford.edu/policies/research-policy-handbook/non-faculty-research-appointments/procedures-appointing-visiting>).

Students of New Faculty

Faculty who are being hired by Stanford University, and who are currently advising doctoral students in advanced stages of degree completion at their home university, may appoint one or more of these students as Students of New Faculty, a nonmatriculated graduate status, for the purpose of facilitating the completion of the student's doctoral research with their faculty adviser. To be eligible for this status, the student must:

- have completed at their home institution all degree requirements equivalent to those required for Stanford's TGR status (i.e., completed all curricular requirements, candidacy, and residency), and
- be in good academic standing at their home institution, and remain so while at Stanford, and
- demonstrate agreement to the terms and conditions for this appointment by signing the Students of New Faculty Representations.

Appointment of these students into nonmatriculated Stanford graduate status requires the approval of the incoming faculty member, that faculty member's Stanford department chair and school dean, and Stanford's office

of the Vice Provost for Graduate Education, as well as of the appropriate office at the student's home institution.

Approval for these appointments is documented by means of an Affiliation Agreement between Stanford and the student's home institution, identifying the student(s) and describing the arrangements for their appointment at Stanford. Attachments to this agreement specify the timing of the appointment and the sources of financial support, if any, for each student.

Students are appointed into this status for one year at a time, up to a limit of three years. The Stanford department may request extensions beyond the third year. Approval for extensions requires the concurrence of the Stanford school dean's office and the Vice Provost for Graduate Education, along with the appropriate office(s) at the student's home institution.

Students of New Faculty must enroll in the appropriate TGR course during each quarter of the academic year while they are at Stanford, and will be charged TGR tuition during each enrolled quarter. Summer enrollment is optional subject to the relevant policies of Stanford and of the home institution. Students of New Faculty may be appointed and paid as Research Assistants. For more information, see GAP 2.4 (<http://gap.stanford.edu/2-4.html>).

Undergraduate Financial Aid

The University has a comprehensive need-based financial aid program for its undergraduates who meet various conditions set by federal and state governments, the University, and other outside agencies. Students are admitted without consideration of their financial circumstances, except in the case of international students.

In awarding its own funds, the University assumes that students and their parents accept the first and primary responsibility for meeting educational costs. Stanford's policy generally is to exclude undergraduates from being considered financially independent of their parents for University-administered scholarship aid unless a student is an orphan, a ward of the court, or at least 25 years of age. Spouses of married undergraduate students share in the responsibility to meet educational costs.

Stanford expects financial aid applicants to apply for and use resources from state, federal, and private funding sources, contribute from their earnings during nonenrollment periods (for example, summer), and use earnings from part-time employment during the academic year to meet educational expenses. If Stanford determines that an applicant and his or her family cannot meet these expenses, the University may offer financial aid funds to help meet these costs.

The amount of scholarship or grant funds offered to students is determined by the difference between the comprehensive cost of attendance (including tuition, fees, room, board and allowances for books, supplies, personal expenses, and travel) and the amount the student and parents can reasonably be expected to contribute toward educational costs based on family financial circumstances. Scholarships from outside sources may change the University's financial aid award. When a student receives outside scholarships, these funds reduce or eliminate the student's responsibility to contribute from job earnings. If the total in outside scholarships exceeds the student's responsibility, the University then reduces institutional scholarship, dollar for dollar, by any additional amount.

Students are considered for University scholarship eligibility during their first four years of undergraduate enrollment. The Financial Aid Office (FAO) considers applicants for University scholarship eligibility beyond the twelfth quarter only if enrollment is essential in order to complete the minimum requirements for the first baccalaureate degree or major. Students who enroll for a fifth year in pursuit of a coterminal program, a minor, a second major, a second degree, or the B.A.S. degree are not eligible for University scholarship consideration but may apply for student loans and federal grants. Eligibility for federal student aid is limited to the equivalent of 18 quarters of full-time undergraduate enrollment, including course

work taken at other colleges and universities. Students must also maintain satisfactory academic progress to retain financial aid eligibility.

For additional detailed information, refer to the FAO (<http://financialaid.stanford.edu>) web site.

Graduate Financial Aid

Graduate students at Stanford receive funding from a variety of sources. University fellowships, research assistantships, and teaching assistantships are offered primarily to doctoral students. In some cases, master's students also may receive fellowships and assistantships. In addition, outside agencies provide fellowships to many graduate students at Stanford. Students without fellowships or assistantships, and those whose funding does not cover all of their costs, may need to use student loans, savings, other personal assets, a spouse's earnings, or parental support to meet their educational expenses.

Veterans' Educational Benefits

The Office of the University Registrar serves as the liaison between the University, its students, and the various federal, state, and local agencies concerned with veterans' benefits. Stanford certifies enrollment for students in degree seeking programs and students in one of 24 VA approved certificate programs offered through the Stanford Center for Professional Development. Other non-matriculated and certificate programs are not eligible. All students eligible to receive veterans' benefits while attending the University are urged to complete arrangements with the appropriate agency in advance of enrollment.

Stanford University is required to certify only those courses that meet minimum graduation requirements. Courses not directly related to a student's degree program or courses beyond those required for a specific degree program are not certified. Undergraduates should meet with an advisor to develop a course enrollment plan. Graduate students should have their departments approve their study lists as meeting graduation requirements on a quarterly basis.

To comply with federal regulations concerning credit for previous training (38 CFR 21.4253), Stanford University is required to evaluate all previous education and training completed elsewhere to determine what credit, if any, should be granted to students eligible to receive Veterans Affairs (VA) educational benefits. Stanford is required to complete an evaluation; credit is granted when appropriate. Credit is evaluated toward the degree program registered with Veterans Affairs as determined by the Office of the University Registrar in conjunction with the relevant academic department(s) or program(s). All relevant policies regarding transfer credit apply. In addition, this evaluation occurs each time a student's degree program is changed.

Subject to current federal and University guidelines, students eligible for receipt of VA educational benefits have their prior education and training evaluated up to the credit limits outlined in the "Residency Policy for Graduate Student (p. 50)s" section of this bulletin. As an exception to that policy, students in master's programs in the schools of Earth Sciences, Education, Engineering, Humanities and Sciences, Law, Medicine, and Graduate Business are allowed a maximum of 6 transfer (quarter) units.

Stanford participates in the Yellow Ribbon provision of the Post 9/11 GI Bill (Ch. 33). If a matriculated student qualifies for Chapter 33 benefits at the 100% level, the student may be eligible to receive additional funding through the Yellow Ribbon Program. Under this program, Stanford provides an annual award of \$3,000 to undergraduate students to supplement the Chapter 33 base tuition benefit. The VA matches Stanford's Yellow Ribbon contribution, so the student receives a combined total of \$6,000 in additional funds. Certain matriculated graduate students may be eligible for the Yellow Ribbon provision, and the amount of institutional contribution varies by school and program at the graduate level.

See the Office of Military Affiliated Communities (OMAC) web site (<https://military.stanford.edu/gi-bill-benefits>) for additional information about veterans' educational benefits..

Tuition, Fees, and Housing

University Communication with Students

Stanford University uses electronic means (such as email, texts, and the Internet) as a primary method of communication and of providing billing, payment, and enrollment services. Signatures or acknowledgments provided by the student electronically to Stanford via Stanford systems and/or @stanford.edu email are valid and legally binding. Additionally, by accepting Stanford's offer of admission and enrolling in classes, each student accepts responsibility for paying all debts to the University, including tuition and fees, for which he or she is liable. An individual's registration as a Stanford student constitutes his or her agreement to make timely payment of all amounts due.

Notification/Obligation to Read Email

For many University communications, email to a student's Stanford email account is the official form of notification to the student, and emails sent by University officials to such email addresses will be presumed to have been received and read by the student. Emails and forms delivered through a SUNet account by a student to the University may likewise constitute a formal communication, with the use of this password-protected account constituting the student's electronic signature.

Regular quarterly tuition for the 2014-15 academic year, payable Autumn, Winter, and Spring quarters, is as follows:

Type	Fee
Undergraduate	\$14,728
Graduate 11-18 units	\$14,728
Graduate 8-10 units	\$9,570
Graduate Engineering 11-18 units	\$15,691
Graduate Engineering 8-10 units	\$10,200
Graduate School of Business, first year MBA	\$20,625
Graduate School of Business, second year MBA	\$19,850
School of Medicine (M.D. Program) 1	\$16,905
Stanford Law School	\$17,450
Law/Business Joint Program	\$18,277
Permit to Attend for Services Only (PSO)	\$4,455
Terminal Graduate Registration (TGR)	\$2,871
Medical School Research Rate	\$3,380

¹ Ph.D. students in the Biomedical Sciences and in the Graduate School of Business are assessed the regular graduate tuition rate.

For complete tuition information, see the Registrar's tuition (http://studentaffairs.stanford.edu/registrar/students/tuition-fees_14-15) web site.

Regular tuition fees apply to the undergraduate Overseas Studies and Stanford in Washington programs.

A coterminal student is subject to graduate tuition assessment and adjustment policies once graduate standing is reached. Coterminal students should see the student policies and procedures for tuition assessment, as

described under in the "Coterminal Degrees (p. 41)" section of this bulletin.

Eligibility for registration at reduced tuition rates is described below. Tuition exceptions may also be made for illness, disability, pregnancy, new-parent relief, or other instances at the discretion of the University. No reduction in tuition charges is made after the first two weeks of the quarter.

All students are advised, before registering at less than the regular full-tuition rate, to consider the effects of that registration on their degree progress and on their eligibility for financial aid and awards, visas, deferment of student loans, and residency requirements.

The University reserves the right to change at any time, without prior notice, tuition, room fees, board fees, or other charges.

Undergraduate Student Tuition

During Autumn, Winter, and Spring quarters, undergraduates are expected to register at the regular full-tuition rate.

During Summer Quarter, Stanford undergraduates may register on a unit-basis (minimum 3 units). For Summer Quarter tuition rates and policies, see the Registrar's summer tuition (http://studentaffairs.stanford.edu/registrar/students/summer-tuition_14-15) web site (https://studentaffairs.stanford.edu/registrar/students/summer-tuition_14-15).

The following reduced-tuition categories can be requested by matriculated undergraduate students in the final stages of their degree program:

1. Permit to Attend for Services Only (PSO)

Undergraduates completing honors thesis, clearing incompletes, or requiring a registration status, and who meet the PSO conditions listed in the "Special Registration Statuses (Undergraduate) (p. 34)" section of this Bulletin, may petition for PSO status one time only in their terminal quarter.

2. 13th Quarter

Undergraduates who meet the 13th Quarter conditions listed in the "Special Registration Statuses (Undergraduate) (p. 34)" section of this Bulletin may petition one time only to register for a minimum of eight units. For per-unit tuition rates, see the Registrar's tuition web site.

3. Graduation Quarter

Undergraduates may petition to register for Graduation Quarter registration status in the quarter in which they are receiving a degree if they are not using any University resources (including housing), have completed all University requirements, and meet the Graduation Quarter conditions listed in the "Special Registration Statuses (Undergraduate) (p. 34)" section of this bulletin. Graduation Quarter may be permitted one time only. The tuition per quarter is \$100 in 2014-15.

Graduate Student Tuition

Matriculated graduate students are expected to enroll for at least eight units during the Autumn, Winter, and Spring quarters. Schools and departments may set a higher minimum. During the Autumn, Winter, and Spring quarters, matriculated graduate students in most departments may register at the reduced 8-, 9-, or 10-unit tuition rate if their enrollment plans are accepted by their departments. Students in the Stanford Law School, the MBA program in the Graduate School of Business, or the M.D. program in the School of Medicine, should consult appropriate school officers about tuition reduction eligibility.

Graduate students who are enrolled in more than one graduate degree at Stanford, where each program charges a different tuition, are charged:

1. the tuition associated with a degree in the doctoral/professional category, if the other degree is in the master's category. Those degrees in the doctoral or professional category for tuition purposes are the Ph.D., D.M.A., J.S.D., M.D., and J.D. degrees. Those degrees in the master's category for tuition purposes are the Engineer, M.A., M.S., M.P.P., M.B.A., M.F.A., L.L.M., M.L.S., and J.S.M. degrees.
2. the higher tuition rate, if both degrees are in the same category.
3. a University-approved tuition rate if the student is in a special program for which specific tuition agreements have been approved by the Faculty Senate (e.g., all joint degree programs (JDPs) or the Master of Science in Medicine program).

As a general proposition, during the Summer Quarter registration is not required by Stanford University and does not substitute for registration during the academic year. Students are required to be enrolled Summer Quarter if, during that quarter, they will meet any of the criteria listed in the "Enrollment Requirements (p.)" section of the "Graduate Degrees" section of this bulletin. Graduate students who do enroll Summer Quarter may reduce their enrollment to a minimum of one unit (charged on a per-unit basis, with a minimum tuition charge at the 1-3 unit rate) unless the terms of a fellowship or other financial support, or of their particular degree program, require a higher level of enrollment. TGR students who enroll in summer pay the TGR rate and must enroll in the required zero-unit course. Students in the schools of Law, Business, or the M.D. program should consult appropriate school officers regarding summer enrollment requirements. Students possessing an F1 or J1 student visa may be subject to additional course enrollment requirements in order to retain their student visas.

Honors Cooperative students register at the per-unit rate. Graduate students who are faculty spouses, regular Stanford employees, or full-time educators in the Bay Area may also register at the per-unit rate.

Nonmatriculated graduate students pay the same tuition rates as matriculated students, but must register for at least 8 units. Visiting Student Researchers pay a monthly fee; they may not enroll in or audit courses. Within certain restrictions, postdoctoral scholars may enroll in courses if the appropriate unit rate for tuition is paid.

The following reduced-tuition categories can be requested by matriculated graduate students in the final stages of their degree programs:

1. Terminal Graduate Registration (TGR)

Doctoral students, master's students, and students pursuing Engineer degrees who have completed all degree requirements other than the University oral exam and dissertation (doctoral students) or a required project or thesis (Engineer or master's students) and meet the conditions listed in the "TGR (p.)" section of this bulletin may request Terminal Graduate Registration tuition status.

Each quarter, TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser. TGR students register at a special tuition rate: \$2,871 per quarter in 2014-15. TGR students may enroll in up to 3 units of course work per quarter at this tuition rate. Within certain restrictions, TGR students may enroll in additional courses at the applicable unit rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status.

2. Graduate Tuition Adjustment

Graduate students who need only 3 to 7 remaining units to complete degree requirements or to qualify for TGR status may apply to register for one quarter only on a unit basis (3 to 7 units) to cover the deficiency. Students with disabilities covered under the Americans with Disabilities Act that have an approved reduced course load (RCL) recommended by the Office of Accessible Education (OAE) (<http://studentaffairs.stanford.edu/oae>) may also request a tuition adjustment for *each* quarter in which they take a RCL. For per-unit tuition rates, see the Registrar's tuition (http://studentaffairs.stanford.edu/registrar/students/tuition-fees_14-15) web site.

3. Graduation Quarter

Registration is required for the term in which a student submits a dissertation or has a degree conferred. Students who meet the conditions listed in the "Graduation Quarter (p.)" section of this bulletin are eligible to be assessed a special tuition rate of \$100 for the quarter in which they are receiving a degree.

International Students

F-1 or J-1 visas are required by the U.S. Department of Homeland Security. International students must be registered as full-time students during the academic year. Summer Quarter registration is not required unless the I-20/DS-2019 notes the Summer Quarter as the start date. International graduate students comply with immigration regulations while enrolled for partial tuition if their Stanford fellowships or assistantships require part-time enrollment, if they are in TGR status, or if they are in the final quarter of a degree program. Nonmatriculated graduate students who are international students must register for at least 8 units.

Application Fee

Contact the Undergraduate Admission Office (<http://admission.stanford.edu>) for information about the undergraduate application fee and the Graduate Admission (<http://gradadmissions.stanford.edu>) section of the Office of the University Registrar for the current graduate application fee. Application fees for the School of Law, the School of Medicine, and the Graduate School of Business vary by program. Fees are payable at the time of application and are not refundable.

ASSU Fees

The Associated Students of Stanford University (ASSU) fees are established by student vote in Spring Quarter. Fees directly fund activities of student organizations and not operations of ASSU. The 2014-15 fees are:

- Undergraduates—\$150 per quarter
- Graduate Students—\$33 per quarter

ASSU fees are assessed in Autumn, Winter and Spring terms and can be waived subject to certain conditions. Waivers can be requested during the first two weeks of each quarter on the ASSU waiver (<http://waivers.stanford.edu>) web site. Waivers granted result in a credit to the student's University bill.

Document Fee

Stanford charges a one-time Document Fee to all students admitted to new degree or non-degree programs. The fee is paid once only, regardless of the number of degrees a student may ultimately pursue. It covers the cost of a variety of University administrative services such as enrollment and degree certification, course drops and adds done in Axess before published deadlines, diplomas, and official transcripts and their production.

The document fee for students admitted to new degree or non-degree programs in 2014-15 is \$200.

Campus Health Service Fee

All students enrolled on the main Stanford campus are required to pay the Campus Health Service Fee. The Campus Health Service Fee covers most of the services provided by Vaden Health Center, including primary care medical visits, psychological evaluation and short-term therapy at Counseling and Psychological Services (CAPS), and health and wellness programs. The services provided by Vaden Health Center are not covered by Cardinal Care or a student's private health insurance. More information and answers to questions about the fee can be found at the Campus Health Service Fee (<http://vaden.stanford.edu/fees/campus-health-fee>) web site. The fee for 2014-15 is \$191 per quarter.

Health Insurance

The University requires all registered students to carry medical insurance to provide coverage for services not provided by Vaden Health Center. Students are enrolled in and charged for the Stanford student health insurance plan, Cardinal Care, unless they have completed waiver procedures by the waiver deadline.

For complete information on health insurance, see the Vaden Health Center Insurance (<http://vaden.stanford.edu/insurance>) web site.

Those who carry medical insurance through an alternate carrier are generally eligible for waiver of the Stanford student health insurance plan. For information on waiver procedures, see the Vaden Health Center Insurance Waiver (http://vaden.stanford.edu/insurance/using_your_own.html#wave) web site.

Special Fees

New Student Orientation Fee

A fee is charged to all entering undergraduates for the costs of orientation, including room and board, and for the cost of class dues to provide funds for later activities of the class.

Law Student Services Fee

A fee is charged each quarter to School of Law students for supplementary course materials.

Graduate School of Business M.B.A. Course Reader Fee

A fee is charged each quarter to M.B.A. students in the Graduate School of Business to cover the cost of in-class handouts and licensing fees.

Late Study List Fees

Charges are imposed for late submission of study lists. The amount is \$200.

Laboratory Fee

Students in chemistry laboratory courses are charged a nonrefundable fee.

Music Practice; Athletics, Physical Education, Recreation; and Dance

Courses for which special fees are charged are indicated in the notes of the scheduled class on Axess (<http://axess.stanford.edu>) or ExploreCourses (<http://explorecourses.stanford.edu>).

Dissertation Fee

Each Ph.D. and D.M.A. candidate has the option to either submit electronically or on paper. Electronic submission is free. Students who choose to submit on paper are charged a fee to cover the cost of microfilming and binding the dissertation and the cost of publishing the abstract.

International Scholar Service Fee

A one-time fee for visa authorization documents is charged to international postdoctoral and visiting scholars.

Housing

University housing is available to enrolled Stanford degree-seeking undergraduates and graduate students as space permits and according to policies described on the R&DE Student Housing (<http://www.stanford.edu/dept/rde/cgi-bin/drupal/housing>) web site. Residential and Dining Enterprises (R&DE) Student Housing is responsible for: managing and maintaining student residences; assigning students to housing; and operating the regional housing front desks. Information on University housing assignments, options, policies, application procedures, and deadlines may be obtained on the R&DE Student Housing (<http://studenthousing.stanford.edu>) web site, by mail or in person at 482 Galvez Mall, Suite 110, Stanford University, Stanford, CA 94305-6034, by telephone at (650) 725-2810, or by email at studenthousing@stanford.edu (housingassignments@lists.stanford.edu). Current and prospective students may also contact R&DE Student Housing by filing a HelpSU request. Information regarding off-campus housing may be obtained from Community Housing on the R&DE Student Housing (<http://offcampus.stanford.edu>) web site, by mail or in person at 482 Galvez Mall, Suite 110, Stanford University, Stanford, CA 94305-6034, by telephone at (650) 723-3906, or by email at communityhousing@lists.stanford.edu. For other housing related information, email studenthousing@lists.stanford.edu or phone the main R&DE Student Housing office at (650) 725-1600.

The department of Residential Education (<http://www.stanford.edu/dept/resed>) (650-725-2800) and the Graduate Life Office (<http://www.stanford.edu/group/glo>) (650-723-1171) are responsible for residential staff, educational programs, counseling, and crisis intervention.

Housing Rates

Complete information on housing is available on the R&DE Student Housing (<http://www.stanford.edu/dept/rde/cgi-bin/drupal/housing>) web site. Campus housing rates are generally below local area market rents.

- See Apply for Housing (<http://www.stanford.edu/dept/rde/cgi-bin/drupal/housing/apply/apply-housing>) to apply for upperclass undergraduate, single graduate, couple without children, or student with children housing.
- Rates for 2014-15 are posted online: undergraduate residence rates chart (<http://www.stanford.edu/dept/rde/cgi-bin/drupal/housing/charts/undergraduate-residences-rates-chart-2014-15>), graduate residence

rates chart (http://www.stanford.edu/dept/rde/cgi-bin/drupal/housing/sites/default/files/pdfs/2014-15_Grad_RatesChart.pdf).

All on-campus rates are per student and include utilities and coinless laundry. Room rates are charged quarterly on the University bill. Information on payment options and procedures is discussed in assignment information sent out by R&DE Student Housing and in the Payments section of the Stanford Bulletin.

House Dues

A quarterly house dues fee for students is generally determined by the local residence staff and/or residents of each house and may be included with room and board charges on the University bill.

Communications Fee

Students who live in housing are automatically assessed a communications fee on their University bill that covers in-room network connections and a land-line phone with basic telephone service.

Undergraduate Residences

Approximately 96 percent of undergraduates live in University housing, not counting students studying abroad during the academic year. All freshmen and transfers (for their first year) are required to live in University residences for educational reasons and are automatically assigned housing following admission. Because freshmen must live in campus housing, losing eligibility for University housing will also likely lead to a loss of student status until the student has returned to University housing, unless an extraordinary exemption is granted from the office of the Vice Provost for Undergraduate Education.

Residence assignments for continuing undergraduates are made on the basis of an annual lottery, called the Draw, and quarterly waiting lists. Undergraduates are guaranteed four years of University housing (two or three years for transfer students based on their entering class standing) if:

1. they are in compliance with the University housing agreement and University policies;
2. they apply by the appropriate Draw deadlines; and,
3. they are willing to live anywhere on campus.

Undergraduate residences include traditional residence halls, language and culture theme houses, cross-cultural theme houses, student-managed and cooperative houses, apartments, suites, fraternities, and sororities.

Graduate Residences

Approximately 57 percent of matriculated graduate students live in R&DE Student Housing at Stanford. Residence assignments are made on the basis of an annual lottery and quarterly waiting lists. New matriculated students are guaranteed University housing if:

1. they are in compliance with the University housing agreement and University policies;
2. they apply by the first round application deadline for the Autumn term; and
3. they are willing to live in any residence for which they are eligible

At Stanford University, new matriculated students are students who are in a graduate program for the first time. Students starting a second graduate degree are not considered new students and therefore are not guaranteed housing.

Coterminal students who opt to live on campus are required to live in undergraduate housing for the duration of their four years of guaranteed undergraduate housing regardless of their student status. Once these four years have been used, students can apply in the annual Spring lottery for graduate housing, where they apply with a coterm priority. Coterminal students are not guaranteed housing and are assigned after all new first-

year graduate students who are guaranteed housing, but before continuing graduate students.

After the first year, continuing matriculated graduate students are provided are given five additional years of limited priority for housing. Limited priority years are not automatically cumulative, so students do not receive additional years of limited priority for subsequent degrees. Students who live in residences that are open year-round and who remain in continuous occupancy in their rooms or apartments may renew their contracts annually if they meet certain eligibility requirements. Students who live in residences that are open only during the academic year, or who want to change residences, re-enter the lottery each year. Stanford also offers subsidized off-campus apartments as part of the first year guarantee. Students apply for these through the graduate housing application process.

Single graduate students may request assignment to furnished graduate apartments in a variety of configurations. Studios, efficiency two-bedroom units (shared kitchen and bath), junior studios (private bedroom and bath with shared kitchen), two-, three- and four-bedroom apartments are available.

Couples without children may request assignment to furnished studios or one-bedroom apartments. Couples housing is available to students who are married and to students who have a same-sex or opposite-sex domestic partner. At Stanford University, a domestic partnership is defined as an established, long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare.

Furnished one-, two-, and three-bedroom apartments are available for students with children, based on the number of dependents. Housing for students with children is available to married couples, domestic partners, and single parents who have dependent children living with them. Housing is not provided for extended families, including the parents and siblings of students, or live-in day care staff.

Community Housing

Community Housing maintains computerized listings of private rooms, houses, and apartments in surrounding communities that are available to students who want to live off-campus. Students must make rental arrangements directly with landlords. An online listing service (<http://www.stanford.edu/dept/rde/cgi-bin/drupal/housing/community-housing/community-housing>) facilitates the process of making connections. Information on community housing may be obtained from the Community Housing web site (<http://offcampus.stanford.edu>), by mail or in person at 482 Galvez Mall, Suite 110, Stanford University, Stanford, CA 94305-6034, by telephone at (650) 723-3906, or by email at communityhousing@lists.stanford.edu.

During mid-August to mid-September, temporary accommodations are available in student residence halls at a modest charge for students searching for off-campus housing for Autumn Quarter. Contact Stanford Conferences (<http://www.stanford.edu/dept/rde/cgi-bin/drupal/conferences>) for more information at (650) 725-1429.

Note that Stanford University does not investigate, endorse, or guarantee the accuracy of the information provided by any listing, or the condition of the accommodation. Furthermore, the University assumes no responsibility for housing arrangements made by persons using any of these services.

Meal Plans

For information on meal plans, see the R&DE Stanford Dining web site (<http://dining.stanford.edu>) and its meal plan rate page (http://www.stanford.edu/dept/rde/dining/meal_plans.htm).

Stanford University's Residential Education program promotes the philosophy that living and learning are integrated and that formal teaching, informal learning, and personal support in residences are integral to a Stanford education. Meals play a key role in this mission of community

building, leading, and learning. Therefore, residents of specially designated University residence halls (Branner, Crothers/Crothers Memorial, Florence Moore, Lakeside, Manzanita, Ricker, Stern, Toyon, Wilbur, Yost, Murray, and EAST) are required to participate in an R&DE Stanford Dining meal plan. R&DE Stanford Dining is committed to excellence by providing meal plans that offer significant value, the highest quality, and maximum flexibility of dining across campus.

Payments

By accepting Stanford's offer of admission and enrolling in classes, each student accepts responsibility for paying all debts to the University, including tuition and fees, for which he or she is liable. An individual's registration as a Stanford student constitutes his or her agreement to make timely payment of all amounts due.

Charges and credits from offices within the University are aggregated in a student's individual account and presented on the University bill. Student Financial Services sends the University bill electronically to students monthly via Stanford ePay. Students may designate 'Authorized Payers' via Stanford ePay to allow others to view the student account and make payment. Students and Authorized Payers may view the student account online 24 hours a day, seven days a week, via Stanford ePay (<http://studentaffairs.stanford.edu/sfs/bill/resources-epay>). Payments should be made online through Stanford ePay. If necessary, the student or Authorized Payer may print a bill or receipt from Stanford ePay.

A list of payment due dates throughout the academic year is available on the Student Financial Services website (<http://studentaffairs.stanford.edu/sfs/bill/overviews-bill/#due>). To avoid late payment penalties, online payments via Stanford ePay can be made up to midnight PST on the 15th of the month; mailed payments must be postmarked by 5:00 p.m. on the 15th of the month.

After the start of the term, adding units may result in additional tuition charges. Other fees, such as room damage repair charges, petition fees, late fees, lab fees, library fees, and other miscellaneous fees or charges are due on the 15th of the month after which they are billed.

Stanford offers an installment payment plan for undergraduates. See Installment Payment Plan (<http://studentaffairs.stanford.edu/sfs/bill/IPP>) for information.

Forms of Payment

Stanford's standard method of payment is the online service, Stanford ePay, which includes electronic check (eCheck) and an International Funds Transfer option. No fee is associated with ePay payments. See the eCheck via Stanford ePay information (<http://studentaffairs.stanford.edu/sfs/bill/overviews-payment/#echeck>) web site. International students wishing to pay in foreign currencies should consider using the International Funds Transfer option within ePay, which allows students to arrange for payment in foreign currencies via Western Union. This electronic option offers students favorable exchange rates and eliminates bank fees typically charged for wire transfer.

Alternative methods of payment are available if Stanford ePay is not possible. See University Bill Payment Methods (<http://studentaffairs.stanford.edu/content/university-bill-payment-methods>) for information. Stanford does not accept cash, credit cards or postdated checks for payments to the University bill.

Credit Balances

Stanford uses Direct Deposit to refund credit balances to students. See the Direct Deposit enrollment instructions (<http://studentaffairs.stanford.edu/sfs/bill/steps-direct-deposit>) web site. Students are expected to enroll in Direct Deposit at the beginning of their Stanford career or as soon as possible thereafter. Direct Deposits reach the bank within 24-48 hours of

processing. Receipt of funds will not be delayed by mail time, lost checks, or the need to go to the bank as is the case with paper checks.

Generally credit balances resulting from financial aid are refunded automatically every Monday, Wednesday and Friday. Credit balances resulting from an overpayment of cash (e.g. ePayment, wire, check) remain on the student account to be applied to future charges. A refund of a cash overpayment may be provided at any time upon student request. Annually, in August, Student Financial Services will refund any remaining overpayment of cash from the prior academic year to the student.

Account Fees and Actions

Late Payment Fees

The University must receive the full amount due on or before the due date indicated on the bill. If full payment is not received by the due date, a late fee of 1% of the amount past due may be assessed. Anticipated aid (aid that has been accepted but not disbursed and is shown on the student account) reduces the total amount due prior to late fees being applied.

Holds

Accounts that become past due more than 30 days are subject to financial holds. A financial hold blocks transcripts, diplomas, and enrollment eligibility.

Insufficient Funds

A non-refundable \$25.00 administrative fee may be assessed for checks or eCheck payments returned due to insufficient funds. In addition, student accounts are subject to holds, and late payment penalties may apply.

Delinquent Accounts

Delinquent accounts may be reported to one or more of the national credit reporting agencies. Severely delinquent accounts may be referred to a collection agency and/or placed in litigation in accordance with state and federal laws. Students with delinquent accounts may be held responsible for collection costs, attorney fees, and court costs. Stanford may consider past delinquent accounts in determining whether to provide Stanford loans.

Refunds

Students who withdraw from the University before the end of a term may be eligible to receive refunds of portions of their tuition under certain limited circumstances.

See the Registrar's Tuition page for 2014-15 for a schedule of refunds (http://studentaffairs.stanford.edu/registrar/students/tuition-fees_14-15).

Annulled Registration

Students who take a leave of absence or summer annulment from the University voluntarily before the first day of instruction may have their registrations annulled. Tuition is refunded in full if the student never attended. Such students are not included in University records as having registered for the term and new students do not secure any privileges for admission for any subsequent quarter as returning students. A leave of absence or summer annulment does not automatically cancel health coverage (both Cardinal Care and the Campus Health Services Fee) unless the leave of absence or summer annulment is granted before the first day of instruction. Financial aid recipients should be aware that a proportion of any refund is returned to the various sources of aid.

Cancellation of Registration or Suspension

Students who have their registrations canceled or are suspended from the University generally receive refunds on the same basis as those receiving

leaves of absence unless otherwise specified. A student whose registration is canceled less than one week after the first day of instruction for an offense committed during a preceding quarter receives a full refund of tuition fees.

Institutional Interruption of Instruction

It is the University's intention to avoid the necessity of taking the actions described in this paragraph. However, should the University determine that continuation of some or all academic and other campus activities is impracticable, or that their continuation involves a high degree of physical danger to persons or property, activities may be curtailed and students requested or required to leave the campus. In such an event, arrangements are made as soon as practical to offer students the opportunity to complete their courses, or substantially equivalent work, so that appropriate credit may be given. Alternatively, the University may determine that students receive refunds on the same basis as those receiving leaves of absence, or on some other appropriate basis.

Leaves of Absence

A student in good standing who desires or is required to take a leave of absence from the University after the first day of instruction, but before the end of the first 60 percent of the quarter (term withdrawal deadline), may file a petition for a leave of absence and tuition refund. Graduate students submit the completed leave of absence form to the Student Services Center (<http://studentservicescenter.stanford.edu>). Undergraduates who wish to withdraw from the current quarter, or from a quarter for which they have registered in advance and do not wish to attend, must file a Leave of Absence Petition (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/leaveofabsence.pdf>) with and receive approval from the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. A voluntary leave of absence after the first 60 percent of the quarter (term withdrawal deadline) is only granted for approved health and emergency reasons. For more information on leaves of absence, undergraduates should see the "Leaves of Absence and Reinstatement (Undergraduate) (p. 35)" section of this bulletin, and graduate students should see the "Leaves of Absence (Graduate) (p. 51)" section of this bulletin.

Room and Meal Plan Refunds

Students assigned to a University residence are subject to the terms of the University Residence Agreement, and are required to live in University Housing for the full duration of their signed contract. The text of the University Residence Agreement is available at the Residence Agreement (http://www.stanford.edu/dept/rde/shs/res_agree.htm) web site.

Room refunds are made only when students move out of the residence system and graduate from or cease to be enrolled at the University. Eligibility for refunds is listed in the Residence Agreement. Termination of Occupancy is filed in Axess. Filing a termination of occupancy form and moving out of Student Housing does not necessarily entitle a student to a refund. Students in greek letter houses are billed directly by the fraternity or sorority, and refunds are arranged between the student and the fraternity or sorority.

A meal plan refund is based on the date when a student moves out of University residence and is approved under conditions as specified in the Residence Agreement. If a student uses the meal plan after that date, an additional daily charge incurs.

Any decision to refund prepaid room and meal plan charges or to waive liability for deferred charges is made at the sole discretion of the University. Students with questions about refunds should contact Housing Assignments

for room refunds or the central office of Stanford Dining for residential meal plan refunds.

Undergraduate Degrees and Programs

Degree Requirements A Liberal Education

As do all major universities, Stanford provides the means for its undergraduates to acquire a liberal education, an education that broadens the student's knowledge and awareness in each of the major areas of human knowledge, that significantly deepens understanding of one or two of these areas, and that prepares him or her for a lifetime of continual learning and application of knowledge to career and personal life.

The undergraduate curriculum at Stanford allows considerable flexibility. It permits each student to plan an individual program of study that takes into account personal educational goals consistent with particular interests, prior experience, and future aims. All programs of study should achieve some balance between depth of knowledge acquired in specialization and breadth of knowledge acquired through exploration. Guidance as to the limits within which that balance ought to be struck is provided by the University's General Education Requirements and by the requirements set for major fields of study.

These educational goals are achieved through study in individual courses that bring together groups of students examining a topic or subject under the supervision of scholars. Courses are assigned credit units. To earn a bachelor's degree, the student must complete at least 180 allowable units and, in so doing, also complete the Writing Requirement, the General Education Requirements, the Language Requirement, and the requirements of a major.

The purpose of the Writing Requirement is to promote effective communication by ensuring that every undergraduate can write clear and effective English prose. Words are the vehicles for thought, and clear thinking requires facility in writing and speech.

The Language Requirement ensures that every student gains a basic familiarity with a foreign language. Foreign language study extends the student's range of knowledge and expression in significant ways, providing access to materials and cultures that otherwise would be out of reach.

The General Education Requirements provide guidance toward the attainment of breadth and stipulate that a significant share of a student's work must lie outside an area of specialization. These requirements ensure that every student is exposed to different ideas and different ways of thinking. They enable the student to approach and to understand the important ways of knowing how to assess their strengths and limitations, their uniqueness, and, no less important, what they have in common with others.

Depth, the intensive study of one subject or area, is provided through specialization in a major field. The major relates more specifically to a student's personal goals and interests than do the general requirements outlined above. Stanford's curriculum provides a wide range of standard majors through its discipline-oriented departments, a number of interdisciplinary majors in addition to department offerings, and the opportunity for students to design their own major programs.

Elective courses, which are not taken to satisfy requirements, play a special role in tailoring the student's program to individual needs. For most students, such courses form a large portion of the work offered for a degree. Within the limitations of requirements, students may freely choose any course for which previous studies have prepared them.

This section provides more detailed descriptions of these various requirements and the rationales upon which they are based.

Bachelor of Arts (B.A.), Bachelor of Science (B.S.)

Stanford University confers the degree of Bachelor of Arts (B.A.) or the degree of Bachelor of Science (B.S.) on those candidates who have been recommended by the Committee on Undergraduate Standards and Policy (C-USP), who have applied in advance for conferral of the degree, and who have fulfilled the following requirements:

1. A minimum of 180 units of allowable University work. (As described below, units above the allowable limits for activity courses and for courses taken on a satisfactory/no credit and credit/no credit basis cannot be counted towards the 180-unit minimum.)
2. The Writing, General Education, and Language Requirements (see below).
3. Curricular requirements of at least one major department or program and the recommendation of the department(s). (Descriptions of curricular and special degree requirements are included in each department's section of this bulletin.)
4. Students admitted as freshmen—A minimum of 135 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 135 units in resident work may petition for a waiver of the last quarter-in-residence requirement for up to 15 units through the Last Units Out of Residence (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/last_units_out_of_residence.pdf) petition.
5. Students admitted as transfers—A minimum of 90 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 90 units in resident work may petition for a waiver of the last quarter-in-residence requirement for up to 15 units through the Last Units Out of Residence (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/last_units_out_of_residence.pdf) petition.

Stanford confers the Bachelor of Science degree on candidates who fulfill these requirements in the School of Earth Sciences, in the School of Engineering, or in the departments of Applied Physics, Biology, Chemistry, Mathematics, or Physics in the School of Humanities and Sciences. The University also awards B.S. degrees to candidates in the Program in Science, Technology, and Society; in the Program in Mathematical and Computational Science; in the Program in Symbolic Systems; and, when appropriate, in the Program for Individually Designed Majors. Candidates who fulfill these requirements in other schools or departments receive the Bachelor of Arts degree.

Students who complete the requirements for two or more majors, which ordinarily would lead to the same degree (B.A. or B.S.), should review "The Major" section of this bulletin to ensure that they have an understanding of the requirements for multiple or secondary majors.

Bachelor of Arts and Science (B.A.S.)

The University confers the degree of Bachelor of Arts and Science (B.A.S.) on candidates who have completed the following:

1. with no overlapping courses, the curricular requirements of two majors which ordinarily would lead to different bachelor's degrees (that is, a Bachelor of Arts degree and a Bachelor of Science).

2. These students must have applied in advance for graduation with the B.A.S. degree instead of the B.A. or B.S. degree, been recommended by the Committee on Undergraduate Standards and Policy (C-USP),
3. Fulfilled a minimum of 180 units of University work described in point 1 of the "Bachelor of Arts (B.S.), Bachelor of Science (B.S.)" section.
4. The requirements of each major without applying any course towards the requirements of more than one major, according to "Multiple Majors" section of this bulletin. The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with the B.A.S. degree.
5. The Writing, General Education, and Language requirements.
6. Students admitted as freshmen—A minimum of 180 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 180 units in resident work may petition for a waiver of the last quarter-in-residence requirement for up to 15 units.
7. Students admitted as transfers—A minimum of 135 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 135 units in resident work may petition for a waiver of the last quarter-in-residence requirement with no overlapping courses,

Students who cannot meet the requirements for both majors without overlapping courses are not eligible for the B.A.S., but may apply to have a secondary major recorded on their transcripts. (See "The Major" in the "Undergraduate Degrees and Programs" section of this bulletin.)

Dual Bachelor's Degrees (Concurrent B.A. and B.S.)

A Stanford undergraduate may work concurrently toward both a B.A. and a B.S. degree. To qualify for both degrees, a student must complete:

1. A minimum of 225 units of University work. Units above the allowable limits for activity courses and for courses taken on a satisfactory/no credit and credit/no credit basis cannot be counted towards the 225 minimum.
2. The requirements of each major without applying any course towards the requirements of more than one major, according to "Multiple Majors" section of this bulletin. The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with dual degrees.
3. The Writing, General Education, and Language requirements.
4. The curricular requirements of two majors (one of which leads to a Bachelor of Arts degree and the other to a Bachelor of Science degree).
5. Students admitted as freshmen—A minimum of 180 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 180 units in resident work may petition for a waiver of the last quarter-in-residence requirement for up to 15 units.
6. Students admitted as transfers—A minimum of 135 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 135 units in resident work may petition for a waiver of the last quarter-in-residence requirement.

A student interested in dual bachelor's degrees should declare them in Axess no later than two quarters in advance of completing the program.

Students who do not meet the higher unit and residence requirements of the dual degree option may be eligible instead for the B.A.S. degree as described above.

Second Bachelor's Degree

Stanford does not award a second Bachelor of Arts degree to an individual who already holds a Bachelor of Arts, nor a Bachelor of Science degree to an individual who already holds a Bachelor of Science degree. However,

the holder of a Bachelor of Arts degree from Stanford may apply to the C-USP Subcommittee on Academic Standing for admission to candidacy for a Bachelor of Science degree, and the holder of a Bachelor of Science degree from Stanford may apply for candidacy for a Bachelor of Arts degree. The C-USP Subcommittee on Academic Standing determines whether the application for a second degree may be approved and/or the conditions a student must meet in order to be allowed to earn a second degree. A recommendation of the major department for the second bachelor's degree must accompany the application.

Generally, a holder of a B.A. or B.S. degree may not apply for the Bachelor of Arts and Sciences degree, although a student may submit a petition for exception. The office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall, reviews these petitions. A student approved for this program may register as an undergraduate and is subject to the current rules and regulations affecting undergraduates. Requirements for a second Stanford bachelor's degree are the same as those described above for dual bachelor's degrees.

Approvals or denials of applications under this section are in the discretion of the University.

Coterminal Bachelor's and Master's Degrees

See the "Coterminal Degrees (p. 41)" section of this Bulletin.

The Major

The primary purpose of the major is to encourage each student to explore a subject area in considerable depth. This in-depth study complements the breadth of study promoted by the General Education Requirements and, in many cases, by a student's choice of electives. Work in depth permits practice in critical analysis and the solving of problems. Because of its depth, such study also provides a sense of how knowledge grows and is shaped by time and circumstances.

The structure of a major should be a coherent reflection of the logic of the discipline it represents. Ideally, the student should be introduced to the subject area through a course providing a general overview, and upper-division courses should build upon lower-division courses. The course of study should, if feasible, give the student the opportunity and responsibility of doing original, creative work in the major subject. Benefits of the major program are greatest when it includes a culminating and synthesizing experience such as a senior seminar, an undergraduate thesis, or a senior project.

Degree Requirements

Undergraduates must select a major by the end of their sophomore year. All undergraduate major programs listed in this bulletin, except for certain honors degree programs that require application and admission in advance, are open to all students. Students may use AxBSS to declare, drop, or change a major. In some departments or programs, though, a late change could easily result in extending the period of undergraduate study. Students who have applied to graduate or who wish to declare an individually designed major must use the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) to select or change a major. Students requiring assistance should contact the Student Services Center (<http://www.stanford.edu/group/studentservicescenter>). For academic advising regarding majors, students should consult the office (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_uar) of Undergraduate Advising and Research (UAR).

Check individual department or program listings in this bulletin for the undergraduate degrees offered and for specific major requirements. If an

area of study has no baccalaureate degree, that discipline is not available as a regular undergraduate major.

Faculty set the minimum requirements for the major in each department. These requirements usually allow latitude for tailoring a major program to a student's specific educational goals. The responsibility for developing a major program within department or program requirements lies ultimately with the individual student working in consultation with the major adviser.

Limits of the Major

In order to achieve the values of study in depth, a well-structured major should constitute at least one-third of a student's program (55-65 units). To ensure the values of breadth, a major should comprise no more than two-thirds of a student's program (115-125 units); and, to avoid intellectual parochialism, a major program should not require a student to take more than about one-third of his or her courses from within a single department.

Major requirements in cognate subjects essential to the structure of a given major should be counted as part of the major program in applying these guidelines. Department or school requirements designed to provide extra disciplinary breadth should not be counted.

For a limited number of qualified students, many departments and programs offer special programs leading to degrees with honors. A student may apply to the major department or program for acceptance into the honors program. Demands on the student may vary, but all honors programs encourage creative, independent work at an advanced level in addition to the major requirements.

The guidelines set forth here are deliberately general; implementation must take into account the specific needs of a student's program and the nature of the discipline or disciplines involved. The exercise of responsibility in achieving the desired educational balance belongs first with the student, who, after all, has the strongest interest in the value of his or her education. It belongs secondarily to departments and major programs, which must set the requirements of competence in the many majors offered.

Multiple Majors

Although most students declare only one major, a student may formally declare more than one major within a single bachelor's degree (B.A., B.S., or B.A.S.) program. The student may do that either at the time of initial major declaration or, as may be more advisable given the planning required to complete more than one major, by amending the original declaration. The student's major departments or programs have access routinely to all information pertinent to that student's academic record (for example, course and grade information), and each is expected to provide advising and other assistance. Students may pick up appropriate information regarding major declarations from the Student Services Center (<http://www.stanford.edu/group/studentservicescenter>). To be awarded a bachelor's degree with multiple majors, the student must fulfill the following requirements:

1. Formally declare all majors through AxBSS to the Office of the University Registrar.
2. Satisfy the requirements of each major without applying any course towards the requirements of more than one major or any minor unless:
 - a. overlapping courses constitute introductory skill requirements (for example, introductory math or a foreign language);
 - b. overlapping courses enable the student to meet school requirements (for example, for two majors within the School of Engineering). Currently, only the School of Engineering has school requirements for its undergraduate majors.

Students pursuing multiple majors must complete a multiple major program form indicating which courses they plan to apply toward each major and any minor(s). Departments must certify that the plan of study meets all requirements for the majors and any minor(s) without unallowable overlaps in course work; the School of Engineering Dean's office certifies this information in any case involving an Engineering

major or minor. To facilitate advance planning, multiple major program forms are available at any time from the Registrar's forms web site (<http://studentaffairs.stanford.edu/registrar/forms>). The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with multiple majors or a minor. The form should be submitted to the Student Services Center (<http://www.stanford.edu/group/student-services-center>) by the Final Study List deadline of the quarter of intended graduation.

If the pursuit of multiple majors (or joint majors or secondary majors, or minors) unduly delays an undergraduate's progress through Stanford, the University reserves the right to limit a student to a single major, and/or to confer a degree on a student who has completed all of the requirements for a degree even though the student has not applied to graduate; such an individual would then be subject to the University's usual rules and restrictions regarding future enrollment or registration.

When students cannot meet the requirements of multiple majors without overlaps, the secondary major (<http://stanford.edu/dept/registrar/bulletin/4894.htm>), may be relevant.

Secondary Major

In some cases, students may complete course requirements for more than one major, but they may not meet the requirements outlined for the multiple major option. For example, the student may develop a course plan in which courses requisite for one major overlap with requirements for another. In these cases, the student may declare a secondary major which results in the transcript bearing an annotation that the course requirements for that major have also been met. Secondary majors are not listed on the diploma. Students declare secondary majors through the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program . (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)

Joint Major Program

A joint major differs from a multiple major in that 1-2 fewer optional courses are required for each major, while an integrative senior capstone experience is required for all students in the program. Ten joint major programs have been approved for a six-year pilot beginning in Autumn Quarter, 2014-15. See the "Joint Major (p. 26)" section of this bulletin for details.

Foreign Language Proficiency

The notation "proficiency in (language)" appears on the official transcripts of those students whose levels of achievement are found by procedures established by the Language Center to be roughly equivalent to knowledge an excellent student can be expected to demonstrate late in the third quarter of the third year of study in that language.

The Joint Major Program (JMP)

Effective Autumn Quarter 2014-15, the University is offering a joint major program (JMP) aimed at integrating the Humanities and Computer Science while providing students with unique educational experiences. This experimental program was approved by the Academic Senate for a six-year pilot. All of these joint major programs involve Computer Science along with one humanities major chosen from among ten approved majors.

Each of the new joint major programs leads to conferral of a B.A.S. (Bachelor of Arts and Sciences), and are distinct from multiple degrees in

which a student may formally declare more than one major within a single bachelor's degree (B.A., B.S., or B.A.S.) program.

The ten joint major programs approved for 2014-15 are (each major is linked to the department's bulletin site with specific information for that major):

- Computer Science (p. 229) and Classics (p. 375)
- Computer Science (p. 229) and English (p.)
- Computer Science (p. 229) and French (p. 465)
- Computer Science (p. 229) and German Studies (p. 479)
- Computer Science (p. 229) and History (p. 495)
- Computer Science (p. 229) and Italian (p. 465)
- Computer Science (p. 229) and Linguistics (p. 543)
- Computer Science (p. 229) and Music (p. 560)
- Computer Science (p. 229) and Philosophy (p. 571)
- Computer Science (p. 229) and Slavic Languages and Literatures (p. 622)

Only a limited number of joint majors has been approved by the Academic Senate. Assessment of the joint major program will continue throughout the duration of the six-year pilot, and decisions will be made about continuation, termination, and/or expansion of the program at the end of the pilot. The School of Humanities and Sciences is limiting participation in the pilot to Humanities departments that wish to propose a joint major with Computer Science. Only approved joint majors as listed in this bulletin are available. Other combinations of majors may be taken as a multiple major, but are not part of the joint major program with its special rules and requirements.

Requirements for Joint Majors

Typically a student in a joint major program will have an adviser in each major.

Graduation with a joint major requires the completion of a minimum of 180 units, of which at least 135 must be completed at Stanford. The specific number of units required for each major is specific to that major. It is not possible to give a single absolute number of units that a student might require in order to graduate with a joint major.

A student who declares a joint major completes the degree requirements for each of the majors. However, each of the majors in a joint major program typically requires 1-2 fewer optional courses; see the "Joint Major" sections of the respective departments for details. This course reduction in the joint major program differs from a multiple major in which all courses in both majors must be completed.

Because the joint major programs are designed to allow a student to pursue a course of study leading to mastery in two fields by blending the intellectual traditions of two Stanford departments, students in a joint major program take a senior capstone experience such as a course or project that is integrative in nature. Although the integrative capstone experience may fulfill the requirement for a capstone experience for both majors, the units may only be counted toward the required total units in one of the majors.

It is possible, with approval of both departments, to use one course to fulfill a requirement for each major in a joint major program. University policy prohibits double counting of courses in multiple programs except in specific cases such as introductory skill requirements or overlapping courses that enable a student to meet University requirements such as GERs. Therefore, when a single course fulfills requirements in both majors, a student may apply the units associated with the course to the total units requirement of only one of the majors and then must work with the other major to identify another course that would benefit the academic plan and whose associated units may be applied to that major's total units requirement.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentsservicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Undergraduate Minor

Students completing a bachelor's degree may elect to complete one or more minors in addition to the major. Minors must be officially declared by students no later than the deadline for their application(s) to graduate, according to declaration procedures developed and monitored by the Registrar. Earlier deadlines for declaration of the minor may be set by the offering school or department. Satisfactory completion of declared minors is noted on the student's transcript after degree conferral.

A minor is a coherent program of study defined by the department or degree program. It may be a limited version of a major concentration or a specialized subset of a field. A minor consists of no fewer than six courses of 3 or more units to a maximum of 36 units of letter-graded work, except where letter grades are not offered. Departments and degree programs establish the structure and requirements of each minor in accordance with the policy above and within specific guidelines developed by the deans of schools. Programs which do not offer undergraduate degrees may also make proposals to their cognizant deans to establish a minor. Requirements for each minor are described in the individual department or program listings in this bulletin.

Students may not overlap (double-count) courses for completing major and minor requirements, unless:

1. Overlapping courses constitute introductory skill requirements (for example, introductory math or a foreign language), or
2. Overlapping courses enable the student to meet school requirements (for example, for a major within the School of Engineering and a minor). Currently, only the School of Engineering has school requirements for its undergraduate majors.

Undergraduates use Axess to declare or drop a minor. The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) is required for graduation for students with a minor. The form should be submitted to the Student Services Center (<http://www.stanford.edu/group/studentsservicescenter>) by the final study list deadline of the quarter of intended graduation.

Students with questions about declaring minors or double-counting courses towards combinations of majors and/or minors should consult with the departments or programs involved or the Student Services Center. For academic advising regarding minors, students should consult the Undergraduate Advising and Research Office (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual) (UAR).

Baccalaureate Honors With Distinction

In recognition of high scholastic attainment, the University, upon recommendation of a major department or program, awards the Bachelor's Degree with Distinction. Distinction is awarded to 15% of the graduating class based on cumulative grade point averages. GPA for Distinction purposes is calculated through Winter Quarter for each graduating class. Distinction is awarded at the end of the Spring Quarter for graduates of the Spring Quarter and prior Summer, Autumn, Winter quarters. Students are notified of Distinction on their diploma. Students who are granted Distinction, and already received their diploma in a prior quarter, will be mailed an updated diploma. The Distinction notation will show on official transcripts after Spring Commencement.

Students are also urged to consider the departmental honors programs that may give depth to their major study and to consider, as well, how the interdisciplinary honors programs might contribute to the quality of their undergraduate education.

Departmental Honors Programs

In recognition of successful completion of special advanced work, departments may recommend their students for honors in the major. Departmental honors programs demand independent creative work at an advanced level in addition to major requirements. If approved for departmental honors, the student should declare the Honors degree through Axess.

Interdisciplinary Honors Programs

In recognition of successful completion of honors program requirements, the following interdisciplinary programs can recommend students majoring in any field for honors in their program:

- Arts (<http://artsinstitute.stanford.edu/programs/honors-in-the-arts-program>)
- Comparative Studies in Race and Ethnicity (<http://csre.stanford.edu/honors.php>)
- Democracy, Development, and the Rule of Law (http://cddrl.stanford.edu/fellowships/cddrl_undergraduate_honors_program) (CDDRL)
- Education (<https://ed.stanford.edu/academics/undergraduate/honors>)
- Environmental Science, Technology, and Policy (<http://woods.stanford.edu/educating-leaders/education/goldman-honors-program>)
- Ethics in Society (<https://ethicsinsociety.stanford.edu/undergraduate-ethics/undergraduate-honors-program>)
- Feminist, Gender, and Sexuality Studies (<https://feminist.stanford.edu/undergraduates/honors-program>)
- International Security Studies (http://cisac.stanford.edu/docs/undergraduate_honors_program) (CISAC)
- Latin American Studies (<http://las.stanford.edu/programs/undergraduate-honors>)

The interdisciplinary honors programs are designed to complement study in a department major. The requirements for these honors programs are described in the department sections of this bulletin. If approved for interdisciplinary honors, the student should submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) to the Student Services Center (<http://www.stanford.edu/group/studentsservicescenter>) to declare the Interdisciplinary Honors Program.

General Education Requirements

Effective for undergraduates admitted in 2013-14, a new General Education Requirements policy is in place. Students admitted in earlier years should consult the "General Education Requirements through 2012-13" section below.

In order to graduate, undergraduates must complete the following General Education Requirements:

- Thinking Matters Requirement
- Ways of Thinking/Ways of Doing Requirement
- Writing and Rhetoric Requirement
 - Program in Writing and Rhetoric (2 courses required, PWR 1 and PWR 2)
 - Writing in the Major
- Language Requirement

Purpose

The General Education Requirements are an integral part of undergraduate education at Stanford. Their purpose is to introduce students to the intellectual life of the University, to foreground important questions, and to illustrate how they may be approached from multiple perspectives. They are intended to develop a broad set of essential intellectual and social competencies of enduring value no matter what field a student eventually pursues. Students have flexibility to select topics that appeal to them while building critical skills, exploring interests, forming relationships with faculty and peers, and forging connections between educational experiences in many spheres. Together with the major, the requirements serve as the nucleus around which students build their four years at Stanford.

General Education requirement courses must be taken for a letter grade and a minimum of 3 units of credit, with the exception of courses taken to fulfill the Language requirement, which may be taken for credit/no credit. Additionally, a course taken to satisfy the Creative Expression Way (Way-CE) may be taken for a minimum of 2 units and/or may be taken satisfactory/no credit at the instructor's discretion.

Credit Transfer

GERs: Students subject to General Education Requirements (GERs) through 2012-13 may propose that work taken at another accredited college or university be accepted in fulfillment of a GER. In such cases, the Office of the University Registrar determines, after appropriate faculty consultation, whether the work is comparable to any of the specifically certified courses or course sequences. To fulfill GER requirements through transfer work, the course must match a specific Stanford course that fulfills the same GER requirement, be a minimum of three quarter units, and be taken for a letter grade. For more information, see the Transfer Work (p.) section of this Bulletin.

WAYS: Students admitted in 2013-14 or later may propose that work taken at another accredited college or university be accepted in fulfillment of a Ways of Thinking/Ways of Doing (WAYS) breadth area. In such cases, the Office of Undergraduate Advising and Research facilitates the evaluation of the course materials. If faculty review determines that the work fulfills

the WAYS requirement, transfer credit is issued. To fulfill a WAYS requirement through transfer work, the course must be a minimum of three quarter units, except for Creative Expression which is a minimum of two units, and be taken for a letter grade. For more information, see the Transfer Work (p.) section of this Bulletin.

Students seeking transfer credit, please see the Transfer Credit Procedures (<https://studentaffairs.stanford.edu/registrar/students/transfer-credit/procedures>) on the Office of the Registrar site.

Thinking Matters

Students are required to take one Thinking Matters (THINK) course during their freshman year. Most students take one stand-alone course selected from approximately eight courses offered each quarter.

- THINK courses for 2013-14

Alternatively, students may take one of three residence-based, year-long programs:

- Immersion in the Arts: Living in Culture (ITALIC (<http://explorecourses.stanford.edu/search?q=ITALIC&view=catalog&page=0&academicYear=20132014&collapse=&filter-coursestatus-Active=on&filter-departmentcode-ITALIC=on>))
- Science in the Making Integrated Learning Environment (SIMILE (<http://explorecourses.stanford.edu/search?q=SIMILE&filter-departmentcode-SiMILE=on&filter-coursestatus-Active=on&academicYear=20132014>))
- Structured Liberal Education (SLE (<http://explorecourses.stanford.edu/search?filter-departmentcode-SLE=on&q=SLE&filter-coursestatus-Active=on&filter-catalognumber-SLE=on&academicYear=20132014>))
 - Each of these also satisfies at least part of the Writing and Rhetoric Requirement as well as several Ways requirements.)

Another option, in Autumn Quarter only, allows students to enroll in Education as Self-Fashioning (ESF (<http://explorecourses.stanford.edu/search?q=ESF&filter-coursestatus-Active=on&filter-departmentcode-ESF=on&academicYear=20132014>)) that satisfies the Thinking Matters requirement as well as PWR 1.

Ways of Thinking/Ways of Doing (WAYS)

In Autumn of 2013, Stanford introduced the Ways of Thinking/Ways of Doing (WAYS) general education breadth system. WAYS is a capacity-based approach to fostering breadth in general education rather than a discipline-based approach.

Beginning Autumn Quarter 2013-14, entering first-year students must satisfy the WAYS requirement. New transfer students must satisfy the WAYS requirement effective Autumn Quarter 2014-15.

These courses provide students with educational breadth by giving instruction in essential skills and capacities in the areas of:

- WAY-A-II: Aesthetic and Interpretive Inquiry (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYAII=on&collapse=,5,&filter-coursestatus-Active=on>) (2 courses)
- WAY-AQR: Applied Quantitative Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYAQR=on&collapse=,5,&filter-coursestatus-Active=on>)
- WAY-CE: Creative Expression (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYCE=on&collapse=,5,&filter-coursestatus-Active=on>)
- WAY-ED: Engaging Diversity (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYED=on&collapse=,5,&filter-coursestatus-Active=on>)

- WAY-ER: Ethical Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYER=on&collapse=,5,&filter-coursestatus-Active=on>)
- WAY-FR: Formal Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYFR=on&collapse=,5,&filter-coursestatus-Active=on>)
- WAY-SI: Social Inquiry (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYSI=on&collapse=,5,&filter-coursestatus-Active=on>) (2 courses)
- WAY-SMA: Scientific Method and Analysis (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYSMA=on&collapse=,5,&filter-coursestatus-Active=on>) (2 courses)

Students are required to take eleven certified WAYS courses, with two courses in WAY-AII, WAY-SI, and WAY-SMA, and one course in each of the remaining five WAYS.

Although courses may be certified to fulfill two WAYS, you may only count a course toward one WAY in your program of study. Thinking Matters courses typically satisfy a WAY. Courses may also count both for major and General Education requirements.

Changing from GERs to WAYS Breadth Requirement

Students admitted prior to Autumn Quarter 2012-13 are eligible to change to the new WAYS breadth requirement. In order to change to the new WAYS system, students must submit the GER to WAYS General Education Requirement Change Request (<https://stanford.app.box.com/profile/214550459/page/0/1/19459877153>).

Students requesting a change to the new WAYS requirement continue to fulfill the other general education requirements in effect at the time of matriculation; specifically, this includes Thinking Matters or IHUM as relevant to the term of matriculation, writing and rhetoric requirements, and the language requirement. Students who change to the new WAYS breadth requirement may not revert to the old GER system.

Additional information on the WAYS requirement is available on the Stanford Undergrad (<https://undergrad.stanford.edu/programs/ways>) site.

Language Requirement

To fulfill the Language Requirement, undergraduates are required to complete one year of college-level study or the equivalent in a foreign language. Students may fulfill the requirement in any one of the following ways:

1. Complete three quarters of a first-year, 4-5 units language course at Stanford or the equivalent at another recognized post-secondary institution subject to current University transfer credit policies. Language courses at Stanford may be taken with the Credit/No Credit grading basis, if so offered, to fulfill the requirement.
2. Score 4 or 5 on the Language Advanced Placement (AP) test in one of the following languages: Chinese, French, German, Japanese, Latin, or Spanish. Advanced Placement (AP) tests in foreign literature do not fulfill the requirement.
3. Achieve a satisfactory score on the SAT II Subject Tests in the following languages taken prior to college matriculation:

Test Subject	Score
Chinese	630
French	640
German	630
Latin	630
Spanish	630
Italian	630

Japanese	620
Korean	630
Hebrew	540

5. Take a diagnostic test in a particular language which either:
 - a. Places them out of the requirement, or
 - b. Diagnoses them as needing one, two, or three additional quarters of college-level study. In this case, the requirement can then be fulfilled either by passing the required number of quarters of college-level language study at Stanford or the equivalent elsewhere, or by retaking the diagnostic test at a later date and placing out of the requirement.

Written placements are offered online throughout the summer in Chinese, French, German, Italian, Japanese, Russian, Spanish, and Spanish for home background speakers.

For a full description of Language Center offerings, see the "Language Center" section of this bulletin under the school of Humanities and Sciences.

Writing and Rhetoric Requirement

All instructors at Stanford University expect students to express themselves effectively in writing and speech. The Writing and Rhetoric requirement helps students meet those high expectations.

All candidates for the bachelor's degree, regardless of the date of matriculation, must satisfy the Writing and Rhetoric requirement. Transfer students are individually reviewed at the time of matriculation by the Office of the University Registrar's Degree Progress section and, if necessary, the Program in Writing and Rhetoric (PWR) as to their status with regard to the requirement.

The Writing and Rhetoric requirement includes courses at three levels. The first two levels are described in more detail below. Writing-intensive courses that fulfill the third level, the Writing in the Major (WIM) requirement, are designated under individual department listings.

All undergraduates must satisfy the first-level Writing and Rhetoric requirement (WR 1) in one of five ways:

1. PWR 1: a course emphasizing writing and research-based argument.
2. SLE: writing instruction in connection with the Structured Liberal Education program.
3. ESF: writing instruction in connection with the Education as Self-Fashioning Thinking Matters course.
4. ILEs: writing instruction in connection with either the SIMILE or ITALIC Integrated Learning Environment courses.
5. Transfer credit approved by the Office of the University Registrar for this purpose.

All undergraduates must satisfy the second-level Writing and Rhetoric Requirement (WR 2) in one of four ways:

1. PWR 2, a course emphasizing writing, research, and oral presentation of research.
2. SLE: writing and oral presentation instruction in connection with the Structured Liberal Education program.
3. A course offered through a department or program certified as meeting the WR 2 requirement by the Writing and Rhetoric Governance Board. These courses are designated as Write-2.
4. Transfer credit approved by the Office of the University Registrar for this purpose.

A complete listing of PWR 1 courses is available each quarter on the PWR (<https://undergrad.stanford.edu/programs/pwr>) web site, and at the PWR office in Sweet Hall, Third Floor. Complete listings of PWR

2 and Write-2 courses are available to students on the PWR (<https://undergrad.stanford.edu/programs/pwr>) web site the quarter before they are scheduled to complete the WR 2 requirement.

For a full description of the Program in Writing and Rhetoric (PWR), see the "Writing and Rhetoric (p. 89)" section of this bulletin under the Vice Provost of Undergraduate Education.

Students who matriculated prior to Autumn 2003 should consult previous issues of the Stanford Bulletin or the PWR office to determine what requirements apply.

General Education Requirements through 2012-13

Undergraduates fulfill their General Education Requirements through the policy in effect at the time of their admission to Stanford.

- Undergraduates who matriculated in Autumn 2012, follow the Thinking Matters requirement as described above and the GERs, including Language and Writing and Rhetoric requirements, as below.
- Undergraduates who matriculated in Autumn 2011 or earlier follow the freshman IHUM requirement rather than the Thinking Matters requirement and should consult the relevant Bulletin from the year in which they began study at Stanford (http://www.stanford.edu/dept/registrar/bulletin_past) to determine the requirements applying to them. They follow the GER requirements, including Language and Writing and Rhetoric requirements, as below.
- Undergraduates who matriculated prior to Autumn 2003 should consult previous issues of the Stanford Bulletin to determine what requirements apply.

Students may elect to change to the new system described above. The following description applies to students under the GER policy effective through 2012-13.

Purpose

The General Education Requirements are an integral part of undergraduate education at Stanford. Their purpose is:

1. to introduce students to a broad range of fields and areas of study within the humanities, social sciences, natural sciences, applied sciences, and technology; and
2. to help students prepare to become responsible members of society.

Whereas the concentration of courses in the major is expected to provide depth, the General Education Requirements have the complementary purpose of providing breadth to a student's undergraduate program. The requirements are also intended to introduce students to the major social, historical, cultural, and intellectual forces that shape the contemporary world.

Fulfillment of the General Education Requirements in itself does not provide a student with an adequately broad education any more than acquiring the necessary number of units in the major qualifies the student as a specialist in the field. The major and the General Education Requirements are meant to serve as the nucleus around which the student is expected to build a coherent course of study by drawing on the options available among the required and elective courses.

Information regarding courses that have been certified to fulfill the General Education Requirements, and regarding a student's status in meeting these requirements, is available at the Student Services Center. Course planning and advising questions related to the General Education Requirements should be directed to Undergraduate Advising and Research.

It is the responsibility of each student to ensure that he or she has fulfilled the requirements by checking in Axess. This should be done at least two quarters before graduation.

Students should be very careful to note which set of General Education Requirements apply to them. The date of matriculation at Stanford determines which requirements apply to an individual student.

Area Requirements Disciplinary Breadth

This requirement is satisfied by completing five courses of which one course must be taken in each subject area.

Disciplinary Breadth gives students educational breadth by providing experience in the following areas. Each area is linked to a comprehensive list of courses on ExploreCourses.

- Engineering and Applied Science (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERDBEngrAppSci=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)
- Humanities (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-term-Summer=on&page=0&q=%25&filter-ger-GERDBHum=on&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=%2C5%2C&filter-term-Winter=on&catalog=71>)
- Mathematics (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERDBMath=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)
- Natural Sciences (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERDBNatSci=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)
- Social Sciences (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERDBSocSci=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)

Education for Citizenship

This requirement is requirement satisfied by completing two courses in different subject areas; or completing two Disciplinary Breadth courses which also satisfy different Education for Citizenship subject areas.

Education for Citizenship provides students with some of the skills and knowledge that are necessary for citizenship in contemporary national cultures and participation in the global cultures of the 21st century.

Education for Citizenship is divided into four subject areas. Each area is linked to a comprehensive list of courses on ExploreCourses. Further explanation of the purposes of Education for Citizenship requirements follows below.

- Ethical Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERECEthicReas=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)
- Global Community (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERECGlobalCom=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)
- American Cultures (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERECGlobalCom=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)

term=Summer=on&filter-ger-GERECAmerCul=on&filter-coursestatus-Active=on&collapse=%2C5%2C)

- Gender Studies (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-ger-GERECGender=on&filter-coursestatus-Active=on&collapse=%2C5%2C>)

Ethical Reasoning

Courses introduce students to the pervasiveness, complexity, and diversity of normative concepts and judgments in human lives, discuss skeptical concerns that arise about normative practices, review ways in which people have engaged in ethical reflection, and consider ethical problems in light of diverse ethical perspectives.

The Global Community

Courses address the problems of the emerging global situation. They may compare several societies in time and space or deal in depth with a single society, either contemporary or historical, outside the U.S. Challenges of note: economic globalization and technology transfer; migration and immigration; economic development, health; environmental exploitation and preservation; ethnic and cultural identity; and international forms of justice and mediation.

American Cultures

Courses address topics pertaining to the history, significance, and consequences of racial, ethnic, or religious diversity in the culture and society of the U.S. Challenges of note: equity in education; employment and health; parity in legal and social forms of justice; preserving identity and freedom within and across communities.

Gender Studies

Courses address gender conceptions, roles, and relations, and sexual identity in a contemporary or historical context; they critically examine interpretations of gender differences and relations between men and women. Challenge of note: changing sexual and physiological realities in contemporary and historical perspective.

Courses certified as meeting the General Education Requirements must be taken for a letter grade and a minimum of 3 units of credit. A single course may be certified as fulfilling only one subject area within the General Education Requirements; the one exception is that a course may be certified to fulfill an Education for Citizenship subject area in addition to a Disciplinary Breadth subject area.

Notational Symbols

Courses that have been certified as meeting the requirements are identified throughout ExploreCourses with the notational symbols listed below.

Notational symbol	Area
Thinking Matters	
THINK	Freshman Year
Disciplinary Breadth	
DB-EngrAppSci	Engineering and Applied Sciences
DB-Hum	Humanities
DB-Math	Mathematics
DB-NatSci	Natural Sciences
DB-SocSci	Social Sciences
Education for Citizenship	
EC-AmerCul	American Cultures
EC-GlobalCom	Global Communities
EC-Gender	Gender Studies
EC-EthicReas	Ethical Reasoning

Language Requirement

To fulfill the Language Requirement, undergraduates are required to complete one year of college-level study or the equivalent in a foreign language. Students may fulfill the requirement in any one of the following ways:

1. Complete three quarters of a first-year, 4-5 units language course at Stanford or the equivalent at another recognized post-secondary institution subject to current University transfer credit policies. Language courses at Stanford may be taken with the Credit/No Credit grading basis, if so offered, to fulfill the requirement.
 2. Score 4 or 5 on the Language Advanced Placement (AP) test in one of the following languages: Chinese, French, German, Japanese, Latin, or Spanish. Advanced Placement (AP) tests in foreign literature do not fulfill the requirement.
 3. Achieve a satisfactory score on the SAT II Subject Tests in the following languages taken prior to college matriculation:
- | Test Subject | Score |
|--------------|-------|
| Chinese | 630 |
| French | 640 |
| German | 630 |
| Latin | 630 |
| Spanish | 630 |
| Italian | 630 |
| Japanese | 620 |
| Korean | 630 |
| Hebrew | 540 |
5. Take a diagnostic test in a particular language which either:
 - a. Places them out of the requirement, or
 - b. Diagnoses them as needing one, two, or three additional quarters of college-level study. In this case, the requirement can then be fulfilled either by passing the required number of quarters of college-level language study at Stanford or the equivalent elsewhere, or by retaking the diagnostic test at a later date and placing out of the requirement.

Written placements are offered online throughout the summer in Chinese, French, German, Italian, Japanese, Russian, Spanish, and Spanish for home background speakers.

For a full description of Language Center offerings, see the "Language Center" section of this bulletin under the school of Humanities and Sciences.

Writing and Rhetoric Requirement

All instructors at Stanford University expect students to express themselves effectively in writing and speech. The Writing and Rhetoric requirement helps students meet those high expectations.

All candidates for the bachelor's degree, regardless of the date of matriculation, must satisfy the Writing and Rhetoric requirement. Transfer students are individually reviewed at the time of matriculation by the Office of the University Registrar's Degree Progress section and, if necessary, the Program in Writing and Rhetoric (PWR) as to their status with regard to the requirement.

The Writing and Rhetoric requirement includes courses at three levels. The first two levels are described in more detail below. Writing-intensive courses that fulfill the third level, the Writing in the Major (WIM) requirement, are designated under individual department listings.

All undergraduates must satisfy the first-level Writing and Rhetoric requirement (WR 1) in one of five ways:

1. PWR 1: a course emphasizing writing and research-based argument.
2. SLE: writing instruction in connection with the Structured Liberal Education program.
3. ESF: writing instruction in connection with the Education as Self-Fashioning Thinking Matters course.
4. ILEs: writing instruction in connection with either the SIMILE or ITALIC Integrated Learning Environment courses.
5. Transfer credit approved by the Office of the University Registrar for this purpose.

All undergraduates must satisfy the second-level Writing and Rhetoric Requirement (WR 2) in one of four ways:

1. PWR 2, a course emphasizing writing, research, and oral presentation of research.
2. SLE: writing and oral presentation instruction in connection with the Structured Liberal Education program.
3. A course offered through a department or program certified as meeting the WR 2 requirement by the Writing and Rhetoric Governance Board. These courses are designated as Write-2.
4. Transfer credit approved by the Office of the University Registrar for this purpose.

A complete listing of PWR 1 courses is available each quarter on the PWR (<https://undergrad.stanford.edu/programs/pwr>) web site, and at the PWR office in Sweet Hall, Third Floor. Complete listings of PWR 2 and Write-2 courses are available to students on the PWR (<https://undergrad.stanford.edu/programs/pwr>) web site the quarter before they are scheduled to complete the WR 2 requirement.

For a full description of the Program in Writing and Rhetoric (PWR), see the "Writing and Rhetoric (p. 89)" section of this bulletin under the Vice Provost of Undergraduate Education.

Students who matriculated prior to Autumn 2003 should consult previous issues of the Stanford Bulletin or the PWR office to determine what requirements apply.

Credit Activity Courses

For undergraduates, a maximum of 8 units of credit earned in activity courses, regardless of the offering department or if accepted as transfer units, count towards the 180 (225 if dual degrees are being pursued) units required for the bachelor's degree. All activity courses are offered on a satisfactory/no credit basis.

Courses Taken on Satisfactory/No Credit or Credit/No Credit Basis

A maximum of 36 units of credit (including activity courses) taken at Stanford or its overseas campuses for a "CR" or "S" grade may be applied towards the 180 (225 if dual degrees are being pursued) units required for the bachelor's degree. The maximum for transfer students is 27 units.

Departments may also limit the number of satisfactory or credit courses accepted towards the requirements for a major. Satisfactory/Credit courses applied towards a minor may be similarly limited. Courses not letter-graded are not accepted in fulfillment of the General Education Requirements. Writing in the Major courses are usually offered letter grade only. In those instances where the course is offered for a letter grade or CR/NC, the

course must be taken for a letter grade to fulfill the Writing in the Major requirement.

Internship Guidelines

Undergraduate internships should not by themselves carry any credit. However, an individual student may arrange with a faculty member for a research or other academic project to be based on the internship. Arrangements between students and faculty regarding credit are expected to be made well in advance of the internship. Credit should be arranged within departmental rules for directed reading or independent study and should meet the usual department standards. No transfer credit is awarded for internships.

Last Units out of Residence

Students may petition to complete their final 15 units out of residence to complete their degree requirements. The final 15 units of transfer credit must meet the criteria in the undergraduate "Transfer Work (<https://exploreddegrees-nextyear.stanford.edu/undergraduatedegreesandprograms/#transferworktext>)" section of this bulletin. Students must submit the Request for Last Units Out of Residence Petition (<http://studentaffairs.stanford.edu/registrar/forms>) to determine eligibility and to request pre-approval of the transfer work. A registration status is required to graduate. Students should select either the Graduation Quarter or the Permit for Services Only special registration status on the Last Units Out of Residence petition. Refer to the Special Registration Status section of the bulletin for a description of these statuses. An application to graduate should be submitted through Axess.

Concurrent Enrollment (Undergraduate)

Undergraduates may enroll concurrently at Stanford and at another college or university. The following policies apply to concurrent enrollment:

1. Students may not exceed 20 quarter units between both schools. This is the same unit maximum for undergraduates at Stanford. (One semester credit or hour generally equals 1.5 quarter units.)
2. Satisfactory academic progress is determined only by Stanford courses and units. Transfer work completed at other institutions is not considered in this calculation.
3. Students are expected to submit a Request for Transfer Credit Evaluation (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/xfer_credit_request.pdf) for pre-approval of transfer credit prior to enrolling in the transfer institution.

Advanced Placement

Stanford University allows up to 45 units of external credit (90 units for transfer students) toward graduation including work completed in high school as part of the College Board Advanced Placement curriculum. The awarding of such credit is based on Advanced Placement test scores and is subject to University and department approval.

The faculty of a given department determine whether any credit toward the 180-unit requirement can be based on achievement in the College Board Advanced Placement Program in their discipline. Stanford departments electing to accept the Advanced Placement (AP) credit are bound by these University policies:

1. Credit is usually granted for an AP score of 4 or 5. Usually, 10 quarter units are awarded (but occasionally fewer than 10). No more than 10 quarter units may be given for performance in a single examination.
2. Whether credit is to be given for an AP score of 3 is a matter for departmental discretion; up to 10 units may be awarded.
3. No credit may be authorized for an AP score lower than 3.

Performance on an AP exam can indicate the appropriate placement for continuing course work in that subject at Stanford. If students enroll in courses at Stanford for which they received equivalent AP credit, the duplicating AP credit will be removed. The chart below shows the current AP credit and placement policies.

A maximum of 45 quarter units of Advanced Placement (AP), transfer credit, and/or other external credit (such as International Baccalaureate) may be applied toward the undergraduate degree. More than 45 units of AP, transfer, and other external credit may appear on the Stanford University transcript; however, only 45 units can be applied to the minimum units required for the undergraduate degree. Once credit has been posted it cannot be removed from the student record. Stanford University policies on AP and other external credit are subject to review and change on an annual basis. Subjects not listed on this chart are not eligible for AP credit at Stanford University. Students may only receive AP credit for the AP policies that were effective during their matriculation year at Stanford.

Further information is available from the Student Services Center (<http://studentaffairs.stanford.edu/studentsservicescenter>) or on the Registrar's (<http://studentaffairs.stanford.edu/registrar/students/ap>) web site.

AP Scores and Placement

Test Subject	Score	Placement	Quarter Units
Calculus AB (or AB subscore)	5	MATH 51	10
Calculus AB (or AB subscore)	4	MATH 42	5
Calculus BC	4,5	MATH 51	10
Calculus BC	3	MATH 42	5
Chemistry	5	CHEM 33 or above	5
Chinese (Language and Culture) ¹	5	Take placement exam if continuing in this language	10
Computer Science A	4,5	CS 106B or 106X	5
Computer Science AB	4,5	CS 106B, 106X, or 107	5
French (Language) ¹	5	Take placement exam if continuing in this language	10
German (Language) ¹	5	Take placement exam if continuing in this language	10
Japanese (Language and Culture) ¹	5	Take placement exam if continuing in this language	10
Latin (Literature or Virgil) ¹	4,5	Take placement exam if continuing in this language	10
Physics B	5	PHYSICS 25	8
Physics B	4	PHYSICS 23 and 25	4
Physics C Mechanics only	4,5	PHYSICS 43 and 45 or PHYSICS 23 and 25	5
Physics C Mechanics only	3	PHYSICS 41,43 and 45 or PHYSICS 23 and 25	4
Physics C E&M only	4,5	PHYSICS 41 and 45 or PHYSICS 21 and 25	5
Physics C E&M only	3	PHYSICS 41,43 and 45 or PHYSICS 21 and 25	4

Physics C Both Parts	4,5	PHYSICS 45 or PHYSICS 25	10
Physics C Both Parts	3	PHYSICS 41,43 and 45 or PHYSICS 25	8
Spanish (Language) ¹	5	Take placement exam if continuing in this language	10

¹ A score of 4 or 5 on this test fulfills the Language Requirement. A score of 5 is required to receive 10 units of credit.

International Baccalaureate (IB) Transfer Credit

Stanford University awards advanced placement credit for certain International Baccalaureate (IB) and international advanced placement subject examinations. The international test subjects must match the content of the College Board Advanced Placement test subjects that receive advanced placement credit. See the Registrar's web site for detailed information (<https://studentaffairs.stanford.edu/registrar/students/baccalaureate-credit>).

A maximum of 45 quarter units of transfer and test credit may be applied toward the undergraduate degree. Only higher level IB exams with scores of 5 or higher, in the subjects listed below, are eligible for credit. Subjects not listed on this chart are not eligible for IB credit. Scores of 5 or higher on language IB exams fulfill the language requirement. If Stanford courses are taken below the level of the placement course, the duplicating IB units will be removed.

Test Subject	Score	Placement	Quarter Units
Chemistry	5	CHEM 35 or CHEM 135	10
Chinese A1*	5	Take placement exam if continuing in this language	10
Computer Science	4,5	CS 106B or 106X	5
French A1, A2, or B*	5	Take placement exam if continuing in this language	10
German A1, A2, or B*	5	Take placement exam if continuing in this language	10
Japanese A1*	5	Take placement exam if continuing in this language	10
Korean A1*	4,5	Take placement exam if continuing in this language	10
Mathematics	5	MATH 51	10
Physics	6 or higher	PHYSICS 25	8
Physics	5	PHYSICS 23, PHYSICS 25	4
Portuguese A1*	5	Take placement exam if continuing in this language	10
Russian B1*	5	Take placement exam if continuing in this language	10
Spanish A1, A2, or B*	5	Take placement exam if continuing in this language	10

- ¹ A score of 5 on this test fulfills the Language Requirement. A score of 5 is required to receive 10 units of credit.

Undergraduate Transfer Work

Academic credit for work done elsewhere may be allowed toward a Stanford bachelor's degree under the following rules and conditions:

1. Credit may be granted for work completed at institutions in the U.S. only if the institutions are accredited.
2. Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactory work, may be credited toward a Stanford bachelor's degree, subject to the approval of the credit evaluator and the appropriate departments.
3. Credit is officially allowed only after the student has been unconditionally admitted to Stanford.
4. Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned.
5. Credit from another institution may be transferred for courses which are substantially equivalent to those offered at Stanford University on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific undergraduate courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.
6. Course work cannot duplicate, overlap, or regress previous work.
7. Transfer course work cannot count towards secondary school diploma and/or graduation requirements.
8. For students who want to fulfill general education requirements through transfer work and who are subject to the GER system in place prior to Autumn 2013-14, a proposed transfer course must match a specific Stanford course that fulfills the same GER requirement; it must be a minimum of 3 quarter units and have been taken for a letter grade.

For students who want to fulfill general education requirements through transfer work and who are subject to the Ways of Thinking/Doing breadth requirement (instituted in Autumn 2013-14 for incoming first-year students and 2014-15 for incoming transfer students), transfer courses are reviewed to determine if courses can be certified to fulfill WAYS requirements. Courses must be a minimum of 3 quarter units (2 units in the case of Creative Expression only) and must have been taken for a letter grade.

9. Transfer work can be used to satisfy a department major or minor requirement. The transfer work must first be officially accepted into the University through the Office of the University Registrar. Departments determine if approved transfer work can be used to satisfy a department major or minor requirement.
10. The credit allowed at Stanford for one quarter's work may not exceed the number of units that would have been permissible for one quarter if the work had been done at Stanford; for work done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence.
11. Credit is allowed at Stanford for work graded 'A,' 'B,' 'C,' or 'Pass' (where 'Pass' is equivalent to a letter grade of 'C' or above), but not for work graded 'D' or below.
12. No more than 45 (90 for transfer students) quarter units of credit for work done elsewhere may be counted toward a bachelor's degree at Stanford (including advance placement test credit).
13. Credit earned in extension, correspondence, and online courses is transferable only if the university offering the courses allows that credit toward its own bachelor's degree. Such credit is limited to a maximum of 45 quarter units for extension courses, a maximum of 15 quarter units for correspondence and online study, and a maximum of 45 quarter units for the combination of extension, correspondence, and online courses.

14. Credit earned in military training and service is not transferable to Stanford, unless offered by an accredited college or university in the U.S. and evaluated as above by the credit evaluator.

Special Registration Statuses (Undergraduate)

The following reduced-tuition categories can be requested by undergraduates in the final stages of their degree program:

Permit to Attend for Services Only (PSO)

Undergraduates in their terminal quarter who are completing honors theses, clearing incomplete grades, or have completed all requirements and are requiring a registration status to utilize university resources, may petition one time only for PSO status. PSO does not permit any course enrollment. Students should apply to graduate through Axxess if applying for the PSO special registration status. The deadline for the completed PSO petition (<http://studentaffairs.stanford.edu/registrar/forms>) is the Preliminary Study List (<http://studentaffairs.stanford.edu/registrar/students/prelim-study-list>) deadline of the applicable quarter.

13th Quarter

Undergraduates who have completed at least twelve full-time quarters may petition to register for 13th Quarter registration status at a reduced tuition rate for their final quarter, but must register for at least eight units. Undergraduate dual degree students must complete at least fifteen full-time quarters before petitioning for reduced tuition in their final quarter. Students receiving financial aid should check with the Financial Aid Office for eligibility if they are seeking aid beyond 12 quarters of enrollment. Undergraduates should apply to graduate through Axxess if applying for the 13th-quarter special registration status.

Graduation Quarter

Undergraduates may petition one time only for Graduation Quarter in their terminal quarter only if:

1. filing a Request for Last Units Out of Residence (<http://studentaffairs.stanford.edu/registrar/forms>) in order to complete up to 15 final units at another institution; or
2. returning from a discontinued status and filing a Request to Return and Register in Undergraduate Study (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/RR_petitions_returningtostanford.html) in order to confer their degree; or
3. if all degree requirements, including honors theses, have been completed and student requires a registration status to graduate, but will not be using University resources or housing.

Coterm students are only eligible for the Graduation Quarter special registration status if they are conferring both the undergraduate and graduate degree in the same quarter. Undergraduates may be eligible for Graduation Quarter status in these three situations only if the student has completed all graduation requirements and will not be utilizing University resources, including housing. The deadline for the completed Graduation Quarter petition (<http://studentaffairs.stanford.edu/registrar/forms>) is the Preliminary Study List (<http://studentaffairs.stanford.edu/registrar/students/prelim-study-list>) deadline of the applicable quarter.

Minimum Progress for Undergraduates

Undergraduates are expected to finish their degree requirements in a timely fashion. In addition to maintaining academic standing obligations,

students are expected to take courses to progress towards a Bachelor of Arts or a Bachelor of Science. If after 12 quarters, an undergraduate is not on track to complete degree requirements and graduate within the next two quarters, the University may impose requirements with deadlines on a student's course of study. Further, if a student fails to meet those imposed requirements and/or has not after 18 quarters completed all degree requirements, the University may discontinue the student for failure to progress.

Leaves of Absence and Reinstatement (Undergraduate)

Undergraduates are admitted to Stanford University with the expectation that they will complete their degree programs in a reasonable amount of time, usually within four years.

Students on leave of absence are not registered at Stanford and, therefore, do not have the rights and privileges of registered students. They cannot fulfill any official department or University requirements during the leave period. Students on leave may complete course work for which an 'Incomplete' grade was awarded in a prior term and are expected to comply with the maximum one-year time limit for resolving incompletes; a leave of absence does not stop the clock on the time limit for resolving incompletes.

Leaves of absence for undergraduates may not exceed a cumulative total of two years (eight quarters including Summer Quarters).

Voluntary Leave

Students have the option of taking a voluntary leave of absence for up to one year, or four quarters, upon filing a Leave of Absence form with the Office of the University Registrar and receiving approval. Except where unexpected circumstances necessitate an immediate leave, students are expected to file for a voluntary leave of absence 30 days prior to the quarter in which the leave will begin. The leave may be extended for up to one additional year, or four quarters, provided the student files (before the end of the initial one-year leave) a Leave of Absence form for the leave extension with the Office of the University Registrar and receives approval. Leaves requested for a longer period than one year, or four quarters, are approved only in exceptional circumstances (for example, mandatory military service). Leaves of absence for undergraduate students may not exceed a cumulative total of two years (eight quarters including summer quarters).

Undergraduates who take an approved leave of absence while in good standing may enroll in the University for the subsequent quarter with the privileges of a returning student. However, the University may condition its approval of a petition for leave of absence on the student's meeting such requirements as the University deems appropriate in the individual case for the student to be eligible to return (such as, in the case of a leave for medical reasons, proof of treatment and/or an interview with a provider at Vaden Health Center (<http://vaden.stanford.edu>) or Counseling and Psychological Services (<http://vaden.stanford.edu/caps>) or its designee).

New freshmen and transfers are required to register in Autumn Quarter and may not take a leave of absence prior to or during their first quarter, except with the permission of the Vice Provost for Undergraduate Education (or his or her designee) under rare and exceptional circumstances. However, new Stanford students may request a deferment from the Office of Undergraduate Admission.

Undergraduates who wish to withdraw from the current quarter, or from a quarter for which they have registered in advance and do not wish to attend, must file a leave of absence petition (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/leaveofabsence.pdf>) with and receive approval from the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall.

Information on tuition refunds is available in the "Refunds (p. 22)" section of this bulletin. For a full refund, petitions must be received by the Office of the University Registrar no later than the first day of classes for the quarter.

Mandatory Leave

A mandatory leave of absence can be imposed in circumstances in which a student:

- presents a substantial risk of harm to self or others or is failing to carry out substantial self-care obligations; or
- significantly disrupts the educational or other activities of the University community; or
- is unable to participate meaningfully in educational activities; or
- requires a level of care from the University community that exceeds the resources and staffing that the University can reasonably be expected to provide for the student's well-being.

Students whose circumstances warrant a review under the Dean's Mandatory Leave of Absence Policy, will be apprised, in writing, of University concerns by the Dean of Student Life and will be provided an opportunity to respond to concerns in writing or in person or via telephone before a review committee convened by the Dean of Student Life. Students placed on involuntary leave of absence can appeal an unfavorable decision to the Vice Provost for Student Affairs. The University can condition a student's return to registered student status on such requirements as the University deems appropriate in the individual case (such as, in the case of a leave for medical reasons, proof of treatment of an interview with a health care professional at Vaden Health Center (<http://vaden.stanford.edu>) or Counseling and Psychological Services (<http://vaden.stanford.edu/caps>) or its designee). The Dean of Student Life publishes the full Dean's Mandatory Leave of Absence Policy (<http://studentaffairs.stanford.edu/studentlife/involuntary-leave>) on its web site.

When a student is granted or placed on a leave of absence after the beginning of the term, courses in which the student was enrolled after the final study list deadline appear on the student's transcript and show the symbol 'W' (withdraw). For additional information regarding satisfactory academic progress, refer to the "Academic Standing" section of this bulletin. Information on tuition refunds is available in the "Refunds (p. 22)" section of this bulletin.

Discontinuation and Reinstatement

A student's academic degree program may be discontinued if the student:

- fails to be enrolled by the study list deadline; or
- fails to be approved for a leave of absence by the start of the term; or
- voluntarily terminates undergraduate studies; or
- is dismissed for academic reasons; or
- is expelled from the University.

Students who fail to be either enrolled by the final study list deadline, or have exceeded their eight quarters of approved leave, or who fail to submit a Leave of Absence petition by the published deadline, must apply for reinstatement through the Request to Return and Register in Undergraduate Study. The University is not obliged to approve reinstatements of students. Applications for reinstatement are reviewed by the Vice Provost for Undergraduate Education and are subject to the approval of the Faculty Senate Committee on Undergraduate Standards and Policy or its designees. The Committee or its designees may determine whether the application for reinstatement will be approved or not, and/or the conditions a student must meet in order to be reinstated. Reinstatement decisions are in the discretion of the University and may be based on the applicant's status when last enrolled, activities while away from campus, the length of the absence, the perceived potential for successful completion of the program, as well as any

other factors or considerations regarded as relevant to the Vice Provost for Undergraduate Education or the Committee.

Applications for reinstatement through the Request to Return and Register in Undergraduate Study, must be submitted eight weeks prior to the start of the term in which the student seeks to enroll in classes. Information and instructions may be obtained by contacting the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising Research (UAR), Sweet Hall.

Students who have been expelled from Stanford University are not permitted to apply for reinstatement.

Leaves of absence and reinstatement of graduate students are addressed in the "Graduate Degrees (p. 43)" section of this bulletin.

Conferral of Degrees

Upon recommendation to the Senate of the Academic Council by the faculty of the relevant departments or schools and the Committee on Undergraduate Standards and Policy, degrees are awarded four times each year, at the conclusion of Autumn, Winter, Spring, and Summer quarters. All diplomas, however, are prepared and distributed after degree conferral in accordance to the distribution dates listed on the Registrar's Office (<http://studentaffairs.stanford.edu/registrar/students/diplomas>) web site.

Students must apply for conferral of an undergraduate or graduate degree by filing an Application to Graduate through Axess by the deadline for each term. The deadlines are published in the Academic Calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). A separate application must be filed for each degree program and for each conferral term.

Requests for conferral are reviewed by the Office of the University Registrar and the student's department, to verify completion of degree requirements. Registration is required in the conferral term. Students with unmet financial or other University obligations resulting in the placement of a hold on their registration cannot receive a transcript, statement of completion, degree certificate, or diploma until the hold is released. An academic record where no other degree objective is being pursued is permanently frozen after the final degree conferral, and all subsequent grade change requests or changes to the student record are not permitted.

Students are typically expected to apply to graduate during the term in which they expect to be awarded a degree. The University, however, reserves the right to confer a degree on a student who has completed all of the requirements for a degree even though the student has not applied to graduate; such an individual would then be subject to the University's usual rules and restrictions regarding future enrollment or registration.

Students who wish to withdraw a request for conferral or make changes to the Application to Graduate should notify the Student Services Center (<http://www.stanford.edu/group/studentservicescenter>) in writing through the Withdrawal of Application to Graduate Form (<http://studentaffairs.stanford.edu/registrar/forms>) by the late application to graduate deadline on the academic calendar. Students who withdraw their graduation applications or fail to meet degree requirements must reapply to graduate in a subsequent term.

Stanford University awards no honorary degrees.

Undergraduate Major Unit Requirements

Undergraduate Major Unit Requirements

The Writing in the Major (WIM) courses listed below reflect courses, offered in past or present years, which satisfy the WIM requirement for majors applying to graduate in the current academic year. Such WIM courses may or may not be offered in the current year. Consult the applicable department section of the Bulletin or ExploreCourses (<http://explorecourses.stanford.edu>) for more information.

School of Earth Sciences

Major Department	Units required outside the dept./program	Units required within the dept./program	Total # of units	Notes/Special Requirements	WIM Course
Earth Systems	62-111	24	90-134	internship, senior seminar	EARTHSYS 195, EARTHSYS 200
Energy Resources Engineering	77-86	33-34	110-120	Senior Project and Seminar (ENERGY 199)	ENERGY 199
Geological & Environmental Sciences	36-53	54-68	93-110	advanced summer field experience	GES 150, GEOPHYS 199
Engineering Geology & Hydrogeology	55-81	19-31	85-101	-	GES 150, GEOPHYS 199
Geophysics	43-45	15	min. 58	-	GES 150, GEOPHYS 199

School of Engineering

Major Department	Units required outside the dept./program	Units required within the dept./program	Total # of units	Notes/Special Requirements	WIM Course
Aeronautics and Astronautics	46	59	min, 105		AA 190
Architectura Design	40	60	100	-	CEE 100

Atmosphere/50 Energy	51-53	101-103	-	CEE 100, EARTHSYS 200, HUMBIO 4B, MS&E 152W, MS&E 197
Bioengineer:59-66	60-62	119-128	-	BIOE 131
Biomechanics:46-65 Engineering	53-64	99-116	-	ENGR 199W with directed research units; ME 112; ME 131A; ME 140
Biomedical 51-65 Computer	47-56	109-114	Two quarters guided research	ENGR 199W with directed research units (preferred), CS 191W, or CS 272 / BIOMEDIN 212
Chemical min. 70 Engineering	50	min. 120	-	CHEMENG 185A
Civil min. 57 Engineering	min. 59	min. 116	-	CEE 100
Computer min. 29 Science	min. 36	96-106	senior project	CS 181W, CS 191W, CS 194W, CS 210B, CS 294W
Electrical 40 Engineering	60	100	EE191W may satisfy WIM only if it is a follow- up to an REU or independent study project, where a faculty agrees to provide supervision of writing a technical paper and with suitable support from the Writing Center.	EE 109, EE 133, EE 134, EE 168, EE 191W, CS 194W, EE 152, EE 153

Engineering min. 48 Physics	min. 45	min. 93	at least 45 units in Engineering Fundamentals Depth and elective courses must be engineering units	EE 152, ENGR 199W with research or, depending upon specialty track, one of the following: BIOE 131, CS 181W, EE 134, MATSCI 161, MATSCI 164, ME 112, ME 131A & ME 140, PHYSICS 107
Environmen Engineering		93-97	-	CEE 100
Environment:39 Systems Engineering	57	96	Capstone course	COMM 120W, MS&E 152W, MS&E 193, MS&E 197, EARTHSYS 195, ENVRES 200, CEE 100
Individually 41 Designed Major	40	90-107	-	see adviser
Management:54-71 Science and Engineering	40-59	102-120		MS&E 152W, MS&E 193W, MS&E 197
Material min. 53 Science and Engineering	min. 50	min 103	-	MATSCI 161, MATSCI 164
Mechanical 48 Engineering	68	116	-	3-course required sequence to fulfill WIM for ME majors: ME 131A, ME 112, ME 140
Product min. 58 Design	55	113		ME 112

School of Humanities and Sciences

Major Department	Units required outside the dept./ program	Units required within the dept./ program	Total # of units	Notes/Special Requirement	WIM Course
African and African American Studies	50	10	60	AAAS thesis seminar	AFRICAAM 200X
American Studies	20-25	35-40	60	-	AMSTUD 160
Anthropology	5	50	65	ANTHRO 192: Capstone Course: Careers in Anthropology	ANTHRO 90B, ANTHRO 90C
Archaeology	45	20	65	foreign language 1st qtr. at 2nd-year level	ARCHLGY 103
Art History	-	61	61	library orientation, junior seminar	ARTHIST 294
Asian American Studies	40	20	60	core curriculum, foundational course, senior research	CSRE 200X
Biology	min.	min. 49	88-107	fields of study have different unit ranges	BIO 107, BIO 137, BIO 145, BIO 196A, BIO 197WA; BIO 199W; BIOHOPK 44Y, BIOHOPK 184H, BIO 44Y, BIO 168
Chemistry	31	50	81	-	CHEM 134
Chicana/o Studies	40	20	60	core curriculum, foundational course, senior research	CSRE 200X
Chinese	0-16	29-44	min. 45	Capstone course:	CHINGEN 133, CHINGEN 198
Classics	-	-	60-65	majors seminar (CLASSICS 150)	CLASSICS 150 (Formerly CLASSGEN 176)
Communication	5	min. 60	65	-	COMM 104W, COMM 120W, COMM 137W, COMM 142W
Comparative-Literature	-	min. 40	65	-	Gateway course: 101, Core: 121, 122, 123, Capstone course: 199, 3 electives in COMPLIT
Comparative Studies in Race & Ethnicity	45	15	60	-	core curriculum, thematic concentration senior research
East Asian Studies	75	1	76	-	Capstone course; overseas studies in E. Asian country 1 qtr; senior essay
Economics	-	80	80	-	ECON 101
English	-	68-80	68-80	-	ENGLISH 164; ENGLISH 196A, ENGLISH 164C
English w/ Creative Writing	-	73-75	73-75	dept. approval	ENGLISH 164; ENGLISH 196A, ENGLISH 164C
English w/ Interdisciplinary Emphasis	15	58-60	73-75	dept. approval and interdisciplinary paper	ENGLISH 164; ENGLISH 196A, ENGLISH 164C
English w/ Interdepartmental Emphasis	16-20	53-55	69-75	16-20 units in foreign lang. lit.; dept. approval	ENGLISH 164; ENGLISH 196A, ENGLISH 164C
English w/ Philosophy	20-25	57-59	77-84	-	ENGLISH 164; ENGLISH 196A, ENGLISH 164C

Feminist Studies	45	18 core	63	focus statement; practicum	AMSTUD 160, ANTHRO 90B, FEMGEN 105, LINGUIST 150, FEMGEN 157
Film and Media Studies	-	65	65	library orientation, senior seminar	FILMSTUD 101
French	-	32	56	-	FRENCH 130, FRENCH 131, FRENCH 132, FRENCH 133
French and Philosophy	min. 21	32 above #100	65	Gateway course; capstone	FRENCH 130, FRENCH 131, FRENCH 132, FRENCH 133
German	0-25	35-60	60	3 above #130	GERMAN 116, GERMAN 123, GERMAN 190
German and Philosophy	min. 21	min. 39	65	Gateway course; capstone	GERMAN 116, GERMAN 123, GERMAN 190
History	-	63-65	63-65	3 from #200-298	HISTORY 209S
Human Biology	min. 10	min. 39	min. 84	Internship	HUMBIO 4B
Iberian and Latin American Cultures	0	40	60	core courses	ILAC 120, ILAC 159
Individually - Designed Major	-	75	all above #100	honors thesis	see adviser
International Relations	55-70	0-15	70	2 yr. foreign lang; Overseas studies 1 qtr.	INTNLREL 140A, INTNLREL 140C; INTNLREL 174; INTNLREL 200B; MS&E 193; MS&E 197; POLISCI 110C; POLISCI 110D; POLISCI 148
Italian	-	32	60	-	ITALIAN 127, ITALIAN 128, ITALIAN 129
Italian and Philosophy	min. 21	32 above #100	65	Gateway course; capstone	ITALIAN 127, ITALIAN 128, ITALIAN 129
Japanese	0-20	25-44	min. 45	Capstone course: 198-	JAPANGEN 138
Jewish Studies (Individually Designed)	75-77	-	75-77	-	CSRE 200X
Linguistics	-	50	50	foreign language at 6th-quarter level	LINGUIST 121; LINGUIST 130A; LINGUIST 140; LINGUIST 150
Mathematic- & Computator Science	-	-	73-78	-	CS 181W; MATH 109; MATH 110; MATH 120; MATH 171; STATS 155 (previously STATS 166)

Mathematics	up to 15 units	49	64	-	MATH 109; MATH 110; MATH 120; MATH 171	124R; POLISCI 132S; POLISCI 148; POLISCI 212C; POLISCI 215; POLISCI 224T; POLISCI 236; POLISCI 240J; POLISCI 243R; POLISCI 293
Music	-	62-78	62-78	Total units dependent upon selected, optional concentration area	3 from the following: MUSIC 140J, MUSIC 141, MUSIC 142, MUSIC 143J, MUSIC 144J, MUSIC 145J, MUSIC 146, MUSIC 147J, MUSIC 147A, MUSIC 147C, MUSIC 148, MUSIC 149, MUSIC 251	
Native American Studies	40	20	60	core curriculum, foundational course, senior research	CSRE 200X	introductory course, majors' seminar, senior essay or honors thesis, senior colloquium
Philosophy	-	55	55	course in 194 series	PHIL 80	
Philosophy and Literature	min. 15	min. 47	65	Gateway course; 194	PHIL 80	
Philosophy and Religious Studies	-	60	60	3 seminars; 20 units in each dept. + 20 advanced units from both depts.	PHIL 80 or RELIGST 290	
Physics	21-23	58-59	79-82	-	PHYSICS 107	
Political Science	0	70	70	Introductory course in primary and secondary concentration; advanced seminar (200 or 300 level)	POLISCI 3P/136S; POLISCI 110C; POLISCI 110D; POLISCI 120C; POLISCI 121; POLISCI	
Psychology	10	60	70	-		PSYCH 55; PSYCH 60; PSYCH 70; PSYCH 75; PSYCH 105; PSYCH 138
Public Policy	52	30	82			PUBLPOL 106
Religious Studies	-	60	60			introductory course, majors' seminar, senior essay or honors thesis, senior colloquium
Russian Language & Literature	0-10	46-56	56			1st- and 2nd- year Russian
Russian Language, Culture, & History	12-20	36-39	56			1st- and 2nd- year Russian
Russian Literature & Philosophy	21	40	67			Gateway course; capstone
Science, Technology, & Society (B.A.)	max. 72	min. 10	min. 82			Gateway course; capstone
						ANTHRO 90C; CS 181W; COMM 120W; HISTORY 140A; HISTORY 232F; MS&E 193W; MS&E 197

Science, Technology, & Society (B.S.)	max. 72	min. 10	min. 82	Gateway course: capstone	ANTHRO 90C; CS 181W; COMM 120W; HISTORY 140A; HISTORY 232F; MS&E 193W; MS&E 197
Slavic Languages and Literatures	-	-	-	-	SLAVIC 146
Sociology	5-15	45-55	60		SOC 200, SOC 202
Spanish	0	35	60	Spanish Proficiency Notation required	ILAC 120
Studio Art	-	65	65	library orientation, advanced seminar	ARTHIST 294
Symbolic Systems	66-81	4	70-85	-	PHIL 80
Theater and Performance Studies	-	60	60	Gateway course: capstone	TAPS 1, TAPS 151T, TAPS 161H, TAPS 167H
Urban Studies	34	36	70	20 units in concentration; capstone courses	URBANST 203; URBANST 202

section of this bulletin. For University application forms, see the Coterminal Forms (<http://studentaffairs.stanford.edu/registrar/forms/coterm>) web page.

Coterminal Programs Residency Requirement

The University minimum requirements for the coterminal bachelor's/master's program are as follows:

1. 180 units for the bachelor's degree plus 45 (or higher departmental requirement, as determined by each graduate department) unduplicated units for the master's degree.
2. The requirements for the coterminal program with dual undergraduate degrees are 225 units for the two bachelor's degrees, and 45 units for the master's degree.

For the 45-unit University minimum for the master's degree, all courses must be at or above the 100 level and 50 percent must be courses designated primarily for graduate students (typically at least at the 200 level). Department requirements may be higher. Units for a given course may not be counted to meet the requirements of more than one degree, that is, no units may be double-counted. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree. Master's degrees may not be conferred with fewer than 45 units.

Application and Admission Application

Effective Autumn Quarter 2013-14, students who accept an offer of admission and are matriculated into the program are assessed a \$125 coterm application fee.

Applications for admission to a coterminal program must fulfill the following conditions:

- Applicants must have earned a minimum of 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. This includes allowable Advanced Placement (AP) and transfer credit.
- Applicants must submit their application and, if admitted, respond to the offer of admission no later than the quarter prior to the expected completion of their undergraduate degree. This is normally the Winter quarter prior to Spring quarter graduation.
- Applicants must meet the requirements and deadlines established by the department or program to which they are applying.
- Applicants are only permitted to apply to one coterminal program per term.
- Coterminal students must have the bachelor's degree conferred before adding a second advanced degree program.

To apply for admission to a coterminal master's program, students must submit to the prospective graduate department the following:

- Application for Admission to Coterminal Masters' Program (<http://registrar.stanford.edu/pdf/CotermApplic.pdf>),
- statement of purpose,
- preliminary program proposal,
- two letters of recommendation from Stanford professors,
- and a current Stanford transcript.

Graduate Record Examination (GRE) scores or other requirements may be specified by the prospective department.

Admission

Each master's department is responsible for admissions/acceptance decisions for coterminal applicants. Departments or programs must admit

Coterminal Bachelor's and Master's Degrees

Coterminal Degrees

The coterminal degree program allows undergraduates to study for a master's degree while completing their bachelor's degree(s) in the same or a different department. Undergraduates with strong academic records may apply for admission to a coterminal master's program upon completion of 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. Full-time enrollment during Summer Quarters, as well as allowable undergraduate transfer credit, are also counted towards quarters of undergraduate study. Students who wish to apply for a master's program after these deadlines must apply through the regular graduate admissions process.

The specific University residency, unit requirement, and additional policies for a bachelor's/master's program are described under the Graduate Degrees

coterminal applicants and submit the completed and approved application for admission to the Office of the Registrar no later than the quarter prior to the expected completion of the undergraduate degree. This is normally the last day of classes in Winter quarter prior to Spring quarter graduation.

Students may defer admission to the coterminal program to a later quarter as long as they still meet all University and departmental requirements for coterminal admission, and the coterminal application has not yet been processed. This may require postponement of conferral of the undergraduate degree.

Admitted students must have one quarter of overlap in the undergraduate and graduate career prior to conferring their undergraduate degree. For example, if the admit term for the coterminal program is Autumn quarter then the earliest that the undergraduate degree can be conferred is Autumn quarter.

Tuition

For coterminal students, the quarter following completion of 12 full-tuition undergraduate quarters is identified as the first graduate quarter for tuition assessment. Beginning with this quarter (13th quarter), coterminal students are subject to graduate student policies and procedures (including those described in the "Graduate Degrees" section of this bulletin) in addition to undergraduate minimum progress standards. These policies include continuous registration or leaves of absence for quarters not enrolled and minimum progress guidelines. Tuition and Fee information for 2013-14 (http://studentaffairs.stanford.edu/registrar/students/tuition-fees_13-14) is available on The Office of the University Registrar web site.

Undergraduate Tuition Assessment

Students will normally remain in the undergraduate coterminal student group until the completion of 12 undergraduate quarters.

- Students in the undergraduate coterminal student group are assessed the undergraduate tuition rate, and are subject to the 20-unit maximum enrollment per quarter. Students enrolled in over 20 units are subject to an enrollment hold effective the following quarter.
- Students in the undergraduate coterminal group who have fewer than 12 quarters at Stanford but who want to enroll at the 8, 9, 10 unit graduate or graduate Engineering tuition rate may request to be moved to the graduate coterminal student group under the following conditions
 - They must have completed 180 undergraduate units. This includes transfer credit but not AP and other external test credit.
 - Once students have moved to the graduate coterminal student group, they may not move back to the undergraduate coterminal student group.

Graduate Tuition Assessment

For coterminal students, the quarter following completion of 12 full-tuition undergraduate quarters is identified as the first graduate quarter for tuition assessment. Thus, coterminal students are changed from the undergraduate to the graduate coterminal student group in the 13th quarter and are then assessed either the regular graduate tuition rate or the graduate Engineering tuition rate.

- Students in the graduate coterminal student group are assessed the graduate tuition rate, and are subject to the 24-unit maximum enrollment per quarter. Students enrolled in over 24 units are subject to an enrollment hold effective the following quarter.
- For coterminal students with two undergraduate degrees, the quarter following completion of 15 full-tuition undergraduate quarters is identified as the first graduate quarter for tuition assessment. Thus,

coterminal students are changed from the undergraduate to the graduate coterminal student group in the 16th quarter and are then assessed either the regular graduate tuition rate or the graduate Engineering tuition rate.

- Beginning with the first graduate coterminal student group quarter, coterminal students are subject to graduate student policies and procedures (including those described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4902.htm>)" section of the *Stanford Bulletin*) in addition to undergraduate minimum progress standards. These policies include continuous registration or leaves of absence for quarters not enrolled and minimum progress guidelines.
- Once students have moved to the graduate coterminal student group, they may not move back to the undergraduate student group.
- Coterminal students are not eligible for reduced graduate tuition rates below 8 units prior to conferral of the undergraduate degree.
- Students in the graduate coterminal student group are assessed additional graduate or Engineering tuition on a per-unit basis beginning with the 19th unit.

Assistantships

Students who receive Research Assistant (RA) or Teaching Assistant (CA/TA) appointments from the department prior to the 13th quarter (or 16th quarter for students completing two undergraduate degrees) are changed to the graduate coterminal student group and assessed the applicable graduate tuition rate for the quarter in which they hold the assistantship appointment. Student or department must notify Student Services Center through a HelpSU ticket to change to graduate or graduate Engineering tuition. The following conditions must apply:

- Students must have completed 180 undergraduate units (or 225 for students completing two undergraduate degrees) to be eligible for research or teaching assistantships. Advanced placement and transfer units may be used towards the 180 units (or 225 for students completing two undergraduate degrees), subject to university policies regarding the acceptance of external credit.
- Once students have moved to the graduate coterminal student group, they may not move back to the undergraduate coterminal student group even if they no longer hold an assistantship appointment.
- Student or department should submit a HelpSU (<https://remedyweb.stanford.edu/helpsu/helpsu?pcat=StuAcct&dtag=10772>) ticket to request to be moved to graduate billing.

Graduate Tuition Option

Students who have fewer than 12 quarters at Stanford but who want to enroll at the 8, 9, 10 unit graduate or graduate Engineering tuition rate may request to the Student Services Center to be moved to the graduate coterminal student group under the following conditions:

- They must have completed 180 units. This includes transfer credit but not AP and other external test credit.
- Once students have moved to the graduate coterminal student group, they may not move back to the undergraduate coterminal student group.
- Coterminal students should submit a HelpSU (<https://remedyweb.stanford.edu/helpsu/helpsu?pcat=StuAcct&dtag=10772>) ticket to request to be moved to graduate billing.

Degree Progress Academic Progress

Once the student is in the Graduate Coterminal Student Group (for tuition purposes), coterminal students are subject to graduate student policies and procedures, as described in the "Graduate Degrees" section of the *Stanford Bulletin*, in addition to undergraduate minimum progress standards.

Up until the conferral of the undergraduate degree(s), coterminal students' academic progress is monitored by the Undergraduate Advising and Research Office (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/NBY_Coterm.html) (UAR, part of the office of the Vice Provost for Undergraduate Education) in conjunction with the graduate department. After the conferral of the undergraduate degree, the students' degree progress is evaluated using the graduate degree progress standards and monitored by the adviser and graduate department.

Once the coterminal student is subject to graduate degree progress standards, all courses taken during a quarter, whether enrolled in the undergraduate or graduate career, are used to evaluate graduate minimum progress.

Coterminal Course Transfer

Coterminal students are permitted to count coursework taken in the two quarters immediately prior to their first graduate quarter toward their graduate degree (Summer quarter is not included in the two quarter back count). However, if a student is on an approved leave of absence in the two quarters prior to the admit term, the course transfer option may not be applicable. All course transfer requests should be submitted no later than the Final Study List Deadline of the intended degree conferral quarter. Course work cannot be transferred once the undergraduate degree is conferred.

Advising and Time Limit

In the first graduate quarter, a coterminal student is assigned an adviser in the master's department for assistance in planning a program of study to meet the requirements for the master's degree. The plan is outlined on the Program Proposal for a Master's Degree, which is approved by the master's department by the end of the first graduate quarter. Authorizations for master's programs expire three calendar years from the first graduate quarter. An extension requires review of academic performance by the department, and is in the discretion of the department.

Degree Conferral

Conferral of each degree is applied for separately by the deadlines given in the Academic Calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>) web site. The master's degree must be conferred simultaneously with, or after, the bachelor's degree.

Coterminal students must have the bachelor's degree conferred before adding a second advanced degree program. Courses may not be transferred between undergraduate and graduate careers once the undergraduate degree is conferred.

Graduate Degrees

General Requirements

For each Stanford advanced degree, there is an approved course of study that meets University and department requirements. The University's general requirements, applicable to all graduate degrees at Stanford, are described below. University requirements pertaining to only a subset of advanced degrees are described in the "Degree-Specific Requirements, Master's Degrees (p. 44)" and "Degree-Specific Requirements, Doctoral Degrees (p. 45)" sections.

See the "Graduate Programs" section of each department's listing for specific department degree requirements. Additional information on professional school programs is available in the bulletins of the Graduate School of Business, the School of Law, and the School of Medicine.

Enrollment Requirements

Graduate education at Stanford is a full-time commitment requiring full-time enrollment, typically at least 8 units. For a complete definition of full-time enrollment, see the "Certification of Enrollment or Degrees (p. 64)" section of this bulletin. Unless permission is granted by the department (for example for field work) enrolled graduate students must maintain a significant physical presence on campus throughout each quarter a student is enrolled.

Requests to enroll for fewer than 8 units during the academic year are approved only in specific circumstances. Students enrolled in the Honors Cooperative or the Master of Liberal Arts programs are permitted part-time enrollment on a regular basis. Graduate students who need only a few remaining units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 7 units) to cover the deficiency (see the "Graduate Tuition Adjustment (p. 18)" section of this bulletin). Students with disabilities covered under the Americans with Disabilities Act may enroll in a reduced course load (RCL) as recommended by the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>) (OAE). Women students may request up to two quarters of part-time enrollment for an approved Childbirth Academic Accommodation; see the "Childbirth Accommodation Policy (p.)" section of this bulletin and the GAP 5.9, Childbirth Accommodation (<http://gap.stanford.edu/5-9.html>).

Graduate students must enroll in courses for all terms of each academic year (Autumn, Winter, and Spring quarters) from the admission term until conferral of the degree. The only exception to this requirement occurs when the student is granted an official leave of absence. Failure to enroll in courses for a term during the academic year without taking a leave of absence (p. 51) results in denial of further enrollment privileges unless and until reinstatement to the degree program is granted and the reinstatement fee paid. As a general proposition, registration in Summer Quarter is not required and does not substitute for registration during the academic year. Students possessing an F-1 or J-1 student visa may be subject to additional course enrollment requirements in order to retain their student visas.

In addition to the above requirement for continuous registration during the academic year, graduate students are required by the University to be registered:

1. In each term during which any official department or University requirement is fulfilled, including qualifying exams or the University oral exam. The period between the last day of final exams of one term and the day prior to the first day of the following term is considered an extension of the earlier term, with the option of considering the two weeks preceding the start of Autumn Quarter as part of Autumn Quarter (rather than as part of Summer Quarter). See details below.
2. In any term in which a University dissertation/thesis is submitted or at the end of which a graduate degree is conferred.
3. Normally, in any term in which the student receives financial support from the University.
4. In any term for which the student needs to use University facilities.
5. For international students, in any term of the academic year (summer may be excluded) for which they have non-immigrant status (i.e., a J-1 or F-1 visa).

Individual students may also find themselves subject to the registration requirements of other agencies (for example, external funding sources such as federal financial aid). Course work and research are expected to be done on campus unless the department gives prior approval.

Degree programs have the option to include the two weeks before the start of Autumn Quarter as part of Autumn Quarter for the purposes of completing milestones and departmental requirements. The following considerations apply to this exception:

1. The student must enroll in the subsequent Autumn Quarter in the applicable standard enrollment category prior to the completion of the milestone; a leave of absence is not permitted for that Autumn Quarter.
2. A student exercising this option will not be eligible for Graduation Quarter status until the following Winter Quarter at the earliest.
3. This exception is permitted only for milestones administered by the department, such as qualifying examinations or University oral examinations.
4. This exception does not apply to deadlines administered through Stanford University, such as filing the Application to Graduate, or Dissertation/Thesis submission.
5. Degree programs are not obligated to exercise this option solely because a student requests it.

Degree-Specific Requirements (Master's Degrees)

Master of Arts and Master of Science

In addition to completing the general requirements for advanced degrees and the specified program requirements, candidates for the degree of Master of Arts (M.A.) or Master of Science (M.S.) must outline an acceptable program of study on the Master's Degree Program Proposal and complete their degrees within the time limit for completion of the master's degree.

Master's Program Proposal

Students pursuing an M.A., M.F.A., M.S., or M.P.P. degree are required to submit an acceptable program proposal to their department during the first quarter of enrollment. Coterminal students must submit the proposal during the first quarter after admission to the coterminal program. The program proposal establishes a student's individual program of study to meet University and department degree requirements. Students must amend the proposal formally if their plans for meeting degree requirements change.

In reviewing the program proposal or any subsequent amendment to it, the department confirms that the course of study proposed by the student fulfills all department course requirements (for example, requirements specifying total number of units, course levels, particular courses, sequences, or substitutes). The department confirms that all other department requirements (for example, required projects, foreign language proficiency, or qualifying exams) are listed on the form and that all general University requirements (minimum units, residency, and so on) for the master's degree will be met through the proposed program of study. Students who fail to submit an acceptable proposal may be dismissed.

Time Limit for Completion of the Master's Degree

All requirements for a master's degree must be completed within three years after the student's first term of enrollment in the master's program (five years for Honors Cooperative students). Students pursuing a coterminal master's degree must complete their requirements within three years of their first quarter of graduate standing.

The time limit is not automatically extended by a student's leave of absence. All requests for extension, whether prompted by a leave or some other circumstance, must be filed by the student before the conclusion of the program's time limit. Departments are not obliged to grant an extension. The maximum extension is one additional year. Extensions require review of academic progress and any other factors regarded as relevant by the department, and approval by the department; such approval is at the department's discretion.

Master of Public Policy

The degree of Master of Public Policy (M.P.P.) is a two-year program leading to a professional degree. Enrollment in the M.P.P. program is limited to candidates who have earlier been accepted to another Stanford graduate degree program and to recent (within three years) Stanford graduates. In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Public Policy (<http://stanford.edu/dept/registrar/bulletin/6616.htm>)" section of this bulletin, candidates for the degree of Master of Public Policy (M.P.P.) must outline an acceptable program of study on the Master's Degree Program Proposal and complete their degrees within the time limit for completion of the master's degree.

Master of Business Administration

The degree of Master of Business Administration (M.B.A.) is conferred on candidates who have satisfied the requirements established by the faculty of the Graduate School of Business and the general requirements for advanced degrees. Full particulars concerning the school requirements are found on the M.B.A. program web site of the Graduate School of Business (<http://www.gsb.stanford.edu/mba/academics>). The M.B.A. must be completed within the time limit for completion of the master's degree.

Master of Fine Arts

In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Art and Art History (<http://stanford.edu/dept/registrar/bulletin/7148.htm>)" section of this bulletin, candidates for the degree of Master of Fine Arts (M.F.A.) must outline an acceptable program of study on the Master's Degree Program Proposal and complete their degrees within the time limit for completion of the master's degree.

Master of Liberal Arts

The Master of Liberal Arts (M.L.A.) program is a part-time interdisciplinary master's program in the liberal arts for returning adult students. In addition to completing the general requirements for advanced degrees, candidates for the degree of Master of Liberal Arts (M.L.A.) must complete their degrees within five years, an exception to the rule specified above.

Engineer

In addition to completing the general requirements for advanced degrees and the requirements specified by their department, candidates for the degree of Engineer must be admitted to candidacy and must complete a thesis per the specifications below.

Candidacy

The Application for Candidacy for Degree of Engineer is an agreement between the student and the department on a specific program of study to fulfill degree requirements. Students must apply for candidacy by the end of the second quarter of the program. Honors Cooperative students must apply by the end of the fourth quarter of the program. Candidacy is valid for five calendar years.

Thesis

A University thesis is required for the Engineer degree. Students have the option of submitting the thesis electronically or via the paper process. Standards for professional presentation of the thesis have been established by the Committee on Graduate Studies. Directions for preparation of the thesis for electronic or paper submission are available at the Office of the University Registrar dissertation/thesis (<http://studentaffairs.stanford.edu/registrar/students/dissertation-thesis>) web site.

The deadline for submission of theses for degree conferral in each term is specified by the University academic calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). If submitting via the paper process, three copies of the thesis, bearing the approval of the adviser under whose supervision it was prepared, must be submitted to the Office of the University Registrar before the quarterly deadline listed on the University academic calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). A fee is charged for binding copies of the paper thesis. If submitting via the electronic process the signed thesis signature page and title page must be submitted to the Student Services Center (<http://www.stanford.edu/group/student-services-center>) and one final copy of the thesis must be uploaded, and approved by the Final Reader, on or before the quarterly deadline indicated in the University's academic calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). There is no fee charged for the electronic submission process.

Students must be registered or on graduation quarter in the term in which they submit the thesis; see "Graduation Quarter (<http://stanford.edu/dept/registrar/bulletin/4941.htm>)" section of this bulletin for additional information. At the time the thesis is submitted, an Application to Graduate must be on file, all department requirements must be complete, and candidacy must be valid through the term of degree conferral.

Master of Legal Studies

The Master of Legal Studies degree (M.L.S.), a nonprofessional degree, is conferred upon candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the Stanford Law School over not less than one academic year and who otherwise have satisfied the requirements of the University and the Stanford Law School. The Stanford Law School Student Handbook (pdf) provides detailed information on degree requirements.

Master of Laws

The degree of Master of Laws (L.L.M.) is conferred upon candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the Stanford Law School over not less than one academic year and who otherwise have satisfied the requirements of the University and the Stanford Law School.

The degree is designed for foreign graduate students trained in law and is available only to students with a primary law degree earned outside the United States. The L.L.M. program offers students a choice of three areas of specialization: Corporate Governance and Practice; Law, Science, and Technology; or International Economic Law, Business, and Policy. The Stanford Law School Student Handbook (http://www.law.stanford.edu/experience/studentlife/SLS_Student_Handbook2011.pdf) (pdf) provides detailed information on degree requirements.

Master of the Science of Law

The degree of Master of the Science of Law (J.S.M.) is conferred upon candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the Stanford Law School over not less than one academic year and who otherwise have satisfied the requirements of the University and the Stanford Law School.

The degree is primarily designed for those qualified students who hold a J.D. or its equivalent and who are at the Stanford Law School for independent reasons (for example, as teaching fellows) and who wish to combine work toward the degree with their primary academic activities. Specially qualified lawyers, public officials, academics, and other professionals who have worked outside the United States may apply for the degree through the Stanford Program in International Legal Studies (SPILS). The Stanford Law School Student Handbook (<http://www.law.stanford.edu/experience/studentlife/>

(http://www.law.stanford.edu/experience/studentlife/SLS_Student_Handbook2011.pdf) (pdf) provides detailed information on degree requirements.

Degree-Specific Requirements (Doctoral Degrees)

Doctor of Jurisprudence

The degree of Doctor of Jurisprudence (J.D.) is conferred on candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the Stanford Law School over not less than three academic years and who otherwise have satisfied the requirements of the University and the Stanford Law School. The Stanford Law School web site (<http://www.law.stanford.edu/degrees>) provides detailed information on degree requirements.

Doctor of the Science of Law

The degree of the Doctor of the Science of Law (J.S.D.) is conferred upon candidates who hold a J.D. or its equivalent, who complete one academic year in residence, and who, as a result of independent legal research, present a dissertation that is, in the opinion of the faculty of the Stanford Law School a contribution to knowledge. Such work and dissertation must conform to the rules of the Stanford Law School and the University for the dissertation and the University Oral Examination, as described in the "Doctor of Philosophy" section of this bulletin.

Candidacy is limited to students of exceptional distinction and promise. The Stanford Law School web site (<http://www.law.stanford.edu/degrees/jd>) provides detailed information on degree requirements.

Doctor of Musical Arts

The degree of Doctor of Musical Arts (D.M.A.) is conferred on candidates who have satisfied the general requirements for advanced degrees, the program requirements specified in the "Music (<http://stanford.edu/dept/registrar/bulletin/7094.htm>)" section of this bulletin, and the candidacy requirement as described in the "Doctor of Philosophy" section.

Doctor of Medicine

Candidates for the degree of Doctor of Medicine (M.D.) must satisfactorily complete the required curriculum in medicine. The requirements for the M.D. degree are detailed online at <http://med.stanford.edu/md>.

Doctor of Philosophy

The degree of Doctor of Philosophy (Ph.D.) is conferred on candidates who have demonstrated to the satisfaction of their department or school substantial scholarship, high attainment in a particular field of knowledge, and the ability to do independent investigation and present the results of such research. They must satisfy the general requirements for advanced degrees, the program requirements specified by their departments, and the doctoral requirements described below. The option for a Ph.D. minor is also described below, though it is not a Ph.D. requirement.

Candidacy

Admission to a doctoral degree program is preliminary to, and distinct from, admission to candidacy. Admission to candidacy for the doctoral degree is a judgment by the faculty in the department or school of the student's potential to successfully complete the requirements of the degree program. Students are expected to complete department qualifying procedures and apply for candidacy by the end of their second year in the Ph.D. program. Honors Cooperative students must apply by the end of their fourth year. A Pregnancy or Parental Leave of Absence automatically extends the pre-

candidacy period by one year for a birth mother and three months (one quarter) for a non-birth parent.

Admission to candidacy for the doctoral degree is granted by the major department following a student's successful completion of qualifying procedures as determined by the department. Departmental policy determines procedures for subsequent attempts to become advanced to candidacy in the event that the student does not successfully complete the procedures. Failure to advance to candidacy results in the dismissal of the student from the doctoral program; see "Guidelines for Dismissal of Graduate Students for Academic Reasons (p. 48)" section of this bulletin.

The Application for Candidacy specifies a departmentally approved program of study to fulfill degree requirements, including required course work, language requirements, teaching requirements, dissertation (final project and public lecture-demonstration for D.M.A.), and University oral examination (for Ph.D.). Prior to candidacy, at least 3 units of work must be taken with each of four Stanford faculty members. To reiterate, however, a student will only be admitted to candidacy if, in addition to the student's fulfilling departmental prerequisites, the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program.

If the Ph.D. student is pursuing a minor, approval by the department awarding the minor is also required on the Application for Candidacy.

Time Limit for Completion of a Degree with Candidacy

Students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. Candidacy is valid for five years unless terminated by the department (for example, for unsatisfactory progress). The time limit is not automatically extended by a student's leave of absence. A Pregnancy or Parental Leave of Absence automatically extends the candidacy period by one year for a birth mother and three months (one quarter) for a non-birth parent.

Failure to make minimum progress or complete university, department, and program requirements in a timely or satisfactory manner may lead to dismissal; see Guidelines for Dismissal of Graduate Students for Academic Reasons (p.) section of this bulletin.

All requests for extension, whether prompted by a leave or some other circumstance, must be filed by the student before the conclusion of the program's time limit. Departments are not obligated to grant an extension. Students may receive a maximum of one additional year of candidacy per extension. Extensions require review by the department of a dissertation progress report, a timetable for completion of the dissertation, any other factors regarded as relevant by the department, and approval by the department; such approval is at the department's discretion.

Teaching and Research Requirements

A number of departments require their students to teach (serving as a teaching assistant) or assist a faculty member in research (serving as a research assistant) for one or more quarters as part of their doctoral programs. Detailed information is included in the department sections of this bulletin.

Foreign Language Requirement

Some departments require a reading knowledge of one or more foreign languages as indicated in department sections of this bulletin. Fulfillment

of language requirements must be endorsed by the chair of the major department.

University Oral Examination

Passing a University oral examination is a requirement of the Ph.D. and J.S.D. degrees. The purpose of the examination is to test the candidate's command of the field of study and to confirm fitness for scholarly pursuits. Departments determine when, after admission to candidacy, the oral examination is taken and whether the exam will be a test of knowledge of the field, a review of a dissertation proposal, or a defense of the dissertation. The chairperson of a Stanford oral examination is appointed for this examination only, to represent the interests of the University for a fair and rigorous process.

Students must be registered in the term in which the University oral examination is taken. The period between the last day of final exams of one term and the day prior to the first day of the following term is considered an extension of the earlier term. Candidacy must also be valid.

The University Oral Examination Committee consists of at least five Stanford faculty members: four examiners; and the committee chair from another department. All committee members are normally members of the Stanford University Academic Council, and the chair must be a member of the Stanford University Academic Council. Emeritus faculty are also eligible to serve as examiners or chair of the committee.

A petition for appointment of an examining committee member who is neither a current or emeritus member of the Academic Council may be approved by the chair of the department if that person contributes an area of expertise that is not readily available from the faculty and holds a Ph.D. or equivalent foreign degree. Exceptions for individuals whose terminal degree is not the Ph.D. or equivalent foreign degree may be granted by the Vice Provost for Graduate Education, upon the request of the student's department chair. The majority of the examiners must be current or emeritus Academic Council members; more specifically, one of four or five examiners or two of six or seven examiners may be appointed to the Oral Examination Committee by means of this petition.

The chair of the examining committee may not have a full or joint appointment in the adviser's or student's department, but may have a courtesy appointment in the department. The chair can be from the same department as any other member(s) of the examination committee and can be from the student's minor department provided that the student's adviser does not have a full or joint appointment in the minor department.

For Interdisciplinary Degree Programs (IDPs), the chair of the examining committee may not have a full or joint appointment in the primary adviser's major department and must have independence from the student and adviser.

The University Oral Examination form must be submitted to the department graduate studies administrator at least two weeks prior to the proposed examination date. The examination is conducted according to the major department's adopted practice, but it should not exceed three hours in length, and it must include a period of private questioning by the examining committee.

Responsibility for monitoring appointment of the oral examination chair rests with the candidate's major department. Although the department cannot require the candidate to approach faculty members to serve as chair, many departments invite students and their advisers to participate in the process of selecting and contacting potential chairs.

The candidate passes the examination if the examining committee casts four favorable votes out of five or six, five favorable votes out of seven, or six favorable votes out of eight. Five members present and voting constitute a quorum. If the committee votes to fail a student, the committee chair sends within five days a written evaluation of the candidate's performance to the major department and the student. Within 30 days and after review of the examining committee's evaluation and recommendation, the chair of

the student's major department must send the student a written statement indicating the final action of the department.

Dissertation

An approved doctoral dissertation is required for the Ph.D. and J.S.D. degrees. The doctoral dissertation must be an original contribution to scholarship or scientific knowledge and must exemplify the highest standards of the discipline. If it is judged to meet this standard, the dissertation is approved for the school or department by the doctoral dissertation reading committee. Each member of the reading committee signs the signature page of the dissertation to certify that the work is of acceptable scope and quality. These signatures must be in ink; proxy or electronic signatures are not permitted. One reading committee member reads the dissertation in its final form and certifies on the Certificate of Final Reading that department and University specifications have been met.

Dissertations must be in English. Approval for writing the dissertation in another language is normally granted only in cases where the other language or literature in that language is also the subject of the discipline. Such approval is routinely granted for dissertations in the Division of Literatures, Cultures, and Languages, in accordance with the policy of the individual department. Approval is granted by the school dean upon a written request from the chair of the student's major department. Dissertations written in another language must include an extended summary in English.

Students have the option of submitting the dissertation electronically or via the paper process. Directions for preparation of the dissertation for electronic or paper submission are available at the Office of the University Registrar dissertation (<http://studentaffairs.stanford.edu/registrar/students/dissertation-thesis>) web site. If submitting via the paper process, the signed dissertation copies and accompanying documents must be submitted to the Office of the University Registrar on or before the quarterly deadline indicated in the University's academic calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). A fee is charged for the microfilming and binding of the paper dissertation copies. If submitting via the electronic process the signed dissertation signature page and title page must be submitted to the Student Services Center (<http://www.stanford.edu/group/studentsservicescenter>) and one final copy of the dissertation must be uploaded, and approved by the Final Reader, on or before the quarterly deadline indicated in the University's academic calendar (<http://www.stanford.edu/group/studentsservicescenter>). There is no fee charged for the electronic submission process.

Students must either be registered or on graduation quarter in the term they submit the dissertation; see "Graduation Quarter" in the "Graduate Degrees" (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this Bulletin for additional information. At the time the dissertation is submitted, an Application to Graduate must be on file, all department requirements must be complete, and candidacy must be valid through the term of degree conferral.

Doctoral Dissertation Reading Committee

The doctoral dissertation reading committee consists of the principal dissertation adviser and, typically, two other readers. The doctoral dissertation reading committee must have three members and may not have more than five members. All members of the reading committee approve the dissertation. At least one member must be from the student's major department. Normally, all committee members are members of the Stanford University Academic Council or are emeritus Academic Council members. The student's department chair may, in some cases, approve the appointment of a reader who is not a current or emeritus member of the Academic Council, if that person is particularly well qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree. Exceptions for individuals whose terminal degree is not the PhD

or equivalent foreign degree may be granted by the Vice Provost for Graduate Education, upon the request of the student's department chair. Former Stanford Academic Council members and non-Academic Council members may thus on occasion serve on a reading committee. A non-Academic Council member (including former Academic Council members) may replace only one of three required members of dissertation reading committees. If the reading committee has four or five members, at least three members (comprising the majority) must be current or emeritus members of the Academic Council.

Any member of the Academic Council may serve as the principal dissertation adviser. If former Academic Council members, emeritus Academic Council members, or non-Academic Council members are to serve as the principal dissertation adviser, the appointment of a co-advisor who is currently on the Academic Council is required. This is to ensure representation for the student in the department by someone playing a major adviser role in completion of the dissertation. However, a co-advisor is not required during the first two years following retirement for emeritus Academic Council members who are recalled to active service.

The reading committee, as proposed by the student and agreed to by the prospective members, is endorsed by the chair of the major department on the Doctoral Dissertation Reading Committee form. This form must be submitted before approval of Terminal Graduate Registration (TGR) status or before scheduling a University oral examination that is a defense of the dissertation. The reading committee may be appointed earlier, according to the department timetable for doctoral programs. All subsequent changes to the reading committee must be approved by the chair of the major department. The reading committee must conform to University regulations at the time of degree conferral.

Ph.D. Minor

Students pursuing a Ph.D. may pursue a minor in another department or program to complement their Ph.D. program. This option is not available to students pursuing other graduate degrees. Ph.D. candidates cannot pursue a minor in their own major department or program. In rare cases, a Ph.D. student may complete the requirements for more than one minor. In that case, 20 unduplicated units must be completed for each minor.

Only departments that offer a Ph.D. may offer a minor, and those departments are not required to do so. Interdisciplinary Ph.D. minors, administered by a designated academic department, may be approved by the Faculty Senate. The minor should represent a program of graduate quality and depth, including core requirements and electives or examinations. The department offering the minor establishes the core and examination requirements. Elective courses are planned by the students in conjunction with their minor and Ph.D. departments.

The minimum University requirement for a Ph.D. minor is 20 units of course work at the graduate level (typically courses numbered 200 and above). If a minor department chooses to require those pursuing the minor to pass the Ph.D. qualifying or field examinations, the 20-unit minimum can be reduced. All of the course work for a minor must be done at Stanford.

Units taken for the minor can be counted as part of the overall requirement for the Ph.D. of 135 units of graduate course work done at Stanford. Courses used for a minor may not be used also to meet the requirements for a master's degree.

An Application for Ph.D. Minor (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf) outlining a program of study must be approved by the major and minor departments and submitted to the Student Services Center. This form is submitted at the time of admission to candidacy and specifies whether representation from the minor department on the University oral examination committee is required.

Joint Degree Programs

A Joint Degree Program (JDP) is a specified combination of degree programs or degree types in which a student is enrolled in two graduate degree programs concurrently. JDPs are developed and proposed by the relevant academic units with agreement of the deans of the schools affected.

An approved JDP includes a set of agreements between the participating programs and schools about matters such as admissions, advising, curricula, and tuition. In a JDP, a specified number of units may be double-counted toward the minimum University residency requirements for both degrees, reducing the total number of residency units required to complete both degrees. Students pursuing a Joint Degree that includes a Ph.D. may not also count a Stanford master's degree or transfer units towards residency for the Ph.D. degree. Application deadlines for each program or degree apply. Students must be admitted to the JDP no later than the study list deadline of the term prior to the term of expected degree conferral. In a JDP, both degrees are conferred concurrently since the units required for each degree are linked to the completion of both degrees. The sole exception is the J.D. degree which may be awarded prior to the second degree.

The following Joint Degree Programs, permitting students to complete requirements for two degrees with a reduced number of total residency units, are offered:

- Juris Doctor with a Master of Arts in Economics, Education, History, Public Policy, or the Division of International Comparative and Area Studies: African Studies, East Asian Studies, International Policy Studies, Latin American Studies, and Russian, East European and Eurasian Studies (J.D./M.A.)
- Juris Doctor with a Master of Science in Bioengineering, Computer Science, Electrical Engineering, Environment and Resources, Health Research and Policy, or Management Science and Engineering (J.D./M.S.)
- Juris Doctor with a Master of Public Policy (J.D./M.P.P.)
- Juris Doctor with a Doctor of Philosophy in Bioengineering, Economics, Environment and Resources, History, Management Science and Engineering, Philosophy, Political Science, Psychology, or Sociology (J.D./Ph.D.)
- Juris Doctor with a Master of Business Administration (J.D./M.B.A.)
- Master of Business Administration with a Master of Arts in Education (M.B.A./M.A.)
- Master of Business Administration with a Master of Science in Computer Science, Electrical Engineering, and Environment and Resources (M.B.A./M.S.)
- Master of Business Administration with a Master of Public Policy (M.B.A./M.P.P.)
- Master of Arts in Education or International Policy Studies with a Master of Public Policy (M.A./M.P.P.)
- Master of Science in Management Science and Engineering with a Master of Public Policy (M.S./M.P.P.)
- Doctor of Philosophy in Economics, Education, Management Science and Engineering, Psychology, Sociology, or Structural Biology with a Master of Public Policy (Ph.D./M.P.P.)
- Juris Doctor with a Doctor of Medicine (J.D./M.D.)
- Master of Public Policy with a Doctor of Medicine (M.P.P./M.D.)

Specific requirements for the joint degree programs are available from the participating departments and schools and at Registrar's (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>) web site.

Creation of additional Joint Degree Programs that are combinations of J.D./M.A., J.D./M.S., and Ph.D./M.P.P. degrees have been authorized by the Faculty Senate. New JDPs from among these combinations may double-count up to 45 units towards residency requirements. JDPs from these combinations are proposed by the coordinating programs and schools. Once

approvals from the chairs of the programs and deans of the relevant schools are obtained, approval on behalf of the Committee on Graduate Studies is granted by the Office of the Vice Provost for Graduate Education, and final approval is granted by the Office of the University Registrar. JDPs combining other degree types or programs may be proposed, but require review by the Faculty Senate Committee on Graduate Studies and must be approved by the Faculty Senate.

Minimum Progress Requirements for Graduate Students

The academic requirements for graduate students include completion of University, department, and program requirements, such as admission to candidacy, successful completion of qualifying exams, and so on in a timely and satisfactory manner. Graduate students must also meet the following standards of minimum progress as indicated by units and grades. (These standards apply to all advanced degree programs except the School of Business Ph.D., and the M.B.A., J.D., L.L.M., J.S.M., J.S.D., M.D., and M.L.A., which follow guidelines issued by the respective schools and are described in their respective school bulletins.)

Graduate students enrolled for 11 or more units must pass at least 8 units per term by the end of each term. Those registered for fewer than 11 units must pass at least 6 units per term by the end of each term, unless other requirements are specified in a particular case or for a particular program.

In addition, graduate students must maintain a 3.0 (B) grade point average overall in courses applicable to the degree.

Department requirements for minimum progress that set a higher standard for units to be completed, or a higher or lower standard for grade point average to be maintained, take precedence over the University policy; any such different standards must be published in the Stanford Bulletin.

Students identified as not meeting the requirements for minimum progress and timely and satisfactory completion of requirements are reviewed by their departments to determine whether the problem lies with administrative matters such as reporting of grades or with academic performance. Students have the opportunity to explain any special circumstances. Approval for continuation in the degree program is contingent on agreement by the student and department to a suitable plan to maintain appropriate progress in subsequent quarters. Dismissal of graduate students is addressed in separate guidelines.

Graduate students who have been granted Terminal Graduate Registration (TGR) status must enroll each term in the TGR course (801 for master's and Engineer programs or 802 for doctoral programs) in their department in the section appropriate for the adviser. An 'N' grade signifying satisfactory progress must be received each quarter to maintain registration privileges. An 'N-' grade indicates unsatisfactory progress. The first 'N-' grade constitutes a warning. A second consecutive 'N-' grade normally causes the department to deny the student further registration until a written plan for completion of degree requirements has been approved by the department. Subsequent 'N-' grades are grounds for dismissal from the program.

Students receiving federal student aid funds, including student loans, must maintain satisfactory academic progress standards that may be stricter than departmental standards. See the Financial Aid Office (<http://financialaid.stanford.edu>) web site for details.

Graduate Units Requirements

The University's expectation is that the units counted towards all graduate degrees are primarily in graduate courses. The University has set specific requirements for units applied to the minimum requirement for the M.A., M.S., and M.F.A. degrees: All units must be in courses at or above the 100 level and at least 50 percent of those must be courses designated primarily

for graduate students (typically at least the 200 level). Units earned in courses below the 100 level may not be counted towards the minimum unit requirement for the master's degree. Department specifications for the level of course work accepted for a particular master's degree program may be higher than the University's specifications.

Changes of Degree Programs

Graduate students are admitted to Stanford for a specific degree program. Students who have attended Stanford for at least one term and who are currently enrolled may submit a Graduate Program Authorization Petition to make one of the following changes:

1. change to a new degree program in the same department;
2. change to a new degree program in a different department;
3. add a new degree program in the same or a different department to be pursued with the existing program. Coterminal students must have the bachelor's degree conferred before adding a second advanced degree program. Summer term enrollment is optional for students beginning a new degree program in the Autumn term provided that they have been enrolled the prior Spring term.

It is important that the attempt to add or change degree programs be made while enrolled. Otherwise, a new Application for Graduate Admission must be submitted and an application fee paid. The Graduate Program Authorization Petition is submitted electronically through Axxess to the department in which admission is requested. If applying for a higher degree program, students may also be required to submit other application materials such as GRE Subject Test scores, a statement of purpose, or new letters of recommendation. Decisions on the petitions are made by the programs or departments to which they are directed, and are at the discretion of those programs or departments.

International students changing departments or degree programs must also obtain the approval of the Foreign Student Adviser at the Bechtel International Center. If the requested change lengthens their stay, they also are required to submit verification of sufficient funding to complete the new degree program.

Students who wish to terminate study in a graduate program should submit a properly endorsed Request to Permanently Withdraw from Degree Program form (<http://studentaffairs.stanford.edu/registrar/forms>) to the Student Services Center (<http://www.stanford.edu/group/student-services-center>). To return to graduate study thereafter, the student is required to apply for reinstatement (if returning to the same degree program) or admission (if applying to a different program). Both applications require payment of a fee.

Guidelines for Dismissal of Graduate Students for Academic or Professional Reasons

Admission to graduate programs at Stanford is highly selective. It is anticipated that every admitted student will be able to fulfill the requirements for the advanced degree. This document provides guidelines to be used in the unusual circumstance that a department must consider dismissal of a graduate student for academic reasons. These guidelines apply to all advanced degree programs except those in the schools of Law and Business, the STEP program in the Graduate School of Education, and the M.D. program in the School of Medicine, which follow guidelines issued by the respective schools.

The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the University, department, and program requirements for the degree, fulfillment of minimum progress requirements, and meeting standards of professional behavior. The

guidelines that follow specify procedures for dismissal of graduate students who are not meeting these conditions. In such cases, a departmental committee (hereafter "the committee"), whether the department's committee of the faculty or other committee authorized to act on the department's behalf such as the departmental graduate studies committee, will:

1. Where possible and as early as possible, warn the student, in writing, of the situation and deficiency. A detailed explanation of the reason for the warning should be provided.
2. Consider extenuating circumstances communicated by the student.
3. Decide the question of dismissal by majority vote of the committee (with at least three faculty members participating in the committee's deliberation), and communicate the decision to the student in writing.
4. Place a summary of department discussions, votes, and decisions in the student's file.
5. Provide students the opportunity to examine their department files, if requested.
6. Provide students with information on their rights to appeal under the Student Academic Grievance Procedure. See the "Student Academic Grievance Procedure (p. 66)" section of this bulletin.

Careful records of department decisions safeguard the rights of both students and faculty.

Guidelines for Addressing Graduate Student Professional Conduct

The success of any academic institution depends on a shared willingness to discharge the ethical obligations that bind students, staff and faculty together in a system of mutually supporting professional roles. Stanford University is no exception. (Administrative Guide, 1.1.1 Code of Conduct (<https://adminguide.stanford.edu/chapter-1/subchapter-1/policy-1-1-1>)). The relevant ethical obligations are clearly defined for faculty in the Faculty Handbook: "In order to maintain the integrity of its teaching and research and to preserve academic freedom, Stanford University demands high standards of professional conduct from its faculty." (Faculty Handbook 4.3.A (<http://facultyhandbook.stanford.edu/ch4>)). The purpose of this policy is to similarly define the professionalism expectations for graduate students as they prepare to be responsible members of professional communities.

Graduate students are expected to meet standards of professional behavior, including: being present on campus to meet the academic and research expectations of the school or department; communicating in a timely, respectful and professional manner; complying with institutional policies and procedures; and participating appropriately in the program's community. Graduate students are expected to familiarize themselves with applicable University policy and degree program requirements. Failure to meet these standards may be grounds for dismissal.

Information about degree program requirements is available from departments; students are encouraged to consult with faculty and staff in those programs should they have questions about local requirements.

When the University has professionalism concerns about a graduate student, the University will manage the concern utilizing the Guidelines for Dismissal of Graduate Students for Academic or Professional Reasons (above).

Additional Specifics for Degrees with Candidacy Before Candidacy

The committee, before review for admission to candidacy, may vote to dismiss a student who is not making minimum progress or completing requirements in a timely and satisfactory way or meeting standards of

professional behavior. Before considering dismissal, the committee should communicate with the student (which may include a meeting with the student) concerning his or her academic or professional performance and how to correct deficiencies, where such deficiencies are deemed correctable.

At the Review for Candidacy

In a review for admission to candidacy, if the committee votes not to recommend the student for admission to candidacy, the vote results in the dismissal of the student from the program. The department chair, or Director of Graduate Studies, or the student's adviser shall communicate the department's decision to the student in writing and orally. The student may submit a written request for reconsideration. The committee shall respond in writing to the request for reconsideration; it may decline to reconsider its decision.

During Candidacy

When a student admitted to candidacy is not making minimum progress, or not meeting standards of professional performance, or not completing University, department, or program requirements in a timely and satisfactory manner, the student's adviser, the Director of Graduate Studies, or department chair, and other relevant faculty should meet with the student. A written summary of these discussions shall be sent to the student and the adviser and added to the student's department file. The summary should specify the student's academic or professional deficiencies, the steps necessary to correct them (if deemed correctable), and the period of time that is allowed for their correction (normally one academic quarter). At the end of the warning period, the committee should review the student's progress and notify the student of its proposed actions. If the student has corrected the deficiencies, he or she should be notified in writing that the warning has been lifted.

If the deficiencies are not deemed correctable by the committee (for example, the failure of a required course or examination, or a pattern of unsatisfactory behavior or performance) or if, at the end of the warning period, the student has not in the view of the committee corrected the deficiencies, the committee may initiate proceedings for dismissal. The student shall be notified, in writing, that the case of dismissal will be considered at an impending committee meeting. The student has the right to be invited to attend a portion of the scheduled meeting to present his or her own case; a student may also make this case to the committee in writing.

After full discussion at the committee meeting, the committee, without the student present, shall review the case and vote on the issue of dismissal. The student shall be sent a written summary of the discussion, including the committee's decision and the reasons for it. The student may submit a written request for reconsideration. The committee's response to the request for reconsideration shall be made in writing; it may decline to reconsider its decision.

Childbirth Accommodation Policy

A Childbirth Accommodation is designed to make it possible to maintain the mother's full-time, registered student status, and to facilitate her return to full participation in classwork, and, where applicable, research, teaching, and clinical training in a seamless manner. Women graduate students, including students in professional schools, anticipating or experiencing a birth are eligible for an academic accommodation period of up to two consecutive academic quarters (in total), before and after the birth, during which the student may postpone course assignments, examinations, and other academic requirements. During this period, they are eligible for full-time enrollment and retain access to Stanford facilities, Cardinal Care, and Stanford housing. Such students are granted an automatic one quarter extension of University and departmental requirements and academic milestones, with the possibility of up to three quarters by petition under unusual circumstances. Women graduate students supported

by fellowships, teaching assistantships, and/or research assistantships are excused from regular TA or RA duties for a period of six weeks during which they continue to receive support. Students do not receive a stipend or salary if none was received previously, but are eligible for the academic accommodation period and the one quarter extension of academic milestones.

Stanford University prohibits discrimination on the basis of any characteristic protected by applicable law, including discrimination on the basis of pregnancy, in the administration of its programs and activities. Stanford will neither require nor prohibit leaves of absence for reason of pregnancy or childbirth-related concerns. Pregnant women and non-birth parents are eligible for Pregnancy and Parental Leaves of Absence.

For more information and a complete statement of the policies, see the policy on Pregnancy, Childbirth and Adoption (<http://stanford.edu/group/gap/5-9>).

Residency Policy for Graduate Students

Each type of graduate degree offered at Stanford (for example, Master of Science, Doctor of Philosophy) has a residency requirement based on the number of academic units required for the degree. These residency requirements and the maximum allowable transfer units for each degree type are listed below. Unless permission is granted by the department (for example, for field work) enrolled graduate students must maintain a significant physical presence on campus throughout each quarter a student is enrolled.

The unit requirements for degrees can represent solely course work required for the degree or a combination of course work, research, and a thesis or dissertation. Academic departments and schools offering degrees may establish unit requirements that are higher than the minimum University residency requirement, but they may not have a residency requirement that is lower than the University standard. In addition to the University's residency requirement based on a minimum number of units for each degree, the School of Medicine and the Graduate School of Business may establish residency requirements based on the number of quarters of full-time registration in which students are enrolled to earn a degree. However, in no case may a student earn fewer units than the University minimum for each degree. All residency requirements are published in the Stanford Bulletin. Students should consult the Stanford Bulletin or their academic department to determine if their degree program has residency requirements that exceed the minimum.

Students eligible for Veterans Affairs educational benefits should refer to the "Veterans' Educational Benefits (p. 55)" section of this bulletin.

It is Stanford University's general policy that units are applicable toward only one degree. Units may not normally be duplicated or double-counted toward the residency requirement for more than one degree, with the exception that up to 45 units of a Stanford M.A. or M.S. degree may be applied to the residency requirement for the Ph.D., D.M.A., or Engineer degrees. Other exceptions to this general policy for specified combinations of degree types, known as Joint Degree Programs, may be approved by agreement of the Faculty Senate and the deans of the schools affected, with review by the Committee on Graduate Studies. Students pursuing a Joint Degree that includes a Ph.D. may not also count a Stanford master's degree or transfer units towards residency for the Ph.D. degree. See the "Joint Degree Programs (p. 47)" section of this bulletin for additional information.

Only completed course units are counted toward the residency requirement. Courses with missing, incomplete, in progress, or failing grades do not count toward the residency requirement. Courses from which a student has formally withdrawn do not count toward the residency requirement.

Terminal Graduate Registration (TGR) is available to graduate students who have met all of the conditions listed in the "TGR (p.)" section of this bulletin.

University Minimum Residency Requirements for Graduate Degrees ¹

Degree Type	Minimum # of Units	Maximum Allowable External Transfer Units
M.A., M.S., M.F.A., M.L.A.	45	0 (see note 4)
Engineer (see note 2)	90	45
M.B.A., M.P.P. (see note 3)	90	0 (see note 4)
Ph.D., D.M.A. (see note 5)	135	45
M.D.	235	90
J.D. (see notes 6,7)	109	45
M.L.S., L.L.M., J.S.M. (see note 6)	35	0 (see note 4)
J.S.D. (see note 6)	44	0 (see note 4)

- ¹ The University has authorized the granting of the M.A.T., Ed.S. and Ed.D degrees, but they are not being offered.
- ² Up to 45 units completed at Stanford toward a M.A. or M.S. degree or accepted as transfer credit, but not both, in an Engineering discipline may be used toward the 90 unit residency requirement for the Engineer degree. At least 45 units of work at Stanford are necessary to complete the 90 residency units for the Engineer degree.
- ³ Enrollment in the M.P.P. degree program is limited to candidates who have earlier been accepted to another Stanford graduate degree program and to recent (within three years) Stanford graduates.
- ⁴ Students eligible for Veterans Affairs educational benefits should refer to the Veterans Benefits section of "Admissions and Financial Aid (<http://stanford.edu/dept/registrar/bulletin/4815.htm>)" in this bulletin.
- ⁵ Up to 45 units completed at Stanford toward a M.A. or M.S. degree or accepted as transfer credit, but not both, may be used toward the 135 unit residency requirement for the Ph.D. or D.M.A. degree. At least 90 units of work at Stanford are necessary to complete the 135 residency units for the Ph.D. or D.M.A. degree.
- ⁶ The Academic Senate approved these residency requirements on February 4, 2010, effective for the 2009-10 academic year.
- ⁷ J.D. students entering prior to the Autumn Quarter 2009-10 must take the equivalent of 86 semester units.

University Minimum Residency Requirements for Graduate Degree Combinations

Students with multiple degree programs must complete the residency requirements for all their degrees types. Students enrolled in a Joint Degree Program should see the "Joint Degree Program (p. 47)" section of this Bulletin.

A table of these residency requirements is available on the Registrar's web site (<http://studentaffairs.stanford.edu/registrar/students/graduate-residency>); this table will be available on this page shortly.

Graduate Residency Transfer Credit

After at least one quarter of enrollment, students pursuing an Engineer, D.M.A., or Ph.D. may apply for transfer credit for graduate work done at

another institution. Engineer candidates who also earned their master's at Stanford are not eligible for transfer residency credit, nor are any master's degree students. Ph.D. or D.M.A. students may only apply a total of 45 units of transfer credit and credit earned for a Stanford master's degree toward the PhD residency total.

Students enrolled at Stanford who are going to study elsewhere during their degree program should obtain prior approval of any transfer credit sought before their departure.

The following criteria are used by the department in determining whether, in its discretion, it awards transfer credit for graduate-level work done at another institution:

1. Courses should have comparable Stanford counterparts that are approved by the student's department. A maximum of 12 units of courses with no Stanford counterparts and/or research units may be granted transfer credit.
2. The student must have been enrolled at the other institution in a student category which yields graduate credit. The maximum amount of credit given for extension and nonmatriculated (non-degree) courses is 12 units. No transfer credit is given for online or correspondence work.
3. Courses must have been taken after the conferral of the bachelor's degree. The only exception is for work taken through programs structured like the Stanford coterminal bachelor's/master's program.
4. Courses must have been completed with a grade point average (GPA) of 3.0 (B) or better. Pass grades are accepted only for courses for which letter grades were not an option and for which the standard of passing is 'B' quality work.
5. Courses must have been taken at a regionally accredited institution in the U.S. or at an officially recognized institution in a foreign country. Courses taken at foreign universities must be at the level of study comparable to a U.S. graduate program.

The Application for Graduate Residency Credit is reviewed by the department and the Office of the University Registrar. For transfer credit done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence. One semester unit or hour usually equals 1.5 quarter units.

Leaves of Absence (Graduate)

Students on leave of absence are not registered at Stanford and, therefore, do not have the rights and privileges of registered students. They cannot fulfill any official department or University requirements during the leave period.

Leaves do not delay candidacy or master's program expiration dates.

Students on leave may complete course work for which an 'Incomplete' grade was awarded in a prior term and are expected to comply with the maximum one-year time limit for resolving incompletes; a leave of absence does not stop the clock on the time limit for resolving incompletes. Students with extenuating circumstances that may warrant an exception to academic policy should discuss the need for an extension to the time limit with their adviser and the course instructor. Students may request an extension of the deadline for resolving an incomplete by submitting the Petition to Change Course Enrollment (Graduate Students) (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_crse_enroll.pdf).

When a student is granted (or placed on) a leave of absence after the beginning of the term, courses in which the student was enrolled after the drop deadline appear on the student's transcript and show the symbol 'W' (Withdraw).

Voluntary Leaves of Absence

Graduate students who do not meet the requirement for continuous registration during the academic year must obtain an approved leave of absence, in advance, for the term(s) they will not be registered. The leave of absence must be reviewed for approval by the chair or director of graduate studies of the student's major department and, if the student is in the United States on a foreign student visa, by the Bechtel International Center (<http://icenter.stanford.edu>). Except in the case of pregnancy or parental leaves, the granting of a leave of absence is at the discretion of the department and subject to review by the Office of the University Registrar. The University may condition its approval of a petition for leave of absence on the student's meeting such requirements as the University deems appropriate in the individual case for the student to be eligible to return (such as, in the case of a leave for medical reasons, proof of treatment and/or an interview with a health care professional at Vaden Health Center (<http://vaden.stanford.edu>) or Counseling and Psychological Services (<http://vaden.stanford.edu/caps>) or its designee).

New graduate students and approved coterminal students may not take a leave of absence during their first quarter. Coterminal students are required to register their first graduate quarter. However, new Stanford students may request a deferment from the department.

Leaves of absence are granted for a maximum of one calendar year, or four quarters. Leaves requested for a longer period are approved only in exceptional circumstances (for example, mandatory military service). An extension of leave, for a maximum of one year or four quarters, is approved only in unusual circumstances. Extension requests must be made before the expiration of the original leave of absence. Leaves of absence for graduate students may not exceed a cumulative total of two years (eight quarters including summer quarters).

Any pregnant graduate student may request a Pregnancy Leave of Absence in order to suspend her student enrollment around the time of the birth. Alternatively, she may choose to remain enrolled and to request a Childbirth Accommodation. Non-birth parents may request a Parental Leave of Absence. Non-birth parents include: spouses/partners of women (who do not have to be Stanford students) anticipating or recently experiencing the birth of a child, parents who adopt a child, and parents by means of surrogacy.

In the case of Pregnancy and Parental Leaves of Absence, all provisions of the policy for Voluntary Leaves of Absence, defined above, will apply, except:

- Any matriculated pregnant student requesting a Pregnancy Leave of Absence will automatically be approved for a leave period of four quarters (12 months).
- Non-birth parents who request a Parental Leave of Absence will automatically be approved for a leave period of one academic quarter.
- Any student on a Pregnancy Leave of Absence in a degree program requiring candidacy, who has not yet been admitted to candidacy, will have the period of time in which to achieve candidacy automatically extended by 12 months (four quarters). If she has been admitted to candidacy, the candidacy period will be automatically extended by 12 months (four quarters). The 12-month extension of pre-candidacy or candidacy will be applicable whether the student takes a full year of leave or returns in less than one year.
- Any student on a Parental Leave of Absence in a degree program requiring candidacy, who has not yet been admitted to candidacy, will have the period of time in which to achieve candidacy automatically extended by three months (one quarter). If he or she has been admitted to candidacy, the candidacy period will be automatically extended by three months (one quarter).
- In the case where a Pregnancy or Parental Leave of Absence would extend the student's cumulative total beyond 8 quarters, that extension

will be permitted so that the student may return to his or her program. The student will then be considered to have reached his or her maximum cumulative leave.

Mandatory Leaves of Absence

A mandatory leave of absence can be imposed in circumstances in which a student:

- presents a substantial risk of harm to self or others or is failing to carry out substantial self-care obligations; or
- significantly disrupts the educational or other activities of the University community; or
- is unable to participate meaningfully in educational activities; or
- requires a level of care from the University community that exceeds the resources and staffing that the University can reasonably be expected to provide for the student's well-being.

Students whose circumstances warrant a review under the Dean's Mandatory Leave of Absence Policy (<http://studentaffairs.stanford.edu/studentlife/involuntary-leave>) will be apprised, in writing, of University concerns and will be provided an opportunity to respond to concerns in writing or in person or via telephone before a review committee convened by the Dean of Student Life. Students placed on mandatory leave of absence can appeal an unfavorable decision to the Vice Provost for Student Affairs. The University can condition a student's return to registered student status on such requirements as the University deems appropriate in the individual case (such as, in the case of a leave for medical reasons, proof of treatment and/or an interview with a health care professional at Vaden Health Center (<http://vaden.stanford.edu>) or Counseling and Psychological Services (<http://vaden.stanford.edu/caps>) or its designee). The Dean of Student Life publishes the full Dean's Mandatory Leave of Absence Policy (<http://studentaffairs.stanford.edu/studentlife/involuntary-leave>) on its web site. Information on tuition refunds is available in the "Refunds (p. 22)" section of this bulletin.

Discontinuation and Reinstatement

A student's academic degree program may be discontinued if the student:

- fails to be enrolled by the study list deadline; or
- fails to be approved for a leave of absence by the start of the term; or
- voluntarily terminates graduate studies; or
- is dismissed from graduate studies for academic reasons; or
- is expelled from the University.

Students who fail to be either enrolled by the final study list deadline or approved for a leave of absence by the start of a term or after a voluntary withdrawal are required to apply for reinstatement (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/appgradreinststate.pdf>) through the Graduate Admissions office before they can return to the same degree program. Students whose master's program or doctoral candidacy has expired must petition to have extensions of their programs or candidacy approved by their departments before reinstatement may be approved.

The decision to approve or deny reinstatement is made by the student's department or program. Departments are not obliged to approve reinstatements of students. Reinstatement decisions are made at the discretion of the department or the program and may be based on the applicant's academic status when last enrolled, activities while away from campus, the length of the absence, the perceived potential for successful completion of the program, and the ability of the department to support the student both academically and financially, as well as any other factors or considerations regarded as relevant by the department or program.

Reinstatement information is available from the Graduate Admissions office (<https://studentaffairs.stanford.edu/gradadmissions/applying/current-graduate>). Successful applicants are billed. Department-approved reinstatement applications must be submitted prior to the first day of the term for which re-enrollment is requested if the student is registering for courses. International students must submit reinstatement applications early enough to allow time for I-20 or DS-2019 production, visa interview, etc.

In the rare circumstance where a student who had been dismissed for academic reasons wishes to return to the same degree program, and where reinstatement was not precluded at the time of the dismissal, the student should request reinstatement as described above. In this circumstance, the degree program may review such relevant information as course work completed elsewhere or any other factors deemed to be appropriate for consideration.

Conditions for reinstatement may be established at the discretion of the program. The decision to approve or deny reinstatement is made by the department or program to which the student is seeking reinstatement, and is in its discretion. In addition, the department or program retains the right to condition reinstatement on such academic or other conditions as it deems appropriate.

Students who have been expelled from Stanford University are not permitted to apply for reinstatement.

Terminal Graduate Registration (TGR)

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the University oral exam and dissertation, completed 135 units or 10.5 quarters of residency (if under the old residency policy), and submitted a Doctoral Dissertation Reading Committee form, may request Terminal Graduate Registration status to complete their dissertations. Students pursuing Engineer degrees may apply for TGR status after admission to candidacy, completion of all required courses, and completion of 90 units or six quarters of residency (if under the old residency policy). Students enrolled in master's programs with a required project or thesis may apply for TGR status upon completion of all required courses and completion of 45 units. Students with more than one active graduate degree program must be TGR-eligible in all programs in order to apply for TGR status.

The TGR Final Registration status may also be granted for one quarter only to a graduate student who is returning after reinstatement, working on incompletes in his or her final quarter, or registering for one final term after all requirements are completed when Graduation Quarter is not applicable. TGR requirements above apply. Doctoral students under the term-based residency policy need nine quarters of residency to qualify for TGR Final Registration Status.

Each quarter, TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser. TGR students register at a special tuition rate. Students in TGR status enrolled in a course numbered 801 or 802 are certified as enrolled full time. TGR students may enroll in up to 3 units of course work per quarter at this tuition rate. Within certain restrictions, TGR students may enroll in additional courses at the applicable unit rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status. See the "Minimum Progress Requirements for Graduate Students (p.)" of this bulletin for information about satisfactory progress requirements for TGR students.

Graduate Tuition Adjustment (Reduced Enrollment)

Requests to enroll for fewer than eight units during the academic year are approved only in specific circumstances. Graduate students who need fewer than 8 remaining units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 7 units) to cover the deficiency. This status may be used only once during a degree program. Students with disabilities covered under the Americans with Disabilities Act may enroll in an approved reduced course load (RCL) as recommended by the Office of Accessible Education (OAE) (<http://studentaffairs.stanford.edu/oea>). Women students may request up to two quarters of part-time enrollment for an approved Childbirth Academic Accommodation; see the "Childbirth Accommodation Policy (<https://exploreddegrees-nextyear.stanford.edu/graduatedegrees/#degreeprogress-text-chilaccopoli>)" section of this bulletin and the GAP 5.9, Childbirth Accommodation (<http://gap.stanford.edu/5-9.html>).

All students requesting reduced enrollment need to complete and file the Request for Graduate Tuition Adjustment (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/tuitadjreq.pdf>) form.

Graduation Quarter Status

Registration is required for the term in which a student submits a dissertation or has a degree conferred. Students who meet all the following conditions are eligible to be assessed a special tuition rate for the quarter in which they are receiving a degree:

1. All course work, degree requirements, oral exams, and residency requirements for all graduate degree programs, including joint degree programs, have been completed prior to the start of the requested Graduation Quarter.
2. A graduate or professional student must have been enrolled or have been on an approved leave of absence in the term immediately preceding the term chosen as the graduation quarter. Summer term enrollment is optional for students on graduation quarter in the Autumn term provided that they have been enrolled the prior Spring term.
3. The student has formally applied to graduate in Axxess.
4. The student has only to submit the dissertation, project, or master's thesis by the deadline for submission in the term designated as the graduation quarter.
5. The student has filed all necessary forms regarding graduation quarter before the first day of the term chosen as graduation quarter.

Students on graduation quarter are registered at Stanford and, therefore, have the rights and privileges of registered students. Graduation Quarter status may be used only once during a degree program. There is a tuition rate of \$100 for the graduation quarter. Students in Graduation Quarter status and enrolled in a course numbered 801 or 802 are certified as enrolled full time.

Conferral of Degrees

Upon recommendation to the Senate of the Academic Council by the faculty of the relevant departments or schools and the Committee on Graduate Studies, degrees are awarded four times each year, at the conclusion of Autumn, Winter, Spring, and Summer terms. All diplomas, however, are prepared and distributed after degree conferral in accordance to the distribution dates listed on the Registrar's Office (<http://studentaffairs.stanford.edu/registrar/students/diplomas>) web site.

Students must apply for conferral of a graduate degree by filing an Application to Graduate in Axxess by the deadline for each term. The deadlines are available in the Academic Calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). A separate

application must be filed for each degree program and for each conferral term.

Requests for conferral are reviewed by the Office of the University Registrar and the student's department to verify completion of degree requirements. Students must be registered in the term of degree conferral. Students with unmet financial obligations resulting in the placement of a hold on their registration cannot receive a transcript, statement of completion, degree certificate, or diploma until the hold is released by the Office of Student Financial Services. An academic record where no other degree objective is being pursued is permanently frozen after the final degree conferral, and all subsequent grade change requests or changes to the student record are not permitted.

Students are typically expected to apply to graduate during the term in which they expect to be awarded a degree. The University, however, reserves the right to confer a degree on a student who has completed all of the requirements for a degree even though the student has not applied to graduate; such an individual would then be subject to the University's usual rules and restrictions regarding future enrollment or registration.

Students who wish to withdraw a request for conferral or make changes to the Application to Graduate should submit the Withdrawal of Application to Graduate form (<http://studentaffairs.stanford.edu/registrar/forms>) to the Student Services Center (<http://www.stanford.edu/group/student-services-center>) by the late application to graduate deadline. Students who withdraw their graduation applications or fail to meet degree requirements must reapply to graduate in a subsequent term.

Stanford University awards no honorary degrees.

Advising and Credentials

Advising

By the start of their first term, students should be paired by the department with faculty advisers who assist them in planning a program of study to meet degree requirements. The department should also inform doctoral students in a timely fashion about procedures for selecting a dissertation adviser, reading committee members, and orals committee members. Departments should make every effort to assist doctoral students who are not yet admitted to candidacy in finding an appropriate adviser.

Students are obliged to follow department procedures for identifying advisers and committee members for their dissertation reading and university oral examinations.

Occasionally, a student's research may diverge from the area of competence of the adviser, or irreconcilable differences may occur between the student and the faculty adviser. In such cases, the student or the faculty adviser may request a change in assignment. If the department decides to grant the request, every reasonable effort must be made to pair the student with another suitable adviser. This may entail some modification of the student's research project.

In the rare case where a student's dissertation research on an approved project is in an advanced stage and the dissertation adviser is no longer available, every reasonable effort must be made to appoint a new adviser, usually from the student's reading committee. This may also require that a new member be added to the reading committee before the draft dissertation is evaluated, to keep the reconstituted committee in compliance with the University requirements for its composition.

Teaching Credentials

Stanford University is accredited by the California Commission on Teacher Credentialing and the National Council for Accreditation of Teacher Education and is authorized to recommend candidates for credentials. The University offers a complete training program for both Single (Secondary) and Multiple Subject (Elementary) teaching credentials. Upon completion

of a Stanford approved program, the credentials allow teachers to serve in California public schools.

Current Stanford undergraduates wishing to complete the requirements for a teaching credential should apply to the coterminal program at the Graduate School of Education (<https://ed.stanford.edu>). All other applicants should apply directly to the Stanford Teacher Education Program (STEP) at the School of Education.

Transfer Work

Stanford accepts a small number of undergraduate transfer students each year. Requirements for admission (<http://www.stanford.edu/dept/uga/application/transfer>) are described as part of the undergraduate application process and are listed on the Undergraduate Admission web site. Stanford University has a designated adviser who coordinates support for transfer students.

In conjunction with appropriate review bodies, the Office of the University Registrar evaluates and records the amount of transfer credit and advanced placement test credit an undergraduate can apply toward graduation requirements. Stanford awards credit based on course work completed at U.S. colleges or universities accredited by a regional accrediting association; or course work completed at international colleges or universities of recognized standing. Credit may also be awarded for certain Advanced Placement programs, International Baccalaureate Program, GCE, French Baccalaureate, and the German Abitur examinations.

See the "Advanced Placement (p. 32)" section of this Bulletin for information concerning Stanford's policy on credit for Advanced Placement work. Details on how to request credit for advanced placement examinations are available at the Registrar's Advanced Placement site (<http://studentaffairs.stanford.edu/registrar/students/ap>).

Undergraduate Transfer Work

Academic credit for work done elsewhere may be allowed toward a Stanford bachelor's degree under the following rules and conditions:

1. Credit may be granted for work completed at institutions in the U.S. only if the institutions are accredited.
2. Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactory work, may be credited toward a Stanford bachelor's degree, subject to the approval of the credit evaluator and the appropriate departments.
3. Credit is officially allowed only after the student has been unconditionally admitted to Stanford.
4. Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned.
5. Credit from another institution may be transferred for courses which are substantially equivalent to those offered at Stanford University on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific undergraduate courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.
6. Course work cannot duplicate, overlap, or regress previous work.
7. Transfer course work cannot count towards secondary school diploma and/or graduation requirements.
8. For students who want to fulfill general education requirements through transfer work and who are subject to the GER system in place prior to Autumn 2013-14, a proposed transfer course must match a specific Stanford course that fulfills the same GER requirement; it must be a minimum of 3 quarter units and have been taken for a letter grade.

For students who want to fulfill general education requirements through transfer work and who are subject to the Ways of Thinking/Doing

breadth requirement (instituted in Autumn 2013-14 for incoming first-year students and 2014-15 for incoming transfer students), transfer courses are reviewed to determine if courses can be certified to fulfill WAYS requirements. Courses must be a minimum of 3 quarter units (2 units in the case of Creative Expression only) and must have been taken for a letter grade.

9. Transfer work can be used to satisfy a department major or minor requirement. The transfer work must first be officially accepted into the University through the Office of the University Registrar. Departments determine if approved transfer work can be used to satisfy a department major or minor requirement.
10. The credit allowed at Stanford for one quarter's work may not exceed the number of units that would have been permissible for one quarter if the work had been done at Stanford; for work done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence.
11. Credit is allowed at Stanford for work graded 'A,' 'B,' 'C,' or 'Pass' (where 'Pass' is equivalent to a letter grade of 'C' or above), but not for work graded 'D' or below.
12. No more than 45 (90 for transfer students) quarter units of credit for work done elsewhere may be counted toward a bachelor's degree at Stanford (including advance placement test credit).
13. Credit earned in extension, correspondence, and online courses is transferable only if the university offering the courses allows that credit toward its own bachelor's degree. Such credit is limited to a maximum of 45 quarter units for extension courses, a maximum of 15 quarter units for correspondence and online study, and a maximum of 45 quarter units for the combination of extension, correspondence, and online courses.
14. Credit earned in military training and service is not transferable to Stanford, unless offered by an accredited college or university in the U.S. and evaluated as above by the credit evaluator.

Graduate Residency Transfer Credit

After at least one quarter of enrollment, students pursuing an Engineer, D.M.A., or Ph.D. may apply for transfer credit for graduate work done at another institution. Engineer candidates who also earned their master's at Stanford are not eligible for transfer residency credit, nor are any master's degree students. Ph.D. or D.M.A. students may only apply a total of 45 units of transfer credit and credit earned for a Stanford master's degree toward the PhD residency total.

Students enrolled at Stanford who are going to study elsewhere during their degree program should obtain prior approval of any transfer credit sought before their departure.

The following criteria are used by the department in determining whether, in its discretion, it awards transfer credit for graduate-level work done at another institution:

1. Courses should have comparable Stanford counterparts that are approved by the student's department. A maximum of 12 units of courses with no Stanford counterparts and/or research units may be granted transfer credit.
2. The student must have been enrolled at the other institution in a student category which yields graduate credit. The maximum amount of credit given for extension and nonmatriculated (non-degree) courses is 12 units. No transfer credit is given for online or correspondence work.
3. Courses must have been taken after the conferral of the bachelor's degree. The only exception is for work taken through programs structured like the Stanford coterminal bachelor's/master's program.
4. Courses must have been completed with a grade point average (GPA) of 3.0 (B) or better. Pass grades are accepted only for courses for which

letter grades were not an option and for which the standard of passing is 'B' quality work.

5. Courses must have been taken at a regionally accredited institution in the U.S. or at an officially recognized institution in a foreign country. Courses taken at foreign universities must be at the level of study comparable to a U.S. graduate program.

The Application for Graduate Residency Credit is reviewed by the department and the Office of the University Registrar. For transfer credit done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence. One semester unit or hour usually equals 1.5 quarter units.

Veterans and Military Benefits

The Office of the University Registrar serves as the liaison between the University, its students, and the various federal, state, and local agencies concerned with Veterans Affairs (VA) educational benefits and Department of Defense (DoD) tuition assistance.

Stanford University has made a good faith effort to comply with the Principles of Excellence established by Executive Order 13607. Stanford University participates in the Department of Defense Voluntary Education Partnership program so that eligible active duty service members are able to obtain Tuition Assistance from their military branch as administered by the Department of Defense. The Office of Military-Affiliated Communities in the Student Services Center (<http://www.stanford.edu/group/studentservicescenter>) serves as the first point of contact for veterans' educational benefits assistance and DoD tuition assistance.

Stanford certifies enrollment for veterans' educational benefits for students in degree seeking programs, and students in one of 23 VA approved certificate programs offered through the Stanford Center for Professional Development. Other non-matriculated and certificate programs are not eligible. All students eligible to receive veterans' benefits or DoD tuition assistance while attending the University are urged to complete arrangements with the appropriate agency in advance of enrollment.

Stanford University is required to certify only those courses that meet minimum graduation requirements. Courses not directly related to a student's degree program or courses beyond those required for a specific degree program are not certified. Undergraduates should meet with an adviser to develop a course enrollment plan. Graduate students should have their departments approve their study lists as meeting graduation requirements on a quarterly basis.

To comply with federal regulations concerning credit for previous training (38 CFR 21.4253), Stanford University is required to evaluate all previous education and training completed elsewhere to determine what credit, if any, should be granted to students eligible to receive Veterans Affairs educational benefits or DoD tuition assistance. Stanford is required to complete an evaluation; credit is granted when appropriate. Credit is evaluated toward the degree program registered with Veterans Affairs or DoD as determined by the Office of the University Registrar in conjunction with the relevant academic department(s) or program(s). All relevant policies regarding transfer credit apply. In addition, this evaluation occurs each time a student's degree program is changed. Subject to current federal and University guidelines, students eligible for receipt of VA educational benefits or DoD tuition assistance have their prior education and training evaluated up to the credit limits outlined in the "Residency Policy for Graduate Students (p. 43)" and "Undergraduate Degrees and Programs (p. 24)" sections of this bulletin. As an exception to that policy, students in master's programs in the schools of Earth Sciences, Education,

Engineering, Humanities and Sciences, Law, Medicine, and Graduate Business are allowed a maximum of 6 transfer (quarter) units.

VA Status

In order to activate students' VA educational benefits at Stanford the Office of the University Registrar requires that students submit the following forms:

- A copy of the Certificate of Eligibility distributed by the VA
- Veterans' Benefits - Statement of Rights and Responsibilities (online form)
- DD-214 (if applicable)
- Any official transcripts from other institutions

It is the students' responsibility to ensure that all forms are submitted to the Office of University Registrar in order to activate the student as VA benefits receiving student.

In order to comply with VA regulations, students are responsible for the following:

- Obtain official transcripts from all postsecondary institutions attended, whether VA benefits were received or not.
- Report any changes in enrollment status to the Office of the University Registrar.
- Report any changes that are made to a degree plan. Undergraduates declaring or making changes to their major(s), minor(s), honor(s), or degree program(s) in Axess and Graduates adding or removing degree programs through the Graduate Program Authorization Petition in Axess should submit a Student Services Center Help ticket (attention VA Certifying Official) to report degree plan change.
- General overpayments of VA benefits are the responsibility of the student, even if the payment was submitted directly to the school on the student's behalf.
- Stanford University is required to certify only those courses that meet minimum graduation requirements. Courses not directly related to a student's degree program or courses beyond those required for a specific degree program are not certified. Undergraduates should meet with their adviser to develop a course enrollment plan. Graduate students should have their departments approve their study lists as meeting graduation requirements on a quarterly basis.
- If concurrently enrolled with another college/university, notify both Stanford and the host institution.
- *Undergraduates only:* VA regulations require undergraduates to declare their major by the end of their sophomore year. Stanford cannot certify enrollment to the VA beyond sophomore year unless a major has been declared. Note that a student can change their major at any time.

Certification

The Office of the University Registrar certifies enrollment to the VA Office quarterly, approximately one week after the Preliminary Study List Deadline. See the Stanford Academic Calendar for exact dates in each quarter.

After the Final Study List deadline, the Office of the University Registrar confirms that your enrollment has not changed in Axess. If enrollment has increased or decreased your enrollment certification is adjusted.

The Office of the University continues to certify the student to the VA until the student leaves the program or unless notified by the student and/or the VA to stop the process of certification.

General overpayments of VA benefits are the responsibility of the student. If the enrollment change has resulted in tuition overpayment, the student is responsible for paying the tuition and fees back to the VA. If the student

is a Ch. 33 recipient and the enrollment change has resulted in tuition overpayment, a refund check will be issued by Stanford to the student. It remains the student's responsibility to provide tuition and fees back to the VA. If the enrollment change has resulted in underpayment, the VA sends the difference in tuition fees to the student, excluding Ch. 33 recipients. If you are a Ch. 33 recipient, fees will be paid directly to the institution in a separate payment.

Programs Subject to Restriction

Note that the following programs cannot be certified due to VA and federal regulations:

- *Certificate programs for non-matriculated students:* The VA defines "matriculated" as having been formally admitted to a college or university. Per the VA, educational benefits cannot be paid to "non-matriculated" college or university students. Hence, any certificate program that does not officially admit its students into Stanford University cannot be certified.

- *Visiting Students Programs:* Stanford cannot certify visiting students unless they meet one of the following conditions:

1. The student has an approved parent letter from the home institution which guarantees that the courses can be transferred back to original program.
2. The student is pending admission to a Stanford degree program and is required to take a prerequisite course(s). In that case the student can be certified for two terms.

- *Medical Residencies/Fellowship programs that are not certified by the ACGME:* these residencies are not allowed to be certified as on the job training. This is according to VA guidelines and the Federal Code of Regulations. See the School of Medicine for a full list of the fellowship/residency programs.

All students eligible to receive veterans' benefits while attending the University are urged to complete arrangements with the appropriate agency in advance of enrollment.

Financial Aid

The Post-9/11 GI Bill, also known as Chapter 33, is the most commonly used VA educational benefits program at Stanford. This program provides funding for tuition, required fees, books and housing. The level of an individual student's Chapter 33 benefits is determined by the qualifying veteran's length of military service since 9/11/2001. For the 2013-14 academic year, the base benefit for tuition and fees is capped at \$19,198.31. Eligible students may also receive funds through the Yellow Ribbon Provision.

Most of the VA educational benefit programs pay benefits directly to students on a monthly basis. However, under the Post-9/11 GI Bill (Chapter 33), the VA sends tuition and fees benefits to Stanford, where the Financial Aid Office is responsible for applying the funds to the student account (university bill). Chapter 33 books and housing benefits are sent directly to students monthly. Students may need to apply the housing benefits to the university bill to pay for on-campus room and board.

Yellow Ribbon Provision

Stanford elects on a yearly basis to participate in the Yellow Ribbon Program. Under this provision Stanford provides an annual contribution to supplement the Chapter 33 base tuition benefit. The VA matches Stanford's Yellow Ribbon contribution. For the 2014-15 academic year, Stanford's annual Yellow Ribbon contribution for undergraduate students is \$3,000, with the VA providing a matching amount of \$3,000. For graduate and professional students, the amount of Stanford's Yellow Ribbon contribution

varies by school and program; see the Yellow Ribbon information on the University Registrar's web site.

Undergraduates

Undergraduates may apply for need-based financial aid from Stanford to supplement VA educational benefits. If the financial aid application demonstrates financial need beyond the amount of expected VA benefits, the student will be awarded institutional aid to meet the additional need.

If the student will be receiving VA educational benefits transferred from a parent, the student will be treated as a dependent student for financial aid purposes. The student's parents' income and asset information will be considered in determining eligibility for need-based aid from Stanford. If the student is a veteran, the student will most likely be treated as an independent student and will not need to provide parent information. Receipt of VA educational benefits does not impact your eligibility for federal student loan programs.

VA educational benefits are treated like other outside awards in that they can reduce or replace the Student Responsibility portion of the aid package. VA benefits do not reduce or replace the Parent Contribution in the determination of eligibility for need-based Stanford aid.

Graduate Students

Schools and departments are responsible for providing the Yellow Ribbon contribution for eligible graduate students. The Financial Aid Office will coordinate receipt of funds with responsible individuals in each school. Receipt of VA educational benefits does not impact your eligibility for federal student loan programs.

Veterans' Educational Benefits

The Office of the University Registrar serves as the liaison between the University, its students, and the various federal, state, and local agencies concerned with veterans' benefits. Stanford certifies enrollment for students in degree seeking programs and students in one of 24 VA approved certificate programs offered through the Stanford Center for Professional Development. Other non-matriculated and certificate programs are not eligible. All students eligible to receive veterans' benefits while attending the University are urged to complete arrangements with the appropriate agency in advance of enrollment.

Stanford University is required to certify only those courses that meet minimum graduation requirements. Courses not directly related to a student's degree program or courses beyond those required for a specific degree program are not certified. Undergraduates should meet with an advisor to develop a course enrollment plan. Graduate students should have their departments approve their study lists as meeting graduation requirements on a quarterly basis.

To comply with federal regulations concerning credit for previous training (38 CFR 21.4253), Stanford University is required to evaluate all previous education and training completed elsewhere to determine what credit, if any, should be granted to students eligible to receive Veterans Affairs (VA) educational benefits. Stanford is required to complete an evaluation; credit is granted when appropriate. Credit is evaluated toward the degree program registered with Veterans Affairs as determined by the Office of the University Registrar in conjunction with the relevant academic department(s) or program(s). All relevant policies regarding transfer credit apply. In addition, this evaluation occurs each time a student's degree program is changed.

Subject to current federal and University guidelines, students eligible for receipt of VA educational benefits have their prior education and training evaluated up to the credit limits outlined in the "Residency Policy for Graduate Student (p. 50)s" section of this bulletin. As an exception to that policy, students in master's programs in the schools of Earth Sciences,

Education, Engineering, Humanities and Sciences, Law, Medicine, and Graduate Business are allowed a maximum of 6 transfer (quarter) units.

Stanford participates in the Yellow Ribbon provision of the Post 9/11 GI Bill (Ch. 33). If a matriculated student qualifies for Chapter 33 benefits at the 100% level, the student may be eligible to receive additional funding through the Yellow Ribbon Program. Under this program, Stanford provides an annual award of \$3,000 to undergraduate students to supplement the Chapter 33 base tuition benefit. The VA matches Stanford's Yellow Ribbon contribution, so the student receives a combined total of \$6,000 in additional funds. Certain matriculated graduate students may be eligible for the Yellow Ribbon provision, and the amount of institutional contribution varies by school and program at the graduate level.

See the Office of Military Affiliated Communities (OMAC) web site (<https://military.stanford.edu/gi-bill-benefits>) for additional information about veterans' educational benefits..

Academic Policies and Statements

Compliance with University Policies/Registration Holds

Registration as a student constitutes a commitment by the student to abide by and accept University policies, rules, requirements, and regulations, including (but not limited to) those concerning registration, academic performance, student conduct, Title IX, health and safety, housing, use of the libraries and computing resources, intellectual property (including completing and signing the SU-18), operation of vehicles on campus, University facilities, and the payment of fees and assessments. Some of these are set forth in this bulletin while others are available in relevant University offices.

Students should take responsibility for informing themselves of applicable University policies, rules, requirements, and regulations. A collection is available on the Stanford University policy (<http://www.stanford.edu/about/administration/policy>) web site. Many are also set forth in the Research Policy Handbook (<http://doresearch.stanford.edu>) and the Graduate Academic Policies and Procedures Handbook (the GAP handbook) (<http://gap.stanford.edu>).

The University reserves the right to withhold registration privileges or to cancel the registration of any student: who is not in compliance with its policies, rules, requirements, or regulations; or for reasons pertaining to academic performance, health and wellness, qualification to be a student, behavioral conduct, or the safety of the University community.

University Communication with Students

Stanford University uses electronic means (such as email, texts, and the Internet) as a primary method of communication and of providing billing, payment, and enrollment services. Signatures or acknowledgments provided by the student electronically to Stanford via Stanford systems and/or @stanford.edu email are valid and legally binding. Additionally, by accepting Stanford's offer of admission and enrolling in classes, each student accepts responsibility for paying all debts to the University, including tuition and fees, for which he or she is liable. An individual's registration as a Stanford student constitutes his or her agreement to make timely payment of all amounts due.

Notification/Obligation to Read Email

For many University communications, email to a student's Stanford email account is the official form of notification to the student, and emails sent by University officials to such email addresses will be presumed to have been received and read by the student. Emails and forms delivered through a SUNet account by a student to the University may likewise constitute a formal communication, with the use of this password-protected account constituting the student's electronic signature.

Registration and Study Lists

The preliminary study list deadline is the first day of classes of each quarter during the academic year. As early as possible, but no later than this deadline, students (including those with TGR status) must submit to the Office of the University Registrar via Axxess, a study list to enroll officially in classes for the quarter. Students are expected to be enrolled "at status" by the preliminary study list deadline; meaning that students must be enrolled in sufficient units to meet requirements for their status, whether full-time, or on approved special registration status. Students who enroll in more units than their anticipated tuition charge covers will be charged the additional tuition. They may not enroll in courses for zero units unless those courses, like TGR, are defined as zero-unit courses. Undergraduates are subject to academic load limits described in the "Amount of Work (p. 58)" section of this bulletin. Students will be charged a \$200 late study list fee for submitting their study lists after the quarterly deadline.

The University reserves the right to withhold registration from, and to cancel the advance registration or registration of, any student having unmet obligations to the University.

Study List Changes

Students may add courses or units to their study lists through the end of the third week of classes. (Individual faculty may choose to close their classes to new enrollments at an earlier date.) Courses or units may be added only if the revised program remains within the normal load limits.

Courses or units may be dropped by students through the end of the third week of classes, without any record of the course remaining on the student's transcript. No drops are permitted after this point. The Final Study List deadline is the last day for tuition reassessment for dropped courses or units.

A student may withdraw from a course after the final study list deadline through the end of the eighth week of each quarter. In this case, a grade notation of 'W' (withdraw) is automatically recorded on the student's transcript for that course. There are no tuition reassessments for withdrawing from individual courses. Students who do not officially withdraw from a class by the end of the eighth week are assigned the appropriate grade or notation by the instructor to reflect the work completed.

Through the end of the eighth week of classes, students may choose the grading option of their choice in courses where an option is offered.

If the instructor allows a student to take an 'I' (incomplete) in the course, the student must make the appropriate arrangements for that with the instructor by the last day of classes.

The deadlines described above follow the same pattern each quarter but, due to the varying lengths of Stanford's quarters, they may not always fall in exactly the week specified. Students should consult the University's academic calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>) for the deadline dates each term. Other deadlines may apply in Law, Graduate School of Business, Medicine, and Summer Session.

Repeated Courses

Students may not enroll in courses for credit for which they received either Advanced Placement or transfer credit.

Some Stanford courses may be repeated for credit; they are specially noted in this bulletin. Most courses may not be repeated for credit. Under the general University grading system, when a course which may not be repeated for credit is retaken by a student, the following special rules apply:

1. A student may retake any course on his or her transcript, regardless of grade earned, and have the original grade, for completed courses only, replaced by the notation 'RP' (repeated course). When retaking a course, the student must enroll in it for the same number of units originally taken. When the grade for the second enrollment in the course has been reported, the units and grade points for the second course count in the cumulative grade point average in place of the grade and units for the first enrollment in the course. Because the notation 'RP' can only replace grades for completed courses, the notation 'W' cannot be replaced by the notation 'RP' in any case.
2. A student may not retake the same course for a third time unless he or she received a 'NC' (no credit) or 'NP' (not passed) when it was taken and completed the second time. Undergraduate students must file a petition for approval to take the course for a third time with the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. When a student completes a course for the third time, grades and units for both the second and third completions count in the cumulative grade point average. The notation 'W' is not counted toward the three-retake maximum.

Amount of Work

The usual amount of work for undergraduate students is 15 units per quarter; 180 units (225 for dual degree students) are required for graduation. Registration for fewer than 12 units is rarely permitted and may cause the undergraduate to be ineligible for certification as a full-time student. The maximum is 20 units (21 if the program includes a 1-unit activity course). Requests for exception to the maximum may be considered for compelling reasons, the approval of which may include conditions or restrictions. A past superior academic performance is not considered to be sufficient justification for exceeding the maximum. Petitions for programs of fewer than 12 or more than 20 units must be submitted to the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research, Sweet Hall, first floor. For additional information regarding satisfactory academic progress, refer to the "Academic Standing (p. 64)" section of this bulletin.

Matriculated graduate students are expected to enroll for at least eight units during the academic year; schools and departments may set a higher minimum. Petitions for programs of fewer than 8 must be signed by the student's department and submitted for consideration to the Office of the University Registrar. Graduate students are normally expected to enroll in no more than 24 units; registration for more than 24 units must be approved by the department. Under certain circumstances, graduate students may register on a part-time basis. See the "Tuition, Fees, and Housing (p. 18)" section of this bulletin.

Undergraduates and graduate students with disabilities who may seek a reduced course load should contact the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>).

Unit of Credit

Guidance for faculty and instructors on how to comply with this policy is available on the Registrar's web site.

Every unit for which credit is given is understood to represent approximately three hours of actual work per week for the average student. Thus, in lecture or discussion work, for 1 unit of credit, one hour per week

may be allotted to the lecture or discussion and two hours for preparation or subsequent reading and study. Where the time is wholly occupied with studio, field, or laboratory work, or in the classroom work of conversation classes, three full hours per week through one quarter are expected of the student for each unit of credit; but, where such work is supplemented by systematic outside reading or experiment under the direction of the instructor, a reduction may be made in the actual studio, field, laboratory, or classroom time as seems just to the department.

Religious Holidays

Students planning not to attend class or take an exam because of a religious observance are expected to convey this information to instructors in advance. The Office for Religious Life makes available to faculty, staff, and students a list of significant religious observances at the beginning of each academic year. For further information, contact the Deans for Religious Life at (650) 723-1762 or see the Religious Life (<http://religiouslife.stanford.edu>) web site.

Privacy of Students Records Notification of Rights Under FERPA

The Family Educational Rights and Privacy Act of 1974 (FERPA) affords students certain rights with respect to their education records. They are:

1. The right to inspect and review the student's education records within 45 days of the date the University receives a request for access.

The student should submit to the Registrar, Dean, chair of the department, or other appropriate University official, a written request that identifies the record(s) the student wishes to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes are inaccurate, misleading, or otherwise in violation of the student's privacy rights under FERPA.
 - a. A student may ask the University to amend the record that he or she believes is inaccurate or misleading. The student should write the University official responsible for the record (with a copy to the University Registrar), clearly identify the part of the records he or she wants changed, and specify why it should be changed.
 - b. If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment.
 - c. Additional information regarding the hearing procedures is provided to the student when notified of the right to a hearing.
3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

FERPA contains various exceptions to the general rule that the University should not disclose education records without seeking the prior written consent of the student. The following circumstances are representative of those in which education records (and information drawn from education records) may be disclosed without the student's prior written consent:

- a. Upon request, the University may release Directory Information (see the "Directory Information (<http://www.stanford.edu/dept/registrar/bulletin/4962.htm>)" section of this bulletin).

- b. School officials who have a legitimate educational interest in a student's education record may be permitted to review it. A school official is: a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student or volunteer serving on an official committee (or representing a recognized student group), such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her responsibility to Stanford or to the student.
- c. The University discloses education records without consent to officials of another school, in which a student seeks or intends to enroll, upon request of officials at that other school.
- d. The University may choose to disclose education records (and information drawn from education records) to either supporting parent(s) or guardian(s) where the student is claimed as a dependent under the Internal Revenue Code.
- e. The University may inform persons including either parent(s) or guardian(s) when disclosure of the information is necessary to protect the health or safety of the student or other persons.
- f. For students under the age of 21, the University may notify either parent(s) or guardian(s) of a violation of any law or policy relating to the use of alcohol or controlled substances.
- g. The University must provide records in response to lawfully issued subpoenas, or as otherwise compelled by legal process.
4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA.

The name and address of the office that administers FERPA is:
Family Policy Compliance Office, U.S. Department of Education, 400
Maryland Avenue, SW, Washington, DC 20202-4605.

Sharing Information with Parents

Students are encouraged to maintain an ongoing, open dialogue with parents throughout their careers at Stanford about academic progress and personal development. Most student difficulties are resolved at Stanford without involving parents. The University does recognize, however, that there are some exceptional situations where parental involvement may be appropriate to assist a student through a difficult circumstance. Under those circumstances, Stanford may (but is not required to) choose to disclose information to parents if permitted by law.

Under the Family Educational Rights and Privacy Act (FERPA), Stanford is permitted to disclose information drawn from education records to parents if one or more parent claims the student as a dependent for federal tax purposes. Some laws, especially those relating to medical and mental health care, prohibit the disclosure of information without the student's consent, even where the student is a tax dependent.

Directory Information

The University regards the following items of information as "directory information," that is, information that the University may make available to any person upon specific request (and without student consent):

- Name*
- Email addresses
- Specific quarters or semesters of registration at Stanford
- Stanford degree(s) awarded and date(s)

- Major(s), minor(s), and field(s)
- University degree honors
- Student theses and dissertations
- Participation in officially recognized sports or activities*
- Weight and height of members of athletic teams*
- Institution attended immediately prior to Stanford
- ID card photographs

For more information, see Stanford's FERPA (<http://studentaffairs.stanford.edu/registrar/students/ferpa>) web page.

Students may prohibit the release of any of the items listed above (except those with an *) by designating which items should not be released on the Privacy function of Axiom. Students may prohibit the release of all directory information listed above after an appointment with the Office of the University Registrar to discuss the ramifications of this action. Student theses and dissertations can be restricted through the publishing options and embargo settings students select during submission.

Students, faculty, and others with questions regarding student records should contact the Office of the University Registrar.

Consent to Use of Photographic Images

Registration as a student and attendance at or participation in classes and other campus and University activities constitutes an agreement by the student to the University's use and distribution (both now and in the future) of the student's image or voice in photographs, video or audio capture, or electronic reproductions of such classes and other campus and University activities.

If any student in a class where such photographing or recording is to take place does not wish to have his or her image or voice so used, the student should raise the matter in advance with the instructor.

Examinations Midterms

Classes that give midterm examinations outside of regular class hours must:

1. announce the date and time during the first week of the academic quarter, and
2. provide reasonable alternative times to those students who have another class or other University commitment at that time.

According to Honor Code interpretations and applications, different examinations may be given at these alternative times.

End-Quarter Policy Statement

The End-Quarter Period is a time of reduced social and extracurricular activity preceding final examinations. Its purpose is to permit students to concentrate on academic work and to prepare for final examinations.

In Autumn, Winter, and Spring quarters, End-Quarter starts seven full days (to begin at 12:01 a.m.) prior to the first day of final exams. In Spring Quarter, final examinations begin on Friday; no classes are held on Thursday, the day before. In Summer Quarter, this consists of the weekend and the four class days preceding the final examinations, which take place on Friday and Saturday of the eighth week. (See the Time Schedule for dates.)

During the End-Quarter Period, classes are regularly scheduled and assignments made; this regular class time is used by instructors in whatever way seems best suited to the completion and summation of course material. Instructors should neither make extraordinary assignments nor announce additional course meetings in order to "catch up" in course presentations

that have fallen behind. They are free, however, and even encouraged to conduct optional review sessions and to suggest other activities that might seem appropriate for students preparing for final examinations.

No graded homework assignments, mandatory quizzes, or examinations should be given during the End-Quarter Period except:

1. In classes where graded homework assignments or quizzes are routine parts of the instruction process.
2. In classes with laboratories where the final examination will not test the laboratory component. In such a case, the laboratory session(s) during the End-Quarter Period may be used to examine students on that aspect of the course.

Major papers or projects about which the student has had reasonable notice may be called due in the End-Quarter Period.

Take-home final examinations, given in place of the officially scheduled in-class examination, may be distributed in the End-Quarter Period. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course. Such a policy respects the principle that students' final examinations are to be scheduled over a period of several days.

End-quarter examinations may not be held during this period. This policy preserves the instruction time for courses and protects the students' opportunities for extensive review and synthesis of their courses.

During the End-Quarter Period, no musical, dramatic, or athletic events involving student participation may be scheduled, unless approved as exceptions by the Committee on Undergraduate Standards and Policy (C-USP), nor may routine committee meetings be scheduled (such as those of the ASSU, the Senate of the Academic Council, or the committees of the President of the University) when such meetings normally would involve student participation.

Note—Students who believe that there are faculty who are violating End-Quarter policy should contact the Office of the University Registrar (<https://remedyweb.stanford.edu/helpsu/2.0/helpsu-form?pcat=Registrar>).

End-Quarter Examinations

Examinations are part of the process of education at the same time that they are a means to measure the student's performance in course work. Their structure, content, frequency, and length are to be determined in accordance with the nature of the course and the material presented in it, subject only to the limitations contained herein.

Great flexibility is available regarding the types of examinations that an instructor may choose to employ. Examinations, including final examinations, may be, for example, in-class essay examinations, take-home essay examinations, objective examinations, oral examinations, or appropriate substitutes such as papers or projects. Instructors may use any type of examination, paper, or project, or any combination thereof, guided only by the appropriateness of the types of examinations, papers, or projects for the material upon which the student is being examined.

When the final examination is an in-class examination, the following regulations apply:

1. A three-hour period is reserved during examination week for the final examination in each course of more than 2 units. This examination period must be available for students, but not necessarily in its entirety, if an in-class examination is given. In courses with extraordinary meeting times, such that ambiguity might exist as regards the period reserved for the final examination, the schedule should be clarified and students informed no later than the end of the second week of the quarter.
2. Examinations in 1- or 2-unit courses must be completed by the end of the last class meeting before the End-Quarter Period, except in Summer

Quarter when examinations must be completed during the last regularly scheduled class session.

When the final examination or its appropriate substitute is not an in-class examination (for example, when an instructor chooses to employ a take-home examination, paper, or project in lieu of an in-class examination), the following regulations apply:

1. The schedule and format of the final examination or its appropriate substitute are made known not later than the end of the second week of the quarter and, if changed subsequently, may be only an option of the plan originally announced by the instructor.
2. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course.

In submitting official Study Lists, students commit to all course requirements, including the examination procedures chosen and announced by the course instructor. In choosing courses, students should take cognizance of the official schedule of final examinations announced on the Registrar's (<http://studentaffairs.stanford.edu/registrar/final-exams>) web site. Students anticipating conflicts in final examination schedules should seek to resolve these with the instructors involved before the Preliminary Study List deadline at the beginning of the quarter. If accommodation cannot be made at that time, the student should revise his or her Study List before the Final Study List deadline at the end of the third week of the quarter in order to be able to meet the required final examination.

If unforeseen circumstances prevent the student from sitting for the regularly scheduled examination, instructors should make alternative arrangements on an individual basis. Such unforeseen circumstances include illness, personal emergency, or the student's required participation in special events (for example, athletic championships) approved as exceptions by the Committee on Undergraduate Standards and Policy (C-USP). Inquiries regarding these circumstances may be directed to the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual).

Statement Concerning Early Examinations

Students are reminded that taking final examinations earlier than the scheduled time is a privilege, not a right. They should request this privilege only in the event of extraordinary circumstances.

Since the final examination schedule for each quarter (<http://studentaffairs.stanford.edu/registrar/final-exams>) is published annually on the Registrar's web site at the time of course selection and enrollment, students are expected to make their academic plans in light of known personal circumstances that may make certain examination times difficult for them.

In general, faculty members are discouraged from giving final examinations earlier than the published and announced times. If faculty nevertheless decide to administer early examinations, either the questions should be completely different from those on the regularly scheduled examination or the early examination should be administered in a highly controlled setting. An example of such a setting would be a campus seminar room where the examination questions would be collected along with students' work and students would be reminded of their Honor Code (<http://www.stanford.edu/dept/registrar/bulletin/79155.htm>) obligations not to share information about the examination contents. Giving students easy opportunities to abuse the integrity of an examination is unfair to honest students and inconsistent with the spirit of the Honor Code (<http://www.stanford.edu/dept/registrar/bulletin/79155.htm>).

Academic fields differ in the degree to which early examination requests present dilemmas for faculty. If, for example, an examination format

consists of a small number of essay questions, where students would be greatly advantaged by knowing the question topics, faculty should be especially reluctant to allow early examinations unless they are willing to offer totally different examinations or a different kind of academic task, for example, a final paper in lieu of an examination.

Grading Systems

General University Grading Systems

The general University grading system is applicable to all of Stanford University except the Graduate School of Business, the School of Law, and M.D. students in the School of Medicine. Note that the GPA (grade point average) and rank in class are not computed under the general University grading system. Stanford does use an internal-only GPA which is based on units completed up to the time of conferral of the first bachelor's degree. This information is used for internal purposes only (including academic standing) and is not displayed on the official transcript which is sent outside the University. Most courses are graded according to the general University grading system. However, courses offered through Law, Business, and Medicine are graded according to those schools' grading systems, even in cases where students in other programs are enrolled in their classes. Note also that, as to graduate students, there may be departmental requirements as to grades that must be maintained for purposes of minimum academic progress.

Definition and Explanation of Grading Systems

All grades/notations for courses taken in 1995-96 or later are to be visible on student transcripts. Effective Summer Quarter 2008-09, the notation * was changed to GNR (Grade Not Reported).

Grade	Description
A (+,-)	Excellent
B (+,-)	Good
C (+,-)	Satisfactory
D (+,-)	Minimal pass
NP	Not Passed
NC	No Credit (unsatisfactory performance, 'D+' or below equivalent, in a class taken on a satisfactory/no credit basis)
CR	Credit (student-elected satisfactory; A, B, or C equivalent)
S	No-option Satisfactory; A, B, or C equivalent
L	Pass, letter grade to be reported
W	Withdraw
N (-)	Continuing course
I	Incomplete
RP	Repeated Course
*	No grade reported (effective through Spring 2008-09).
GNR	Grade not reported (effective beginning Autumn Quarter 2009-10).

Explanation

Grade	Description
NC	The notation 'NC' represents unsatisfactory performance in courses taken on a satisfactory/no credit basis. Performance is equivalent to letter grade 'D+' or below.
NP	The notation 'NP' is used by instructors in courses taken for a letter grade that are not passed.

CR	In a course for which some students receive letter grades, the 'CR' represents performance that is satisfactory or better when the student has elected the 'CR' grading option.
S	For an activity course or a course in which the instructor elects to grade students only on a satisfactory/no credit basis, the 'S' represents performance that is satisfactory or better. For such a course, no letter grades may be assigned for satisfactorily completed work. It should be noted that the Registrar is unable to record course grades submitted when the instructor has not observed the required distinction between 'S' and 'CR.' The 'satisfactory' options are intended to relieve the pressure on students for achievement in grades. The 'satisfactory' options in no way imply fewer or different course work requirements than those required of students who elect evaluation with a letter grade. A department may limit the number of 'satisfactory' courses to count for a major program. No more than 36 units of Stanford course work (including activity courses) in which a 'CR' or 'S' was awarded can be applied toward the 180 (225 if dual degrees are being pursued) units required for a bachelor's degree. Transfer students are limited to 27 'CR' or 'S' units applied to the 180/225 minimum.
L	The 'L' is a temporary notation that represents creditable completion of a course for which the student will receive a permanent letter grade before the start of the next quarter. The 'L' is given when the instructor needs additional time to determine the specific grade to be recorded, but it is not appropriate if additional work is expected to be submitted by the student. A student receives unit credit for work graded 'L.'
N	The 'N' indicates satisfactory progress in a course that has not yet reached completion. Continuation courses need not continue at the same number of units, but the grade for all quarters of such a course must be the same.
N-	The 'N-' grade indicates unsatisfactory progress in a continuing course. The first 'N-' grade constitutes a warning. The adviser, department chair, and student should discuss the deficiencies and agree on the steps necessary to correct them. A second consecutive 'N-' will normally cause the department to deny the student further registration until a written plan for the completion of the degree requirements has been submitted by the student and accepted by the department. Subsequent 'N-' grades are grounds for dismissal from the program.

I	The 'I' is restricted to cases in which the student has satisfactorily completed a substantial part of the course work. No credit will be given until the course is completed and a passing grade received. When a final grade is received, all reference to the initial 'I' is removed. 'I' grades must be changed to a permanent notation or grade within a maximum of one year. If an incomplete grade is not cleared at the end of one year, it is changed automatically by the Office of the University Registrar to an 'NP' (not passed) or 'NC' (no credit) as appropriate for the grading method of the course. Students must request an incomplete grade by the last class meeting. Faculty may determine whether to grant the request or not. Faculty are free to determine the conditions under which the incomplete is made up, including setting a deadline of less than one year. A leave of absence does not stop the clock on the time limit for resolving incompletes. Graduate students with extenuating circumstances, that may warrant an exception to academic policy, should discuss the need for an extension to the time limit with their advisor and the course instructor. Students may request an extension of the deadline for resolving an incomplete by submitting the Petition to Change Course Enrollment (Graduate Students).
RP	The notation 'RP' (meaning Repeated Course) replaces the original grade recorded for a course when a student retakes a course. (See the "Repeated Courses" section of this bulletin.)
W	The notation 'W' (meaning Withdraw) is recorded when a student withdraws from a course.
*	The '*' symbol appears when no grade has been reported to the Registrar for courses taken prior to 2001-02. The '*' symbol remains on the transcript until a grade has been reported (effective through Spring 2008-09).
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported. (Effective beginning Autumn Quarter 2009-10.)

Reporting of Grades

All grades should be reported within 96 hours after the time and day reserved for the final examination, and in no case later than noon of the fourth day (including weekends) after the last day of the final examination period.

In the case of degree candidates in Spring Quarter, final grades should be reported by noon of the day following the end of the final examination period.

Revision of End-Quarter Grades

When duly filed with the Office of the University Registrar, end-quarter grades are final and not subject to change by reason of a revision of judgment on the instructor's part; nor are grades to be revised on the basis of a second trial (for example, a new examination or additional work undertaken or completed after the end of the quarter). Changes may be made at any time to correct an actual error in computation or transcription, or where some part of the student's work has been unintentionally overlooked; that is, if the new grade is the one that would have been entered on the original report had there been no mistake in computing and had all the pertinent data been before the instructor, the change is a proper one.

If a student questions an end-quarter grade based on the grading of part of a specific piece of work (for example, part of a test) on the basis of one of the allowable factors mentioned in the preceding paragraph (for example, an error in computation or transcription, or work unintentionally overlooked,

but not matters of judgment as mentioned below), the instructor may review the entire piece of work in question (for example, the entire test) for the purpose of determining whether the end-quarter grade was a proper one. In general, changing an end-quarter grade is permitted on the basis of the allowable factors already mentioned whether an error is discovered by the student or the instructor; however, changing a grade is not permitted by reason of revision of judgment on the part of the instructor.

In the event that a student disputes an end-quarter grade, the established grievance procedure should be followed (see the "Student Academic Grievance Procedure (<http://www.stanford.edu/dept/registrar/bulletin/4988.htm>)" section of this bulletin).

Graduate School of Business Grades

All courses offered by the Graduate School of Business are graded according to the following five-level scheme:

Grade	Description
H	Honors. Work that is of truly superior quality.
HP	High Pass. A passing performance, and one that falls approximately in the upper quarter of passing grades.
P	Pass. A passing performance that falls in the center of the distribution of all passing grades.
LP	Low Pass. A passing performance that falls approximately in the lower quarter of passing grades.
U	Unsatisfactory. A failing performance. Work that does not satisfy the basic requirements of the course and is deficient in significant ways.
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported (effective Autumn Quarter 2009-10).

GSB courses may receive grades of "+" (Pass) for courses taken on a Pass-Fail basis, with "U" denoting a failing grade, "I" for Incomplete, and "N" for a continuing grade. The grade of N is recorded in a course that spans more than a single quarter, where the grade in an earlier quarter will be determined only later, after the entire course sequence is complete.

Prior to 2009-10, an asterisk (*) notation was placed when no grade was reported.

For more information, see the GSB Grades web site (p. 61).

Stanford Law School Grades

Effective Autumn Quarter 2009-10, units earned in the Stanford Law School are quarter units. Units earned in the Stanford Law School prior to 2009-10 were semester units. The following grading system became effective in Autumn Semester 2008-09. J.D. students who graduated in 2009 remained on the prior grading system but all other students shifted to the new grading system. For more information, see the Stanford Law School Handbook (http://www.law.stanford.edu/experience/studentlife/SLS_Student_Handbook.pdf).

Grade	Description
H	Honors (exceptional work, significantly superior to the average performance at the school)
P	Pass (representing successful mastery of the course material)
R	Restricted credit (representing work that is unsatisfactory)
F	Fail (representing work that does not show minimally adequate mastery of the material)

MP	Mandatory pass (representing P or better work)
N	Continuing course
I	Incomplete
*	No grade reported
GNR	Grade not reported (effective Autumn Quarter 2009-10).

The grading systems employed at the Stanford Law School September 2001 through Spring 2009 were as follows. Under the numerical system (with letter equivalents), the range of satisfactory grades ran from 4.3 to 2.5 as outlined in the following distribution. Below the grade of 2.5 was one level of restricted credit (2.2) and one level of failure (2.1). The number grades with letter equivalents were as follows:

Numbering	Grade
4.3-4.2	A+
4.1-3.9	A
3.8-3.5	A-
3.4-3.2	B+
3.1-2.9	B
2.8-2.5	B-
2.2	Restricted Credit
2.1	Failure

On this old system, students could elect to take a limited number of courses on a credit/restricted credit/no credit system (K/RK/NK). 'K' was awarded for work that was comparable to numerical grades 4.3 to 2.5, 'RK' for Restricted Credit-level work (2.2), and 'NK' for Failure-level work (2.1). A limited number of courses were offered on a mandatory credit (KM)/no credit (NK) basis.

'N' is a temporary notation used in a continuing course; it is replaced with a final grade upon completion of the course series.

School of Medicine Grades

In general, the following grades are used in reporting on the performance of students in the M.D. program:

Grade	Description
Pass (+)	Indicates that the student has demonstrated to the satisfaction of the department or teaching group responsible for the course that the student has mastered the material taught in the course.
Fail (-)	Indicates that the student has not demonstrated to the satisfaction of the department or teaching group responsible for the course that the student has mastered the material taught in the course.
Incomplete (I)	Indicates that extenuating medical or personal circumstances have prevented the student from completing the course requirements. This grade is given when requested by the student with the prior approval of an Advising Dean in the School of Medicine.
Continuing (N)	Indicates that the course has not concluded and the student is continuing the course.
Exempt (Ex)	Indicates a course that is exempted by examination. No units are awarded.
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported (effective Autumn Quarter 2009-10).

In general, a 'Fail' grade can be cleared by repeating and passing the particular course or by other arrangement prescribed by the department or teaching group. An 'Incomplete' grade can be made up in a manner specified by the department or teaching group within a reasonable time; if the deficiency is not made up within the specified time, the 'Incomplete'

grade becomes a 'Fail' grade. The opportunity to clear a 'Fail' grade or an 'Incomplete' grade cannot be extended to individuals who are not registered or eligible to register as students in the M.D. program. For more specific information, see the Assessment of Student Academic Performance (<http://med.stanford.edu/md/curriculum/assessment-grading.html>) web site.

Records Transcripts

Transcripts of Stanford records are issued by the Office of the University Registrar upon the student's request when submitted in writing or via the online Axess system. There is no charge for official transcripts. The courses taken in one quarter do not appear on any student's transcript until after the final study list deadline. The University reserves the right to withhold transcripts or records of students with unmet obligations to the University.

Certification of Enrollment or Degrees

The Office of the University Registrar can provide written confirmation of registration, enrollment, or degree status upon request by the student. The printed certification can be used whenever enrollment or degree verification is required for car insurance, loan deferments, medical coverage, scholarship purposes, and so on. Using Axess, students are able to print an official certification at no charge. Certification of full- or part-time enrollment cannot be provided until after the study list is filed for the quarter in question.

Degrees are conferred quarterly, but diplomas are issued in accordance to the distribution dates listed on the Registrar's Office (<http://studentaffairs.stanford.edu/registrar/students/diplomas>) web site. After conferral, the degree awarded to a student can be verified by contacting the Office of the University Registrar for an official transcript, or official degree certification form. Requests for transcripts or degree certifications must be made by the student in writing or through Axess.

Stanford University has authorized the National Student Clearinghouse (NSC) to act as its agent for purposes of third party enrollment and degree verification. The NSC will be able to verify degrees and enrollment for only those students who have not placed a privacy block on their academic record. The student's name when enrolled, Social Security Number or Student ID, and date of birth will be required for identification purposes and enrollment or degree verification. All third parties should contact the National Student Clearinghouse by phone or visit their web site for current enrollment and degree verification information, instructions, and fees.

As a general proposition, full-time enrollment for undergraduates is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time status in the current quarter. Enrollment in 8 to 11 units is considered half-time enrollment. Enrollment in 1 to 7 units is considered less-than-half-time, or part-time enrollment. During Summer Quarter, all graduate students who hold appointments as research or teaching assistants are considered to be enrolled on at least a half-time basis.

For students with disabilities taking a reduced course load, contact the Office of Accessible Education (<http://studentaffairs.stanford.edu/oae>) for additional information.

All undergraduates validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification.

Stanford uses the following definitions (in units) to certify the enrollment status of graduate and professional students each quarter:

Status	Graduate	Business (M.B.A./Sloan)	Law	Medicine (M.D.)
Full time:	8 or more	11 or more	9 or more	9 or more
Half time:	6 or 7	6-10	6-8	6-8
Part time:	5 or fewer	5 or fewer	5 or fewer	5 or fewer

TGR students enrolled in a course numbered 801 or 802 are certified as full time. Graduate students on an approved Graduation Quarter status are certified as full time.

As a general proposition, only information classified by the University as directory information (see the "Directory Information (<http://www.stanford.edu/dept/registrar/bulletin/4962.htm>)" section of this bulletin) can be confirmed to inquirers other than the student.

H-1B Degree Certification

As the H-1B application deadline is April 1 and Winter Quarter degree conferral does not occur until after this date (or just before), the Office of the University Registrar provides an H-1B Degree Certification Letter for eligible students graduating Winter Quarter who are applying for the H-1B visa and have completed all school/department and University degree requirements.

Students conferring degrees in all terms except Winter Quarter should request an official transcript in their student Axess account after the degree conferral date of their graduation term. The official transcript indicates the results of all work completed and degrees awarded. Students can also request an official degree certification via Axess, or by completing a Degree Certification Request form. See Certifications and Verifications (<http://studentaffairs.stanford.edu/registrar/students/certifications>) for details on requesting degree verification.

An Enrollment Verification is included with the H-1B Degree Certification Letter. The Enrollment Certification states a student's enrollment history, current program of study, major, expected degree, and expected degree conferral date. This document bears the University seal and signature of the University Registrar. For more information see the Office of the University Registrar H-1B Certification Letter (<http://exploreddegrees.stanford.edu/academicpoliciesandstatements/x-webdoc://D3A5CCDC-66E3-45EE-8E78-2D47E9234AF2/studentaffairs.stanford.edu/registrar/students/h-1b>) web site.

Bechtel International Center organizes H-1B workshops which students are encouraged to attend if they have any questions regarding H-1B issues.

Posthumous Degrees

Stanford will consider granting a posthumous degree in instances in which a student was in good standing and had completed at least 90% of all graduation requirements at the time of death. Requests must be approved by the chair of the major department or the dean of a professional school and the University Registrar. Requests should be addressed to the University Registrar and generally should take place within 12 months of the student's death.

Academic Standing

Undergraduates must maintain a minimum 2.0 cumulative GPA and a quantitative unit requirement for good academic standing. In addition, a minimum 2.0 cumulative GPA is required for conferral of a baccalaureate degree.

Undergraduates normally are expected to plan their academic programs so that they can complete 180 units in four years (twelve quarters), including the requirements for a major and the General Education (p. 28), Writing and Rhetoric (p.), and Language (p.) Requirements. Satisfactory academic progress is, on average, 45 units per academic year

for four years leading to at least 180 units, a cumulative grade point average of at least 2.0, and a baccalaureate degree.

While undergraduates are expected to register for a minimum of 12 units, they are required to earn at least 9 units each quarter (by the end of the final exam period) and at least 36 units in their most recent three quarters of Stanford enrollment (by the end of the third final exam period). In addition, students are expected to maintain a cumulative grade point average of at least 2.0. Transfer work completed at other institutions is not considered in this calculation.

A student earning fewer than 9 units per quarter or fewer than 36 units in three quarters, or earning less than a 2.0 cumulative grade point average, is placed on probation. (For students with disabilities taking a reduced course load, contact the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>) for additional information.) Additionally, a student may be placed directly on provisional registration or suspension (further defined in this section) without first being placed on probation if the student had a prior probation status. Students on probation (p.) or provisional registration (p.) status are required to earn a minimum of 12 units of new course work per quarter (by the end of the final quarter examination period for each quarter) in each quarter for three consecutive quarters, and achieve and maintain a cumulative grade point average of at least 2.0 to attain good academic standing. (A Stanford Summer Session quarter counts toward the three consecutive quarter requirement if 11 or more units are earned). The C-USP Subcommittee on Academic Standing may stipulate otherwise by acting upon a petition for fewer units.

Full-time enrollment is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Under extenuating circumstances, students may petition to the C-USP Subcommittee on Academic Standing to take fewer units. As a general proposition, work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time enrollment in the current quarter. All students registering for fewer than 12 units should consider the effects of that registration on their degree progress, visas, deferment of student loans, residency requirements, varsity athlete status, and their eligibility for financial aid and awards.

All undergraduates validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification and athletic participation.

Units are granted for courses completed with grades 'A,' 'B,' 'C,' 'D,' 'Satisfactory' ('CR' or 'S'), and 'L.' Courses graded 'N' are counted provisionally as units completed, provided the student enrolls in the continuing segment of that course the following quarter. When the course is completed, the student receives the units for which he or she enrolled. No units are granted for a course in which the student receives an 'I' or a 'GNR' ('GNR' replaced the '*' effective Autumn Quarter 2009-10) until the course is completed satisfactorily and the final grade reported. No units are granted for a course in which the student receives a 'W'. (See the "Grading Systems (p. 61)" section of this bulletin).

Students who receive all 'W's as the result of a Leave of Absence (either voluntary or involuntary) are subject to Academic Standing policies.

The C-USP Subcommittee on Academic Standing in its discretion is empowered to place conditions on students on probation or provisional registration in regard to enrollment and participation in programs and activities. In addition, students on probation require approval in advance from Undergraduate Advising and Research (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP/advising/MakeAdvisingAppointment.html), Residential Education (<http://studentaffairs.stanford.edu/resed>), and the Overseas Studies Program (<http://bossp.stanford.edu>) office or Stanford in Washington Program (<http://siw.stanford.edu>) office in order to participate in Stanford's Overseas Studies Program or Stanford in Washington Program; while students on provisional registration are ineligible to participate in these programs.

Academic performance of a student participating in a coterminal program, and whose undergraduate degree or degrees have not yet been conferred, is reviewed on a case-by-case basis in conjunction with the graduate department or program in which the student is enrolled.

Students receiving federal student aid funds must maintain satisfactory academic progress standards that may be stricter than those outlined here. See the Financial Aid Office web site at <http://financialaid.stanford.edu> for details.

Probation

A student who fails to earn at least 36 units of work in his or her most recent three quarters of enrollment at the University (by the end of the third final exam period), or who fails to earn by the end of the final examination period at least 9 quarter units of work in his or her most recent quarter of enrollment at the University, or who has a cumulative grade point average of less than 2.0, may be placed on probation (warning status).

A student shall be removed from probation after three consecutive subsequent quarters of enrollment at the University if, in each quarter, he or she earns a minimum of 12 units of new course work by the end of the final examination period and achieves and maintains a cumulative grade point average of at least 2.0. A student may also be removed from probation at the discretion of the C-USP Subcommittee on Academic Standing or its designees as a result of a review of individual records.

Provisional Registration

A student who, while on probation, fails in any quarter of registration to earn a minimum of 12 units of new course work by the end of the final examination period or fails to achieve and maintain a cumulative grade point average of at least 2.0, may be placed on provisional registration status. In addition, and on occasion, a student may also be placed directly on provisional registration without first being placed on probation if the student has had a prior probation status.

C-USP, in its discretion, may impose conditions on the suspension and in regard to return from a suspension.

Provisional registration status requires that the student earn a minimum of 12 units of new course work per quarter (by the end of the final quarter examination period for each quarter) in each quarter for three consecutive quarters, and achieve and maintain a cumulative grade point average of at least 2.0 to attain good academic standing.

A student shall be removed from provisional registration after three consecutive subsequent quarters of enrollment at the University if, in each quarter, he or she earns a minimum of 12 units of new course work by the end of the final examination period and achieves and maintains a cumulative grade point average of at least 2.0. A student may also be removed from provisional registration at the discretion of the C-USP Subcommittee on Academic Standing or its designees as a result of a review of individual records.

Suspension

A student who, while on provisional registration, fails to earn a minimum of 12 units of new course work by the end of the final examination period, or who fails to achieve and maintain a cumulative grade point average of at least 2.0, may be suspended. In addition, and on occasion, a student may also be suspended directly from probation; or may be suspended without first being placed on probation or provisional registration if the student has had a prior probation status.

While students suspended for the first time are suspended for one year, students suspended a subsequent time may be suspended for up to three years.

Students suspended for one year are not eligible to enroll for four quarters (including Summer Quarter) following the quarter in which the suspension

was issued. Students suspended for up to three years are not eligible to enroll for up to twelve quarters (including Summer Quarter) following the quarter in which the suspension was issued.

As well, until re-enrollment, students who are suspended are ineligible for the privileges associated with registration—privileges that include living in University housing, participating in voluntary student organizations, and involvement in any activity for which enrollment is a requirement.

C-USP, in its discretion, may impose conditions on the suspension and in regard to return from a suspension.

Appeal of Suspension

Students who have been suspended, and who believe they have a compelling reason to appeal their suspension, without a break in enrollment, are required to submit a Petition to Appeal Academic Suspension.

Otherwise, students are expected to complete their academic suspension in full.

Returning from Suspension

Students are required to submit a properly endorsed application for reinstatement to request reenrollment after the suspension period has been completed. Instructions including deadlines for requesting to return should be obtained from the Office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. The C-USP Subcommittee on Academic Standing, or those designated by the subcommittee, acts upon all requests concerning academic standing, including requests to return after academic suspension. The subcommittee or its designees may determine whether the application for reinstatement to return will be approved or not, and/or the conditions a student must meet in order to return. Request to return decisions may be based on activities while away from campus, the perceived potential for successful completion of the program, as well as any other factors or considerations regarded as relevant to the Vice Provost for Undergraduate Education or the subcommittee or its designees.

Questions concerning academic standing or requests to return should be directed to the Office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall.

Students returning from suspension should also contact appropriate campus offices, such as Housing and Financial Aid, regarding those deadlines and procedures.

Notification (Academic Standing)

Written notification that a student is on probation, provisional registration, or suspension is sent to the student, to the student's academic adviser, and to other relevant university offices and individuals as soon as possible after the close of the quarter. Students also receive written notification of the outcome of their Petition to Appeal Academic Suspension or request to return after suspension. Current student status, such as whether a student is enrolled or not, is considered Directory Information for FERPA purposes at Stanford, and Stanford may provide either parent(s) or guardian(s) written notification of a change in student status. Provided that a student consents, or the student is a dependent for income tax purposes, Stanford may also provide either parent(s) or guardian(s) written notification that the student is on probation, provisional registration, suspension, or leave of absence (either voluntary or involuntary). Other FERPA exceptions may also apply.

Student Academic Grievance Procedure

The following policy is subject to periodic review and modification.

1. Coverage
 - a. Any Stanford undergraduate or graduate student who believes that he or she has been subjected to an improper decision on an academic matter is entitled to file a grievance to obtain an independent review of the allegedly improper decision, followed by corrective action if appropriate. A grievance is a complaint in writing made to an administrative officer of the University concerning an academic decision, made by a person or group of persons acting in an official University capacity, that directly and adversely affects the student as an individual in his or her academic capacity.
 - b. This grievance procedure applies only in those cases involving a perceived academic impropriety arising from a decision taken by: (1) an individual instructor or researcher; (2) a school, department, or program; (3) a committee charged to administer academic policies of a particular school, department, or program; or (4) the University Registrar, the Vice Provost for Undergraduate Education, the C-USP Subcommittee on Academic Standing, or a Senate committee or subcommittee charged to administer academic policies of the Senate of the Academic Council. This procedure does not apply to: (1) complaints expressing dissatisfaction with a University policy of general application challenged on the grounds that the policy is unfair or inadvisable; (2) individual school, department, or program academic policies, as long as those policies are not inconsistent with general University policy; (3) matters proceeding through the Office of Judicial Affairs; or (4) involuntary leave decisions.
 - c. Individuals should be aware that the University Ombuds Office is available to all Stanford students, faculty, and staff to discuss and advise on any matter of University concern and frequently helps expedite resolution of such matters. Although it has no decision-making authority, the University Ombuds Office has wide powers of inquiry, including into student complaints against instructors.
2. Grievance and Appeal Procedures
 - a. Informal Attempts at Resolution: the student first should discuss the matter, orally or in writing, with the individual(s) most directly responsible. If no resolution results, the student should then consult with the individual at the next administrative level, for example, the chair or director of the relevant department or program, or, for those cases in which there is none, with the school dean. At this stage, the department chair or program director, if any, may inform the dean that the consultation is taking place and may solicit his or her advice on how to ensure that adequate steps are taken to achieve a fair result. Efforts should be made to resolve the issues at an informal level without the complaint escalating to the status of a formal grievance.
 - b. The Filing of the Grievance:
 - i. If informal means of resolution prove unsatisfactory, the student should set forth in writing a statement of the decision that constitutes the subject matter of the dispute, the grounds on which it is being challenged, and the reasons why the grievant believes that the decision was improperly taken. The statement should also include a description of the remedy sought and the informal efforts taken to date to resolve the matter. It is at this point that the complaint becomes a formal grievance. The written grievance should specifically address the matters set forth in the Standards for Review, as stated in Section 4 below. The grievance should include an allegation of any adverse effects on the grievant, known to the grievant at the time of filing.
 - ii. The grievance document should be submitted to the dean of the school in which the grievance arose; for a grievance concerning a decision of the University Registrar, the Vice Provost for Undergraduate Education, or of a Senate committee or subcommittee, the procedures set forth herein for grievances and appeals shall be modified as stated in Section

3 below. A grievance must be filed in a timely fashion, that is, no later than 30 days after the end of the academic quarter in which the adverse decision occurred or should reasonably have been discovered. Except in extraordinary circumstances, delay in filing a grievance will constitute grounds for rejection of the grievance.

c. The Response to the Grievance:

- i The relevant dean will consider the grievance. The dean may attempt to resolve the matter informally or make whatever disposition of the grievance that he or she deems appropriate. The dean may, in appropriate cases, remand the grievance to a lower administrative level (including to the level at which the grievance arose) for further consideration.
- ii The dean may also refer the grievance, or any issue therein, to any person (the "grievance officer") who will consider the matter and report to the dean as the latter directs. The dean will inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and will specify the matters referred, the directions to the person or persons to whom the referral is made (including the time frame within which the person is to report back to the dean), and the name of that person.
- iii In undertaking the review, the dean or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information considered relevant, including faculty, staff, and students.
- iv Should attempts to resolve the matter informally not be successful, the dean will decide the grievance, and will notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the grievance.
- v Normally, no more than 60 days should elapse between the filing of a grievance and the disposition by the dean. If, because of absence of key persons from the campus or other circumstances or exigencies (including those due to breaks in the academic calendar), the dean decides that disposition on that schedule is not possible, he or she shall inform the grievant (and the party against whose decision the grievance has been filed) of that in writing, giving the grounds therefore and an estimate of when a disposition can be expected. During summers and the winter closure, this time frame will nearly always be extended.

d. The Filing of an Appeal:

- i If the grievant is dissatisfied with the disposition of the grievance at the decanal level, either on substantive or on procedural grounds, he or she may appeal in writing to the Provost.
- ii The appeal must specify the particular substantive or procedural bases of the appeal (that is, the appeal must be made on grounds other than general dissatisfaction with the disposition) and must be directed only to issues raised in the grievance as filed or to procedural errors in the grievance process itself, and not to new issues. The appeal must contain the following:
 1. A copy of the original grievance and any other documents submitted by the grievant in connection therewith.
 2. A copy of the determination made by the dean on that grievance.
 3. A statement of why the reasons for the determination of the dean are not satisfactory to the grievant. This statement should specifically address the matters set forth in the Standards for Review in Section 4 below.

- iii The grievant will file his or her appeal at the earliest practicable date after the grievant's receipt of the determination by the dean. Normally, no more than 30 days should elapse between the transmittal of the dean's decision on the grievance and the filing of the appeal. Except in extraordinary circumstances, delay in filing an appeal will constitute grounds for rejection of the appeal.

e. The Response to the Appeal:

- i The Provost may attempt to resolve the matter informally, or refer the appeal, or any issue thereof, to any person (the "grievance appeal officer") who shall consider the matter and report to the Provost as the latter directs. The Provost may also, in appropriate cases, remand the matter to a lower administrative level (including to the level at which the grievance arose) for further consideration.
- ii The Provost will inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and will specify the matters referred, the directions to the person to whom the referral is made (including the time frame within which the person is to report back to the Provost), and the name of that person.
- iii Should attempts be made to resolve the matter informally not be successful, the Provost will decide the appeal, and will notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the appeal. The decision of the Provost shall be final, unless the grievant requests a further appeal to the President pursuant to subsection 2f below, and the President agrees to entertain this further appeal.
- iv Normally no more than 45 days should elapse between the filing of the appeal and the disposition by the Provost. If, because of absence of key persons from the campus or other circumstances or exigencies (including those due to breaks in the academic calendar), the Provost judges that disposition on that schedule is not possible, he or she will inform the grievant (and the party against whose decision the grievance has been filed) of the fact in writing, giving the grounds therefore and an estimate of when a disposition can be expected. During summers and the winter closure, this time frame will nearly always be extended.

- f. The Request to the President: if the student is dissatisfied with the disposition of the appeal by the Provost, he or she may write to the President of the University giving reasons why he or she believes the grievance result to be wrong (following the general format set forth in subsection 2d.2 above). No more than 30 days should elapse between the transmittal of the Provost's disposition and the written statement to the President urging further appeal. In any case, the President may agree or decline to entertain this further appeal. If the President declines to entertain the further appeal, the decision of the Provost is final. If the President decides to entertain the further appeal, he or she will follow the general procedures set forth in Section 2e above, and the decision of the President will be final.

3. Grievances Concerning Decisions of the University Registrar, the Vice Provost for Undergraduate Education, or of a Senate Committee or Subcommittee

- a. For a grievance concerning a decision of the University Registrar, the Vice Provost for Undergraduate Education, the C-USP Subcommittee on Academic Standing, or of a Senate committee or subcommittee, the grievant will file his or her grievance with the Provost, rather than with the dean, and the Provost will handle that grievance in accordance with the procedures set forth in Section 2c above.

- b. There is no appeal of the Provost's disposition of that grievance, except as may be available under Section 2f above.
4. Standards for Review and Procedural Matters
 - a. The review of grievances or appeals will usually be limited to the following considerations:
 - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
 - ii. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
 - iii. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?
 - b. The time frames set forth herein are guidelines. They may be extended by the relevant administrative officer in his or her discretion for good cause.
 - c. Questions concerning the filing and appeal of grievances should be directed to the Office of the Provost.

Stanford University ID Number

The Stanford University ID Number is assigned to each student's academic record for unique identification. It is printed on the Stanford University ID card and on documents distributed by the Office of the University Registrar and other administrative offices. It is a violation of University policy to use another's Stanford University ID Number to misrepresent yourself in any way; such use can result in loss of student privileges or other disciplinary action.

SUNet ID

The SUNet ID provides access to the Stanford University Network (SUNet) and its services, and identifies authorized users of these services. Each member of the Stanford electronic community creates a unique SUNet ID and SUNet ID password for him/herself. SUNet IDs provide:

- Axxess services
- Email service
- Storage space within Stanford's distributed file system
- Usenet newsgroups
- World wide web services, including serving of personal web pages on the Leland system and access to Stanford Web Resources

The SUNet ID together with SUNet ID password may serve in place of a signature on electronic forms. The SUNet ID password must remain confidential; it is a violation of University policy to permit another person to use your SUNet ID or password. It is a violation of University policy to use another's SUNet ID or SUNet ID password to misrepresent yourself in any way; such use can result in loss of student privileges or other disciplinary action.

Identification Cards

The ID card serves as an identification card, an electronic key, and a debit card, allowing cardholders to use services for which they have privileges, to enter certain facilities, and to make purchases.

ID cards are available to registered students, faculty, academic staff, and regular staff. Students obtain their ID cards at the Student Services Center, Tresidder Union, 459 Lagunita Drive, 2nd Floor (650) 498-CARD). Faculty and staff obtain ID cards at George Forsythe Hall, 275 Panama Street, Room 190 (650-498-CARD).

Courtesy ID cards are available for spouses and domestic partners of the Stanford professoriate, academic staff, regular staff, and students. These cards may be obtained from the Stanford Card ID Office at Forsythe Hall. The spouse/partner courtesy ID card enables use of some campus services during terms for which the student is registered.

Visiting Scholars who are on campus for a minimum of one quarter and contribute to Stanford's mission by teaching or collaborating on Stanford research also receive ID cards and campus privileges during their stay on campus. These cards may be obtained from the Stanford Card ID Office at Forsythe Hall.

Library access and borrowing privileges are reserved for the Stanford professoriate, academic staff, regular staff, students, and others associated with the University with a need for such access.

ID cards bear a photograph of the cardholder. This photograph is maintained in an online database and, as stated in the "Directory Information (<http://www.stanford.edu/dept/registrar/bulletin/4962.htm>)" section of this bulletin, is available for classroom, student residence, and other use upon specific request and without student consent unless the student has designated that the photograph not be released. Photographs can be designated as private using the Privacy function of Axxess.

Misuse of the ID card may result in discipline or administrative action.

For more information, see the Campus Card Service (<http://campuscard.stanford.edu>) web site. For the complete policy on Stanford Identification Cards, see the Administrative Guide, 28-4 (http://adminguide.stanford.edu/28_4.pdf) (pdf).

Auditing

No person shall attend any class unless he or she is a fully registered student enrolled in the course or meets the criteria for auditors. Auditors are not permitted in courses that involve direct participation such as language or laboratory science courses, field work, art courses with studio work, or other types of individualized instruction (i.e., labs, seminars, case study, language, and activity courses are not permitted). Auditors are expected to be observers rather than active participants in the courses they attend, unless the instructors request attendance on a different basis. Stanford does not confer credit for auditing, nor is a permanent record kept of courses audited. Students who have been suspended are not permitted to audit.

Auditors may not join classes for the first time after the University's final study list deadline. Auditors are not eligible for other University services or privileges including housing, health insurance (Cardinal Care), Vaden clinical services, and the University health plan. The University Registrar reviews for approval any other services or privileges that may be sought.

The Auditor status is available to Stanford faculty or staff members for no fee. Otherwise, the Permit to Attend (http://studentaffairs.stanford.edu/registrar/students/tuition-fees_14-15) fee is assessed. The Application for Auditor or Permit to Attend (PTA) Status (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/PTA-Auditor.pdf>) is required. In all cases of auditing, the instructor, department administrator, and the Office of the University Registrar's prior approvals are required. Further information is available from the Office of the University Registrar or the Student Services Center (<http://studentservicescenter.stanford.edu>).

Nonacademic Regulations

Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

ADA (Americans with Disabilities Act)/Section 504 Grievance Procedure (Student)

For information more generally concerning policies and procedures for students with disabilities, see the Diversity & Access Office (<http://www.stanford.edu/dept/diversityaccess>) web site, or the ADA/Section 504 Compliance Officer, Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford CA, 94305-8230, (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email); see also the Office for Accessible Education (OAE) (<http://studentaffairs.stanford.edu/oea>) web site.

Policy

The following is the policy:

I. Policy

Stanford University, in compliance with state and federal laws and regulations, including the Americans with Disabilities Act of 1990 (ADA; as amended 2008) and Section 504 of the Rehabilitation Act of 1973 (Section 504), does not discriminate on the basis of disability in administration of its education-related programs and activities, and has an institutional commitment to provide equal educational opportunities for disabled students who are otherwise qualified.

Students who believe they have been subjected to unlawful discrimination on the basis of disability, or have been denied access to services or accommodations required by law, have the right to use this grievance procedure.

II. Applicability

As a general proposition, the grievance procedure set forth below is applicable to undergraduate and graduate students of the University. In general, it is designed to address disputes concerning the following:

1. Disagreements regarding a requested service, accommodation, or modification of a University practice or requirement;
2. Inaccessibility of a program or activity;
3. Harassment or discrimination on the basis of disability;
4. Violation of privacy in the context of disability.

As a general proposition, this grievance procedure supplants the Student Academic Grievance Procedure (p. 66) and the Student Non-Academic Grievance Procedure (p.) (both of which are set forth in this bulletin) for disability-related grievances. Questions of applicability will be decided by the Director of the Diversity and Access Office.

III. Compliance Officers

Stanford University's Compliance Officers are responsible for administering this grievance procedure as well as ensuring compliance with applicable laws. The Director of the Diversity and Access Office is the designated ADA / Section 504 Compliance Officer. That office is located in the Mariposa House, 585 Capistrano Way, Stanford, CA 94305-8230, 650-725-0326 (Voice), 650-723-1216 (TTY), 650-723-1791 (Fax), email: disability.access@stanford.edu.

Additional Compliance Officers may be designated from time to time by the Provost from those faculty and staff members knowledgeable concerning disability issues and the legal mandates of state and federal disability statutes.

IV. Informal Resolution

Prior to initiating the formal complaint procedure set forth below, the student should, in general, first discuss the matter orally or in writing with the individual(s) most directly responsible. If no resolution results, or if direct contact is inappropriate under the circumstances, the student should then consult with the Compliance Officer at the Diversity and Access Office who will attempt to facilitate a resolution. (The informal resolution process may involve consultation with the Associate Vice Provost and Dean of Educational Resource Centers.)

If the Compliance Officer is not successful in quickly achieving a satisfactory resolution (that is, generally within seven calendar days), the Compliance Officer will inform the student of his or her efforts and the student's right to file a formal complaint.

V. Formal Complaint

If the procedure set forth above for informal resolution does not yield a successful resolution, then the student may file a formal complaint in the following manner:

1. When to File Complaint: Complaints must be filed as soon as possible, but in no event later than 10 days after the end of the quarter in which the concern arose.
2. What to File: a complaint must be in writing and include the following:
 - a. The grievant's name, address, email address and phone number;
 - b. A full description of the problem;
 - c. A description of what efforts have been made to resolve the issue informally;
 - d. A statement of the remedy requested.
3. Where to File Complaint: the complaint is to be filed with the Compliance Officer at the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford CA 94305-8230, 650-725-0326 (Voice), 650-723-1216 (TTY), 650-723-1791 (Fax), email: disability.access@stanford.edu.
4. Notice of Receipt: upon receipt of the complaint, the Compliance Officer reviews the complaint for timeliness and appropriateness for this grievance procedure, and provides the grievant with written notice acknowledging its receipt.
5. Investigation: the Compliance Officer will promptly initiate an investigation and may refer the matter (or any part of it) to a grievance

officer or other designee, who will look into and/or address the matter as the Compliance Officer directs. In undertaking the investigation, the Compliance Officer or grievance officer may interview, consult with, and/or request a written response to the issues raised in the grievance from any individual the grievance officer believes to have relevant information, including faculty, staff, and students.

6. Representation: the grievant and the party against whom the grievance is directed each have the right to have a representative. The party shall indicate whether he or she is to be assisted by a representative and, if so, the name of that representative. For purposes of this procedure, an attorney is not an appropriate representative.
7. Findings and Notification: upon completion of the investigation, the grievance officer will prepare and transmit to the student, and to the party against whom the grievance is directed, a final report containing a summary of the investigation, written findings, and a proposed disposition. This transmission will be expected within 45 calendar days of the filing of the formal complaint. The deadline may be extended by the Compliance Officer for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The final report may also be provided, where appropriate, to any University officer whose authority will be needed to carry out the proposed disposition or to determine whether any personnel action is appropriate.
8. Final Disposition: the disposition proposed by the Compliance Officer will be put into effect promptly. The grievant or any party against whom the grievance or the proposed disposition is directed may appeal. The appeal to the Provost (as set forth below) will not suspend the implementation of the disposition proposed by the grievance officer, except in those circumstances where the Provost decides that good cause exists making the suspension of implementation appropriate.

VI. Urgent Matters

Whenever the application of any of the time deadlines or procedures set forth in this grievance procedure creates a problem due to the nature of the complaint, the urgency of the matter, or the proximity of the upcoming event, the Compliance Officer will, at the request of the grievant, determine whether an appropriate expedited procedure can be fashioned.

VII. Remedies

Possible remedies under this grievance procedure include corrective steps, actions to reverse the effects of discrimination or to end harassment, and measures to provide a reasonable accommodation or proper ongoing treatment. As stated above, a copy of the Compliance Officer's report may, where appropriate, be sent to University officer(s) to determine whether any personnel action should be pursued.

VIII. Appeal

Within ten calendar days of the issuance of the final report, the grievant or the party against whom the grievance is directed may appeal to the Provost the grievance officer's determination.

An appeal is taken by filing a written request for review with the Compliance Officer at the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford CA 94305-8230; (650) 723-0755 (Voice), (650) 723-1216 (TTY), (650) 723-1791 (Fax), email: disability.access@stanford.edu.

The written request for review must specify the particular substantive and/or procedural basis for the appeal, and must be made on grounds other than general dissatisfaction with the proposed disposition. Furthermore, the appeal must be directed only to issues raised in the formal complaint as filed or to procedural errors in the conduct of the grievance procedure itself, and not to new issues.

The Compliance Officer will forward the appeal to the Provost, and also provide copies to the other party or parties. If the grievance involves a

decision that is being challenged, the review by the Provost or his or her designee usually will be limited to the following considerations:

1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
3. Given the proper facts, criteria, and procedures, was the decision a reasonable one?

A copy of the Provost's written decision will be expected within 30 calendar days of the filing of the appeal and will be sent to the parties, the Compliance Officer and, if appropriate, to the University officer whose authority will be needed to carry out the disposition. The deadline may be extended by the Provost for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The decision of the Provost on the appeal is final.

Title IX of the Education Amendments of 1972

It is the policy of Stanford University to comply with Title IX of the Education Amendment of 1972 and its regulations, which prohibit unlawful discrimination on the basis of sex. The Title IX Compliance Officer is Rosa Gonzalez, the Director of the Diversity and Access Office, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title IX and its regulations should contact the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford, CA 94305-8230, (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). (See also the following section for addressing Title IX Concerns relating to sexual harassment.)

Title IX Concerns Relating to Sexual Harassment and the Violence Against Women Reauthorization Act of 2013

Catherine Criswell has been appointed Stanford's Title IX Coordinator to respond to matters of sexual assault, relationship (dating) violence and stalking (prohibited conduct). The Title IX Coordinator serves as a resource to review allegations of prohibited conduct and may provide interim accommodations relating to housing, academics, or no-contact letters while a matter is being reviewed. When prohibited conduct has been confirmed by a preponderance of the evidence, the Title IX Coordinator will provide long term accommodations and services to students to address the effects of sexual harassment and sexual violence. The Title IX Student Policy (https://titleix.stanford.edu/sites/default/files/title_ix_student_policy_ay_2013-14_faculty_staff_may_2014_final_0.pdf) provides the grievance procedure and appeal mechanism to review the University's actions relating to a Title IX concern involving Prohibited Conduct; see the Title IX web site (<https://titleix.stanford.edu>) for additional information. Additional resources are available the Sexual Assault Support and Resources (<https://notalone.stanford.edu>) web site. Ms. Criswell's contact information is titleix@stanford.edu; (650) 497-4955. See also Administrative Guide Memos 2.1.2 Recruiting and Hiring of Regular Staff (<https://adminguide.stanford.edu/chapter-2/subchapter-1/policy-2-1-2>), 1.7.1 Sexual Harassment (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-1>), 1.7.2, Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-2>), and 1.7.3, Sexual Misconduct and Sexual Assault (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-3>).

Title VI of the Civil Rights Act of 1964

It is the policy of Stanford University to comply with Title VI of the Civil Rights Act of 1964 and its regulations, which prohibit unlawful discrimination on the basis of race, color, and national origin. The Title VI Compliance Officer is the Director of the Diversity and Access Office, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title VI and its regulations should contact the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Grievance procedures to address complaints of discrimination on the basis of race, color, and national origin are set forth in the "Student Non-Academic Grievance Procedure (p.)." See also Administrative Guide Memo 2.2.1 General Personnel Policies (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-1>).

Grievances

A Stanford undergraduate or graduate student who believes that he or she has been subject to an improper decision on an academic matter may file a grievance pursuant to the Student Academic Grievance Procedure (p. 66). For other types of grievances, students should review the section that follows on the Student Non-Academic Grievance Procedure (p.), and consult concerning applicable procedures with the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

Student Non-Academic Grievance Procedure Policy

The following is the policy:

1. Applicability
 - a. It is perhaps inevitable in any university that some students may at times feel improperly treated, and that concerns about unfairness (including potential discrimination and harassment) may also at times arise.

In this regard (and although this grievance procedure is not limited to concerns of discrimination), Stanford University's Nondiscrimination Policy provides in part: "Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. "
 - b. At Stanford, there are a number of grievance procedures through which students can raise and seek redress for what they believe to be unfair, improper or discriminatory decisions, actions, or treatment. For example:

- i If the matter involves an academic decision, the Student Academic Grievance Procedure may be the applicable procedure.
 - ii If the matter involves a disability-related concern, the Student ADA/Section 504 Grievance Procedure may be applicable.
 - iii If the matter involves a student-athlete and his or her sport, the Student-Athlete Grievance Procedure may be applicable.
- c. The purpose of the Student Non-Academic Grievance Procedure is to provide a process for students to seek resolution of disputes and grievances that may not fall within the scope of one of the other grievance processes, including those which may arise in a student's capacity as a student-employee.
 - d. As a general proposition, this procedure is available to undergraduates and graduate students at Stanford University. It is designed to address individual decisions or individual actions that affect the grievant personally in his or her capacity as a student, but it does not apply to matters proceeding through the Office of Judicial Affairs or through the Dean's leave policy. This is likewise not a grievance procedure to address the concerns of student groups. Similarly and as a general proposition, dissatisfaction with a departmental, school, or University policy or practice of broad or general application is not grounds for a grievance under this procedure; the Director of the Diversity and Access Office (hereafter "the Director") may, in his or her discretion, entertain such a grievance in exceptional circumstances, such as where (for example) the policy or practice is alleged to be contrary to law. In the same way, the Director may entertain a grievance under this procedure brought by an individual who is not an undergraduate or graduate student, in an appropriate case or as required by law.
 - e. The Director is responsible for administering this Student Non-Academic Grievance Procedure.
 - i The Director may be contacted at: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email), <http://www.stanford.edu/dept/ocr>.
 - ii The Director in his or her sole discretion can decide whether to refer a grievance brought under this procedure to another grievance process. In cases involving allegations of sexual harassment in particular, the Director may wish to consult with the Director of the Sexual Harassment Policy Office as to the most appropriate way to proceed; see Section 5.d below. In cases involving student employment, the Director may wish to consult with the University's Department of Human Resources.
2. Informal Resolution
 - a. As a general proposition (and although particular circumstances may warrant an exception), the student should first discuss the problem and seek a solution with the individual(s) most directly involved.
 - b. If no resolution results (or if circumstances make discussion inappropriate with the person most directly involved), the student should then consult with the individual at the next (higher) administrative level in the department, school, residence or University administrative unit. Serious efforts should be made to resolve the issue locally at an informal level without resort to a formal grievance; such efforts may continue even after the formal process is underway.
 3. Formal Grievance
 - a. If informal means of resolution prove inadequate, the student should set forth in writing the substance of the complaint, the grounds for it and the evidence on which it is based, and the

efforts taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.

- b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally no later than thirty days after of the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
- c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.
- e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any). Conduct meriting discipline will be brought to the attention of the appropriate disciplinary process.

4. Appeal

- a. If the student is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
- b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

5. General Provisions

- a. **Time Guidelines**—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
- b. **Advisers**—A student initiating or participating in a grievance under this procedure may be accompanied by an adviser in any discussion with the Director, the Provost or their designees, or a grievance or grievance appeal officer under this procedure; any adviser must be a current Stanford faculty, staff member or student.
- c. **Ombuds**—Students should be aware that the University Ombuds (<http://www.stanford.edu/dept/ocr/ombuds>) is available to discuss and advise on any matters of University concern and frequently help expedite resolution of such matters. Although it has no decision making authority, the Ombuds' Office has wide powers of inquiry.

- d. **Sexual Harassment and Sexual Misconduct and Sexual Assault**—For information and resources concerning sexual harassment, students should refer to the web page of the Sexual Harassment Policy Office at <http://harass.stanford.edu>. For information and resources concerning sexual assault and relationship abuse, students should refer to the web page of the Sexual Violence Advisory Board at <http://www.stanford.edu/group/svab/help.shtml>.
- e. **No retaliation**—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
- f. **Standards for Review**—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
 - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
 - ii. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
 - iii. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

Age Discrimination Act of 1975

The following is the policy:

1. Policy

It is the policy of Stanford University to comply with the Age Discrimination Act of 1975 and its regulations, which prohibit unlawful discrimination on the basis of age. The Age Discrimination Act Compliance Officer is the Director of the Diversity and Access Office ("the Director"), who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with the Age Discrimination Act and its regulations ("the Act") should contact the Director at the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

2. Grievance Procedure

- a. An individual who believes that Stanford is not acting in compliance with the Act and who wishes to file a grievance should set forth in writing the substance of his or her complaint, the grounds for it and the evidence on which it is based, and the efforts (if any) taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.
- b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally no later than thirty days after the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
- c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the

appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.

- d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.
- e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any).

3. Appeal

- a. If the grievant is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
- b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

4. General Provisions

- a. **Time Guidelines**—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
- b. **No Retaliation**—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
- c. **Standards for Review**—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
 - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
 - ii. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
 - iii. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

Ownership and Use of Stanford Name and Trademarks

Stanford registered marks, as well as other names, seals, logos, and other symbols and marks that are representative of Stanford, may be used solely with permission of Stanford. Merchandise bearing Stanford's names and

marks, such as t-shirts, glassware, and notebooks, must be licensed. For complete text of the currently applicable policy, including the University officers authorized to grant permission to use the Stanford name and marks, see Administrative Guide Memo 1.5.4 Ownership and Use of Stanford Name and Trademarks (<https://adminguide.stanford.edu/chapter-1/subchapter-5/policy-1-5-4>).

Copyright

Copyright laws protect original works of authorship and give the owners of copyrights the exclusive right to do and to authorize others to do certain things in regard to a copyrighted work, including: make copies, distribute the work, display or perform the work publicly, and create derivative works. Copyright laws apply to nearly all forms of captured content, including traditional works like books, photographs, music, drama and sculpture. The laws also adapt to changes in technologies, and include in their scope modern forms of works like motion pictures, web sites, electronic media, software, multimedia works and some databases. Registration is not required to obtain a copyright, so if in doubt, assume a copyright applies.

Unless an exception to the copyright owner's exclusive rights applies, you must obtain permission from the copyright owner to copy, distribute, display or perform a copyrighted work in any medium for any purpose. Be especially mindful of copyright principles when using the Internet. Just because a work is posted on the Internet does not mean that the owner of the copyright has given you permission to use it. In general, do not post material onto the Internet without copyright clearance.

Stanford University Libraries have licenses with many publishers, which permit copying of materials in accordance with the educational, research or administrative functions of the University. In addition, there are four major exceptions to the copyright owner's exclusive rights, which (if applicable) permit limited use without permission. These are: the fair use exception, the library exception, the face-to-face teaching exception, and the distance-learning exception. For a more detailed explanation of these exceptions, the copyright laws and Stanford's copyright policies, please review the University's Copyright Reminder (http://www-sul.stanford.edu/libraries_collections/copyright_reminders) web site. It is each person's responsibility to be aware of and abide by copyright law; violation may result in civil or criminal liability, and constitutes grounds for University discipline, up to and including discharge, dismissal and expulsion.

Peer-to-Peer File Sharing

The use of file-sharing networks and software to download and share copyrighted works like software, music, movies, television programs, and books can violate copyright laws. Both the person who makes an illegal copy of a copyrighted work available and the person who receives or downloads an illegal copy have violated the law and Stanford policies. Many file-sharing programs have default settings that share copyrighted files, such as music and movies, through the Internet. Before enabling any of these programs students, faculty, or staff must read the fine print, make sure to understand the program itself, and only use such programs lawfully. Under the Digital Millennium Copyright Act (DMCA), copyright owners are entitled to notify Internet service providers, such as Stanford, that IP addresses linked to the Stanford network are sharing copies of music, movies, or other content without authorization. The law requires the University to respond to such complaints by eliminating access to the infringing materials. Stanford will disconnect students who fail to respond to a DMCA complaint promptly. Furthermore, the University also will suspend or terminate computer access to the Stanford network, including termination of the SUNet ID, to members of the community who continue to violate copyright laws. Finally, the University will take action through the student, employee, or faculty disciplinary processes if necessary. Beyond University consequences, copyright holders may file civil lawsuits against copyright infringers seeking extensive monetary damages. If compelled by a lawful subpoena, Stanford may be required to identify students, faculty, staff, or others who have violated copyright law. For more information about file-sharing, refer to Residential Computing's online

resource, File-Sharing and Copyright Law (<http://rescomp.stanford.edu/info/dmca>) web site.

Recording Lectures

Except with permission from the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>) or the instructor in question, students may not audio- or video-record lectures. Even with permission, students may only use such recordings for personal use; no posting or further distribution or use is permitted.

Domestic Partners

In October 1990, Stanford University adopted a domestic partners policy. This policy, which implements the University's nondiscrimination policy, makes services that have historically been available to married students available on an equal basis to students with same-sex or opposite-sex domestic partners. These services include access to student housing, a courtesy card that provides access to University facilities, and the ability to purchase medical care at Vaden Health Service. A domestic partnership is defined as an established long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare.

Sexual Harassment and Consensual Sexual or Romantic Relationships

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 2.2.4 Sexual Harassment and Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-4>). It is also available from the Sexual Harassment Policy Office (<http://harass.stanford.edu>) homepage.

Summary

Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.

Policy

The following is quoted from the policy:

1. In General
 - a. Applicability and Sanctions for Policy Violations—This policy applies to all students, faculty and staff of Stanford University, as well as to others who participate in Stanford programs and activities. Its application includes Stanford programs and activities both on and off-campus, including overseas programs. Individuals who violate this policy are subject to discipline up to and including discharge, expulsion, and/or other appropriate sanction or action.
 - b. Respect for Each Other—Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. It is expected that students, faculty, staff and other individuals covered by this policy will treat one another with respect.
 - c. Prompt Attention—Reports of sexual harassment are taken seriously and will be dealt with promptly. The specific action taken in any particular case depends on the nature and gravity of the conduct reported, and may include intervention, mediation, investigation and the initiation of grievance and disciplinary processes as discussed more fully below. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.
 - d. Confidentiality—The University recognizes that confidentiality is important. Sexual harassment advisers and others responsible to implement this policy will respect the confidentiality and privacy of individuals reporting or accused of sexual harassment to the extent reasonably possible. Examples of situations where confidentiality cannot be maintained include circumstances when the University is required by law to disclose information (such as in response to legal process) and when disclosure is required by the University's outweighing interest in protecting the rights of others.
 - e. Protection Against Retaliation—Retaliation and/or reprisals against an individual who in good faith reports or provides information in an investigation about behavior that may violate this policy are against the law and will not be tolerated. Intentionally making a false report or providing false information, however, is grounds for discipline.
 - f. Relationship to Freedom of Expression—Stanford is committed to the principles of free inquiry and free expression. Vigorous discussion and debate are fundamental to the University, and this policy is not intended to stifle teaching methods or freedom of expression generally, nor will it be permitted to do so. Sexual harassment, however, is neither legally protected expression nor the proper exercise of academic freedom; it compromises the integrity of the University, its tradition of intellectual freedom and the trust placed in its members.
2. What Is Sexual Harassment?

Unwelcome sexual advances, requests for sexual favors, and other visual, verbal or physical conduct of a sexual nature constitute sexual harassment when:

 - a. It is implicitly or explicitly suggested that submission to or rejection of the conduct will be a factor in academic or employment decisions or evaluations, or permission to participate in a University activity; or
 - b. The conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance or creating an intimidating or hostile academic, work or student living environment.

Determining what constitutes sexual harassment depends upon the specific facts and the context in which the conduct occurs. Sexual harassment may take many forms—subtle and indirect, or blatant and overt. For example,

 - i. It may be conduct toward an individual of the opposite sex or the same sex.
 - ii. It may occur between peers or between individuals in a hierarchical relationship.
 - iii. It may be aimed at coercing an individual to participate in an unwanted sexual relationship or it may have the effect of causing an individual to change behavior or work performance.
 - iv. It may consist of repeated actions or may even arise from a single incident if sufficiently egregious.

c. The University's Policy on Sexual Assault (see Guide Memo 23.3, Sexual Assault (http://adminguide.stanford.edu/23_3.pdf)) may also apply when sexual harassment involves physical contact.
3. What To Do About Sexual Harassment

Individuals seeking further information are directed to the following resources:

- The Sexual Harassment Policy Office (Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: harass@stanford.edu for information, consultation, advice, or to lodge a complaint. Note that anonymous inquiries can be made to the SHPO by phone during business hours.
- The Sexual Harassment Policy Office web page at <http://harass.stanford.edu>.
- Any designated Sexual Harassment Adviser or resource person listed in 3.a or 5.a.

The following are the primary methods for dealing with sexual harassment at Stanford. They are not required to be followed in any specific order. However, early informal methods are often effective in correcting questionable behavior.

- a. Consultation—Consultation about sexual harassment is available from the Sexual Harassment Policy Office, Sexual Harassment Advisers (including residence deans), human resources officers, employee relations specialists, counselors at Counseling and Psychological Services (CAPS) or the Help Center, chaplains at Memorial Church, ombudspersons and others. A current list of Sexual Harassment Advisers is available from the Sexual Harassment Policy Office and at <http://harass.stanford.edu/SHadvisers.html>. Consultation is available for anyone who wants to discuss issues related to sexual harassment, whether or not "harassment" actually has occurred, and whether the person seeking information is a complainant, a person who believes his or her own actions may be the subject of criticism (even if unwarranted), or a third party.

Often there is a desire that a consultation be confidential or "off the record." This can usually be achieved when individuals discuss concerns about sexual harassment without identifying the other persons involved, and sometimes even without identifying themselves. Confidential consultations about sexual harassment also may be available from persons who, by law, have special professional status, such as:

- i Counselors at Counseling and Psychological Services (CAPS), <http://caps.stanford.edu>
- ii Counselors at the Help Center, <http://www.stanford.edu/dept/helpcenter>
- iii Chaplains at Memorial Church
- iv The University Ombudsperson, <http://www.stanford.edu/dept/ombuds>

In these latter cases, the level of confidentiality depends on what legal protections are held by the specific persons receiving the information and should be addressed with them before specific facts are disclosed. For more information see <http://harass.stanford.edu/confidential.html>.

For further information on confidentiality, see Section 1(d) above.

- b. Direct Communication—An individual may act on concerns about sexual harassment directly, by addressing the other party in person or writing a letter describing the unwelcome behavior and its effect and stating that the behavior must stop. A Sexual Harassment Adviser can help the individual plan what to say or write, and likewise can counsel persons who receive such communications. Reprisals against an individual who in good faith initiates such a communication violate this policy.
- c. Third Party Intervention—Depending on the circumstances, third party intervention in the workplace, student residence or academic setting may be attempted. Third party intervenors may be the

Sexual Harassment Advisers, human resources professionals, the ombudspersons, other faculty or staff, or sometimes mediators unrelated to the University.

When third party intervention is used, typically the third party (or third parties) will meet privately with each of the persons involved, try to clarify their perceptions and attempt to develop a mutually acceptable understanding that can insure that the parties are comfortable with their future interactions. Other processes, such as a mediated discussion among the parties or with a supervisor, may also be explored in appropriate cases.

Possible outcomes of third party intervention include explicit agreements about future conduct, changes in workplace assignments, substitution of one class for another, or other relief, where appropriate.

- d. Formal Grievance, Appeal, and Disciplinary Processes—Grievance, appeal, or disciplinary processes may be pursued as applicable.
- i. Grievances and Appeals—The applicable procedure depends on the circumstances and the status of the person bringing the charge and the person against whom the charge is brought. Generally, the process consists of the individual's submission of a written statement, a process of fact-finding or investigation by a University representative, followed by a decision and, in some cases, the possibility of one or more appeals, usually to Stanford administrative officers at higher levels. The relevant procedure (see below) should be read carefully, since the procedures vary considerably.

If the identified University fact-finder or grievance officer has a conflict of interest, an alternate will be arranged, and the Director of the Sexual Harassment Policy Office or the Director of Employee and Labor Relations can help assure that this occurs.

In most cases, grievances and appeals must be brought within a specified time after the action complained of. While informal resolution efforts will not automatically extend the time limits for filing a grievance or appeal, in appropriate circumstances the complainant and the other relevant parties may mutually agree in writing to extend the time for filing a grievance or appeal.

A list of the established grievance and appeal procedures is located at http://hrweb.stanford.edu/elr/policies/list_grievance_procedures.html. Copies may also be obtained from the Sexual Harassment Policy Office, <http://www.stanford.edu/group/SexHarass>.

Copies of the following may be obtained from Employee and Labor Relations, 651 Serra Street:

1. "Solving Workplace Problems at Stanford: Understanding the Staff Dispute Resolution Policy" (also at <http://hrweb.stanford.edu/forms/staffresolution.pdf>.)
2. "Solving Workplace Problems at Stanford: Information for Academic Staff – Librarians and Academic Staff – Research Associates"
3. "The Dispute Resolution Process (A User's Guide)"

- ii. Disciplinary Procedures—In appropriate cases, disciplinary procedures may be initiated. The applicable disciplinary procedure depends on the status of the individual whose conduct is in question. For example, faculty are subject to the Statement on Faculty Discipline (<http://www.stanford.edu/dept/provost/faculty/policies/handbook/ch4.html#statementonfacultydiscipline>), and students to the Fundamental Standard. For additional information

related to student disciplinary procedures, see the Office of Community Standards (<http://studentaffairs.stanford.edu/communitystandards>).

The individuals referenced in this section are available to discuss these options and differing methods for dealing with sexual harassment.

4. Procedural Matters

- a. Investigations—If significant facts are contested, an investigation may be undertaken. The investigation will be conducted in a way that respects, to the extent possible, the privacy of all of the persons involved. In appropriate cases, professional investigators may be asked to assist in the investigation. The results of the investigation may be used in the third party intervention process or in a grievance or disciplinary action.
- b. Recordkeeping—The Sexual Harassment Policy Office will track reports of sexual harassment for statistical purposes and report at least annually to the University President concerning their number, nature and disposition.

The Sexual Harassment Policy Office may keep confidential records of reports of sexual harassment and the actions taken in response to those reports, and use them for purposes such as to identify individuals or departments likely to benefit from training so that training priorities can be established. No identifying information will be retained in cases where the individual accused was not informed that there was a complaint.

- c. Indemnification and Costs—The question sometimes arises as to whether the University will defend and indemnify a Stanford employee accused of sexual harassment. California law provides, in part, "An employer shall indemnify [its] employee for all that the employee necessarily expends or loses in direct consequence of the discharge of his [or her] duties as such." The issue of indemnification depends on the facts and circumstances of each situation. Individuals who violate this policy, however, should be aware that they and/or their schools, institutes, or other units may be required to pay or contribute to any judgments, costs and expenses incurred as a result of behavior that is wrongful and/or contrary to the discharge of the employee's duties. In general, see Administrative Guide Memo 2.4.6 Indemnification (<https://adminguide.stanford.edu/chapter-2/subchapter-4/policy-2-4-6>).

5. Resources for Dealing with Sexual Harassment

- a. Advice—Persons who have concerns about sexual harassment should contact the Sexual Harassment Policy Office, any Sexual Harassment Adviser at <http://harass.stanford.edu/SHadvisers.html> or one of the other individuals listed below. Reports should be made as soon as possible: the earlier the report, the easier it is to investigate and take appropriate remedial action. When reports are long delayed, the University will try to act to the extent it is reasonable to do so, but it may be impossible to achieve a satisfactory result after much time has passed.

Likewise, anyone who receives a report or a grievance involving sexual harassment should promptly consult with the Sexual Harassment Policy Office or with a Sexual Harassment Adviser.

There are a number of individuals specially trained and charged with specific responsibilities in the area of sexual harassment. In brief, they are:

- i Sexual Harassment Advisers (<http://harass.stanford.edu/SHadvisers.html>) serve as resources to individuals who wish to discuss issues of sexual harassment, either because they have been harassed or because they want information about the University's policy and procedures. There is usually at least one Adviser assigned to each of the schools at the University

and to each large work unit; most of the residence deans also have been appointed as Sexual Harassment Advisers. Advisers are also authorized to receive complaints.

- ii The Director of the Sexual Harassment Policy Office is responsible for the implementation of this policy. The Director's Office also provides advice and consultation to individuals when requested; receives complaints and coordinates their handling; supervises the other Advisers; encourages and assists prevention education for students, faculty and staff; keeps records showing the disposition of complaints; and generally coordinates matters arising under this policy. Because education and awareness are the best ways to prevent sexual harassment; developing awareness, education and training programs and publishing informational material are among the most important functions of the Sexual Harassment Policy Office (<http://harass.stanford.edu>).

- iii As stated above, individuals with concerns about sexual harassment may also discuss their concerns informally with psychological counselors (for example through CAPS or the HELP Center), chaplains (through the Memorial Chapel), or the University ombudsperson. For more information, see <http://harass.stanford.edu/resources.html>.

- b. External Reporting—Sexual harassment is prohibited by state and federal law. In addition to the internal resources described above, individuals may pursue complaints directly with the government agencies that deal with unlawful harassment and discrimination claims, e.g., the U.S. Equal Employment Opportunity Commission (EEOC), the Office for Civil Rights (OCR) of the U.S. Department of Education, and the State of California Department of Fair Employment and Housing (DFEH). These agencies are listed in the Government section of the telephone book. A violation of this policy may exist even where the conduct in question does not violate the law.

6. Consensual Sexual or Romantic Relationships

- a. In General—There are special risks in any sexual or romantic relationship between individuals in inherently unequal positions, and parties in such a relationship assume those risks. In the University context, such positions include (but are not limited to) teacher and student, supervisor and employee, senior faculty and junior faculty, mentor and trainee, adviser and advisee, teaching assistant and student, coach and athlete, and the individuals who supervise the day-to-day student living environment and student residents. Because of the potential for conflict of interest, exploitation, favoritism, and bias, such relationships may undermine the real or perceived integrity of the supervision and evaluation provided, and the trust inherent particularly in the teacher-student context. They may, moreover, be less consensual than the individual whose position confers power or authority believes. The relationship is likely to be perceived in different ways by each of the parties to it, especially in retrospect.

Moreover, such relationships may harm or injure others in the academic or work environment. Relationships in which one party is in a position to review the work or influence the career of the other may provide grounds for complaint by third parties when that relationship gives undue access or advantage, restricts opportunities, or creates a perception of these problems. Furthermore, circumstances may change, and conduct that was previously welcome may become unwelcome. Even when both parties have consented at the outset to a romantic involvement, this past consent does not remove grounds for a charge based upon subsequent unwelcome conduct.

Where such a relationship exists, the person in the position of greater authority or power will bear the primary burden

of accountability, and must ensure that he or she—and this is particularly important for teachers—does not exercise any supervisory or evaluative function over the other person in the relationship. Where such recusal is required, the recusing party must also notify his or her supervisor, department chair or dean, so that such chair, dean or supervisor can exercise his or her responsibility to evaluate the adequacy of the alternative supervisory or evaluative arrangements to be put in place. Staff members may notify their local human resources officers. To reiterate, the responsibility for recusal and notification rests with the person in the position of greater authority or power. Failure to comply with these recusal and notification requirements is a violation of this policy, and therefore grounds for discipline. The University has the option to take any action necessary to insure compliance with the spirit of this recusal policy, including transferring either or both employees in order to minimize disruption of the work group. In those extraordinarily rare situations where it is programmatically infeasible to provide alternative supervision or evaluation, the cognizant Dean or Director must approve all evaluative and compensation actions.

- b. With Students—At a university, the role of the teacher is multifaceted, including serving as intellectual guide, counselor, mentor and adviser; the teacher's influence and authority extend far beyond the classroom. Consequently and as a general proposition, the University believes that a sexual or romantic relationship between a teacher and a student, even where consensual and whether or not the student would otherwise be subject to supervision or evaluation by the teacher, is inconsistent with the proper role of the teacher, and should be avoided. The University therefore very strongly discourages such relationships.

7. Policy Review and Evaluation—This policy went into effect on October 6, 1993, and was amended on November 30, 1995, and on May 30, 2002. It is subject to periodic review, and any comments or suggestions should be forwarded to the Director of the Sexual Harassment Policy Office.

Resources

The following is a summary of resources concerning sexual harassment available to members of the Stanford Community:

A brochure containing the policy, a list of current sexual harassment advisers, confidential resources, and other helpful information is available online at the Sexual Harassment Policy Office (<http://harass.stanford.edu>) web site, and in printed form from the Sexual Harassment Policy Office at Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: harass@stanford.edu. Copies of the University policy on sexual assault, which complements this sexual harassment policy, as well as all other documents mentioned in this section, are also available at the Sexual Harassment Policy Office.

All faculty, staff, and students who have questions regarding this policy and its enforcement can consult with a Sexual Harassment Adviser or can be directed to the local Personnel Officer or Regional Human Resources Manager. Faculty members should contact their dean or department chair, and students should contact the Director of the Sexual Harassment Policy Office or the Dean of Student Affairs.

Sexual Harassment Policy Office—telephone: (650) 723-1583; email: harass@stanford.edu.

Director: Laraine Zappert (Clinical Professor, Psychiatry and Behavioral Sciences)

Assistant Director: Nanette Andrews

Sexual Misconduct and Sexual Assault

The University's Policy on Sexual Misconduct and Sexual Assault is published in complete form in the Administrative Guide Memo 2.2.4 Sexual Harassment and Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-4>).

Summary

The following summarizes the policy on Sexual Assault and provides information on resources available to members of the Stanford community.

Policy

Under Title IX, sexual violence (sexual misconduct and sexual assault) is a severe form of sexual harassment. Sexual misconduct and sexual assault are unacceptable and is not tolerated at Stanford University. All University employees (including student residence staff employees) have a duty to report claims of sexual misconduct or sexual assault to Catherine Criswell, Title IX Coordinator at (650) 497-4955 (voice), titleix@stanford.edu, <https://titleix.stanford.edu/>. For students, report claims to the Title IX Coordinator or the Office of Sexual Assault and Relationship Abuse (SARA) at (650) 725-1056 or saraoffice@stanford.edu.

The University urges an individual who has been subjected to sexual misconduct or sexual assault to make an official report. A report of the matter will be dealt with promptly. Confidentiality will be maintained to the extent possible.

The University is committed to providing information regarding on- and off-campus services and resources to all parties involved.

Students, faculty and staff found to be in violation of this policy will be subject to discipline up to and including termination, expulsion or other appropriate institutional sanctions; affiliates and program participants may be removed from University programs and/or prevented from returning to campus.

A comprehensive web site dedicated to sexual violence awareness, prevention and support can be found at Office of Sexual Assault & Relationship Abuse Education & Response (SARA) (<http://studentaffairs.stanford.edu/sara>). The site contains a list of resources and describes reporting options.

Definitions

What is Sexual Misconduct?

Sexual misconduct is the commission of an unwanted sexual act, whether by an acquaintance or by a stranger, that occurs without indication of consent.

What is Sexual Assault?

Sexual assault is the actual, attempted or threatened unwanted sexual act, whether by an acquaintance or by a stranger, accomplished (1) against a person's will by means of force (express or implied), violence, duress, menace, fear or fraud, or (2) when a person is incapacitated or unaware of the nature of the act, due to unconsciousness, sleep and/or intoxicating substances.

What is Consent?

Consent is informed, freely given, and mutually understood. Consent requires an affirmative act or statement by each participant. If coercion, intimidation, threats and/or physical force are used, there is no consent. If a person is mentally or physically incapacitated or impaired so that the person cannot understand the fact, nature or extent of the sexual situation, there is no consent; this includes conditions due to alcohol or drug consumption or

being asleep or unconscious. Whether one has taken advantage of a position of influence over another may be a factor in determining consent.

Notification

With the consent of the victim, allegations of sexual assault received by University offices or personnel shall be communicated promptly to the Department of Public Safety, 711 Serra Street, telephone 9-911 for emergency response or (650) 723-9633 during normal business hours.

Emergency Services Available to Victims

Victims of sexual assault are urged to seek immediate attention from emergency police, medical, and counseling services. On the Stanford campus and in the immediate vicinity, the following provide 24-hour response and will arrange for police assistance, medical assistance, emotional support services, and advocacy and support:

- "911" Emergency Network: dial 9-911 from University phones or 911 from outside phones
- Santa Clara Valley Medical Center, 751 South Bascom Avenue, San Jose, telephone (408) 885-5000
- YWCA Stanford Hotline, for students, telephone (650) 725-9955
- Stanford Hospital and Clinics, 300 Pasteur Drive, Stanford, telephone (650) 723-5111
- Residence and Graduate Life Deans, page through 723-8222, extension 25085

Non-Emergency Resources

Office of Sexual Assault & Relationship Abuse Education & Response (SARA) (725-1056) provides comprehensive and consistent response to incidents of sexual and relationship violence to the campus community. SARA provides case consultation to students and staff, case management for reported assaults and information and referrals to services on and off campus. The office also assists with educational outreach and training to increase awareness, sensitivity, and community accountability in the prevention of these acts. Online information is available at the Sexual Assault & Relationship Abuse Education & Response (SARA) (<http://studentaffairs.stanford.edu/sara.html>) web site.

Additional resources for students are available at Vaden Health Service at (650) 723-3785, including short-term counseling, referral to long-term therapy, follow-up pregnancy testing, and testing and treatment for sexually transmitted diseases. Additional services for faculty and staff are available at the University's HELP Center, Galvez House (723-4577), including general counseling, information, support, and referral. The University ombuds (723-3682) is available to all in the Stanford community for general counseling, advice, and advocacy. Christine Criswell, Title IX Coordinator, Mariposa House, 585 Capistrano Way, Stanford University, Stanford CA, 94305-8230, (650) 497-4955, (650) 497-9257, titleix@stanford.edu, <https://titleix.stanford.edu/>, is available to assist students to address the effects of sexual harassment and sexual violence

Confidentiality of Information

The University will make reasonable and appropriate efforts to preserve an individual's privacy and protect the confidentiality of information. However, because of laws relating to reporting and other state and federal laws, the University cannot guarantee confidentiality to those who report incidents of sexual violence except where those reports are privileged communications with those in legally protected roles (set forth below). The professional being consulted should, if possible, make these limits clear before any disclosure of facts.

An individual can speak confidentially with certain individuals in legally protected roles. They include sexual assault counselors such as those at the YWCA Sexual Assault Center at Stanford, the Help Center, Counseling and Psychological Services (CAPS) and clergy. Exceptions to maintaining confidentiality are set by law; for example, physicians and nurses who treat any physical injury sustained during a sexual assault are required to report it to law enforcement. In addition, physicians, nurses, psychologists, psychiatrists, teachers and social workers must report a sexual assault committed against a person under age 18.

Information shared with other individuals is not legally protected from being disclosed. Considerations with respect to a complainant's request for confidentiality include factors such as the University's ability to respond effectively, to prevent further harassment or to ensure the safety of the University community. For example, an advisor, the Dean of Student Life, a Residence Dean or a Resident Assistant may need to inform other individuals to protect their safety or rights, in fairness to the persons involved, or in response to legal requirements. As required by law, all disclosures to any University employee of an on-campus sexual assault must be reported for statistical purposes only (without personal identifiers) to the Stanford University Department of Public Safety, which has the responsibility for tabulating and annually publishing sexual assault and other crime statistics. Such reports are for statistical purposes and do not include individual identities.

State law permits law enforcement authorities to keep confidential the identity of a person officially reporting a sexual assault. The Stanford University Department of Public Safety policy is to maintain such confidentiality. However, if the District Attorney files a criminal charge, confidentiality might not be maintained.

If a complaint is filed with the Office of Judicial Affairs then the accused student must be provided with the name of the alleged victim and witnesses, if applicable. However, accommodations can be made to protect the victim's privacy, as described on the website for the Office of Judicial Affairs.

Information about Options

The University offices responding to allegations of sexual misconduct or sexual assault will inform affected individuals, at a minimum, of the options of: criminal prosecution, civil prosecution, the disciplinary process, the appropriate Title IX grievance procedure, alternative housing assignments, and academic assistance alternatives.

Political Activities

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 1.5.1 Political Activities (<https://adminguide.stanford.edu/chapter-1/subchapter-5/policy-1-5-1>).

Summary

The following summarizes the policy on Political Activities:

Stanford University, as a charitable entity, is subject to federal, state, and local laws and regulations regarding political activities: campaign activities, lobbying, and the giving of gifts to public officials.

While all members of the University community are naturally free to express their political opinions and engage in political activities to whatever extent they wish, it is very important that they do so only in their individual capacities and avoid even the appearance that they are speaking or acting for the University in political matters.

In the limited circumstances where individuals must speak or act on behalf of the University in the political arena, they must do so in accordance with the provisions of this Guide Memo.

Policy

The following is quoted from the policy:

1. Summary of Legal Requirements and Restrictions

- a. Campaign Activities: contributions of money, goods, or services to candidates for political office and in support of or opposition to ballot measure campaigns are subject to a wide variety of political laws. Depending on the jurisdiction and the campaign, political contributions may be prohibited or limited and, in nearly all cases, are subject to a complicated series of disclosure rules. Because of the University's tax-exempt status, the University is legally prohibited from endorsing candidates for political office or making any contribution of money, goods, or services to candidates. It is important, therefore, that no person inadvertently cause the University to make such a contribution.
- b. Lobbying: lobbying can generally be described as any attempt to influence the action of any legislative body (for example, Congress, state legislatures, county boards, city councils, and their staffs) or any federal, state, or local government agency. Laws regulating lobbying exist at the federal, state, and local levels but can differ widely in scope, depending on the jurisdiction. Some laws, for example, only regulate lobbying of the legislative branch. Others, however, also cover lobbying of administrative agencies and officers in the executive branch (for example, lobbying for federally-funded grants). To one degree or another, however, most lobbying laws require registration and reporting by individuals engaged in attempts to influence governmental action.

Tax-exempt organizations are permitted to lobby, and the University engages in lobbying on a limited number of issues, mostly those affecting education, research, and related activities. There is usually some threshold of time or money spent on lobbying that triggers registration and reporting requirements. Regardless of thresholds, however, no University employee—other than the following individuals, on matters under their jurisdiction—may lobby on behalf of the University without specific authorization:

- President
- Provost
- Deans of the Seven Schools
- Vice Provost and Dean of Research
- Vice President for Business Affairs and Chief Financial Officer
- Executive Director of Human Resources
- Director of the Stanford Linear Accelerator Center
- Director of the Hoover Institution
- General Counsel
- Vice President for Public Affairs

The Vice Provost and Dean of Research may grant permission to faculty members to lobby on behalf of the University for specific purposes. The Director of Government and Community Relations may grant permission to staff members to lobby on behalf of the University for specific purposes. All lobbying on behalf of the University should be coordinated with the Director of Government and Community Relations.

- c. Giving of Gifts to Public Officials and Staff: almost all jurisdictions have strict rules on the extent to which gifts and honoraria may be given to public officials (both elected and non-elected officials and, often, staff). In some cases gifts and honoraria are prohibited; in others they are limited; and in most cases they are subject to detailed disclosure. In addition, in some jurisdictions such as California, gifts to both state and local public officials can

result in a public official's disqualification from participation in any governmental action affecting the interests of the donor. Meals, travel, and entertainment are the most common types of gifts, but gift rules can also apply in cases where public officials attend a reception or receive tickets to sporting or other events.

As a non-profit organization, the University generally does not give gifts to public officials and, in those limited cases where it does give such gifts, it must do so in accordance with all applicable laws and regulations. Therefore, any University employee who, on behalf of the University, wishes to make a gift to a public official must receive prior approval from the Director of Government and Community Relations before making such a gift.

- d. Reporting of Political Activities: the University must report most of its political activities above certain thresholds. Therefore, any University employee engaging in such activities on behalf of the University should carefully review the remainder of this Guide Memo and should discuss the relevant activities in advance with the Director of Government and Community Relations.

2. Prohibited and Restricted Political Activities

a. In General:

- i No person may, on behalf of the University, engage in any political activity in support of or opposition to any candidate for elective public office (including giving or receiving funds or endorsements), nor shall any University resources be used for such purpose.
- ii No person may, on behalf of the University, lobby (or use University resources to lobby) any federal, state, or local legislative or administrative official or staff member unless specifically authorized to do so. Any lobbying activity, even when authorized, must be conducted in compliance with this Guide Memo, other applicable University policies, and applicable law.
- iii No person may, on behalf of the University, give a gift (or use any University resources to give a gift) to any federal, state, or local official or staff member, except in compliance with this Guide Memo, other applicable University policies, and applicable law.
- iv No person supporting candidates for public office or engaging in other political activities may use University space or facilities or receive University support, except in the limited ways described in section 3A, below.
- v No person may use for lobbying activities federally-funded contract or grant money received by the University.

Even the foregoing activities that are only restricted, rather than prohibited, may be subject to limitations imposed by law. Therefore, any person engaging in the activity, or contemplating doing so, should consult with the Director of Government and Community Relations.

- b. Guidelines for Avoiding Prohibited Partisan Political Activities: the following guidelines should assist in preventing the involvement or apparent involvement of the University in political activities in support of or opposition to any candidate for elective public office, that is, partisan political activities. Except in the limited circumstances set forth in section 3.b., below:

- i Use of Name and Seal: neither the name nor seal of the University or of any of its schools, departments, or institutions should be used on letters or other materials intended for partisan political purposes.
- ii Use of Address and Telephones: no University office should be used as a return mailing address for partisan political

mailings, and telephone service that is paid by the University, likewise, should not be used for partisan political purposes. (Obviously, a student's dormitory room and telephone service that are personal to the student may be used for these purposes.)

- iii Use of Title: the University title of a faculty or staff member or other person should be used only for identification and should be accompanied by a statement that the person is speaking as an individual and not as a representative of the University.
- iv Use of Services and Equipment: University services, such as Interdepartmental Mail; equipment, such as duplicating machines, computers, and telephones; and supplies should not be used for partisan political purposes.
- v Use of Personnel: no University employee may, as part of his or her job, be requested to perform tasks in any way related to partisan political purposes.

3. Permissible Activities

- a. In General: as noted above, the federal, state, and local laws which limit the partisan political activities that can take place in University facilities and with University support in no way inhibit the expression of personal political views by any individual in the University community. Nor do they forbid faculty, students, or staff from joining with others in support of candidates for office or in furtherance of political causes. There is no restriction on discussion of political issues or teaching of political techniques. Academic endeavors which address public policy issues are in no way affected.

Because the University encourages freedom of expression, political activities which do not reasonably imply University involvement or identification may be undertaken so long as regular University procedures are followed for use of facilities. Examples of permissible activities are:

- i Use of areas, such as White Plaza, for tables, speeches, and similar activities.
- ii Use of auditoriums for speeches by political candidates, but subject to rules of the Internal Revenue Service, the Federal Election Commission, and the California Fair Political Practices Commission, and other applicable laws. Arrangements must be made with University Events and Services. (See also Guide Memo 82.1, Public Events (http://adminguide.stanford.edu/82_1.pdf), for more information.)

To reiterate, because tax and political compliance laws impose restrictions, and even prohibitions, on certain political activities and on the use of buildings and equipment at a non-profit institution such as the University, any such activities must be in compliance with these legal requirements. Individuals taking political positions for themselves or groups with which they are associated, but not as representatives of the University, should clearly indicate, by words and actions, that their positions are not those of the University and are not being taken in an official capacity on behalf of the University.

- b. Limited University Political Activities: limited activities relating to specific federal, state, or local legislation or ballot initiatives are permissible where (1) the subject matter is directly related to core interests of the University's activities; (2) the President has determined that the University should take a position; and (3) the individuals who speak or write on the University's behalf are specifically authorized to do so.

- 4. Responsibility for Interpretation: the Director of Government and Community Relations, in consultation with the General Counsel, is the administrative officer responsible for interpretation and application

of the above guidelines. Questions on whether planned student activities are consistent with the University's obligations should be directed to the Dean of Students, who will consult with the Director of Government and Community Relations and/or the General Counsel. All other questions on whether planned activities are consistent with the University's obligations should be addressed directly to the Director of Government and Community Relations or the General Counsel.

Campus Disruptions

The University's policy on campus disruption applies to students, faculty, and staff. It is published in its complete form on the Office of the General Counsel (http://www.stanford.edu/dept/legal/su_links.html) web site.

Policy

The following is quoted from the policy:

Because the rights of free speech and peaceable assembly are fundamental to the democratic process, Stanford firmly supports the rights of all members of the University community to express their views or to protest against actions and opinions with which they disagree.

All members of the University also share a concurrent obligation to maintain on the campus an atmosphere conducive to scholarly pursuits, to preserve the dignity and seriousness of University ceremonies and public exercises, and to respect the rights of all individuals.

The following regulations are intended to reconcile these objectives.

It is a violation of University policy for a member of the faculty, staff, or student body to:

1. prevent or disrupt the effective carrying out of a University function or approved activity, such as lectures, meetings, interviews, ceremonies, the conduct of University business in a University office, and public events.
2. obstruct the legitimate movement of any person about the campus or in any University building or facility.

Members of the faculty, staff, and student body have an obligation to leave a University building or facility when asked to do so in the furtherance of the above sections by a member of the University community acting in an official role and identifying himself or herself as such; members of the faculty, staff, or student body also have an obligation to identify themselves, when requested to do so by such a member of the University community who has reasonable grounds to believe that the person(s) has violated section (1) or (2) of this policy and who has so informed the person(s).

The policy has been applied to the following actions: refusal to leave a building which has been declared closed; obstructing the passage into or out of buildings by sitting in front of doorways; preventing University employees from entering their workplace; preventing members of a class from hearing a lecture or taking an examination, or preventing the instructor from giving a lecture, by means of shouts, interruptions, or chants; refusing to leave a closed meeting when unauthorized to attend; and intruding upon or refusing to leave a private interview.

It should be understood that while the above are examples of extraordinarily disruptive behavior, the application of the Policy also takes situational factors into consideration. Thus, for example, conduct appropriate at a political rally might constitute a violation of the Policy on Campus Disruption if it occurred within a classroom.

Students found responsible for violating the Fundamental Standard in connection with this policy are subject to University discipline.

Use of the Main Quadrangle and Memorial Court Policy

The following is quoted from the policy:

The Main Quadrangle and Memorial Court are part of Stanford University's academic preserve due to their locations at the heart of the campus. To protect and enhance their historic status, University policy limits activities primarily to established or traditional ceremonies and events.

To schedule an event, approval must be obtained in advance from the Office of Stanford Events (see below). Unscheduled events, protests, or activities are prohibited.

Requests for waivers to this policy must be submitted in advance and in writing to the Office of Stanford Events. Exceptions may be granted only in extraordinary cases.

Resources

The following is a summary of resources available:

For instructions on use of the Main Quadrangle/Memorial Court, contact the Office of Special Events and Protocol (OSEP) at (650) 724-1387, or at the OSEP (<https://osep.stanford.edu>) web site.

Note: White Plaza is made available to Stanford students, faculty, and staff for events other than scheduled "established or traditional ceremonies and events" including those that may involve amplified sound. For further information on the use of such other venues, students should contact Student Activities and Leadership (SAL) at (650) 723-2733, or at the SAL (<http://studentaffairs.stanford.edu/sal>) web site. Faculty and staff should contact the Office of Special Events and Protocol (OSEP) (<https://osep.stanford.edu>).

Oval Policy

The Oval is considered to be the initial and official visual entrance to the Stanford University campus. Given this historic and aesthetic status, it is in the best interests of the University community and visiting members of the public to maintain its open and pristine space, to help preserve its natural beauty and environmental integrity. The Oval also presents the formal academic image of the University, leading directly to departments, classrooms and other academic space, and faculty and graduate student offices, and thus is subject to the University's Noise Policy.

The University prohibits formal or informal events of any kind to take place in the Oval. Gatherings of Stanford students, faculty, and staff such as demonstrations, rallies, or dances may take place in White Plaza, which can be reserved through the Office of Student Activities. Weddings also are not allowed in the Oval but are in certain circumstances allowed in Memorial Church (refer to Memorial Church wedding ceremony guidelines (<http://www.stanford.edu/group/religiouslife/servicesWeddings.html>)).

The Oval is considered a pedestrian zone and appropriate use of its space includes walking, running, reading, relaxing, and other limited recreational use of the lawn area (such as quiet, very small picnics and Frisbee), unless or until such use damages or otherwise harms the property.

Cooking food or use of any grill/barbecue or open flame is strictly prohibited. Fireworks or the use of other incendiary devices represent a safety hazard to the area and are therefore prohibited. Amplified sound from items such as boom boxes, musical instruments, or the use of bullhorns or amplified speakers is also prohibited. Only authorized Stanford service vehicles are permitted inside the Oval areas.

As the official entrance to the University, the Oval offers public access to general parking spaces in the marked areas surrounding the outer perimeter

of the Oval; drivers are expected to obey all traffic signs and limitations. Buses are subject to additional restrictions.

For further information regarding this policy, contact the Executive Director of Special Events and Protocol, 724-1387 or see the Office of Special Events & Protocol (<http://osep.stanford.edu/policies/oval.html>) web site.

Noise and Amplified Sound Policy

The following is quoted from the policy:

Stanford is not only an academic institution but a residential community as well. It is the responsibility of all faculty, students, and staff to moderate noise especially during an event or activity held on campus. Supporting the mission of the University and respecting those who are studying, researching, or otherwise carrying out academic-related activities is a Stanford priority. The campus must require a conducive atmosphere to ensure these endeavors are accomplished and supported. Disturbing noise in or around a residence or other campus buildings which infringe on the rights of other residents or members of the University community is considered a violation of this policy. As part of the event planning process, the event sponsor must obtain all appropriate approvals regarding the use of amplified sound during an event or activity.

Resources

Information regarding whether and how the use of amplified sound is permitted is available from the following sources, which must be consulted for prior approval:

1. The Office of Student Activities: phone: 723-2733, or see <http://studentaffairs.stanford.edu/sal/policies/noise>
2. Registrar's Scheduling Office: email reg-events@stanford.edu, or see <http://studentaffairs.stanford.edu/registrar/faculty/events>.
3. Office of Special Events and Protocol (OSEP) at (650) 724-1387, or see <http://stanfordevents.stanford.edu>.

Prohibition of the Possession of Dangerous Weapons on Campus

The University's policy prohibiting weapons on campus is published in its complete form on the Office of Community Standards web site.

Policy

The following is quoted from the policy:

Except for authorized academic purposes, the knowing possession by any student on any Stanford campus of the following is prohibited: firearms, explosives, ammunition, or any instrument or weapon of the kind commonly known as blackjack, slingshot, billy club, sandclub, sandbag, or metal knuckles.

Notwithstanding the paragraph above, a student who is a resident of a Stanford campus may store a weapon on such campus if both of the following conditions are met:

1. The student has complied with all state and federal regulations regarding the use and possession of said weapon, or, in the case of a foreign campus, with the laws of the country in which the campus is located.
2. The student stores such weapons with the Stanford Department of Public Safety (SDPS) or, in the case of a foreign campus, in a facility provided by the director of such campus.

Students may remove their weapons from storage only in accordance with regulations established by the SDPS or by the director of the foreign campus at which the weapon is stored. A student who is a resident of a Stanford campus may bring any of the above weapons on campus for purposes of storage only if the student has previously notified the SDPS of the intention to do so, but in no event more than six hours after arrival on the campus. When the student removes the weapon from storage, it must be taken off campus as soon as is practicable, but in no event more than one hour after such removal.

The term "Stanford campus" shall include all the lands and facilities of Leland Stanford Junior University, whether owned or leased, and whether located in the United States or abroad.

Student Alcohol Policy

This document clarifies the University's expectations and approach related to the use of alcohol by students. The University's Controlled Substances and Alcohol Policy is also applicable. The full text is contained in the Controlled Substance and Alcohol (http://adminguide.stanford.edu/23_6.pdf) policy.

Preamble

The Fundamental Standard has set the standard of conduct for students at Stanford since 1896. It states: "Students at Stanford are expected to show both within and without the University such respect for order, morality, personal honor and the rights of others as is demanded of good citizens." Implicit in the Standard is the understanding that students are responsible for making their own decisions and accepting the consequences of those decisions.

The University is committed to the health, safety and well-being of each member of the Stanford community. In order to further student learning, development and success and to promote the University's academic mission, Stanford fosters an environment of personal and collective responsibility and respectful citizenship. This means that all members of the university community—students, faculty and staff—have a role in safeguarding a healthy learning environment free of the consequences of alcohol misuse. The University also strives to create a culture that supports students who do not use alcohol and students who use alcohol in a safe, legal and responsible fashion.

Legal Background

Members of the Stanford community are expected to abide by all federal, state and local laws, including those governing alcohol consumption and distribution. Under California law, it is illegal for anyone under the age of 21 to purchase alcohol or to possess alcohol in a public space. It is also illegal for anyone to furnish alcohol to an individual under the age of 21. Other state laws governing the use of alcohol are listed below.

While it is not the responsibility of most Stanford officials to enforce state law, it is the responsibility of the University's Department of Public Safety, and accordingly they enforce all state alcohol laws when they encounter violations. All community members should understand the law and, as individuals, ensure that they themselves do not violate it.

In addition, it is the responsibility of all community members to ensure that the University does not, through their actions, violate the law. Accordingly, official University functions, including events held by registered student groups, are not allowed to provide alcohol to those under 21, and no University funds may be used to purchase alcohol for that purpose. Violations of this requirement can result in both criminal prosecution and University administrative action, including dismissal from the University.

Responsible Alcohol Use

Stanford students are expected to behave responsibly, both in the classroom and outside, both on campus and off. In particular, the University does

not tolerate reckless drinking and its consequent harmful behaviors. The University is especially concerned about the misuse of distilled alcohol products ("hard alcohol"), and the dangers that arise from that misuse.

All students should understand the physical and behavioral effects of alcohol misuse, and should avoid such misuse themselves. In addition, they are expected to do their part to ensure the safety of fellow students whom they perceive to be engaged in reckless drinking behavior or to be suffering from its consequences.

The University provides educational resources to assure that students understand the effects of alcohol misuse and know how to respond when they perceive others to be engaged in dangerous behavior.

Reckless drinking and encouraging reckless drinking are violations of University policy, and may be subject to disciplinary action. Extreme or repeated violations may result in dismissal from the University.

More generally, students are expected to make legal, healthy, responsible choices concerning their personal use of alcohol and the University supports them in this endeavor through education and other resources. The University sponsors activities and programs focused on students who choose not to drink or to drink lightly, as well as resources and services to assist students who need help for themselves or others related to alcohol use.

Authority, Application, and Enforcement

Responsibility for application of the Student Alcohol Policy resides with the Vice Provost for Student Affairs. The Office of Alcohol Policy and Education reports to the Vice Provost for Student Affairs and is expected to coordinate and implement alcohol programs. (The University's Controlled Substances and Alcohol Policy is also applicable. The full text is contained at the Controlled Substances and Alcohol web site (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-8>).

The Stanford University Department of Public Safety enforces federal, state and local laws among students, other community members, guests and visitors.

Alcohol Policy Violations

The Office of Alcohol Policy and Education will work with the following offices to address violations of the University's alcohol policy as determined by the specifics of each situation.

- The Office of Residential Education (<http://studentaffairs.stanford.edu/resed>) for undergraduate students, residential groups, fraternities and sororities
- Graduate Life Office (GLO) (<http://glo.stanford.edu>) for graduate students
- Student Activities and Leadership (SAL) (<http://studentaffairs.stanford.edu/sal>) for voluntary student organizations
- Department of Athletics, Physical Education and Recreation (DAPER) (<http://www.gostanford.com/school-bio/stan-administration.html>) for student athletes and athletic groups
- Such other offices as are appropriate under particular circumstances

Violations may be referred to the Office of Judicial Affairs (<http://judicialaffairs.stanford.edu>) (for individual students) and the Organization Conduct Board (<http://studentaffairs.stanford.edu/studentlife/ocb>) (for student groups). The Dean of Student Life (<http://studentaffairs.stanford.edu/studentlife>) may take action as well in certain circumstances.

Getting Help: Resources Available to Students

Students have access to a variety of University resources (<http://alcohol.stanford.edu/resources.html>).

Additional University Regulations

- Students living in University residences sign a residence agreement (http://www.stanford.edu/dept/rde/shs/res_agree.htm) that outlines housing policies and expectations for conduct. Violations of the residence agreement can lead to loss of housing. [http://www.stanford.edu/dept/rde/shs/res_agree.htm]
- All parties must be registered with the University, and availability of alcohol is regulated by party planning guidelines coordinated by the Office of Student Activities and Leadership. [<http://studentaffairs.stanford.edu/sal/planning/party>]

Other restrictions apply to particular circumstances

- **Frosh Housing**—Alcoholic beverages are prohibited at all-frosh house events in common area spaces.
- **University Funds and the Purchase of Alcohol**—No University funds or funds collected by the University may be used in a way that violates the alcohol policy. In student residences, house funds (funds collected by Student Financial Services or other University offices) may not be used to buy alcohol. Any decision to use student-collected funds to buy alcohol must be made lawfully, thoughtfully, fairly and in a way that respects the views of all students. Students must not be required to contribute to the purchase of alcohol.
- **Dining Hall**—Students may not possess or consume alcoholic beverages in Stanford Dining Halls during meal times and food service. University Dining staff can deny admission, access or meal service to anyone who is believed to be intoxicated by the Dining Management staff.
- **White Plaza**—Alcoholic beverages in White Plaza are prohibited.
- **End of Quarter Period and Finals Week**—No registered parties (with or without alcohol) can occur during the End of the Quarter Period (dead week) or Finals Week.
- **Athletic Facilities**—No alcohol is permitted inside Stanford athletic facilities public spaces during athletic events.
- **Stanford Conferences and University Facilities**—The University requires that event sponsors and student groups wishing to offer alcoholic beverages at their programs and events operate within state and local laws as provided by the Department of Alcohol and Beverage Control (ABC). Alcohol service is not allowed in classrooms.
- **Admit Weekend**—Stanford students are prohibited from providing, serving or in anyway making alcohol available to any prospective frosh (ProFro). All student groups/organizations and residences may host only alcohol-free parties or events during Admit Weekend. This specifically means that no alcohol is to be present, served or consumed at any student group/organization and/or dorm function during Admit Weekend.
- **New Student Orientation (NSO) Period**—At no time should any Stanford student provide, serve or in any way make alcohol available to any new, incoming undergraduate student (freshman or transfer). All undergraduate student groups/organizations and residences will host only alcohol-free parties or events during Orientation. This specifically means that no alcohol is to be present, served, or consumed at any student group/organization and/or dorm function during NSO.

California State Laws

Students should be familiar with California laws governing the consumption of alcohol. The following summarizes those laws most relevant to individuals.

- It is illegal for persons under the age of 21 to possess an alcoholic beverage in any public place or any place open to the public (CA Business and Professions Code 25662).
- Any person who furnishes, gives or sells any alcoholic beverage to someone under the age of 21 is guilty of a misdemeanor (CA Business and Professions Code 25658(a)).
- Any person under the age of 21 who attempts to purchase an alcoholic beverage is guilty of an infraction (CA Business and Professions Code 25658.5).
- Any person under the influence of alcohol in a public place and unable to exercise care for one's own safety or that of others is guilty of a misdemeanor (CA Penal Code 647(f)).
- It is illegal for persons to operate a motor vehicle while under the influence of alcohol or other intoxicants or with a blood alcohol level of .08% or higher (CA Vehicle Code Section 23152). NOTE: A golf cart is a motor vehicle.
- It is unlawful for a person under the age of 21 years who has 0.05 percent or more, by weight, of alcohol in his or her blood to drive a vehicle (CA Vehicle Code Section 23140(a)).
- It is illegal for a person under the age of 21 to drive a vehicle when he or she has a blood alcohol concentration (BAC) of .01% or higher (CA Vehicle Code Section 23136).
- It is a misdemeanor to ride a bicycle under the influence of alcohol, drugs or both (CA Vehicle Code Section 21200.5).
- It is an infraction to possess an open container of an alcoholic beverage while in a motor vehicle (CA Vehicle Code Section 23223).
- It is an infraction for an owner or driver of a motor vehicle to allow an open container of alcohol in the passenger area (CA Vehicle Code Section 23225).

Hazing Policy

Hazing is not permitted at Stanford University. No individual, recognized student organization, club, team, or any other Stanford-affiliated student group is permitted to plan, engage in, or condone hazing, on or off the Stanford campus.

Definition of Hazing at Stanford University

Hazing includes any activity done in connection with a student organization, regardless of whether the organization is officially recognized at Stanford, that causes or is reasonably likely to cause another student to suffer bodily danger, physical harm, or significant personal degradation or humiliation, even if no bodily danger, physical harm, or significant degradation or humiliation in fact results. Hazing might occur during initiation or pre-initiation into a student organization, but is not limited to these time frames. Any individual who plans or intentionally assists in hazing activity has engaged in hazing, regardless of whether that individual is present when the hazing activity occurs.

Consequences of a Violation

Stanford University expects its students to conduct themselves in socially responsible and respectful ways. Thus, participation in hazing, either as an

individual or as part of any student group, may result in serious individual and organizational consequences including, but not limited to: disciplinary action up to and including expulsion; permanent loss of organizational recognition; and loss of eligibility to remain a member of any club, team, or other Stanford-affiliated student group. Consent, implied or expressed, is not a defense to any complaint or charge alleging a hazing violation.

A number of University offices may take institutional action, including: the Organizational Conduct Board; Judicial Affairs; or other University offices, such as the Vice Provost for Student Affairs or the Department of Athletics.

Applications

Stanford's hazing policy is distinct from and broader than California Penal Code section 245.6, which prohibits: "any method of initiation or preinitiation into a student organization or student body, whether or not the organization or body is officially recognized by an educational institution, which is likely to cause serious bodily injury to any former, current, or prospective student of any school, community college, college, university or other educational institution in this state." A violation of Penal Code Section 245.6 that does not result in serious bodily injury is punishable as a misdemeanor, while a violation that results in death or injury is punishable as a felony or a misdemeanor.

Nothing in this hazing policy prevents Stanford from taking institutional action against hazing activity that falls outside the narrower definition of Penal Code section 245.6.

Stanford's hazing policy is not intended to prohibit student recruitment or new or continuing member activities that are positive and educational in nature, designed to instill a group ethos or unity. Its intent is to deter those behaviors that cause or are likely to cause danger, harm or humiliation to another student.

Stanford's hazing policy is not intended to apply to customary athletic events or other similar institutionally-approved contests or competitions.

Questions should be directed to the Office of Student Activities, (650) 723-2733.

Smoke-Free Environment

The University's policy on a smoke-free environment is published in its complete form in the Administrative Guide Memo 2.2.6 Smoke-Free Environment (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-6>).

Applicability—This policy applies to all academic and administrative units of Stanford University, including the SLAC National Accelerator Laboratory, and all campus student housing. This policy does not supersede more restrictive policies which may be in force in compliance with federal, state, or local laws or ordinances.

Note also that the School of Medicine has adopted a more restrictive policy; see the Tobacco-free Campus Policy (<http://med.stanford.edu/tobaccofree/>).

Policy

The following is quoted from the policy:

1. Policy

It is the policy of Stanford University that the smoking of tobacco products in enclosed buildings and facilities and during indoor or outdoor events (and the selling of tobacco products) on the campus is prohibited.

2. Guidelines

- a. **Smoking-Prohibited Areas**—Specifically, smoking is prohibited in classrooms and offices, all enclosed buildings and facilities, in covered walkways, in University vehicles, during indoor and

outdoor athletic events, and during other University sponsored or designated indoor or outdoor events.

- i Ashtrays will not be provided in any enclosed University building or facility.

- ii "Smoking Prohibited" signs will be posted.

- b. **Outdoor Smoking Areas**—Smoking is permitted in outdoor areas, except during organized events. Outdoor smoking areas should be located far enough away from doorways, open windows, covered walkways, and ventilation systems to prevent smoke from entering enclosed buildings and facilities. To accommodate faculty, staff, and students who smoke, Vice Presidents, Vice Provosts, and Deans may designate certain areas of existing courtyards and patios as smoking areas in which case ashtrays must be provided. Costs associated with providing designated smoking areas and ashtrays will be absorbed by the specific academic or administrative unit(s).

3. **Enforcement**—This policy relies on the consideration and cooperation of smokers and non-smokers. It is the responsibility of all members of the University community to observe and follow this policy and its guidelines.

- a. **Smoking Cessation Information**—Smoking cessation programs are available for faculty and staff through the Center for Research in Disease Prevention, and the Health Improvement Program (HIP). Students may contact the Health Promotion Program (HPP) through the Student Health Center for smoking cessation information or programs.

- b. **Repeated Violations**—Faculty, staff, and students repeatedly violating this policy may be subject to appropriate action to correct any violation(s) and prevent future occurrences.

4. **Implementation and Distribution**—Copies of this policy will be disseminated by the Manager of HR Policy/Staff and Labor Relations and the Vice Provost for Student Affairs to all faculty, staff, and students, and to all new members of the University community.

Visitor Policy/University Statement on Privacy

Stanford University has an interest in ensuring that the privacy of its students, faculty, and staff is respected, and that no activities interfere with education, research, or residential life.

The University is private property; however, some areas of the campus typically are open to visitors. These areas include White Plaza, public eating areas (such as those at Tresidder Union), outdoor touring areas, and locations to which the public has been invited by advertised notice (such as for public educational, cultural, or athletic events). Even in these locations, visitors must not interfere with the privacy of students, faculty, and staff, or with educational, research, and residential activities. The University may revoke at any time permission to be present in these, or any other areas. Visitors should not be in academic or residential areas unless they have been invited for appropriate business or social purposes by the responsible faculty member, student, or staff member.

No commercial activity, including taking photos or similar audio or visual recordings that are sold to others or otherwise used for commercial purposes, may occur on the campus without the University's permission. Requests for permission should be submitted to the Director of University Communications or, as appropriate, the Dean of Students, the Department of Athletics, or the Office of Public Events. Recognized student groups and official units of the University will be granted such permission so long as they do not violate privacy or property interests of others; so long as any sale of their products is predominantly on campus to students, faculty, and

staff; and so long as they comply with applicable University policies and procedures.

Violators of this policy may be subject to criminal and/or civil liability, as well as University disciplinary action.

Computer and Network Usage

For a complete text of the currently applicable version of this policy, see Administrative Guide Memo 6.2.1 Computer and Network Usage Policy (<https://adminguide.stanford.edu/chapter-6/subchapter-2/policy-6-2-1>).

Policy

The following is quoted from the policy:

Users of Stanford network and computer resources have a responsibility not to abuse the network and resources. This policy provides guidelines for the appropriate and inappropriate use of information technologies.

Summary

The following summarizes the policy on Computer and Network Usage:

In particular, the policy provides that users of University information resources must respect software copyrights and licenses, respect the integrity of computer-based information resources, refrain from seeking to gain or permitting others to gain unauthorized access, including by sharing passwords, and respect the rights of other computer users.

This policy covers appropriate use of computers, networks, and information contained therein. As to political, personal and commercial use, the University is a non-profit, tax-exempt organization and, as such, is subject to specific federal, state, and local laws regarding sources of income, political activities, use of property, and similar matters. It also is a contractor with government and other entities, and thus must assure proper use of property under its control and allocation of overhead and similar costs. For these reasons, University information resources must not be used for partisan political activities where prohibited by federal, state, or other applicable laws, and may be used for other political activities only when in compliance with federal, state, and other laws, and in compliance with applicable University policies. Similarly, University information resources should not be used for personal activities not related to appropriate University functions, except in a purely incidental manner. In addition, University information resources should not be used for commercial purposes, except in a purely incidental manner or except as permitted under other written policies of the University or with the written approval of a University officer having the authority to give such approval. Any such commercial use should be properly related to University activities, take into account proper cost allocations for government and other overhead determinations, and provide for appropriate reimbursement to the University for taxes and other costs the University may incur by reason of the commercial use. Users also are reminded that the .edu domain on the Internet has rules restricting or prohibiting commercial use, and thus activities not appropriately within the .edu domain and which otherwise are permissible within the University computing resources should use one or more other domains, as appropriate.

The University's Information Security Officer is authorized in appropriate circumstances to inspect or monitor private data (including email), such as when there is a reasonable cause to suspect improper use of computer or network resources.

For further information on the topic of peer-to-peer file sharing, see the section above on Copyright.

Stanford University Online Accessibility Policy

Stanford University will make Stanford Websites and web-based applications accessible to its students, faculty, staff and participants in the University's programs and activities who have disabilities. All personnel who are involved in the procurement, preparation and maintenance of University Websites and web-based applications should adopt this goal, with the assistance of campus resources dedicated to supporting web accessibility. Stanford Websites and web-based applications must either conform to WCAG 2.0 Level AA or their content and functionality be made available to Users on request (such as by a student request to the Office of Accessible Education) in an equally effective and accessible alternative manner.

Applicability

This policy applies to all Stanford academic and administrative units that create and maintain Websites and web-based applications used in the programs and activities of the University.

Definitions

Stanford Website: Any website or web-based application within the Stanford University (stanford.edu) domain used in the programs or activities of the University.

Users: Stanford Website users are defined as current Stanford students and applicants for admission, Stanford staff and faculty, and participants in the University's programs and activities.

Accessible: Refers to the concept that people with disabilities are able to independently and timely access and use a product or system, including with the benefit of assistive technologies. Assistive technologies include adaptive hardware and/or software and other devices that are used to increase, maintain, or improve the functional capabilities of individuals with disabilities.

Stanford Online Accessibility Program ("SOAP") Office: The SOAP Office (soap.stanford.edu) provides resources and services for Stanford web designers, developers and content creators to assist them in producing accessible materials. Services include Website accessibility testing and guidance regarding universal design and web standards compliance. The SOAP Office is also the campus resource designated to facilitate online accessibility for Users. To report and seek assistance on web accessibility issues, Users may contact the SOAP Office by email at web-accessibility@stanford.edu or submit a HelpSU ticket through the SOAP Office website (<http://soap.stanford.edu>).

Office of Accessible Education ("OAE"): OAE (<http://exploreddegrees.stanford.edu/nonacademicregulations/>(<http://oae.stanford.edu>) is the campus office designated to work with Stanford students with disabilities. OAE provides support services, accommodations, and programs to remove barriers to full participation of students with disabilities in the programs or activities of the University.

Diversity and Access Office ("D&A"): D&A (<http://diversityandaccess.stanford.edu>) oversees compliance with state and federal anti-discrimination laws including the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. D&A provides disability-related access information, and assists faculty, staff and other non-student participants in University programs and activities with disabilities who may need accommodations and/or auxiliary aids to obtain equal access to Stanford facilities, programs and activities. D&A also oversees the ADA/Section 504 Grievance Procedure for students who believe they have been subjected to unlawful discrimination based

on a disability or denied access to services or accommodations which the ADA and/or Section 504 require Stanford to provide. Information about the ADA/Section 504 Grievance Procedure is located at in this bulletin (<http://exploreddegrees.stanford.edu/nonacademicregulations/nonacademicregulations/#text-amerwithdisaactsgrieprocstud>).

Accessibility Standard

Stanford University has adopted the Worldwide Web Consortium Web Content Accessibility Guidelines version 2.0, Level AA Conformance (WCAG 2.0 Level AA) as its goal for accessible Stanford Websites. The guidelines and success criteria of WCAG 2.0 Level AA are organized around the following four principles which lay the foundation for Users with disabilities to access and use web content. For a Stanford Website to be accessible under these principles, its content must be:

Perceivable – Information and user interface components must be presentable to Users in ways they can perceive.

Operable – User interface components and navigation must be operable.

Understandable – Information and the operation of user interface must be understandable.

Robust – Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

Implementation Guidelines

1. All personnel responsible for existing Stanford Websites must use good faith efforts, subject to the requirements and exceptions of the applicable laws, to bring those Websites into conformance with WCAG Level 2.0 AA.
2. New Stanford Website development and purchases, including development and purchases for major revisions and updates of existing Stanford Websites, should conform to WCAG 2.0 Level AA.
3. Vendors seeking to develop or provide Websites or web-based applications for Stanford will be required to ensure that their products satisfy WCAG 2.0 Level AA Success Criteria, unless undue burden or fundamental alteration can be demonstrated (see below). Preferred standards for demonstrating satisfaction of WCAG 2.0 Level AA Success Criteria, and accessibility language for Stanford Website vendor contracts, as well as for other types of Electronic Information Technology vendor contracts, may be obtained from University Procurement (Purchasing and Payment Services) or from the SOAP Office.
4. Each Stanford Website should contain "Accessibility" contact information for the site's webmaster and/or the SOAP Office. The contact information may take a variety of forms, such as an email address, a link to a HelpSU page, or a contact form on the site. The recommended location for this information is the Website's "Contact" or "About Us" page.
5. The SOAP Office will continue to test Stanford Websites for accessibility and report accessibility issues to the webmaster.
6. OAE will continue to seek input from Stanford students regarding accessibility issues.
7. Conformance to WCAG 2.0 Level AA guidelines may be an undue burden due to the nature of the content, the purpose of the resource, the lack of accessible solutions, or an unreasonably high administrative or financial cost necessary to make the resource meet that goal. However, these difficulties do not relieve University programs or activities from meeting applicable legal obligations to provide reasonable accommodations to Users in regard to access to the content and services provided on Stanford Websites. Managers of University programs and activities must be prepared to provide content and/or services in a suitable alternative format (e.g., electronic text file or audio description) or manner upon request (such as by a student to the OAE).

Implementation Assistance

Guidelines and best practices are available from the SOAP Office (<http://soap.stanford.edu>). In addition, on-campus assistance is available for designing and implementing Websites that meet accessibility guidelines and for evaluating the accessibility of existing sites and those under development. If such assistance is needed, please visit soap.stanford.edu or email the SOAP Office at web-accessibility@stanford.edu.

Responding to Accessibility Issues

Recognizing the ongoing evolution of current web content and technologies, the webmaster, upon being made aware of an accessibility issue, should proceed as follows:

- Acknowledge receipt of the issue in writing (via email) to the User raising the issue, with a copy to the SOAP Office.
- Open an accessibility case for recording the issue and resulting action taken.
- Verify that the issue is an authentic accessibility issue.
- Treat all issues as important. Address any time-sensitive need of the User promptly (generally within a period of no greater than two business days), unless technology or work involved requires more effort, in which case the User will be promptly notified in writing of expected delivery.

Upon receiving a report of an accessibility issue, the SOAP Office shall notify the webmaster, as well as OAE (for reports from students) or D&A (for reports from non-students.) If the SOAP Office, in consultation with the webmaster, determines that the information or service provided on the Stanford Website cannot be made accessible, or that doing so would constitute an undue burden or fundamental alteration, OAE or D&A will engage in an interactive process with the User about alternative methods for providing the information or service and will provide an equally effective alternative format or service. In the event that an alternative format or service cannot be provided or the user is not satisfied with the results, he or she may contact the ADA/Section 504 Compliance Officer at D&A by telephone at (650) 723-0755 or by email at equalopportunity@stanford.edu for assistance in resolving the issue.

For questions about the policy, please contact the SOAP Office (<http://soap.stanford.edu>).

Protection of Sensitive Data

Stanford University maintains sensitive non-public data protected by laws and agreements, including Social Security numbers, financial information, health information, and student records. It is incumbent on every member of the Stanford community with access to such data to be familiar with and abide by Stanford's data classifications requirements provided at the Data Classification, Access, Transmittal and Storage (http://www.stanford.edu/group/security/securecomputing/dataclass_chart.html) web site. Members of the Stanford community should also familiarize themselves with applicable laws and University policies on privacy as provided by the University, including Administrative Guide Memos 6.3.1 Information Security (<https://adminguide.stanford.edu/chapter-6/subchapter-3/policy-6-3-1>), 6.4.1 Identification and Authentication Systems (<https://adminguide.stanford.edu/chapter-6/subchapter-4/policy-6-4-1>), 6.6.1 Information Security Incident Response (<https://adminguide.stanford.edu/chapter-6/subchapter-6/policy-6-6-1>), and 3.4.2 Card and Payment Account Acceptance and Processing (<https://adminguide.stanford.edu/chapter-3/subchapter-4/policy-3-4-2>). For information on best practices for securing mobile computing devices, see the Guidelines for Securing Mobile Computing Devices (http://www.stanford.edu/group/security/securecomputing/mobile_devices.html) web site.

Campus Safety and Criminal Statistics

Stanford University complies with the Jeanne Clery Disclosure of Campus Security Policy and Crime Statistics Act. A copy of Stanford's policies and statistics under this act are posted on the Department of Public Safety (<http://stanford.edu/group/SUDPS/safety-report.shtml>) web site. A paper copy can be obtained by calling the Stanford Department of Public Safety at (650) 723-9633.

Undergraduate Education (VPUE)

Established in 1995, the Office of the Vice Provost for Undergraduate Education (VPUE) comprises the Bing Overseas Studies Program, the Center for Teaching and Learning, Stanford Introductory Studies, and Undergraduate Advising and Research. VPUE fosters innovation, integration, and pedagogical advancement of the Stanford undergraduate journey. Working with our partners, we prepare Stanford students to be engaged citizens with the creative confidence to tackle the world's most complex challenges.

VPUE programs for first- and second-year students include New Student Orientation/Approaching Stanford, the Leland Scholars Program, Thinking Matters, Program in Writing and Rhetoric, Introductory Seminars, and Sophomore College. Programs for more advanced students include the Bing Overseas Studies Program, Writing in the Major, Undergraduate Research, Arts Intensive, Leadership Intensive, and Bing Honors College. Undergraduate Advising, the Center for Teaching and Learning, and the Hume Center for Writing and Speaking serve undergraduates throughout their time at Stanford. The office of the VPUE works closely with the office of the Vice Provost for Student Affairs and the Admissions Office. The Vice Provost for Undergraduate Education reports to the Provost.

Policies governing undergraduate education are formulated by Faculty Senate committees and voted into legislation by the Faculty Senate. The Committee on Undergraduate Standards and Policy (C-USP) addresses such topics as general education requirements, grading, awards, advising, and teaching evaluation. The Committee on Review of Undergraduate Majors (C-RUM) oversees the initiation and review of undergraduate degree programs. Committee members include the Vice Provost for Undergraduate Education or his delegated staff (ex-officio) and representatives from the faculty at large, administration (such as the Office of the University Registrar), and students. The Associated Students of Stanford University (ASSU) nominations committee selects student members. The VPUE also maintains, by rule of the Faculty Senate, the Thinking Matters Governance Board, the Writing and Rhetoric Governance Board, and the Breadth Governance Board to oversee these university degree requirements. Finally, the Undergraduate Advisory Council (UGAC) was established by the provost in 1996 to serve as the main faculty advisory body for the Vice Provost for Undergraduate Education.

Freeman-Thornton Vice Provost for Undergraduate Education: Harry J. Elam, Jr.

Olive H. Palmer Professor in the Humanities

Senior Associate Vice Provost for Undergraduate Education: Liz Hadly
Professor of Biology

Associate Vice Provost for Undergraduate Education: Sharon Palmer

Associate Vice Provost for Finance and Administration: Charles Litchfield

Stanford Introductory Studies

Stanford Introductory Studies

Program Directors: Marvin Diogenes, Ellen Woods

Offices: Sweet Hall

Email: stanfordintrostudies@stanford.edu

Web Site: <https://undergrad.stanford.edu/programs>

Stanford Introductory Studies (SIS) offers courses taught by faculty from across the seven Schools of the University and by SIS Lecturers. Some of these courses satisfy University Requirements (THINK, WAYS, and the Writing and Rhetoric Requirement) while others are electives especially designed for first- and second-year students including Introductory Seminars. Special residential programs such as Structured Liberal Education, Science in the Making (SIMILE), Immersion in the Arts—Living in Culture (ITALIC), and September Studies (Leland Scholars, Sophomore College, Leadership Intensive, Arts Intensive, and Bing Honors College) expand SIS curricular opportunities for students. The Hume Center for Writing and Speaking, which manages writing and oral communication services such as tutorials and workshops for all students, is also part of SIS.

Thinking Matters

Faculty Director: Russell A. Berman, Comparative Literature and German Studies

Director, Stanford Introductory Studies for Thinking Matters : Ellen Woods

Associate Director: Parna Sengupta

Affiliated Faculty: Steven Block (Applied Physics), James Campbell (History), Shelley Correll (Sociology), Cari Costanzo (Anthropology), Adrian Daub (German Studies), Jenna Davis (Civil and Environmental Engineering), Russ Fernald (Biology), Shelley Fisher Fishkin (English), Peter Graham (Physics), Allyson Hobbs (History), Susan Holmes (Statistics), Adam Johnson (English), Michelle Karnes (English), Jeffrey Koseff (Civil and Environmental Engineering), William Koski (School of Law), Joseph Lipsick (School of Medicine), Tanya Luhrmann (Anthropology), David Lummus (French and Italian), David Magnus (School of Medicine), Pamela Matson (Dean of the School of Earth Sciences), Peter Michelson (Physics), Josiah Ober (Political Science), Vijay Pande (Chemistry), Rob Reich (Political Science), Eric Roberts (Computer Science), Thomas Ryckman (Philosophy), Gabriella Safran (Slavic Languages), Scott Sagan (Political Science), Jan Skotheim (Biology), Kathryn Starkey (German Studies), Abraham Verghese (School of Medicine), Blakey Vermeule (English), Allen Weiner (School of Law), Amir Weiner (History), Tobias Wolff (English), Lee Yearley (Religious Studies)

Lecturers: Ayca Alemdaroglu, Jelena Batinic, Kassahun Betre, Noelle Boucquey, Rahul Chaudhri, Anna Corwin, Brian Coyne, Andrew Dosmann, Kjerstin Gruys, Jamie Conklin Imam, Sarah Ives, Raymond Kania, Hania Köver, Karola Kreitmair, Andy Lyons, Nicole Martinez, Kara McCormack, Pete Mohanty, Kate Leila Norako, Nate Olson, Melinda Owens, Michael Park, Sarah Perkins, Simon Rubenstein-Salzedo, Stephen Speiss, Bronwen Tate, Stacey Wirt Taylor, Ruth Tennen, Matthew Walker, Adam Zientek, Ian Zuckerman

Offices: Sweet Hall, Second Floor

Mail code: 3068

Phone: (650) 723-0944

Email: thinkingmatters@stanford.edu

Web Site: <https://undergrad.stanford.edu/programs/thinking-matters>

Thinking Matters courses are listed under the subject code THINK on the Stanford Bulletin's ExploreCourses web site (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20132014&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on>).

Thinking Matters offers courses that satisfy the one-quarter Freshman Requirement. Taught by faculty from a wide range of disciplines and fields, the *Thinking Matters* (THINK) requirement helps you develop the ability to ask rigorous and genuine questions that can lead to scientific experimentation or literary interpretation or social policy analysis. Through the study of these questions and problems, you will develop critical skills in

interpretation, reasoning, and analysis as well as enhance your capacities for writing and discussion. The THINK requirement may be satisfied in three ways:

1. Thinking Matters courses:
 - a one quarter, 4-unit course taught by Academic Council faculty.
2. Education as Self-Fashioning courses: ESF
 - a one quarter, 7-unit course that satisfies both the Thinking Matters Requirement and the first-year Writing Requirement. For information on the program, faculty, and instructors, see the "ESF" section of this bulletin.
3. Integrated Learning Environments: ITALIC, SIMILE, and SLE
 - a three quarter, residence-based learning experience, which satisfies the THINK requirement, two of the University Writing and Rhetoric requirements and selected General Education Requirements. For information regarding the three residence-based programs, faculty, and instructors, see the "ILE" section of this bulletin.

Thinking Matters Courses Offered in 2014-15

- All Thinking Matters Courses Offered in 2014-15 (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on&filter-catalognumber-THINK=on>)
- Autumn Quarter (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on>) (click link to see Autumn course offerings)
- Winter Quarter (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20142015&filter-term-Winter=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on&filter-catalognumber-THINK=on>) (click link to see Winter course offerings)
- Spring Quarter (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on&filter-catalognumber-THINK=on>) (click link to see Spring course offerings)

Program in Writing and Rhetoric (PWR)

Acting Director: Marvin Diogenes

Director, Stanford Introductory Studies for PWR: Marvin Diogenes

Associate Director: Christine Alfano

Director, Hume Center for Writing & Speaking: Julia Bleakney

Director, Oral Communication Program: Doree Allen

Director, Stanford Storytelling Project: Jonah Willihnganz

Lecturers: Christine Alfano, Paul Bator, Shaleen Brawn, Russ Carpenter, Erica Cirillo-McCarthy, Kevin DiPirro, Erik Ellis, Thomas Freeland (Oral Comm), Chris Gerben, Wendy Goldberg, Arturo Heredia, Donna Hunter, Chris Kamrath, John Lee, Sohui Lee, Clara Lewis, Katie McDonough (SIMILE), Hillary Miller (ITALIC), Kimberly Moekle, Gabrielle Moyer, Alyssa O'Brien, John Peterson, Sarah Pittock, Emily Polk, Alya Raphael (Oral Comm), Carolyn Ross, Kim Savelson, Susan Schuyler, Zachary Sifuentes, Ruth Starkman, Jennifer Stonaker, Mary Stroud, Kathleen Tarr, Ann Watters, Cassie Wright

Fellows: Jodie Archer, Karli Cerankowski, Jesse Davie-Kessler, Magdalena Gross, Sarah Ives (Aut, Win), Kiersten Jakobsen, Hanna Janiszewska, Raechel Lee, Lindsey Mantoan, Luke Parker, Ethan Plaut, Trisha Stan, Robert Stephan, Eric Vanden Bussche

Teaching Affiliates: Vanessa Chang, Allen Frost, Daniel Murray (Win), Irena Yamboliev

Offices: Sweet Hall, Third Floor
Mail Code: 94305-3069
Phone: (650) 723-2631
Email: pwrcourses@stanford.edu
Web Site: <http://pwr.stanford.edu>

Courses offered by the Program in Writing and Rhetoric are listed under the subject code PWR on the Stanford Bulletin's ExploreCourses web site. Courses offered by the Oral Communication Program within PWR are listed under the subject code ORALCOMM on the Stanford Bulletin's ExploreCourses web site. Please see below for more information about the Oral Communication Program.

The Program in Writing and Rhetoric (PWR) designs and teaches courses that meet the Writing and Rhetoric requirement for undergraduates at Stanford as well as intermediate and advanced writing and rhetoric classes. For more information on the requirement, see the "Writing and Rhetoric Requirement" page on the PWR website.

PWR courses engage students in rhetorical analysis of texts and research-based argument. Students in PWR courses learn and practice time-tested rhetorical principles to gain increasing control over the intellectual and stylistic elements of their writing; they learn to analyze the persuasive strategies of others and to apply those insights to their own writing.

Toward these ends, PWR 1 focuses on elements of academic argument: understanding a writer's stance; developing an argumentative thesis; discovering, developing, and deploying cogent proofs; making appropriate organizational and stylistic choices; and understanding the expectations of varied audiences. The course emphasizes research-based writing, including the effective use of primary and secondary sources and data based on fieldwork. Students enrolled in PWR 1 carry out significant research and use it as the basis for a persuasive research-based argument.

PWR 2 further develops students' skills in writing and oral presentation of research, emphasizing the ongoing development of content, organization, and style. The course addresses the dynamic interdependence of writing and speaking, as well as the importance of visual and multimedia elements in the effective presentation of research. Students enrolled in PWR 2 have opportunities to draft and revise written assignments and oral presentations as well as opportunities to present the results of scholarly inquiry, with an emphasis on how to work purposefully and well with a variety of presentation media.

As a general rule, students complete a minimum of three major assignments in both PWR 1 and 2. Written assignments vary from 5 to 15 pages in length, and students work intensively on revising each piece of writing. All assignments involve analyzing a range of texts as well as identifying, evaluating, and using multiple sources in support of research-based arguments. In-class work focuses on how to read with an increasingly critical eye, how to utilize a range of generative writing and revision activities, and how to identify, evaluate, integrate, and cite sources effectively.

Writing and Rhetoric classes enroll no more than 15 students, and all classes are conducted as seminars in which participation is crucial. In-class activities include close reading of and responding to the writing of peers; these workshops are augmented by a minimum of three individual or small group conferences with the PWR instructor during the quarter.

Courses

The Writing and Rhetoric requirement includes courses at three levels.

1. The first-level course, taken in the first year, can be satisfied by courses in PWR, Structured Liberal Education, or Integrated Learning Environments (SIMILE and ITALIC) or by completion of the Education as Self-Fashioning course; the curriculum emphasizes analysis and research-based argument.
2. The second-level course, to be completed by the end of the sophomore year, is a writing and oral/multimedia presentation course taught by the Program in Writing and Rhetoric and by other programs and departments (completion of Structured Liberal Education fulfills this requirement); courses taught outside of PWR may include experience in visual, oral, and/or multimodal communication.
3. The third-level course is a Writing in the Major (WIM) course taught in each major, providing students with systematic opportunities to develop skills for writing in their chosen fields. A list of certified WIM courses may be found in the table of "Undergraduate Major Unit Requirements (p. 36)" of this bulletin. WIM course descriptions may be found under individual department and program sections.

The sequence of required courses provides a coordinated approach responsive to how students mature as writers, researchers, and presenters during their undergraduate years. At each level, students develop greater sophistication in conducting inquiry and producing scholarly work in progressively more specific disciplinary contexts.

Before the term in which students enroll in the first two levels of the requirement, they review course descriptions on the PWR Courses webpage. After reviewing the offerings, students submit a list of top choices, and the PWR office assigns students to courses based on these preferences.

Students wishing to pursue advanced work in Writing and Rhetoric may enroll in electives offered by PWR. Topics vary; further information may be found in the PWR section of the Stanford Bulletin's ExploreCourses web site or on the PWR advanced courses web page. PWR also offers courses culminating in a Notation in Science Communication. For more information, visit the webpage.

Writing and Rhetoric 2 Requirement

The Writing and Rhetoric 2 requirement may be satisfied through completion of PWR 2 courses or by other programs and departments; all courses outside of PWR must be certified by the Writing and Rhetoric Governance Board. In addition to PWR 2, some Introductory Seminars certified by the Writing and Rhetoric Governance Board satisfy the second-level Writing and Rhetoric requirement (Write-2). Courses offered as Introductory Seminars require an additional application form; see the Introductory Seminars web site.

Hume Center for Writing and Speaking

Location: Building 250

Mail Code: 2085

Phone: (650) 723-0045

Email: writingcenter@stanford.edu (for writing);

speakinghelp@stanford.edu (for speaking)

Web Site: <http://hume.stanford.edu>

The Hume Center for Writing and Speaking (Hume) works with all Stanford writers to help them develop rich and varied abilities in every aspect of writing and oral communication. In one-to-one sessions, Hume writing consultants help students get started on assignments; address and overcome writer's block or performance anxiety; learn strategies for revising and editing; and understand academic conventions in their fields. Hume emphasizes support for students' writing, oral presentations, and multimedia compositions for PWR, Thinking Matters, and Introductory Seminars while also serving all Stanford undergraduates through individual

and group tutorials, workshops, and seminars. The Hume Center also works with students in Writing in the Major (WIM) courses and students writing Honors theses. Other events hosted by the Center include performances for Parents Weekend and Admit Weekend. For further details, see the Hume Center for Writing and Speaking web site.

Oral Communication Program

The Oral Communication Program provides opportunities for undergraduates and graduate students to develop or improve their oral communication skills. Courses and workshops offer a comprehensive approach to speech communication, including training in the fundamental principles of public speaking and the effective delivery of oral presentations. The goal is to enhance students' general facility and confidence in oral expression. The program also provides innovative discipline-based instruction to help students refine their personal speaking styles in small groups and classroom settings.

Those interested in individualized instruction or independent study are invited to visit the Hume Center for Writing and Speaking, where trained student tutors, multimedia, and instructional resource materials are available on an ongoing basis.

Students with a passion for public speaking are encouraged to apply to become Oral Communication Tutors (OCTs); the application process takes place each January, and for those students chosen to serve as OCTs, we offer OralComm119, a required training practicum, in Spring Quarter.

To schedule appointments see the Hume Center for Writing and Speaking web site. For further details, call (650) 725-4149 or 725-7667 or email speakinghelp@stanford.edu.

Peer Writing Consultants

The Program in Writing and Rhetoric offers PWR 195 for undergraduates chosen to serve as peer writing consultants in the Hume Center for Writing and Speaking.

PWR Courses Offered in 2014-15

- PWR 1 Courses
 - Autumn Quarter (https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-ger-Writing1=on&filter-component-SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)
 - Winter Quarter
 - Spring Quarter (https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&filter-ger-Writing1=on&filter-component-SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)
- PWR 2 Courses (https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-ger-Writing2=on&filter-component-SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)
 - Autumn Quarter (https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-ger-Writing2=on&filter-component-SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)
 - Winter Quarter (https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&page=0&academicYear=20142015&filter-term-Winter=on&filter-ger-Writing2=on&filter-component-SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)

SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)

- Spring Quarter (https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&filter-ger-Writing2=on&filter-component-SEM=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)

Oral Communication Courses Offered in 2014-15

- Oral Communication Courses
 - Autumn Quarter
 - Winter Quarter
 - Spring Quarter (https://explorecourses.stanford.edu/search?q=oralcomm*&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&filter-coursestatus-Active=on&collapse=%2C5%2C6%2C)
 - Summer Quarter (<https://explorecourses.stanford.edu/search?q=oralcomm&view=catalog&page=0&academicYear=20142015&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=>)

Advanced PWR Courses

Prerequisites: PWR 1 and PWR 2.

		Units
PWR 194	Topics in Writing and Rhetoric	4
PWR 194SB	Topics in Writing and Rhetoric: Rhetoric of Science	4
PWR 194KD	Topics in Writing and Rhetoric: Technology and Human Values	4
PWR 91	Intermediate Writing	3
PWR 91CL	Intermediate Writing: Creative Inquiry: New Genres for Science Writing	3
PWR 91CG	Intermediate Writing: Science and Technology Writing for Popular Audiences	3
PWR 91JS	Intermediate Writing: Stanford Science Podcast	3
PWR 91KS	Intermediate Writing: Design Thinking and Science Communication	3
PWR 5	Independent Writing	1-5
PWR 6	Writing Workshop	1-3

Integrated Learning Environments

By integrating the academic and residential experience, ILEs offer a comprehensive approach to liberal education across the entire year. One of the stated aims of residential education is to help students connect their curricular and residential lives, to create a culture in which ideas and inquiry are a part of the daily fabric of life. Listed below are the three ILE Programs.

Immersion in the Arts: Living in Culture

Director: Janice Ross (Theater and Performance Studies)

Assistant Director: Kim Beil

Faculty: Jonathan Berger (Music), Scott Bukatman (Art and Art History), Janice Ross (Theater and Performance Studies)

Lecturer: Ben Lempert

Program in Writing and Rhetoric Lecturer: Hillary Miller

Offices: Sweet Hall, Second Floor, and Stern Hall

Mail Code: 94305-7000

Phone: (650) 723-0944

Email: TBD

Web Site: <https://undergrad.stanford.edu/programs/residential-programs/italic/overview>

ITALIC is a new residence-based program built around a series of big questions about the purposes of art and its unique capacities for intellectual creativity. It fosters close exchanges along faculty, students and guest artists in class, over meals and during excursions to arts events. This year-long program fosters close exchanges among faculty, students and guest artists and scholars in class, over meals and during excursions to arts events. We trace the challenges that works of art have presented to categories of knowledge – history, politics, culture, science, medicine, law – by turning reality upside-down or inside-out, or just by altering one’s perspective on the world. The arts become a model for engaging with problem-solving: uncertainty and ambiguity confront art makers and viewers all the time; artworks are experiments that work by different sets of rules. Students will begin to understand and use the arts to create new frameworks for exploring our (and others’) experience.

All lectures, sections, arts workshops and guest talks and student “arts lab” work will happen in a cluster of on-site seminar and practice rooms dedicated to ITALIC. Through a series of close readings and analyses of canonical works of theatre, film, dance, music and visual and arts as well as graphic novels, comics, magic shows and popular culture, freshmen will live and learn together in Burbank Hall.

ITALIC satisfies the Thinking Matters requirement, PWR1, and between two and four Ways breadth requirements. ITALIC is designed as a three quarter sequence, and students are expected to make a commitment for the entire year (4 units in two quarters; 8 in the quarter with intensive writing). ITALIC writing sections are scheduled in all three quarters.

ITALIC Courses Offered in 2014-15

ITALIC 91	Immersion in the Arts: Living in Culture	4
ITALIC 92	Immersion in the Arts: Living in Culture	4
ITALIC 93	Immersion in the Arts: Living in Culture	4
ITALIC 95W	Immersion in the Arts: Living in Culture, Writing Section	4

Science in the Making Integrated Learning Environment

Director: Paula Findlen (History)

Assistant Director: Kristen Haring

Faculty: Paula Findlen (History), Tom Mullaney (History), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History)

Lecturer: Marcelo Aranda

Program in Writing and Rhetoric Lecturer: Katie McDonough

Offices: Sweet Hall, Second Floor, and Stern Hall

Mail Code: 94305-7000

Phone: (650) 723-0944

Email: haring@stanford.edu

Web Site: <https://undergrad.stanford.edu/programs/residential-programs/science-making-integrated-learning-environment-simile>

SIMILE is a new residence-based program organized around the question of when something we might call “science” identifiably began, what it became, and what it might become. While we may believe that science,

technology and medicine represent some of the powerful tools we have for making a difference in the world, SIMILE challenges students to consider these as dynamic and changing fields of knowledge which must be understood in their historical, cultural and social contexts. Only then can we consider how new ideas, interpretations, technological artifacts and systems respond to societal needs within the limits of what is possible but also, importantly, in light of what might even become plausible.

Lectures and discussions take place in the dorm and are complemented by hands-on tutorials, field trips, and guest speakers as well as informal conversations among faculty and students. Each week offers students the opportunity to examine a rich and well-chosen case study mapped in time and space. We see how past societies identified important scientific and technical problems and developed the means to provide explanations and solutions.

SIMILE satisfies the Thinking Matters requirement, PWR1, and between two and four Ways breadth requirements. SIMILE is designed as a three quarter sequence, and students are expected to make a commitment for the entire year (4 units in two quarters; 8 in the quarter with intensive writing). SIMILE writing sections are scheduled in two quarters, with one writing section in Autumn and two in Winter.

SIMILE Courses in 2014-15

SIMILE 91	Science In the Making an Integrated Learning Environment	4
SIMILE 92	Science in the Making Integrated Learning Environment	4
SIMILE 93	Science in the Making Integrated Learning Environment	4
SIMILE 95W	Science In the Making an Integrated Learning Environment, Writing Section	4

Structured Liberal Education

Director: Joshua Landy (French and Italian)

Assistant Director: Greg Watkins

Lecturers: Michael Bogucki, Elizabeth Coggeshall, Lisa Hicks, Peter Mann, Jeremy Sabol, Greg Watkins

Offices: Sweet Hall, Second Floor, and Florence Moore Hall
Mail Code: 94305-8581
Phone: (650) 723-0944
Email: sle-program@stanford.edu
Web Site: <http://sle.stanford.edu>

The Program in Structured Liberal Education (SLE) is a year-long residence-based great works course that satisfies several requirements at once: Thinking Matters, Writing and Rhetoric (both PWR1 and PWR2), and four of the Ways requirements. The curriculum includes works of philosophy, literature, art, and music from the ancient world to the present. The program is interdisciplinary in approach; it emphasizes intellectual rigor and individualized contact between faculty and students.

SLE has two fundamental purposes: to develop a student's ability to ask effective questions of texts, teachers, the culture, and themselves; and to develop intellectual skills in critical reading, expository writing, logical reasoning, and group discussion. SLE encourages students to live a life of ideas in an atmosphere that stresses critical thinking and a tolerance for ambiguity. Neither the instructors nor the curriculum provides ready-made answers to the questions being dealt with; rather, SLE encourages a sense of intellectual challenge, student initiative, and originality.

The residence hall is the setting for lectures and small group discussions. SLE enhances the classroom experience with other educational activities, including a weekly film series, writing tutorials, occasional special events and field trips, and a student-produced play each quarter.

Freshmen interested in enrolling in SLE should indicate this preference for their Thinking Matters assignment. SLE is designed as a three quarter sequence, and students are expected to make a commitment for the entire year (8 units each quarter).

SLE Courses Offered in 2014-15

		Units
SLE 91	Structured Liberal Education	8
SLE 92	Structured Liberal Education	8
SLE 93	Structured Liberal Education	8
SLE 299	Structured Liberal Education Capstone Seminar	1

Education as Self-Fashioning

Director: Blair Hoxby (English)

Faculty: Robert Harrison (French and Italian), Blair Hoxby (English), Caroline Hoxby (Economics), Andrea Nightingale (Classics), Kathryn Starkey (German Studies), Kenneth Taylor (Philosophy)

Writing Instructor: Jean Abbott, Max Ashton, Artemis Brod, Allen Frost, Karola Kreitmair, Inga Pierson, Ava Shirazi, Grainne Watson

Offices: Sweet Hall, Second Floor

Mail Code: 94305-3068

Phone: (650) 723-0944

Email: thinkingmatters@stanford.edu

Web Site: <https://undergrad.stanford.edu/programs/education-self-fashioning-esf>

Education as Self-Fashioning (ESF) is a unique opportunity offered only in the autumn quarter, since its aim is to introduce entering students to a liberal education. The six courses provide you with an opportunity to work closely with a faculty member in a seminar-style setting while simultaneously completing your first-year writing requirement. In ESF, we consider writings about education by intellectuals working in various fields, with the aim of articulating different ways that education can be used to structure one's thinking, one's self, and ultimately one's life as a whole. You will grapple with this issue in dialogue with fellow students and faculty from across a wide range of disciplines — from the humanities and social sciences through the natural sciences and mathematics.

The ESF program satisfies both the Thinking Matters and the PWR1 requirement. ESF is a set of linked seminars related to the general theme expressed in the course title. Six seminars, each with a different focus, meet separately as discussion classes led by the faculty; all ESF students also come together for a plenum session or large lecture each week. Each seminar coordinates writing instruction with the course theme in specially designated writing sections.

The three components of ESF are described below. ESF counts as a 7-unit course.

1. A seminar with a faculty member that meets once per week for at least 75 minutes.
2. A section with a writing instructor that meets for sessions of 110 minutes twice per week.
3. A lecture series that will meet once-a-week featuring prominent intellectuals. These lectures are required for students enrolled in ESF.

ESF Courses Offered in Autumn 2014-15

- All ESF Courses Offered in 2014-15 (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&page=0&q=ESF&filter-coursestatus->

Active=on&view=catalog&filter-catalognumber-ESF=on&academicYear=20142015&collapse=) (click link to see Autumn course offerings)

term-Winter=on&filter-component-IDS=on&filter-component-ISS=on&filter-coursestatus-Active=on&collapse=%2C6%2C)

- Spring Quarter (<https://explorecourses.stanford.edu/search?q=all+courses&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&filter-component-IDS=on&filter-component-ISS=on&filter-coursestatus-Active=on&collapse=%2C6%2C>)

Introductory Seminars

Faculty Director: Russell Berman, Comparative Literature and German Studies

Director, Stanford Introductory Studies for Introductory Seminars: Ellen Woods

Associate Directors: Joyce Moser, Lee West

Faculty: Over 200 faculty from more than 60 departments in all Schools of the University teach an SIS Introductory Seminar.

Offices: Sweet Hall, 229B, Second Floor

Mail Code: 3069

Phone: (650) 724-2405

Email: introsems@stanford.edu

Web Site: <http://introsems.stanford.edu>

Introductory Seminars provide opportunities for first- and second-year students to work closely with their peers and faculty in a small group setting of up to 16 students per class. Together they engage in the study of topics of mutual interest related to the research and scholarship of the professor teaching the seminar. Introductory Seminars aim to intensify the intellectual experience of freshmen and sophomores by fostering faculty-student relationships in a spirit of mentorship. Seminars require little or no formal background and allow freshmen and sophomores to discover the joys of learning in a vast range of fields. Over 200 faculty from more than 60 departments take part in the program. The courses provide department credit toward graduation, and many count towards a major as well as fulfill Ways of Thinking Ways of Doing requirements (WAYS) and General Education Requirements (GERs), including the second level Writing and Rhetoric Requirement (Write 2). Students submit an essay(s) for each seminar (up to three per quarter), which faculty review and select their student participants.

For a list of Introductory Seminars offered in 2014-15, see the online catalog. For information about submitting an essay and for course updates, see the Introductory Seminars web site. Due dates for submitting an essay(s) for an Introductory Seminar are at 5 p.m. on:

- Autumn Quarter: September 2, 2014
- Winter Quarter: October 14, 2014
- Spring Quarter: January 27, 2015

Introductory Seminars Courses Offered in 2014-15

- Freshman Introductory Seminars (<https://explorecourses.stanford.edu/search?q=all+courses&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-component-ISF=on&filter-coursestatus-Active=on&collapse=%2C6%2C>)
 - Autumn Quarter
 - Winter Quarter
- Spring Quarter (<https://explorecourses.stanford.edu/search?q=all+courses&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&filter-component-ISF=on&filter-coursestatus-Active=on&collapse=%2C6%2C>)
- Sophomore Introductory Seminars
 - Autumn Quarter (<https://explorecourses.stanford.edu/search?q=all+courses&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&filter-component-IDS=on&filter-component-ISS=on&filter-coursestatus-Active=on&collapse=%2C6%2C>)
 - Winter Quarter (<https://explorecourses.stanford.edu/search?q=all+courses&view=catalog&page=0&academicYear=20142015&filter-term-Winter=on&filter-component-IDS=on&filter-component-ISS=on&filter-coursestatus-Active=on&collapse=%2C6%2C>)

September Studies

Director: Marvin Diogenes

September Studies at Stanford allows students to be on-campus for three weeks prior to the beginning of Autumn Quarter to work with faculty on a focused area of study or artistic practice. The programs facilitate mentoring relationships between faculty and students and create vibrant learning communities. Leland Scholars are incoming first-year students; Sophomore College participants have completed their first year and are rising sophomores; Leadership Intensive participants are rising juniors; Arts Intensive participants are rising sophomores, juniors, and seniors; and Bing Honors College participants are generally rising seniors.

Sophomore College

Offices: Sweet Hall, Third Floor

Mail code: 3069

Phone: (650) 724-4667

Email: sophcollege@stanford.edu

Web Site: <http://soco.stanford.edu>

Sophomore College (SoCo) offers rising sophomores who share a passion for an area of study an opportunity to meet daily in seminar-size classes with Stanford faculty for lecture and discussion; students may also work in labs, participate in community-based learning, go on field trips, and engage in a range of other activities that facilitate in-depth mentoring relationships. Held before the start of students' sophomore year, this residential program encourages academic and social connections and transforms classes into intellectual communities, helping participants establish rich relationships with peers and faculty that extend beyond graduation. Seminars are for 2 credits; the Sophomore College program fee covers tuition, room, board, books, and class-required travel arranged by the program. Financial Aid is available. You can view the on-line catalog and learn more about SoCo at the Sophomore College (<https://undergrad.stanford.edu/programs/sophomore-college>) web site.

Arts Intensive

Offices: Sweet Hall, Third Floor

Mail code: 3069

Phone: (650) 724-4667

Email: artsintensive@stanford.edu

Web Site: <http://artsintensive.stanford.edu>

The Arts Intensive (AI) Program offers rising sophomores, juniors, and seniors the opportunity to study intensively with Stanford arts faculty and small groups of other Stanford students. The Arts Intensive program takes place over three weeks in September before the start of Autumn Quarter.

Arts Intensive courses engage students in the theory and practice of a particular artistic discipline. Courses often include field trips, workshops, film screenings, studio sessions, or other arts events in the afternoons, evenings, and on weekends. Courses are taught by Stanford arts faculty and often include contributions from professional visiting artists. Arts Intensive students live together in a Stanford residence during the program, making for a rich immersion into a creative community. This unique opportunity allows students to focus on their art practice without the constraints of other coursework. Enrollment is by application and takes place in Spring Quarter for the upcoming September program. Each Arts Intensive course enrolls 10 to 20 students and offers 2 units of academic credit. For more information

or to apply, see the Arts Intensive (<http://artsintensive.stanford.edu>) web site.

Leland Scholars Program

Offices: Sweet Hall, Third Floor

Mail code: 3069

Email: lelandscholars@stanford.edu

Web Site: <http://lelandscholars.stanford.edu>

In recognizing the need to prepare first year students for the academic, intellectual, social, and personal challenges they will face at Stanford, the Leland Scholars Program (LSP) facilitates the transition to college for incoming freshmen intending to study in the STEM (Science, Technology, Engineering, Math) or pre-health fields. Scholars will participate in a three-week residential program in the summer prior to arrival on campus. This fully-funded program has a carefully crafted schedule of activities, coursework, discussions, and trips designed to support the transition to Stanford. During the academic year, Leland Scholars will have access to additional advising and freshman seminars that sustain the community and reinforce the skills and strategies acquired during the program.

Bing Honors College

Offices: Sweet Hall, Third Floor

Mail code: 3069

Phone: (650) 724-4667

Email: binghonorscollege@stanford.edu

Web Site: Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)

Bing Honors College brings together students working on the early phases of their honors theses back to campus in early September, and gives them three weeks before the start of Autumn Quarter during which they can think, read, plan, research, and write.

With the support of faculty leaders and graduate students from participating departments and programs, students work on what they need, such as narrowing down a topic, improving research skills, making a timeline, writing a literature review, starting a chapter, collecting or sorting data, etc. This opportunity to focus solely on their theses helps the students to begin their senior year with a sense of direction and intellectual purpose, a commitment to their scholarship, and concrete progress on their projects. The College provides room and board. It also sponsors cross-disciplinary forums, such as writing workshops and faculty-led methodology panels, as well as residential activities and a closing celebratory event for all the students and their faculty leaders.

If you are a prospective honors student interested in joining Bing Honors College, please contact your department to find out whether it is participating. If your department is not participating but your adviser is willing to nominate you, the College will try to place you with a BHC leader who will provide you with the necessary support and guidance.

Leadership Intensive

Offices: Sweet Hall, Third Floor

Mail code: 3069

Phone: (650) 724-4667

Email: leadershipintensive@stanford.edu

(binghonorscollege@stanford.edu)

Web Site: Leadership Intensive (<https://undergrad.stanford.edu/programs/leadership-intensive>)

Leadership Intensive (LEAD) offers rising juniors a unique and immersive study of the complexities of leadership through a 3-week residential summer program just before the start of fall quarter. The program is characterized by an atmosphere of intense exploration of one's own leadership skills and abilities and participation in a strong community committed to helping all members develop their own unique potential. Design thinking, collaborative leadership and hands-on practice of essential

leadership skills are integral components of LEAD. Enrollment is by application (spring quarter for the following September) and there is a \$600 program fee (financial aid is available). LEAD enrolls 24 – 40 students and offers 2 units of academic credit. For more information, please visit our website: undergrad.stanford.edu/lead.

Overseas Studies

Bing Overseas Studies Program

The Bing Overseas Studies Program (BOSP) provides opportunities for Stanford students to broaden their undergraduate education through study in another country and exposure to its culture. Regular quarter-length programs in Australia, Beijing, Berlin, Cape Town, Florence, Istanbul, Kyoto, Madrid, Oxford, Paris, and Santiago offer courses in social and natural sciences, humanities, engineering, and earth sciences with full Stanford credit. Many courses also count toward major requirements and/or fulfill University breadth requirements. Students may enroll for one or more quarters at most locations. Academic or paid internships are available at the Beijing, Berlin, Florence, Kyoto, Madrid, Paris, and Santiago programs. Research opportunities are available in various formats at different centers. Service-learning and community-based research opportunities are available in Cape Town. Minimum academic and language prerequisites are specific to each program. See the BOSP (<http://bosp.stanford.edu>) web site for information on these requirements.

While studying overseas through BOSP, students remain registered at Stanford and pay regular tuition, along with an overseas fee, which is based on Stanford on-campus room and board rates. Regular financial aid applies, and may be adjusted to cover additional costs. At many centers, students live in a homestay or with local students.

In addition to regular programs offered for enrolled Stanford students, the University is a member of two consortia: the Consortium for Advanced Studies in Barcelona and the Kyoto Consortium for Japanese Studies. Overseas Studies also offers three-week faculty-led overseas seminars in various locations during Summer Quarter, a special program in Oaxaca, Mexico focusing on community health, and occasional faculty-initiated programs.

Overseas Studies, located on the ground floor of Sweet Hall, has full-time staff members and student advisors to assist in advising and planning for overseas study. Course information, while accurate at the time of publication, is subject to change. See the BOSP (<http://bosp.stanford.edu>) web site for updated information.

Locations

Courses offered by the Overseas Studies Program are listed on the Stanford Bulletin's (<http://explorecourses.stanford.edu>) ExploreCourses (<http://explorecourses.stanford.edu>) web site under subject codes beginning with OSP. Each BOSP location has its own subject code. Those subject codes, by location, are:

- Australia [OSPAUSTL] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPAUSTL&filter-catalognumber-OSPAUSTL=on>)
- Barcelona (Consortium for Advanced Studies) [OSPBARCL] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPBARCL&filter-catalognumber-OSPBARCL=on>)
- Beijing [OSPBELJ] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPBELJ&filter-catalognumber-OSPBELJ=on>)

- Berlin [OSPBBER] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPBBER&filter-catalognumber-OSPBBER=on>)
- Cape Town [OSPCPTWN] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPCPTWN&filter-catalognumber-OSPCPTWN=on>)
- Florence [OSPFLOR] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPFLOR&filter-catalognumber-OSPFLOR=on>)
- Istanbul [OSPISTAN] (<https://explorecourses.stanford.edu/search?view=catalog&catalog=&page=0&q=OSPISTAN&filter-catalognumber-OSPISTAN=on>)
- Kyoto [OSPKYOTO] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPKYOTO&filter-catalognumber-OSPKYOTO=on>)
- Kyoto Consortium for Japanese Studies [OSPKYOCT] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPKYOCT&filter-catalognumber-OSPKYOCT=on>)
- Madrid [OSPMADRD] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPMADRD&filter-catalognumber-OSPMADRD=on>)
- Oxford [OSPOXFRD] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPOXFRD&filter-catalognumber-OSPOXFRD=on>)
- Paris [OSPPARIS] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPPARIS&filter-catalognumber-OSPPARIS=on>)
- Santiago [OSPSANTG] (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPSANTG&filter-catalognumber-OSPSANTG=on>)

Program Director

Program Director: Ramón Saldívar

Stanford Program in Australia

Director: Ian Tibbetts, School of Biological Sciences, University of Queensland

Faculty-in-Residence: Kevin Arrigo

Program Faculty: Claire Baker, Catherine Lovelock, Brian McIntosh, Christopher Salisbury, Selina Ward

Stanford Program in Beijing

Director: Yuan Tian

Faculty-in-Residence: Stephen Cooper, Scott Rozelle

Program Faculty: Li Chen, Wenxiang Gong, Canfei He, Anshan Li, Kun Li, Liyan Qin, Chenshan Tian, Suolao Wang, Yan Wang, Pei Zhang, Shiqui Zhang, Xiaoyo Zhu

Stanford Program in Berlin

Director: Karen Kramer

Faculty-in-Residence: Paulla Ebron, Thomas Fingar, Paula Moya, Ramón Saldívar

Program Faculty: Maria Biege, Diana Boebe, Ulrich Brückner, Martin Jander, Wolf-Dietrich Junghanns, Ingo Klein, Sylvia Kloetzer, Matthias Pabsch, Cemile Tat-Unger, Sylke Tempel, Jochen Wohlfeil

Stanford Program in Cape Town

Director: Trudy Meehan

Faculty-in-Residence: Margaret Brandeau, Grant Parker, Barton Thompson

Program Faculty: Mohamed Adhikari, June Bam, Ronelle Carolissen, Diane Cooper, Stephan Klingebiel, Janice McMillan, John Parkington, Chris Saunders, Mary Simons, Nolubabalo Tyam

Stanford Program in Florence

Director: Ermelinda Campani

Faculty-in-Residence: Regina Casper, Jonathan Payne, Luigi Pistaferrì

Program Faculty: Elena Baracani, Fausto Brevi, Alba Cappallieri, Paolo Galluzzi, Pier Francesco Indelli, Massimo Martignoni, Anthony Molho, Michele Papa, Fiorenza Quercicoli, Filippo Rossi, Emanuela Scarpellini, Monica Toraldo di Francia, Timothy Verdon

Stanford Program in Kyoto

Director: Mike Hugh

Program Faculty: Steven Carter, Jaroslaw Kapuscinski

Program Faculty: Yuko Kawahara, Catherine Ludvik, Yasue Numaguchi, Satsuko Onodera, Akiko Shimizu, Akiko Sugawa, Kiyoko Tanaka, Hiroko Tayama, Rie Tsujino, Haruka Ueda

Stanford Program in Madrid

Director: Santiago Tejerina-Canal

Faculty-in-Residence: Jennifer Raymond, Gary Segura, Lisa Surwillo

Program Faculty: María Almudena Ariza Armada, Francisco Javier Bobillo de la Peña, Alberto Bosco, María Teresa Cambor Portilla, Pablo Campos Calvo Sotelo, Andrés Díez Herrero, Julia Doménech López, Sylvia Hilton, Sheila Klaiber, Miguel Larrañaga Zulueta, Pablo de Lora Deltoro, Laura Luceño Casals, Eduardo Manzano Moreno, Antonio Muñoz Carrión, Laura Murcia Canovas, Miguel Requena Díez de Revenga, Liliana Suárez Navas, Oscar Sánchez Fuster, Palo Taviel de Andrade Hermida, Isidro Yerba Prada

Stanford Program in Oxford

Director: Geoffrey Tyack

Faculty-in-Residence: Ian Hodder, Jonathan Levin

Program Faculty: James Forder, Matthew Landrus, Robert McMahon, Amanda Palmer, Scot Peterson, Emma Plaskitt, Richard Rowley

Stanford Program in Paris

Director: Estelle Halévi

Faculty-in-Residence: Cécile Alduy, Terry Castle, Carolyn Lougee, Blakey Vermeule

Program Faculty: Nadine Airout, Cecile Cotté, Laurie Boussaguet, Jean-Marie Fessler, Benedicte Gady, Brigitte Gallini, Patrick Guédon, Tiphaine Karsenti, Eloi Laurent, Florence Leca, Jacques Le Cacheux, Giovanni Lévi, Elizabeth Molkou, Marie-Christine Ricci, Klaus-Peter Sick, Sylvie Strudel, Fabrice Virgili, Oscar Villegas-Paez

Stanford Program in Santiago

Director: Iván Jaksic

Faculty-in-Residence: Pamela Hinds, Lochlann Jain, Kenneth Scheve

Program Faculty: Mabel Abad, César Albornoz, Andrés Bobbert, Germán Correa, Rolf Lüders, Sergio Missana, Cristian Muñoz, Alvaro Palma, Iván Poduje, Hernan Pons, Sharon Reid, Emilio Rivano, Maria Riveros, Alberto van Klaveren

Undergraduate Advising and Research

Undergraduate Advising and Research

Associate Vice Provost for Undergraduate Education, Director, and Dean of Freshmen: Rob Urstein

Central UAR Office: Sweet Hall, first floor

Phone: (650) 723-2426

Fax: (650) 725-1436

Web Site: <http://undergrad.stanford.edu>

Email: advising@stanford.edu (vpue-advising@stanford.edu), vpue-research@stanford.edu

Appointments: (650) 723-2426

Undergraduate Advising and Research upholds the mission, standards, and requirements of the University, introduces students to the full intellectual richness of undergraduate study at Stanford, supports students in their academic and intellectual pursuits, and instills within them a sense of identity within and belonging to our community of scholars at Stanford.

This process begins with the pairing of each freshman with two advisers: a Pre-Major Adviser and a UAR Academic Director. Freshmen are assigned to Pre-Major Advisers (faculty and academic staff) according to their preliminary academic interests and residence. Pre-Major Advisers are well-suited to help students understand the university and are the first of many mentors students will find at Stanford. The UAR Academic Directors in the undergraduate residences complement the role of the assigned Pre-Major Advisers with a comprehensive understanding of the curriculum; they advise students broadly on their courses of study and long-term goals. The UAR advising staff also includes professional advisers in Sweet Hall who specialize in research, fellowships, and pre-professional advising, and advisers in the Athletics Academic Resource Center (AARC), who support varsity athletes.

UAR functions include:

- overseeing the transition of freshmen/transfers into the university
- assistance with curriculum planning
- consultation on choosing a major
- advice on integrating research into an undergraduate program of study
- support for students considering and applying for merit-based scholarships and national fellowships
- practical advice on how to prepare for and apply to graduate and professional schools
- academic and personal advising related to academic performance
- guidance on policies and procedures concerning academic standing

- assistance with interpretation and application of academic rules and regulations
- referrals to campus tutoring resources and counseling offices

See the Advising (<https://undergrad.stanford.edu/advising>) web site for more information about academic advising, programming, and support for undergraduate students.

Scholarships and Fellowships, and Post-Baccalaureate Studies

Together with advisers at the Overseas Resource Center (<http://stanford.edu/dept/center/orc>) and the Haas Center for Public Service (<http://studentaffairs.stanford.edu/haas>), UAR advisers help prepare students to compete for nationally competitive fellowships. UAR also administers the campus nomination process for several U.S.-based fellowships. See the Fellowships (<https://undergrad.stanford.edu/opportunities-research/fellowships>) web site for more information on fellowship opportunities.

UAR offers workshops and individual consultations on planning for graduate or professional studies (e.g., business, education, law, and medicine) and on general application procedures, including how to write personal statements, how to solicit letters of recommendation, and how to prepare for interviews. See the Planning for Graduate and Professional School (<https://undergrad.stanford.edu/opportunities-research/steps-planning-graduate-and-professional-school>) web site for more information.

Undergraduate Research

UAR encourages undergraduates to work with faculty on independent projects in research, the arts, and senior synthesis. UAR facilitates these close relationships by providing advising and funding to undergraduate students across all disciplines and at all stages of developing an idea. See the Research and Independent Projects (<http://undergradresearch.stanford.edu>) web site for more information.

Student Grant Programs

UAR offers Student Grants for faculty-mentored independent projects in research, the arts, and senior synthesis. Grants are typically used to pay for project supplies and travel expenses. Full-time summer projects may also use grants as a stipend.

The application for any Student Grant is centered on:

1. a student-authored project proposal, including a line-item budget
2. a letter of support written by a qualified member of the Stanford faculty

Proposals are judged on intellectual significance, rigor and feasibility of project design, and evidence of student preparedness. The program is competitive, and not all good proposals can be funded.

For current deadlines, grant types, and program details, see the Student Grants (<http://studentgrants.stanford.edu>) web site.

Departmental and Faculty Research Opportunities

Departments, interdisciplinary programs, research centers, and individual faculty use VPUE funding to support programs that provide undergraduates with mentorship and training in scholarship and research. Typically, students are paired with a faculty member or faculty-led research group according to their mutual scholarly interests. Students conduct substantive, directed research on a particular aspect of the faculty member's research project, and they meet frequently with their faculty mentors to discuss progress and future directions for the project. Students should consult

directly with the departments and programs of interest to learn about these opportunities.

Faculty or departments interested in applying for this funding can learn more at the For Faculty (<https://undergrad.stanford.edu/opportunities/research/faculty>) page of the Research and Independent Projects web site.

Center for Teaching and Learning

Center for Teaching and Learning

The Center for Teaching and Learning is a University-wide resource whose vision is that everyone at Stanford will know how learning works and will translate that knowledge into research-based, daily practice and public dialog. The Center supports faculty, lecturers, teaching assistants, and students with courses and other resources designed to enhance teaching excellence and/or learning skills while also providing a source of motivation, inspiration, and guided self-reflective growth.

CTL Resources for Teaching

CTL provides the Stanford community with services and resources on effective teaching. The center's goals are to:

- engender and disseminate knowledge and understanding of the newest research on student learning
- network and support instructors seeking to share ideas and community around teaching
- stimulate faculty involvement in the scholarship of teaching and learning
- identify and involve successful faculty, lecturers, and TAs who are willing to share their talents with others
- provide those who are seeking to improve their teaching with the means to do so
- acquaint the Stanford community with important innovations and new technologies for teaching
- prepare new faculty and TAs for their responsibilities
- contribute to the professional development of teaching assistants
- expand awareness of the role of teaching at research universities
- increase the rewards for superior teaching.

Resources available to faculty, lecturers, and TAs include: classroom observation and video recording, microteaching (simulated practice teaching), and consultation; small group and other forms of mid-quarter evaluation; workshops, lectures, and teaching orientations; online teaching resources, and a library of teaching materials. CTL works with individuals, groups, and departments on their specific needs, including support of teaching events, retreats, and the design of effective TA training programs.

All these resources and more are available at <http://teachingcommons.stanford.edu>.

For questions or requests, email TeachingCenter@stanford.edu.

CTL Resources for Learning

CTL provides academic coaching for graduate students and undergraduates who want to enhance their study approaches and learning strategies. Through courses, individual counseling, and workshops, CTL helps students build skills that are the foundation for continual improvement

and lifelong learning. Students benefit from developing and applying individually crafted strategies that build on their existing strengths. Time management, test preparation, note taking, reading comprehension and retention, and procrastination are common topics for discussion. For more information, visit Academic Skills Coaching (<https://undergrad.stanford.edu/tutoring-support/academic-skills-coaching>).

Free tutoring is available to undergraduates in many subjects; see <http://tutoring.stanford.edu> for details on where and when tutors can be found, what to expect, and how to apply to work as a tutor.

Associate Vice Provost for Undergraduate Education and Director: Robyn Wright Dunbar

Senior Associate Director: Vera Safa Michalchik

Associate Directors: Jennifer Randall Crosby, Mariatte Denman, Adina Glickman

Directors of Community Engaged Learning: Suzanne Gaulocher, Luke Terra, Sarah Truebe

Assistant Director: Tim Randazzo

Faculty Fellows: Sarah Billington, Michele Elam

Faculty Advisers: Robert Calfee, Tom Ehrlich, Sheri Sheppard, Lee Shulman

ROTC

Reserve Officers' Training Corps (ROTC) Cross-Enrollment Agreements for ROTC

Stanford has cross-enrollment agreements for the Reserve Officers' Training Corps (ROTC) with the Navy and Marine Corps ROTC program at the University of California at Berkeley, the Army ROTC program at Santa Clara University, and the Air Force ROTC program at San Jose State University. These agreements allow Stanford students to engage in military training while working on their degrees from Stanford. Courses taken in ROTC programs are offered by and through UC Berkeley, Santa Clara, and San Jose State. Most courses count for academic or activity credit and count toward the 12-unit requirement for full-time registration status and satisfactory academic progress requirements for Stanford undergraduates.

Normally, students who participate in ROTC training complete a four-year course of instruction at the respective institution that consists of two years of basic courses during the freshmen and sophomore years, and an advanced course of instruction during the junior and senior years. Students who accept ROTC scholarships are generally subject to a service obligation, depending on the regulations of the particular service.

Stanford students who are enrolled in ROTC programs under the cross-enrollment agreements are eligible to compete for various scholarships that provide up to full tuition and a monthly stipend. Students normally compete for national scholarships as high school seniors, although current Stanford students may be eligible to enroll in ROTC on a non-scholarship basis. Non-scholarship ROTC students are eligible to compete for scholarships, and individual services may offer additional scholarship programs to current qualifying undergraduate and graduate students. Interested students should contact the appropriate military branch at the host institution to obtain information on these programs and to initiate application procedures.

Students who satisfactorily complete an ROTC program and are awarded a Stanford degree qualify for a commission as a Second Lieutenant in the

U.S. Army, an Ensign in the U.S. Navy, a Second Lieutenant in the U.S. Marines, or a Second Lieutenant in the U.S. Air Force.

For additional questions concerning the ROTC programs, Stanford students should consult with one of the host units.

Academic Credit

All three service programs have a mandatory lab course each quarter which carries 1 unit of activity credit for satisfactory completion of work. Although there is no limitation on the number of activity classes in which a student may enroll, no more than 8 units of these activity classes (and/or other university activity classes) may be applied toward undergraduate graduation requirements (see the Undergraduate Degrees (p. 32) section of this bulletin).

Upper level ROTC academic courses carry two units of credit for satisfactory completion of work and are graded on a credit/no credit basis. No more than 36 units without a letter grade may be applied toward undergraduate graduation requirements (see the Undergraduate Degrees (p. 32) section of this bulletin).

Air Force ROTC

Commanding Officer: Lieutenant Colonel Douglas Lomsdalen

Air Force ROTC courses are offered at San Jose State University. See also the SJSU website (<http://www.sjsu.edu/afrotc>).

Courses in the freshman year focus on the foundation of the United States Air Force and introduce students to the Air Force and AFROTC. Topics include the characteristics, missions, and organization of the Air Force, the qualities of an officer and professionalism, career opportunities, military customs and courtesies, and communication skills.

Courses in the sophomore year focus on the evolution of the United States air and space power. Students study air and space power through historical analysis and examine the capabilities, function, and doctrinal employment of aerospace forces. The course emphasizes oral and written communication skills.

Courses in the junior year focus on Air Force leadership studies. Topics include leadership, management fundamentals, professional knowledge, Air Force personnel system, ethics, and communications. Students apply knowledge and skills required of junior Air Force officers through case studies, practical exercises, and seminar discussion.

Senior year courses cover two subjects, national security affairs and preparation for active duty. Students learn about national security process, international and regional relations, advanced leadership ethics, Air Force doctrine with focus on the military as a profession, military justice, civilian control of the military, and current issues affecting the military. Preparation for active duty focuses on the role of the Air Force officer in contemporary society emphasizing skills to facilitate a smooth transition from civilian to military life.

The leadership laboratory is required for all students every quarter. Students participate in hands-on exercises to learn drill and ceremony; Air Force customs and courtesies; leadership and followership skills; and they hear from guest speakers on a variety of Air Force topics.

Army ROTC

Commanding Officer: Lieutenant Colonel John Tao

Some Army ROTC courses are offered at Santa Clara University and some are offered on Stanford's campus. See also the Army ROTC web site (<http://www.scu.edu/rotc>).

Freshman year courses introduce students to leadership and personal development and provide foundations for leadership. Course topics include personal challenges and competencies for effective leadership, goal setting,

time management, physical fitness, and stress management related to leadership and officership. Students develop a personal fitness program under the guidance of an Army master fitness trainer. In addition, they learn leadership fundamentals such as setting direction, problem solving, listening, presenting briefs, providing feedback, and effective writing skills in the context of practical and interactive exercises.

Army courses taught in the sophomore year look at leadership through a variety of lenses using case study and interactive exercises. Topics include creative and innovative leadership strategies and styles, challenges of leading in contemporary operational environments along with crosscultural challenges, and team leading procedures.

In the junior year, students learn adaptive team leadership and situational leadership. They develop skills including decision making, persuading, and motivating team members when under fire in small-unit tactical operations scenarios.

Courses for seniors provide capstone leadership instruction and experiences in a practical and current event driven context. Students plan, execute, and assess complex operations, function as a member of staff, and provide leadership performance feedback to subordinates. They use case studies, scenarios, and exercises to prepare for their first unit assignment and the transition to commissioned officer in a modern world.

All students are also required to take a military history course focused on leadership. This course may be taken any year. The leadership laboratory is required for all students every quarter. In addition, students complete a four-day weekend field training exercise away from the University in the Autumn and Spring quarters, and a formal military dinner during an evening in the Winter Quarter.

Naval ROTC

Executive Officer: Captain Michael J. Slotsky

Naval ROTC courses are offered at the University of California at Berkeley. See also the Naval ROTC web site.

Courses in the freshman year introduce students to the Navy and Marine Corps and to the NROTC program. They also study sea power from a historical and United States centered perspective.

In the sophomore year, students take their first leadership class with a focus on management and their first navigation class with a focus on the fundamentals of nautical navigation. Courses include case studies, student presentations, and practical exercises.

Juniors study introductory naval engineering with a focus on ship systems and modern weapons systems. Example topics include gas turbine propulsion systems, nuclear reactors, and radar and sonar theory.

During their senior year, students study advanced leadership topics within an ethics framework and advanced navigation and naval operations.

Students pursuing a commission in the Marine Corps do not take the two engineering courses or the two navigation courses. Marine option students take two Marine Corps specific courses that examine the history of littoral warfare and the evolution of warfare.

All students are required to take the weekly professional development laboratory course (drill) at UC Berkeley every quarter.

Graduate Education (VPGE)

The Vice Provost for Graduate Education (VPGE) works collaboratively to ensure that every graduate student has the best possible education. VPGE's initiatives and resources enrich students' academic experiences at Stanford, advancing diversity, preparing leaders, and positioning Stanford at the forefront of innovation in graduate education. VPGE serves Stanford's doctoral, master's, and professional degree students from all seven Stanford schools. VPGE plays a leadership role in initiating and managing policies and programs that enhance and complement the offerings of the departments and programs that have primary responsibility for organizing and delivering graduate education.

In addition to providing University-wide graduate policy direction, the VPGE office has five primary areas of program activity: administering University-wide graduate fellowship programs; advancing graduate student diversity; providing professional development programs and events; promoting interdisciplinary and cross-school learning; and encouraging innovation in graduate programs. The Vice Provost for Graduate Education reports to the Provost.

Graduate Policy

The Faculty Senate Committee on Graduate Studies (C-GS) formulates policy concerning the substance and process of graduate education as well as the evaluation and recording of graduate achievement, and reviews the implementation of such policy. The committee also monitors the academic quality and effectiveness of the University's graduate interdisciplinary and joint degree granting programs. Committee members include the Vice Provost for Graduate Education or her delegated staff (ex officio) and representatives from the faculty at large, administration such as the Office of the University Registrar, and students. The Graduate Student Council and the Nominations Committee of the Associated Students of Stanford University (ASSU) choose student members.

VPGE recommends, promulgates, and interprets University policies related to graduate education. VPGE oversees administrative and financial systems related to graduate student support, including policies related to requirements for research and teaching assistantships, and minimum compensation levels for those positions. For other policies related to graduate admissions and degree requirements, see relevant sections of this bulletin.

Honor Code and Fundamental Standard

The Honor Code and Fundamental Standard establish the conditions for academic work at Stanford and represent an agreement between students and faculty about their responsibilities for learning and teaching. The Interpretations and applications of the Honor Code, the Student Judicial Charter of 1997, the Student Conduct Penalty Code, statistics, and other documents are available at the Office of Community Standards (<http://studentaffairs.stanford.edu/communitystandards>) web site.

Research Policies for Graduate Students

Graduate education and research are interrelated enterprises. Many Stanford graduate students conduct research under the guidance and sponsorship of Stanford faculty members. The Dean of Research has primary responsibility for oversight of the research enterprise. Several policies in that arena are particularly relevant to graduate students. These include:

Academic Authorship

Guidelines related to academic authorship, such as the allocation of responsibility and credit for scholarly publications. For complete text of the guidelines, see Research Policy Handbook memo 1.5, On Academic Authorship (<http://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/academic-authorship>).

Intellectual Property

Policies on copyrights and patents resulting from University work. Graduate students and postdoctoral scholars, as well as all faculty, staff, and visitors engaged in research, must sign the Stanford University Patent and Copyright Agreement (SU-18). For complete text of the currently applicable versions of these policies, see Research Policy Handbook chapter 9, Intellectual Property (<http://doresearch.stanford.edu/policies/research-policy-handbook/intellectual-property>).

Openness in Research

Policy on openness in research, such as the principle of freedom of access by all interested persons to the underlying data, processes, and final results of research. Stanford University does not accept funding for research projects that require secrecy. For complete text of the currently applicable version of this policy, see Research Policy Handbook memo 1.4, Openness in Research (<http://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/openness-research>).

Relationships between Students and Outside Organizations

Summary of policies on the establishment of relationships between students and outside entities, such as private companies or nonprofit organizations, as part of or outside the student's academic program at Stanford. This covers open versus proprietary nature of the work, ownership of intellectual property, and possible conflicts of commitment and interest. For complete text of the currently applicable versions of these policies, see Research Policy Handbook memo 10.6, Relationships Between Students (Including Postdoctoral Scholars) and Outside Entities (<http://doresearch.stanford.edu/policies/research-policy-handbook/non-faculty-research-appointments/relationships-between-students>).

Research Compliance

Several administrative panels review and approve research projects to safeguard the rights and welfare of all human research subjects, ensure the humane care and use of laboratory animals, and protect the safety of personnel and the general public in the areas of biosafety and radiological safety. For more information, contact the Research Compliance Office (<http://researchcompliance.stanford.edu>).

Research Misconduct

Policy on allegations, investigations, and reporting of research misconduct. Each member of the University community has a responsibility to foster an environment which promotes intellectual honesty and integrity, and which does not tolerate misconduct in any aspect of research or scholarly endeavor. For complete text of the currently applicable version of this policy, see Research Policy Handbook memo 1.7, Research Misconduct: Policy on Allegations, Investigations and Reporting (<http://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/research-misconduct-policy-allegations>).

Graduate Fellowship Programs

Several University-wide graduate fellowship programs are administered by the VPGE, including the Stanford Graduate Fellowships Program in Science and Engineering (SGF) and the Stanford Interdisciplinary Graduate Fellowship (SIGF) program. VPGE also administers several smaller

University-wide fellowships programs to new and continuing doctoral students that require nomination by faculty or deans.

Stanford Graduate Fellowships Program in Science and Engineering (SGF)

Web site: <http://sgf.stanford.edu>

SGF competitively awards approximately 100 two- and three-year fellowships providing tuition support and stipend to outstanding students pursuing a doctoral degree in the sciences and engineering. SGF fellows can explore labs in a variety of fields. Nominations for SGF fellowships are submitted by science and engineering departments and programs.

Stanford Interdisciplinary Graduate Fellowships (SIGF)

Web Site: <http://sigf.stanford.edu>

The SIGF program awards fellowships on a competitive basis to doctoral students engaged in interdisciplinary research. The fellowships enable Stanford doctoral students to pursue questions that cross traditional disciplinary boundaries. Students in the first three years of their doctoral program are eligible to apply.

Graduate Student Diversity

VPGE works to diversify the graduate student population by supporting recruitment and retention programs in collaboration with faculty and staff in each of the schools. VPGE funds recruitment activities to expand the pool of qualified applicants, such as visits to campus and travel grants. VPGE offers resources to groups within and across schools for activities that enhance the quality of students' educational experiences and improve retention. VPGE also works collaboratively to develop programs that cultivate interest in academic careers and diversify the pipeline for future faculty. The DARE Doctoral Fellowship Program, administered by VPGE, awards two-year fellowships on a competitive basis to Stanford doctoral students in their final two years who want to investigate and prepare for academic careers and whose presence will help to diversify the professoriate.

Professional Development

Leadership, pedagogy, communication, working in teams, career development and entrepreneurship are topics of interest to graduate students across the University. VPGE collaborates with other departments, such as the Center for Teaching and Learning (p. 97), the Graduate Life Office (p.), and the Hume Writing Center (p.) to raise the visibility and expand the breadth of offerings to help graduate students' professional development.

Interdisciplinary and Cross-School Learning Opportunities

VPGE provides seed funding to initiatives that foster interdisciplinary and cross-school interactions for graduate students. The Stanford Graduate Summer Institute (SGSI) offers noncredit interdisciplinary short courses exclusively for Stanford graduate students and postdoctoral scholars. VPGE also seeks to facilitate enrollment in courses outside of students' home departments and schools.

Leadership, pedagogy, communication, working in teams, career development and entrepreneurship are topics of interest to graduate students across the University. VPGE collaborates with other departments, such as the Center for Teaching and Learning, the Graduate Life Office, and the Hume Writing Center to raise the visibility and expand the breadth of offerings to help graduate students' professional development.

Stanford Graduate Summer Institute (SGSI)

Web site: <http://sgsi.stanford.edu>

SGSI courses introduce graduate students to multidisciplinary and interdisciplinary thinking. Students from across the University have the opportunity to meet others outside their fields, create networks, and foster cross-disciplinary collaborations. Most SGSI courses are small and taught in an intensive workshop format at the end of Summer Quarter. Courses are non-credit bearing and free of tuition or fees.

Innovation in Graduate Programs

Academic departments and programs are the foundation of graduate education, so VPGE supports innovation in degree-granting programs. VPGE awards funds to faculty members for program innovation with SCORE Innovation funds (<http://vpge.stanford.edu/programs/score.html>); these help faculty and graduate students to scrutinize long-existing practices and test new approaches for graduate education. Student Projects for Intellectual Community Enhancement (SPICE) funds (<http://vpge.stanford.edu/programs/spice.html>) support graduate students (master's, doctoral, or professional) to develop activities to expand the intellectual community and enhance the academic life of their department or program.

Vice Provost for Graduate Education: Patricia J. Gumport

Associate Vice Provosts for Graduate Education: John Boothroyd, Chris M. Golde, Sheri D. Sheppard

Director of Fellowships and Programs: Pat Cook

Directors of Educational Programs: Helen Doyle, Anika Green

Associate Director, Programs and Administration: Rebecca Jantzen

Graduate School of Business

The mission of the Stanford Graduate School of Business is to create ideas that deepen and advance the understanding of management, and with these ideas, develop innovative, principled, and insightful leaders who change the world.

The two-year Master of Business Administration (M.B.A.) degree program prepares change agents to make a meaningful impact in the world through leadership of business, government, and social-sector organizations. The general management curriculum rests on a foundation of social science principles and management functions, tailored to each student's background and aspirations. Interdisciplinary themes of critical analytical thinking, creativity and innovation, and personal leadership development differentiate the Stanford M.B.A. experience. Each M.B.A. student undertakes a global experience to provide direct exposure to the world's opportunities. A Joint Degree Program (p. 47) allows Stanford students to combine the M.B.A. with degrees in the Graduate School of Education (M.A.), the School of Engineering (M.S. in C.S., M.S. in E.E.), the Stanford Law School (J.D.), and the School of Medicine (M.D.), as well as interdisciplinary degrees in Public Policy (M.P.P.) and in Environment and Resources (M.S.).

The primary criteria for admission are intellectual vitality, demonstrated leadership potential, and personal qualities and contributions. No specific undergraduate major or courses are required for admission, but experience with analytic and quantitative concepts is important. Almost all students obtain one or more years of work experience before entering, but a few students enroll directly following undergraduate study.

The Stanford Master of Science in Management for Experienced Leaders Program (MSx) is an intensive, one-year course of study for middle-management executives leading to the degree of Master of Science in management. Participants generally have eight or more years of work experience, with at least five years of management experience. Some students are sponsored by their company, but most are self-sponsored.

The Doctor of Philosophy (Ph.D) degree program is designed to develop outstanding scholars for careers in research and teaching in various fields of study associated with business education. Students focus on one of seven distinct areas of study including accounting, economic analysis and policy, finance, marketing, operations information and technology, organizational behavior, and political economics.

For detailed information on programs, curricula, and faculty, see the School's (<http://gsb.stanford.edu>) web site.

Emeriti: (Professors) David P. Baron, William H. Beaver, Charles P. Bonini, Paul Brest**, Alain C. Enthoven, Robert J. Flanagan*, J. Michael Harrison, Charles A. Holloway, James E. Howell, Robert K. Jaedicke, Robert L. Joss*, David M. Kennedy**, James G. March, Joanne Martin, Arjay Miller, James R. Miller III, William F. Miller, David B. Montgomery, George G. C. Parker*, Jerry I. Porras, Evan L. Porteus, Michael L. Ray, D. John Roberts*, Channing R. Robertson**, Henry S. Rowen, Myron S. Scholes*, William F. Sharpe, George P. Shultz, A. Michael Spence, Venkataraman Srinivasan, Myra Strober**, James C. Van Horne*, Robert B. Wilson*; (Associate Professor) Andrea Shepard; (Senior Lecturers) David L. Bradford*, Steven Brandt, Kirk O. Hanson; (Lecturer)

Dean: Garth Saloner

Senior Associate Deans: Glenn R. Carroll, Paul Pfeleiderer, Madhav Rajan, Larissa Tiedens

Associate Deans: Rajkumar Chellaraj, Stephanie Frost, Ranga Jayaraman, Claudia J. Morgan, Dave Weinstein

Assistant Deans: Derrick Bolton, Bethany Coates, Margaret Hayes, Maeve Richard

Professors: Jennifer L. Aaker, Anat R. Admati, Susan Athey, William P. Barnett, Mary E. Barth, Jonathan Bendor, Lanier Benkard, Jonathan B. Berk, David W. Brady, Jeremy I. Bulow, Robert A. Burgelman, Steven Callander, Glenn R. Carroll, Peter M. DeMarzo, J. Darrell Duffie, Yossi Feinberg, Francis J. Flynn, George Foster, Steven R. Grenadier, Deborah H. Gruenfeld, Michael T. Hannan, Chip Heath, Guido Imbens, Charles I. Jones, Ron Kasznik, Daniel P. Kessler, Roderick M. Kramer, Keith Krehbiel, David M. Kreps, Arvind Krishnamurthy, David F. Larcker, James M. Lattin, Edward P. Lazear, Charles M.C. Lee, Hau L. Lee, Brian S. Lowery, Neil Malhotra, John G. McDonald, Maureen F. McNichols, Haim Mendelson, Dale T. Miller, Benoit Monin, Harikesh Nair, Margaret A. Neale, Charles A. O'Reilly III, Paul Oyer, James M. Patell, Jeffrey Pfeffer, Paul C. Pfleiderer, Erica L. Plambeck, Madhav Rajan, Hayagreeva Rao, Joshua Rauh, Stefan J. Reichelstein, Peter C. Reiss, Condoleezza Rice, Garth Saloner, Kathryn L. Shaw, Baba Shiv, Kenneth W. Shotts, Itamar Simonson, Kenneth J. Singleton, Andrzej Skrzypacz, Jesper Sørensen, Sarah A. Soule, Ilya Strebulaev, Larissa Z. Tiedens, Lawrence W. Wein, Seungjin Whang, S. Christian Wheeler, Stefanos Zenios, Jeffrey H. Zwiebel

Associate Professors: Anne Beyer, Wesley Hartmann, Dirk Jenter, Saumitra Jha, Uzma Khan, Jonathan Levav, Sridhar Narayanan, Michael Ostrovsky, Joseph D. Piotroski, Zakary L. Tormala

Assistant Professors: Mohsen Bayati, Shai B. Bernstein, Konstantinos Bimpikis, Elizabeth Blankespoor, T. Renee Bowen, Bradyn Breon-Drish, Katherine Casey, Eduard DeHaan, Lisa De Simone, Sebastian Di Tella, Rebecca Diamond, John-Paul Ferguson, Octavia D. Foarta, Pedro Gardete, Amir Goldberg, Lindred Greer, Yonatan Gur, Nir Halevy, Sharique Hasan, Szu-chi Huang, Dan A. Iancu, Peter Koudijs, Nicholas S. Lambert, Kristin Laurin, Ivan Marinovic, Timothy McQuade, Francisco Pérez-González, Mar Reguant-Rido, Navdeep Sahni, Stephan Seiler, Takuo Sugaya, Christopher Tonetti, Victoria Vanasco, Ali Yurukoglu

Professor (Teaching): James A. Phills, Jr.

Courtesy Professors: Michele Barry, Eric P. Bettinger, Nicholas Bloom, Timothy F. Bresnahan, M. Kate Bundorf, Geoffrey L. Cohen, Shelley J. Correll, Robert M. Daines, Joseph Grundfest, Jens Hainmueller, Warren H. Hausman, Takeo Hoshi, Ronald A. Howard, Carolyn M. Hoxby, Mark G. Kelman, Jonathan D. Levin, Paul R. Milgrom, Walter W. Powell, Balaji Prabhakar, Ilya Segal, Robert I. Sutton, Robb Willer

Lecturers: Douglas Abbey, Matthew Abrahams, Federico Antoni, Laura K. Arrillaga-Andreessen, Steven Ballmer, Matthew Bannick, Sven Beiker, Kirk D. Bowman, Scott Brady, Melissa Briggs, Scott Bristol, Jeffrey Brown, Safra Catz, William Chace, Jeffrey Chambers, Patricia Chang, Robert B. Chess, Michael Child, Stephen J. Ciesinski, George Cogan, Richard Cox, Stephen Davis, David Demarest, Gary Dexter, David M. Dodson, Nicholas Donatiello, R. James Ellis, Christopher Flink, Peter Francis, Richard P. Francisco, Douglas Galen, Matthew Glickman, John Glynn, Jacob Goldfield, Theresia Gouw, Brian Grey, Saar Gur, William Guttentag, Mark Hartmann, Laura Hattendorf, Keith Hennessey, Sujay Jaswa, Efrat Kasznik, Dan Katzir, David Kaval, Peter B. Kelly, Dan Klein, Allison Kluger, Glenn Kramon, Gloria Lee, Mark Leslie, Peter Levine, Nori Lietz, Richard Lin, Leo E. Linbeck III, Ann Livermore, Kevin Mak, Fern Mandelbaum, Paraag Marathe, Michael Marks, William L. McLennan, William F. Meehan III, Stephen Mellas, Craig Milroy, Shantanu Narayan, Raymond Nasr, Robert Pearl, Nancy Pfund, John Powers, Andrew Rachleff, Alyssa Rapp, Alan Rappaport, Dan Reicher, Barry Rhein, Carole Robin, Dennis M. Rohan, Howard Rosen, JD Schramm, Robert Seigel, Russell Siegelman, F. Victor Stanton, Emma Stewart, Kevin Taweel, Allan Thygesen, Robert Urstein, Gil-li Vardi, Jay Watkins, John G. Watson, Graham Weaver, Leah Weiss, Peter C. Wendell, Donald Wood, Thomas Wurster, Peter Ziebelman

Consulting Professors: H. Irving Grousbeck, Joel C. Peterson, Mark A. Wolfson

Visiting Professor: Henri-Claude De Bettignies

* Recalled to active duty. ** Emeritus Professor from another SU department recalled to active duty.

School of Earth Sciences

On February 11, 2015, the Stanford Board of Trustees approved the change of name for the school to become the School of Earth, Energy and Environmental Sciences. Prior to February 11, the school was named the School of Earth Sciences.

Courses offered by the School of Earth, Energy and Environmental Sciences are listed under the subject code EARTHSCI on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EARTHSCI&filter-catalognumber-EARTHSCI=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EARTHSCI&filter-catalognumber-EARTHSCI=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EARTHSCI&filter-catalognumber-EARTHSCI=on>). Courses offered by departments and programs of the school are linked on their separate sections, and are available at the ExploreCourses (<http://explorecourses.stanford.edu>) web site.

The School of Earth, Energy and Environmental Sciences includes the departments of Geological Sciences, Geophysics, Energy Resources Engineering, and Earth System Science; and two interdisciplinary programs: the Earth Systems undergraduate and coterminal M.S. program and the Emmett Interdisciplinary Graduate Program in Environment and Resources (E-IPER). The Earth Systems Program and E-IPER offer study in biophysical and social dimensions of environment and resources.

The aims of the school are:

1. to prepare students for careers in the fields of biogeochemistry, climate science, energy resource engineering, environmental science, geology, geochemistry, geomechanics, geophysics, geostatistics, hydrogeology, land science, oceanography, petroleum engineering, and petroleum geology
2. to conduct research in the Earth sciences
3. to provide opportunities for Stanford undergraduates to learn about the planet's history, to understand the energy and resource base that supports humanity, to appreciate the geological and geophysical hazards that affect human societies, and to understand the challenges and solutions related to the environment and sustainability.

To accomplish these objectives, the school offers a variety of programs adaptable to the needs of the individual student:

- four-year undergraduate programs leading to the degree of Bachelor of Science (B.S.)
- five-year programs leading to the coterminal Bachelor of Science and Master of Science (M.S.)
- graduate programs offering the degrees of Master of Science, Engineer, and Doctor of Philosophy.

Details of individual degree programs are found in the section for each department or program.

Undergraduate Programs in the School of Earth, Energy and Environmental Sciences

Any undergraduate admitted to the University may declare a major in one of the school's departments or programs by contacting the appropriate department or program office.

Requirements for the B.S. degree are listed in each department or program section. Departmental academic advisers work with students to define a career or academic goal and assure that the student's curricular choices

are appropriate to the pursuit of that goal. Advisers can help devise a sensible and enjoyable course of study that meets degree requirements and provides the student with opportunities to experience advanced courses, seminars, and research projects. To maximize such opportunities, students are encouraged to complete basic science and mathematics courses in high school or during their freshman year.

The Earth Systems Program offers an honors program in Environmental Science, Technology, and Policy through the Woods Institute for the Environment.

Coterminal Bachelor's and Master's Degrees in the School of Earth, Energy and Environmental Sciences

The Stanford coterminal degree plan enables an undergraduate to embark on an integrated program of study leading to the master's degree before requirements for the bachelor's degree have been completed. This may result in more expeditious progress towards the advanced degree than would otherwise be possible, making the program especially important to Earth scientists because the master's degree provides an excellent basis for entry into the profession. The coterminal plan permits students to apply for admission to a master's program after earning 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree.

Under the plan, the student may meet the degree requirements in the more advantageous of the following two ways: by first completing the 180 units required for the B.S. degree and then completing the three quarters required for the M.S. degree; or by completing a total of 15 quarters during which the requirements for the two degrees are completed concurrently. In either case, the student has the option of receiving the B.S. degree upon meeting all the B.S. requirements or of receiving both degrees at the end of the coterminal program. Students earn degrees in the same department or program, in two different departments, or even in different schools; for example, a B.S. in Physics and an M.S. in Geological and Environmental Sciences. Students are encouraged to discuss the coterminal program with their advisers during their junior year. Additional information is available in the individual department offices.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4874.htm>)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Graduate Programs in the School of Earth, Energy and Environmental Sciences

Admission to the Graduate Program

A student who wishes to enroll for graduate work in the school must be qualified for graduate standing in the University and also must be accepted by one of the school's four departments or one of the two interdisciplinary Ph.D. programs. One requirement for admission is submission of scores on the verbal and quantitative sections of the Graduate Record Exam. Admission to one department of the school does not guarantee admission to other departments.

Faculty Adviser

Upon entering a graduate program, the student should report to the head of the department or program who arranges with a member of the faculty to act as the student's adviser. Alternatively, in several of the departments, advisers are established through student-faculty discussions prior to admission. The student, in consultation with the adviser(s), then arranges a course of study for the first quarter and ultimately develops a complete plan of study for the degree sought.

Financial Aid

Detailed information on scholarships, fellowships, and research grants is available from the school's individual departments and programs. Applications should be filed by the various dates listed in the application packet for awards that become effective in Autumn Quarter of the following academic year.

Dean: Pamela A. Matson

Associate Dean, Academic Affairs: Stephan A. Graham

Associate Dean, Educational Initiatives: Margot Gerritsen

Associate Dean, Multicultural Affairs: Jerry M. Harris

Assistant Dean, Academic Affairs: Roni Holeton

Assistant Dean, Multicultural Affairs: Tenea M. Nelson

Lecturers: Sara Cina, Richard Nevle, Jennifer Saltzman

Earth Systems

Courses offered by the Earth Systems Program are listed under the subject code EARTHSYS (<https://explorecourses.stanford.edu/search?q=EARTHSYS&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&collapse=&filter-departmentcode-EARTHSYS=on&filter-coursestatus-Active=on&filter-catalognumber-EARTHSYS=on&filter-catalognumber-EARTHSYS=on>) on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EARTHSYS&filter-catalognumber-EARTHSYS=on>).

Mission of the Undergraduate Program in Earth Systems

The Earth Systems Program is an interdisciplinary environmental science major. Students learn about and independently investigate complex environmental problems caused by human activities in interaction with natural changes in the Earth system. Earth Systems majors become skilled in those areas of science, economics, and policy needed to tackle the globe's most pressing environmental problems, becoming part of a generation of scientists, professionals, and citizens who approach and solve problems in a new way: a systematic, interdisciplinary way.

For students to be effective contributors to solutions for such problems, their training and understanding must be both broad and deep. To this end, Earth Systems students take courses in the fundamentals of biology, calculus, chemistry, geology, and physics, as well as economics, policy, and statistics. After completing breadth training, they concentrate on advanced work in one of six focus areas: biology, energy, environmental economics and policy, land systems, sustainable food and agriculture, or oceanography. Tracks are designed to support focus and rigor but include flexibility for specialization. Examples of specialized focus have included but are not limited to environment and human health, sustainable agriculture, energy economics, sustainable development, business and the environment, and marine policy. Along with formal course requirements, Earth Systems

students complete a 9-unit (270-hour) internship. The internship provides a hands-on academic experience working on a supervised field, laboratory, government, or private sector project.

The following is an outline of the sequential topics covered and skills developed in this major.

- Fundamentals:** The Earth Systems Program includes courses that describe the natural workings of the physical and biological components of the Earth, as well as courses that describe the human activities that lead to change in the Earth system. Training in fundamentals includes introductory course work in geology, biology, chemistry, physics, and economics. Depending on the Earth Systems track chosen, training may also include introduction to the study of energy systems, microbiology, oceans, or soils.
- System Interactions:** Focus in these courses is on the fundamental interactions among the physical, biological, and human components of the Earth system. The dynamics of the interplay between natural variation and human-imposed influences must be understood to achieve effective solutions to environmental problems.
 - Earth Systems courses that introduce students to the dynamic and multiple interactions that characterize global change problems include:

		Units
EARTHSYS 10	Introduction to Earth Systems	4
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 112	Human Society and Environmental Change	4
 - Competence in understanding system-level interactions is critical to development as an Earth Systems thinker, so additional classes that meet this objective are excellent choices as electives.
- Skills Development:** Students take skills courses that help them to recognize, quantify, describe, and help solve complex problems that face society.

Field and laboratory methods can help students to recognize the scope and nature of environmental change. For example, training in satellite remote sensing and geographic information systems allows students to monitor and analyze large-scale spatial patterns of change. This training is either required or recommended for all tracks.

Quantification of environmental problems requires training in single and multivariable calculus, linear algebra, and statistics. Training in statistics is specific to the area of focus: geostatistics, biostatistics, econometrics.

Success in building workable solutions to environmental problems is linked to the ability to effectively communicate ideas, data, and results. Writing intensive courses (WIM) help students to communicate complex concepts to expert and non-expert audiences. All Stanford students must complete one WIM course in their major. The Earth Systems WIM courses are:

		Units
EARTHSYS 195	Natural Hazards and Risk Communication	3
EARTHSYS 200	Sustaining Action: Research, Analysis and Writing for the Public	3

Other Earth Systems courses also focus on effective written and oral communication and are recommended.

Effective solutions to environmental problems take into consideration natural processes as well as human needs. Earth Systems emphasizes the importance of interdisciplinary analysis and implementation of workable solutions through:

		Units
EARTHSYS 210A	Senior Seminar	3

EARTHSYS 210B	Senior Seminar	3
EARTHSYS 260	Internship	9

A comprehensive list of environmental courses (p. 111), as well as advice on those that focus on problem solving, is available in the program office.

The Earth Systems Program provides an advising network that includes faculty, staff, and student peer advisers.

Learning Outcomes (Undergraduate)

The program expects majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the program's undergraduate degree. Students are expected to:

1. demonstrate knowledge of foundational skills and concepts relevant to interdisciplinary study of the environment.
2. analyze environmental problems at the interface of natural and human systems in an interdisciplinary fashion.
3. demonstrate the ability to communicate complex concepts and data to expert and non-expert audiences.
4. apply relevant science, economics, engineering, and policy to problem analysis and proposed solutions, both independently and as part of a team.

Learning Outcomes (Graduate)

The master's degree in Earth Systems provides the student with enhanced analytical tools to evaluate the disciplines most closely associated with the student's focus area. Specialization is gained through course work and independent research work supervised by the M.S. faculty adviser.

Bachelor of Science in Earth Systems

The B.S. in Earth Systems (EARTHSYS) requires the completion of courses divided into three categories: 1) core; 2) foundation and breadth; 3) track-specific requirements. The student must carry out an internship project and participate in the Senior Seminar, as well as the Writing in the Major (WIM) requirement. Core courses, track courses, and electives must be taken for a letter grade.

Required Core

		Units
EARTHSYS 10	Introduction to Earth Systems	4
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 112	Human Society and Environmental Change	4
Select one of the following:		3
EARTHSYS 210A	Senior Seminar	
or	Senior Seminar	
EARTHSYS 210B		
Select one of the following:		3
EARTHSYS 195	Natural Hazards and Risk Communication	
or	Sustaining Action: Research, Analysis and Writing for the Public	
EARTHSYS 200		
EARTHSYS 260	Internship	1-9

Required Foundation and Breadth Courses

		Units
Biology		
Select one of the following:		
BIO 41	Genetics, Biochemistry, and Molecular Biology	
BIO 43	Plant Biology, Evolution, and Ecology	
BIOHOPK 43	Plant Biology, Evolution, and Ecology	
BIO 101	Ecology	
EARTHSYS 30	Ecology for Everyone	
HUMBIO 2A & HUMBIO 2B	Genetics, Evolution, and Ecology and Culture, Evolution, and Society	
EARTHSYS 116	Ecology of the Hawaiian Islands	
Chemistry		
Select one of the following:		
CHEM 31X	Chemical Principles Accelerated	
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	
Economics		
ECON 1	Principles of Economics	5-10
Geology and Environmental Sciences		
Select one of the following:		
GES 1A	Introduction to Geology: The Physical Science of the Earth	
GES 1B	Introduction to Geology	
GES 1C	Introduction to Geology: Dynamic Earth	
GES 4	Evolution and Extinction: Introduction to Historical Geology	
EARTHSYS 117	Earth Sciences of the Hawaiian Islands	
Mathematics		
Select one of the following:		
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	
or MATH 41 & MATH 42	Calculus and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables	
or CME 100	Vector Calculus for Engineers	
Probability and Statistics		
Select one of the following:		
BIOHOPK 174H	Experimental Design and Probability	
BIO 141	Biostatistics	
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	
STATS 110	Statistical Methods in Engineering and the Physical Sciences	
STATS 116	Theory of Probability	
More extensive work in mathematics and physics may be valuable for those planning graduate study. Graduate study in ecology and evolutionary biology and in economics requires familiarity with differential equations, linear algebra, and stochastic processes. Graduate study in geology,		

oceanography, and geophysics may require more physics and chemistry. Students should consult their adviser for recommendations beyond the requirements specified above.

Tracks

Anthrosphere

Additional foundation and breadth courses

ECON 50	Economic Analysis I	10
ECON 155	Environmental Economics and Policy	

Physics (select one of the following): 3-4

One physics class from the PHYSICS 20 or 40 series

Choose one course in each of the three following sub-categories, with a total of six required. At least one of the six must be a skills/methods course marked with an asterisk (*):

Economics and Environmental Policy 3-5

ECON 51	Economic Analysis II
ECON 102B	Applied Econometrics *
ECON 150	Economic Policy Analysis
ECON 154	Law and Economics

EARTHSYS 175 California Coast: Science, Policy, and Law

MSE 197	Ethics, Technology, and Public Policy
MSE 243	Energy and Environmental Policy Analysis
MSE 294	Climate Policy Analysis
MSE 295	Energy Policy Analysis

Social Entrepreneurship and the Environment 2-5

CEE 151	Negotiation
ENGR 231	Transformative Design
MSE 180	Organizations: Theory and Management
MSE 264	Sustainable Product Development and Manufacturing
MSE 277	Creativity and Innovation
ME 206A	Entrepreneurial Design for Extreme Affordability
ME 221	Green Design Strategies and Metrics
ME 222	Design for Sustainability
ME 377	Design Thinking Studio: Experiences in Innovation and Design

URBANST 132 Concepts and Analytic Skills for the Social Sector *

URBANST 133 Social Entrepreneurship Collaboratory

Sustainable Development 3-5

ANTHRO 161	Human Behavioral Ecology
ANTHRO 162	Indigenous Peoples and Environmental Problems
ANTHRO 343	Culture as Commodity
ANTHRO 349	Anthropology of Capitalism
BIO 102	Demography: Health, Development, Environment
CEE 124	Sustainable Development Studio (must be taken for at least 3 units)

EARTHSYS 106 World Food Economy *

EARTHSYS 142A Negotiating Sustainable Development

ECON 52	Economic Analysis III *
ECON 118	Development Economics

HUMBIO 118 Theory of Ecological and Environmental Anthropology

POLISCI 337T Designing Liberation Technology

URBANST 163 Land Use Control

Elective Requirement 6-10

Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

Biosphere

Units

Additional foundation and breadth courses

Instead of Biology Foundation requirement listed above, these Bio courses are required:

BIO 41 Genetics, Biochemistry, and Molecular Biology

And select one of the following: 5

BIO 43 Plant Biology, Evolution, and Ecology
or BIOHOPK 43 Plant Biology, Evolution, and Ecology

Additional Chemistry requirement (in addition to 31A/B or X): 5

CHEM 33 Structure and Reactivity

Instead of Geology Foundation requirement listed above, select one of the following:

GES 1C Introduction to Geology: Dynamic Earth ¹
or GES 4 Evolution and Extinction: Introduction to Historical Geology

or Earth Sciences of the Hawaiian Islands

EARTHSYS 117

Physics (select one of the following): 4

PHYSICS 41 Mechanics
or PHYSICS 45 Light and Heat

Choose two courses from Ecology and Conservation Biology, and one course from each of the remaining sub-categories below, total six required:

Biogeochemistry 3-4

BIO 216 Terrestrial Biogeochemistry
CEE 177 Aquatic Chemistry and Biology

EARTHSYS 134

EARTHSYS 151 Biological Oceanography

EARTHSYS 152 Marine Chemistry

EARTHSYS 155 Science of Soils

EARTHSYS 158 Geomicrobiology

Ecology and Conservation Biology 3-12

BIO 101 Ecology
BIO 136 Evolutionary Paleobiology
BIO 144 Conservation Biology: A Latin American Perspective

BIO 164 Biosphere-Atmosphere Interactions

EARTHSYS 116 Ecology of the Hawaiian Islands

GES 123 Paleobiology

BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems
BIOHOPK 177H	Dynamics and Management of Marine Populations
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities
BIOHOPK 189H	Sustainability and Marine Ecosystems
OSPAUSTL 10	Coral Reef Ecosystems
OSPAUSTL 25	Freshwater Systems
OSPAUSTL 30	Coastal Forest Ecosystems

Ecosystems and Society ² 3-5

ANTHRO 118	Heritage, Environment, and Sovereignty in Hawaii
ANTHRO 147	Nature, Culture, Heritage
ANTHRO 161	Human Behavioral Ecology
ANTHRO 162	Indigenous Peoples and Environmental Problems
ANTHRO 165	Parks and Peoples: The Benefits and Costs of Protected Area Conservation
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness
ANTHRO 177	Environmental Change and Emerging Infectious Diseases
ANTHRO 178	Evolution and Conservation in Galapagos
ANTHRO 183	

Elective Requirement 6-10

Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

¹ Must take GES 1C, GES 4, or EARTHSYS 117 to fulfill this requirement, and not GES 1A or 1B.

² May also use ANTHRO 183 or HISTORY 169 to fulfill this requirement. These courses are not offered this year.

Energy, Science and Technology

	Units
Additional Foundation and Breadth Courses	8
PHYSICS 43 Electricity and Magnetism	
PHYSICS 45 Light and Heat	
CME 100 Vector Calculus for Engineers (preferred over MATH 51 for this track)	
Computer science requirement: One-unit of Computer Science is required (unless CME 100 was completed); see Earth Systems staff for approved CS courses.	0-1
Energy Fundamentals	3
ENGR 30 Engineering Thermodynamics	
Select one of the following:	3-4
CEE 272R Modern Power Systems Engineering	
ENERGY 120 Fundamentals of Petroleum Engineering	
MATSCI 154 Thermodynamic Evaluation of Green Energy Technologies	
MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
Select one of the following:	3-5
EARTHSYS 101 Energy and the Environment	

EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes
EARTHSYS 103	Energy Resources

Choose at least one course in each of the three sub-categories, total five required. Please note that many of these have prerequisite work:

Energy Resources & Technology 3-5

EARTHSYS 101	Energy and the Environment
EARTHSYS 103	Energy Resources
CEE 156	Building Systems
CEE 176A	Energy Efficient Buildings
ENERGY 120	Fundamentals of Petroleum Engineering
ENERGY 171	Energy Infrastructure, Technology and Economics
ENERGY 269	Geothermal Reservoir Engineering
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
ENERGY 293B	Fundamentals of Energy Processes
ENERGY 293C	Energy from Wind and Water Currents
ME 250	Internal Combustion Engines
ME 260	Fuel Cell Science and Technology

Sustainable Energy & Development 3-4

EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes
CEE 176B	Electric Power: Renewables and Efficiency
CEE 215	Goals and Methods of Sustainable Building Projects
CEE 221A	Planning Tools and Methods in the Power Sector
CEE 226	Life Cycle Assessment for Complex Systems
CEE 272S	Green House Gas Mitigation
ENERGY 153	Carbon Capture and Sequestration
MATSCI 154	Thermodynamic Evaluation of Green Energy Technologies
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
EARTHSYS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation

Energy Policy, Economics & Entrepreneurship 2-4

ENERGY 104	Transition to sustainable energy systems
ENERGY 154	Energy in Transition: Technology, Policy and Politics
ENERGY 191	Optimization of Energy Systems
MSE 243	Energy and Environmental Policy Analysis
MSE 264	Sustainable Product Development and Manufacturing
MSE 294	Climate Policy Analysis
MSE 295	Energy Policy Analysis
GSBGEN 336	Energy Markets and Policy
LAW 455	Energy Law

Elective Requirement 3-5

One additional course at the 100-level or above is required. This course must be a minimum of 3 units. 3 units of approved energy seminars may count as one elective. See Earth Systems staff for the approved seminar list.

Land Systems

Additional foundation and breadth courses Units 4

PHYSICS 41 Mechanics
or PHYSICS 45 Light and Heat

Choose at least one course in each of the four sub-categories below, total seven required:

Land Ecosystems 3-4

BIO 144 Conservation Biology: A Latin American Perspective

EARTHSYS 155 Science of Soils

EARTHSYS 156 Soil and Water Chemistry

BIO 216 Terrestrial Biogeochemistry

Water 3-4

CEE 101B Mechanics of Fluids

CEE 166A Watersheds and Wetlands

CEE 166B Floods and Droughts, Dams and Aqueducts

CEE 177 Aquatic Chemistry and Biology

GEOPHYS 190 Near-Surface Geophysics

GES 130 Soil Physics and Hydrology

Land Use 3-5

EARTHSYS 106 World Food Economy

CEE 115 Goals and Methods of Sustainable Building Projects

CEE 124 Sustainable Development Studio (must be taken for at least 3 units)

CEE 176A Energy Efficient Buildings

URBANST 110 Utopia and Reality: Introduction to Urban Studies

URBANST 113 Introduction to Urban Design: Contemporary Urban Design in Theory and Practice

URBANST 163 Land Use Control

URBANST 171 Urban Design Studio

EARTHSYS 181 Urban Agriculture in the Developing World

Methods 3-5

EARTHSYS 142 Remote Sensing of Land

EARTHSYS 144 Fundamentals of Geographic Information Science (GIS)

EARTHSYS 211 Fundamentals of Modeling

Elective Requirement 6-10

Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

Sustainable Food and Agriculture

Additional foundation and breadth courses Units 4

PHYSICS 41 Mechanics
or PHYSICS 45 Light and Heat

A total of seven courses are required from the Food and Agriculture focus areas:

Fundamentals of Agriculture Production and Economics 9-10

Both required:

EARTHSYS 106 World Food Economy

EARTHSYS 185 Feeding Nine Billion

Biogeophysical Dimensions 9-12

Required:

EARTHSYS 155 Science of Soils

And select two of the following:

EARTHSYS 184 Climate and Agriculture

BIO 137 Plant Genetics

HUMBIO 113 The Human-Plant Connection

HUMBIO 130 Human Nutrition

GES 130 Soil Physics and Hydrology

Social Dimensions 3-5

Select one of the following:

EARTHSYS 173 Aquaculture and the Environment: Science, History, and Policy

EARTHSYS 181 Urban Agriculture in the Developing World

HUMBIO 166 Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context

ANTHRO 169 The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet

Applied Study in the Field 3-4

Required:

EARTHSYS 180B Principles and Practices of Sustainable Agriculture

Elective Requirement 6-10

Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

Oceans

Additional Foundation and Breadth Courses Units 0-5

MATH 51 Linear Algebra and Differential Calculus of Several Variables & MATH 52 Variables

and Integral Calculus of Several Variables ¹

or CME 100 Vector Calculus for Engineers

Physics (select one of the following): 3-4

PHYSICS 41 Mechanics

PHYSICS 45 Light and Heat

or GEOPHYS 110 Earth on the Edge: Introduction to Geophysics

Physics of the Atmosphere and Climate 3

Select one of the following:

CEE 63 Weather and Storms

EARTHSYS 146A Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation (preferred)

Physics of the Ocean 3-4

Select one of the following:

EARTHSYS 164 Introduction to Physical Oceanography

EARTHSYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation ²	
Spatial Analysis		3-4
EARTHSYS 141	Remote Sensing of the Oceans	
Biological Oceanography		3-4
Select one of the following:		
EARTHSYS 151	Biological Oceanography (preferred; take at the same time as EARTHSYS 152)	
BIOHOPK 163H	Oceanic Biology	
Marine Chemistry		3-4
EARTHSYS 152	Marine Chemistry	
Human Dimensions		1-5
Select one of the following:		
BIOHOPK 173H	Marine Conservation Biology	
EARTHSYS 175	California Coast: Science, Policy, and Law	
EARTHSYS 156M	Marine Resource Economics and Conservation	
Field Experience ³		12-20
Select at least one of the following:		
EARTHSYS 323	Stanford at Sea	
One quarter abroad at the Stanford in Australia Program		
One quarter (or more) at the Hopkins Marine Station		
Elective Requirement		6-10
Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units. See Earth Systems staff for a list of possible electives.		
¹ CME 100 is preferred over taking MATH 51 and MATH 52 for this track.		
² EARTHSYS 146B can be taken in addition to EARTHSYS 164 and would count as an elective.		
³ Courses taken during Stanford@SEA and BOSP Australia cannot be substituted for track requirements but can count toward electives.		

Summary of Course Requirements and Units

For all students:

	Units
Earth Systems Introduction and Core	12
Required Foundation and Breadth Courses	31-48
Internship	9
Senior Seminar	3
Writing in the Major (WIM)	3

Track-Specific:

	Units
Anthrosphere Track	38-54
Biosphere Track	40-60
Energy, Science and Technology Track	34-47
Land Systems Track	31-44

Sustainable Food and Agriculture Track	34-45
Oceans Track	37-63

Honors Program

The Earth Systems Honors program provides students with an opportunity to pursue individual interdisciplinary research. It consists of a year-long research project that is mentored by one or more Earth Systems-affiliated faculty members, and culminates in a written thesis.

To qualify for the honors program, students must have and maintain a minimum overall GPA of 3.4. Potential honors students should complete the EARTHSYS 111 Biology and Global Change and EARTHSYS 112 Human Society and Environmental Change sequence by the end of the junior year. Qualified students can apply in Spring Quarter of the junior year, or the fourth quarter before graduation (check with program for specific application deadlines), by submitting a detailed research proposal and a brief statement of support from a faculty research adviser. Students who elect to do an honors thesis should begin planning no later than Winter Quarter of the junior year.

A maximum of 9 units is awarded for thesis research through EARTHSYS 199 Honors Program in Earth Systems. Those 9 units may not substitute for any other required parts of the Earth Systems curriculum. All theses are evaluated for acceptance by the thesis faculty adviser and one additional faculty member, who is the second reader. Both the adviser and second reader must be members of the Academic Council. Acceptance into the Honors program is not a guarantee of graduating with the honors designation. The thesis must be accepted and approved by both readers and the Earth Systems Honors Committee, and a minimum overall GPA of 3.4 must be maintained.

Honors students are encouraged to present their research through the School of Earth Sciences Annual Research Review, which highlights undergraduate and graduate research in the school during the annual visit of the School of Earth Sciences external Advisory Board. Faculty advisers are encouraged to sponsor presentation of student research results at professional society meetings.

Coterminal Master's Degree in Earth Systems

The Stanford coterminal degree plan enables an undergraduate to embark on an integrated program of study leading to the master's degree before requirements for the bachelor's degree have been completed. Undergraduates majoring in Earth Systems, or a related field, may apply to work simultaneously toward their Bachelor's of Science (B.S.) degree and Master's of Science (M.S.) degree in Earth Systems. The M.S. degree in Earth Systems allows increased specialization through additional course work that may include up to nine units of research with the master's adviser. This may culminate in the preparation of a M.S. thesis; however, a thesis is not required for the degree. All coterminal M.S. students are required to take the capstone course, EARTHSYS 290 Master's Seminar.

Application and Admission

To apply, complete and return the following to the Earth Systems office:

- The Stanford coterminal application (<http://studentaffairs.stanford.edu/sites/default/files/CotermApplic.pdf>)
- A statement of purpose
- A resume
- A current Stanford unofficial transcript
- Two letters of recommendation, one of which must be from the M.S. adviser (who must be an Academic Council member)
- A list of courses that fulfill degree requirements signed by the M.S. adviser and the Director of Earth Systems

- Applications must be submitted no later than the quarter prior to the expected completion of the B.S. degree (check with program office for specific application deadline). An application fee is assessed by the Registrar's Office for coterminal applications, once students are matriculated into the program.
- Students applying to the coterminal M.S. program must have completed a minimum of 120 units toward graduation with a minimum overall Stanford GPA of 3.4.
- All applicants must devise a program of study that shows a level of specialization appropriate to the master's level, as determined in consultation with the M.S. adviser and the Director of Earth Systems.
- Students applying from an undergraduate major other than Earth Systems should review their undergraduate course list with Kevin Arrigo, Richard Nevle, Deana Fabbro-Johnston, Katie Phillips, or Julie Kennedy.
- The student has the option of receiving the B.S. degree after completing that degree's requirements or receiving the B.S. and M.S. degrees concurrently at the completion of the M.S. program.

Degree Requirements

These specific requirements must be fulfilled to receive an M.S. degree in Earth Systems:

- A minimum of 45 units of course work and/or research credit (upon approval).
- At least 34 units of the student's course work for the M.S. must be at the 200-level or above.
- All remaining course work must be at the 100-level or above.
- All courses for the M.S. degree must be taken for a letter grade; courses not taken for a letter grade must be approved by the M.S. adviser and Director of Earth Systems.
- A minimum overall GPA of 3.4 must be maintained.
- The following courses must be taken if not completed in your undergraduate degree program (these may not be counted as part of the 45-unit M.S. degree):

	Units
Core (both required):	8
EARTHSYS 111 Biology and Global Change	
EARTHSYS 112 Human Society and Environmental Change	
Biology (select one of the following):	4-10
BIO 41 Genetics, Biochemistry, and Molecular Biology	
BIO 43 Plant Biology, Evolution, and Ecology	
BIOHOPK 43 Plant Biology, Evolution, and Ecology	
BIO 101 Ecology	
HUMBIO 2A Genetics, Evolution, and Ecology & HUMBIO 2B and Culture, Evolution, and Society	
EARTHSYS 116 Ecology of the Hawaiian Islands	
Chemistry (select one of the following):	5-10
CHEM 31X Chemical Principles Accelerated	
CHEM 31A Chemical Principles I & CHEM 31B and Chemical Principles II	
Physics (select one of the following):	3-4
One physics class from the PHYSICS 20 or 40 series	
Mathematics (select one of the following):	5
MATH 51 Linear Algebra and Differential Calculus of Several Variables	
CME 100 Vector Calculus for Engineers	

Statistics (select one of the following):

3-5

BIOHOPK 174H	Experimental Design and Probability
BIO 141	Biostatistics
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists
STATS 110	Statistical Methods in Engineering and the Physical Sciences
STATS 116	Theory of Probability

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the "Procedures for Coterminal Students (<http://studentaffairs.stanford.edu/registrar/students/coterm>)" web site.

Director: Kevin Arrigo

Deputy Director: Richard Nevle

Associate Director: Deana Fabbro-Johnston

Affiliated Faculty and Lecturers: Patrick Archie (Earth Systems, Environmental Earth System Science), Nicole Ardoin (School of Education, Woods Institute for the Environment), Kevin Arrigo (Earth Systems, Environmental Earth System Science), Gregory Asner (Department of Global Ecology, Carnegie Institution), Greg Beroza (Geophysics), Barbara Block (Biology, Hopkins Marine Station, Woods Institute for the Environment), Alexandria Boehm (Civil and Environmental Engineering), Gordon Brown (Geological and Environmental Sciences), Marshall Burke (Environmental Earth System Science), Ken Caldeira (Environmental Earth System Science), Margaret Caldwell (Law, Woods Institute for the Environment), Karen Casciotti (Environmental Earth System Science), Page Chamberlain (Environmental Earth System Science), Lisa Curran (Anthropology, Woods Institute for the Environment), Gretchen Daily (Biology, Woods Institute for the Environment), Jenna Davis (Civil and Environmental Engineering, Woods Institute for the Environment), Mark Denny (Biology, Hopkins Marine Station), Noah Diffenbaugh (Environmental Earth System Science, Woods Institute for the Environment), Rodolfo Dirzo (Biology, Woods Institute for the Environment), Robert Dunbar (Environmental Earth System Science, Woods Institute for the Environment), Debra Dunn (Earth Systems, Hasso Plattner Institute of Design), William Durham (Anthropology, Woods Institute for the Environment), Louis Durlafsky (Energy Resources Engineering), Bradley Eichelberger (Woods Institute for the Environment), Gary Ernst (Geological and Environmental Sciences, emeritus), Walter Falcon (Freeman Spogli Institute for International Studies, emeritus, Woods Institute for the Environment), Scott Fendorf (Environmental Earth System Science, Woods Institute for the Environment, Precourt Institute for Energy), Christopher Field (Department of Global Ecology, Carnegie Institution, Woods Institute for the Environment), Derek Fong (Civil and Environmental Engineering), Christopher Francis (Environmental Earth System Science, Woods Institute for the Environment), Zephyr Frank (History, Woods Institute for the Environment), David Freyberg (Civil and Environmental Engineering, Woods Institute for the Environment), Tad Fukami (Biology), Margot Gerritsen (Energy Resources Engineering), Theo Gibbs-Plessl (Earth Systems), Deborah Gordon (Biology, Woods Institute for the Environment), Steven Gorelick (Environmental Earth System Science, Woods Institute for the Environment), Elizabeth Hadly (Biology, Woods Institute for the Environment), Thomas Hayden (Environmental Earth System Science), George Hilley (Geological and Environmental Sciences), Robert Jackson (Environmental Earth System Science, Woods Institute for the Environment), David Kennedy (History, emeritus, Woods Institute for the Environment), Donald Kennedy (Biology, Freeman Spogli Institute for International Studies, emeritus, Woods Institute for the Environment), Julie Kennedy (Earth Systems, Environmental Earth System Science, Woods Institute for the Environment), Karl Knapp (Atmosphere and Energy Operations),

Rosemary Knight (Geophysics, Woods Institute for the Environment), Jeffrey Koseff (Civil and Environmental Engineering, Woods Institute for the Environment), Anthony Kovscek (Energy Resources Engineering), Eric Lambin (Environmental Earth System Science, Woods Institute for the Environment), David Lobell (Environmental Earth System Science, Woods Institute for the Environment), Gilbert Masters (Civil and Environmental Engineering), Pamela Matson (Dean, School of Earth Sciences, Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Anna Michalak (Environmental Earth System Science), Fiorenza Micheli (Hopkins Marine Station), Stephen Monismith (Civil and Environmental Engineering, Woods Institute for the Environment), Ian Monroe (Earth Systems), Harold Mooney (Biology, emeritus, Woods Institute for the Environment), Rosamond Naylor (Environmental Earth System Science, Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Richard Neve (Earth Systems), Julia Novy-Hildesley (Earth Systems), Stephen Palumbi (Biology, Hopkins Marine Station, Woods Institute for the Environment), Jonathan Payne (Geological and Environmental Sciences), Kathleen Phillips (Earth Systems), Bala Rajaratnam (Environmental Earth System Science, Statistics), Thomas Robinson (Medicine), Terry Root (Biology, Woods Institute for the Environment), Matt Rothe (Earth Systems, Hasso Plattner Institute of Design, Graduate School of Business), Paul Segall (Geophysics), Deborah Sivas (Law), George Somero (Biology, Hopkins Marine Station), James Sweeney (Management Science and Engineering, Woods Institute for the Environment), Leif Thomas (Environmental Earth System Science), Nancy Thomas (Environmental Earth System Science), Barton Thompson, Junior (Law, Woods Institute for the Environment), Tiziana Vanorio (Geophysics), Peter Vitousek (Biology, Emmett Interdisciplinary Program in Environment and Resources, Woods Institute for the Environment), Virginia Walbot (Biology), Paula Welander (Environmental Earth System Science), Cindy Wilber (Jasper Ridge), Michael Wilcox (Anthropology), Jane Woodward (Atmosphere and Energy Operations), Mark Zoback (Geophysics)

Overseas Studies Courses in Earth Systems

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPBEIJ 35	Toward a Sustainable Future: China's Environmental Challenges	4
OSPCPTWN 49	Water in South Africa: Human Right, Public Trust, or Market Commodity?	4
OSPFLOR 52	Mass Extinctions and the Geology of Italy	4
OSPKYOTO 45	Japan's Energy-Environment Conundrum	4-5
OSPMADRD 79	Earth and Water Resources' Sustainability in Spain	4
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms	4-5
OSPSANTG 58	Living Chile: A Land of Extremes	5
OSPSANTG 85	Marine Ecology of Chile and the South Pacific	5

Environmental Courses List

Units

AA 116Q	Electric Automobiles and Aircraft
AA 260	Sustainable Aviation
AFRICAAM 16N	African Americans and Social Movements
AFRICAAM 47	History of South Africa
AFRICAAM 147	History of South Africa
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa
AFRICAST 141A	Science, Technology, and Medicine in Africa
AMSTUD 1B	Media, Culture, and Society
AMSTUD 124A	The American West
ANTHRO 11SC	Conservation and Development Dilemmas in the Amazon
ANTHRO 31	Ecology, Evolution, and Human Health
ANTHRO 90C	Theory of Ecological and Environmental Anthropology
ANTHRO 113	Faunal Analysis: Animal Remains for the Archaeologist
ANTHRO 117	Thinking Through Animals
ANTHRO 118	Heritage, Environment, and Sovereignty in Hawaii
ANTHRO 119	Zooarchaeology: An Introduction to Faunal Remains
ANTHRO 125	Language and the Environment
ANTHRO 130B	Introduction to GIS in Anthropology
ANTHRO 137	The Politics of Humanitarianism
ANTHRO 141A	Science, Technology, and Medicine in Africa
ANTHRO 147	Nature, Culture, Heritage
ANTHRO 155	Research Methods in Ecological Anthropology
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case
ANTHRO 161	Human Behavioral Ecology
ANTHRO 162	Indigenous Peoples and Environmental Problems
ANTHRO 163	Conservation and Evolutionary Ecology
ANTHRO 164	Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes
ANTHRO 164A	Anthropology of Ecotourism
ANTHRO 165	Parks and Peoples: The Benefits and Costs of Protected Area Conservation
ANTHRO 165A	People and Parks: Management of Protected Areas
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness
ANTHRO 167A	A Wilderness Empire: The Political Ecology of California
ANTHRO 168	Everest: Extreme Anthropology
ANTHRO 168A	Risky Environments: The Nature of Disaster

ANTHRO 169	The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet	BIO 10AX	Conservation Photography
ANTHRO 173	Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice	BIO 10SC	Natural History, Marine Biology, and Research
ANTHRO 177	Environmental Change and Emerging Infectious Diseases	BIO 11N	Biotechnology in Everyday Life
ANTHRO 213	Faunal Analysis: Animal Remains for the Archaeologist	BIO 12N	Sensory Ecology of Marine Animals
ANTHRO 219	Zooarchaeology: An Introduction to Faunal Remains	BIO 13N	Environmental Problems and Solutions
ANTHRO 225	Language and the Environment	BIO 15N	Environmental Literacy
ANTHRO 237	The Politics of Humanitarianism	BIO 18Q	Plant Evolutionary Ecology
ANTHRO 247	Nature, Culture, Heritage	BIO 22Q	Infection, Immunity, and Global Health
ANTHRO 255	Research Methods in Ecological Anthropology	BIO 30N	Extinctions in Near Time: Biodiversity loss since the Pleistocene
ANTHRO 260	Social and Environmental Sustainability: The Costa Rican Case	BIO 33N	Conservation Science and Practice
ANTHRO 261	Human Behavioral Ecology	BIO 34N	Hunger
ANTHRO 262	Indigenous Peoples and Environmental Problems	BIO 37N	Green Revolution and Plant Biotechnology
ANTHRO 263	Conservation and Evolutionary Ecology	BIO 43	Plant Biology, Evolution, and Ecology
ANTHRO 264	Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes	BIO 44Y	Core Plant Biology & Eco Evo Laboratory
ANTHRO 266	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	BIO 101	Ecology
ANTHRO 268A	Risky Environments: The Nature of Disaster	BIO 102	Demography: Health, Development, Environment
ANTHRO 277	Environmental Change and Emerging Infectious Diseases, Japanese Society and Culture	BIO 105A	Ecology and Natural History of Jasper Ridge Biological Preserve
ANTHRO 302	History of Anthropological Theory, Ecology and Environment	BIO 105B	Ecology and Natural History of Jasper Ridge Biological Preserve
ANTHRO 305	Research Methods in Ecological Anthropology	BIO 116	Ecology of the Hawaiian Islands
ANTHRO 353	Landscape	BIO 117	Biology and Global Change
ANTHRO 362A	Introduction to Human Evolution, Ecology, Genetics, and Culture	BIO 121	Biogeography
ANTHRO 364	EcoGroup: Current Topics in Ecological, Evolutionary, and Environmental Anthropology	BIO 136	Evolutionary Paleobiology
ANTHRO 364A	EcoGroup: Problems in Ecological and Evolutionary Anthropology	BIO 137	Plant Genetics
APPPHYS 79N	Energy Options for the 21st Century	BIO 139	Biology of Birds
APPPHYS 219	Solid State Physics Problems in Energy Technology	BIO 141	Biostatistics
APPPHYS 294	Cellular Biophysics	BIO 143	Evolution
ARCHLGY 12	Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years	BIO 144	Conservation Biology: A Latin American Perspective
ARCHLGY 119	Zooarchaeology: An Introduction to Faunal Remains	BIO 145	Ecology and evolution of animal behavior
ARCHLGY 126	Archaeobotany	BIO 146	Population Studies
ARCHLGY 224	Archaeology of Food: production, consumption and ritual	BIO 157	Biochemistry and Molecular Biology of Plants
ARCHLGY 226	Archaeobotany	BIO 164	Biosphere-Atmosphere Interactions
ARTHIST 152	The American West	BIO 166	Faunal Analysis: Animal Remains for the Archaeologist
ARTSTUDI 12AX	Drawing Intensive: Revisiting Nature	BIO 182	Modeling Cultural Evolution
BIO 1	Human Evolution and Environment	BIO 186	Natural History of the Vertebrates
BIO 3	Frontiers in Marine Biology	BIO 196A	Biology Senior Reflection
BIO 3N	Views of a Changing Sea: Literature & Science	BIO 196B	Biology Senior Reflection
BIO 7N	Introduction to Conservation Photography	BIO 196C	Biology Senior Reflection
		BIO 216	Terrestrial Biogeochemistry
		BIO 227	Foundations of Community Ecology
		BIO 245	Ecology and evolution of animal behavior
		BIO 257	Biochemistry and Molecular Biology of Plants
		BIO 264	Biosphere-Atmosphere Interactions
		BIO 266	Faunal Analysis: Animal Remains for the Archaeologist
		BIO 274S	Hopkins Microbiology Course
		BIO 286	Natural History of the Vertebrates
		BIO 375	Field Ecology & Conservation
		BIO 459	Frontiers in Interdisciplinary Biosciences
		BIOC 158	Genomics, Bioinformatics and Medicine
		BIOC 459	Frontiers in Interdisciplinary Biosciences
		BIOE 44	Fundamentals for Engineering Biology Lab
		BIOE 80	Introduction to Bioengineering

BIOE 191	Bioengineering Problems and Experimental Investigation	BIOHOPK 264H	POPULATION GENOMICS
BIOE 372	Design for Service Innovation	BIOHOPK 266H	Molecular Ecology
BIOE 459	Frontiers in Interdisciplinary Biosciences	BIOHOPK 267H	Nerve, Muscle, and Synapse
BIOHOPK 43	Plant Biology, Evolution, and Ecology	BIOHOPK 272H	Marine Ecology: From Organisms to Ecosystems
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution	BIOHOPK 273H	Marine Conservation Biology
BIOHOPK 150H	Ecological Mechanics	BIOHOPK 274	Hopkins Microbiology Course
BIOHOPK 151H	Ecological Mechanics	BIOHOPK 274H	Experimental Design and Probability
BIOHOPK 160H	Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates	BIOHOPK 275H	Synthesis in Ecology
BIOHOPK 161H	Invertebrate Zoology	BIOHOPK 277H	Dynamics and Management of Marine Populations
BIOHOPK 162H	Comparative Animal Physiology	BIOHOPK 280	Short Course on Ocean Policy
BIOHOPK 163H	Oceanic Biology	BIOHOPK 280H	Air and Water
BIOHOPK 165H	The Extreme Life of the Sea	BIOHOPK 284H	Holistic Biology
BIOHOPK 166H	Molecular Ecology	BIOHOPK 285H	Ecology and Conservation of Kelp Forest Communities
BIOHOPK 167H	Nerve, Muscle, and Synapse	BIOHOPK 287H	Sensory Ecology
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	BIOHOPK 300H	Research
BIOHOPK 173H	Marine Conservation Biology	BIOHOPK 323H	Stanford at Sea
BIOHOPK 174H	Experimental Design and Probability	BIOMEDIN 156	Economics of Health and Medical Care
BIOHOPK 177H	Dynamics and Management of Marine Populations	BIOMEDIN 256	Economics of Health and Medical Care
BIOHOPK 180H	Air and Water	CEE 29N	Managing Natural Disaster Risk
BIOHOPK 182H	Stanford at Sea	CEE 48N	Managing Complex, Global Projects
BIOHOPK 184H	Holistic Biology	CEE 50N	Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities	CEE 63	Weather and Storms
BIOHOPK 187H	Sensory Ecology	CEE 64	Air Pollution and Global Warming: History, Science, and Solutions
BIOHOPK 198H	Directed Instruction or Reading	CEE 70	Environmental Science and Technology
BIOHOPK 199H	Undergraduate Research	CEE 70N	Water, Public Health, and Engineering
BIOHOPK 250H	Ecological Mechanics	CEE 100	Managing Sustainable Building Projects
BIOHOPK 251H	Ecological Mechanics	CEE 101B	Mechanics of Fluids
BIOHOPK 260H	Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates	CEE 101D	Computations in Civil and Environmental Engineering
BIOHOPK 261H	Invertebrate Zoology	CEE 109	Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision
BIOHOPK 262H	Comparative Animal Physiology	CEE 110A	Building Information Modeling and Short Course
BIOHOPK 263H	Oceanic Biology	CEE 112A	Industry Applications of Virtual Design & Construction
		CEE 112B	Industry Applications of Virtual Design & Construction
		CEE 112C	Industry Applications of Virtual Design & Construction
		CEE 115	Goals and Methods of Sustainable Building Projects
		CEE 124	Sustainable Development Studio

CEE 129	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	CEE 242A	Negotiating Sustainable Development
CEE 129S	Climate Change Adaptation in the Coastal Built Environment	CEE 245A	Global Project Seminar
CEE 134A	Site and Space	CEE 248G	Certifying Green Buildings
CEE 136	Green Architecture	CEE 251	Negotiation
CEE 138A	Contemporary Architecture: Materials, Structures, and Innovations	CEE 256	Building Systems
CEE 142A	Negotiating Sustainable Development	CEE 260A	Physical Hydrogeology
CEE 151	Negotiation	CEE 260B	Surface and Near-Surface Hydrologic Response
CEE 155	Introduction to Sensing Networks for CEE	CEE 260C	Contaminant Hydrogeology and Reactive Transport
CEE 156	Building Systems	CEE 262A	Hydrodynamics
CEE 161A	Rivers, Streams, and Canals	CEE 262B	Transport and Mixing in Surface Water Flows
CEE 164	Introduction to Physical Oceanography	CEE 262D	Introduction to Physical Oceanography
CEE 165C	Water Resources Management	CEE 262E	Lakes and Reservoirs
CEE 166A	Watersheds and Wetlands	CEE 262F	Ocean Waves
CEE 166B	Floods and Droughts, Dams and Aqueducts	CEE 263A	Air Pollution Modeling
CEE 166D	Water Resources and Water Hazards Field Trips	CEE 263B	Numerical Weather Prediction
CEE 169	Environmental and Water Resources Engineering Design	CEE 263C	Weather and Storms
CEE 171	Environmental Planning Methods	CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions
CEE 171E	Environmental Challenges and Policies in Europe	CEE 264A	Rivers, Streams, and Canals
CEE 172	Air Quality Management	CEE 265A	Sustainable Water Resources Development
CEE 172A	Indoor Air Quality	CEE 265C	Water Resources Management
CEE 172S	Green House Gas Mitigation	CEE 265D	Water and Sanitation in Developing Countries
CEE 173A	Energy Resources	CEE 266A	Watersheds and Wetlands
CEE 175A	California Coast: Science, Policy, and Law	CEE 266B	Floods and Droughts, Dams and Aqueducts
CEE 176A	Energy Efficient Buildings	CEE 266C	Advanced Topics in Hydrology and Water Resources
CEE 176B	Electric Power: Renewables and Efficiency	CEE 266D	Water Resources and Water Hazards Field Trips
CEE 176F	Energy Systems Field Trips: China Energy Systems	CEE 268	Groundwater Flow
CEE 177	Aquatic Chemistry and Biology	CEE 270	Movement and Fate of Organic Contaminants in Waters
CEE 177S	Design for a Sustainable World	CEE 271A	Physical and Chemical Treatment Processes
CEE 177X	Current Topics in Sustainable Engineering	CEE 271B	Environmental Biotechnology
CEE 178	Introduction to Human Exposure Analysis	CEE 271D	Introduction to Wastewater Treatment Process Modeling
CEE 179A	Water Chemistry Laboratory	CEE 271E	Environmental Challenges and Policies in Europe
CEE 179C	Environmental Engineering Design	CEE 272	Coastal Contaminants
CEE 179S	Seminar: Issues in Environmental Science, Technology and Sustainability	CEE 272R	Modern Power Systems Engineering
CEE 196	Engineering Geology and Global Change	CEE 272S	Green House Gas Mitigation
CEE 201D	Computations in Civil and Environmental Engineering	CEE 273	Aquatic Chemistry
CEE 206	Decision Analysis for Civil and Environmental Engineers	CEE 273A	Water Chemistry Laboratory
CEE 206A	Decision Models in Civil Engineering	CEE 273C	Introduction to Membrane Technology for Water/Wastewater Treatment, Introduction to Membrane Technology for Water / Wastewater Treatment
CEE 207A	Energy Resources	CEE 273S	Chemical Transformation of Environmental Organic Compounds
CEE 215	Goals and Methods of Sustainable Building Projects	CEE 274A	Environmental Microbiology I
CEE 217	Renewable Energy Infrastructure	CEE 274B	Microbial Bioenergy Systems
CEE 224A	Sustainable Development Studio	CEE 274D	Pathogens and Disinfection
CEE 226	Life Cycle Assessment for Complex Systems	CEE 274E	Pathogens in the Environment
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	CEE 274P	Environmental Health Microbiology Lab
CEE 227	Global Project Finance	CEE 274S	Hopkins Microbiology Course
CEE 228C	Design and Construction for Sustainability in Extreme Environments	CEE 275A	California Coast: Science, Policy, and Law
CEE 229	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	CEE 275B	Process Design for Environmental Biotechnology
CEE 236	Green Architecture	CEE 276	Introduction to Human Exposure Analysis
		CEE 276E	Environmental Toxicants
		CEE 276F	Energy Systems Field Trips: China Energy Systems
		CEE 277D	Water, Health & Development in Africa

CEE 277F	Advanced Field Methods in Water, Health and Development	CHEMENG 60Q	Environmental Regulation and Policy
CEE 277K	Environmental Information Engineering	CHEMENG 70Q	Masters of Disaster
CEE 277S	Design for a Sustainable World	CHEMENG 174	Environmental Microbiology I
CEE 278A	Air Pollution Fundamentals	CHEMENG 274	Environmental Microbiology I
CEE 278B	Atmospheric Aerosols	CHEMENG 456	Microbial Bioenergy Systems
CEE 278C	Indoor Air Quality	CHEMENG 459	Frontiers in Interdisciplinary Biosciences
CEE 279	Environmental Engineering Seminar	CME 211	Introduction to Programming for Scientists and Engineers
CEE 287	Earthquake Resistant Design and Construction	COMM 1B	Media, Culture, and Society
CEE 288	Introduction to Performance Based Earthquake Engineering	COMM 104W	Reporting, Writing, and Understanding the News
CEE 297	Issues in Geotechnical and Environmental Failures	COMM 108	Media Processes and Effects
CEE 297R	Structural Geology and Rock Mechanics	COMM 172	Media Psychology
CEE 301	The Energy Seminar	COMM 177C	Specialized Writing and Reporting: Environmental Journalism
CEE 316	Sustainable Built Environment Research	COMM 272	Media Psychology
CEE 363C	Ocean and Estuarine Modeling	COMM 277C	Specialized Writing and Reporting: Environmental Journalism
CEE 363F	Oceanic Fluid Dynamics	COMPLIT 168	Imagining the Oceans
CEE 363G	Field Techniques in Coastal Oceanography	COMP MED 84Q	Globally Emerging Zoonotic Diseases
CEE 364Y	Advanced Topics in Coastal Oceanography	CSRE 16N	African Americans and Social Movements
CEE 365A	Advanced Topics in Environmental Fluid Mechanics and Hydrology	CSRE 109A	Federal Indian Law
CEE 365B	Advanced Topics in Environmental Fluid Mechanics and Hydrology	CSRE 178	Ethics and Politics of Public Service
CEE 365C	Advanced Topics in Environmental Fluid Mechanics and Hydrology	CSRE 187A	The Anthropology of Race, Nature, and Animality
CEE 365D	Advanced Topics in Environmental Fluid Mechanics and Hydrology	EARTHSCI 1	Current Research in the Earth and Environmental Sciences
CEE 370A	Environmental Research	EARTHSCI 5	Geokids: Earth Sciences Education
CEE 370B	Environmental Research	EARTHSCI 100	Research Preparation for Undergraduates
CEE 370C	Environmental Research	EARTHSCI 117	Earth Sciences of the Hawaiian Islands
CEE 370D	Environmental Research	EARTHSCI 191	GES Field Trips
CEE 371	Frontiers in Environmental Research	EARTHSCI 193	Natural Perspectives: Geology, Environment, and Art
CEE 374A	Introduction to Physiology of Microbes in Biofilms	EARTHSCI 211	Introduction to Programming for Scientists and Engineers
CEE 374B	Introduction to Physiology of Microbes in Biofilms	EARTHSCI 218	Communicating Science
CEE 374C	Introduction to Physiology of Microbes in Biofilms	EARTHSCI 251	Negotiation
CEE 374D	Introduction to Physiology of Microbes in Biofilms	EARTHSCI 300	Earth Sciences Seminar
CEE 374S	Advanced Topics in Microbial Pollution	EARTHSCI 400	Directed Research
CEE 374T	Advanced Topics in Coastal Pollution	EARTHSYS 4	Evolution and Extinction: Introduction to Historical Geology
CEE 374U	Advanced Topics in Submarine Groundwater Discharge	EARTHSYS 8	The Oceans: An Introduction to the Marine Environment
CEE 374V	Advanced Topics in Microbial Source Tracking	EARTHSYS 10	Introduction to Earth Systems
CEE 374W	Advanced Topics in Water, Health and Development	EARTHSYS 12SC	Environmental and Geological Field Studies in the Rocky Mountains
CEE 375	Advanced Methods in Pathogen Detection		
CEE 378	Statistical Analysis of Environmental Data: Tools and Applications		
CEE 385	Performance-Based Earthquake Engineering		
CHEM 10	Exploring Research and Problem Solving Across the Sciences		
CHEM 24N	Nutrition and History		
CHEM 25N	Science in the News		
CHEM 25Q	Science-in-Theatre: A New Genre?		
CHEM 459	Frontiers in Interdisciplinary Biosciences		
CHEMENG 25E	Energy: Chemical Transformations for Production, Storage, and Use		
CHEMENG 35N	Renewable Energy for a Sustainable World		

EARTHSYS 13SC	People, Land, and Water in the Heart of the West	EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities
EARTHSYS 18	Promoting Sustainability Behavior Change at Stanford	EARTHSYS 122	Paleobiology
EARTHSYS 30	Ecology for Everyone	EARTHSYS 128	Evolutionary History of Terrestrial Ecosystems
EARTHSYS 37N	Climate Change: Science & Society	EARTHSYS 135	Podcasting the Anthropocene
EARTHSYS 38N	The Worst Journey in the World: The Science, Literature, and History of Polar Exploration	EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development
EARTHSYS 39N	The Carbon Cycle: Reducing Your Impact	EARTHSYS 140	The Energy-Water Nexus
EARTHSYS 41N	The Global Warming Paradox	EARTHSYS 141	Remote Sensing of the Oceans
EARTHSYS 42	The Global Warming Paradox II	EARTHSYS 142	Remote Sensing of Land
EARTHSYS 46N	Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough	EARTHSYS 142A	Negotiating Sustainable Development
EARTHSYS 46Q	Environmental Impact of Energy Systems: What are the Risks?	EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)
EARTHSYS 49N	Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay	EARTHSYS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
EARTHSYS 56Q	Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays	EARTHSYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation
EARTHSYS 57Q	Climate Change from the Past to the Future	EARTHSYS 151	Biological Oceanography
EARTHSYS 61Q	Food and security	EARTHSYS 152	Marine Chemistry
EARTHSYS 100	Environmental and Geological Field Studies in the Rocky Mountains	EARTHSYS 155	Science of Soils
EARTHSYS 101	Energy and the Environment	EARTHSYS 156	Soil and Water Chemistry
EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes	EARTHSYS 156M	Marine Resource Economics and Conservation
EARTHSYS 103	Energy Resources	EARTHSYS 158	Geomicrobiology
EARTHSYS 104	The Water Course	EARTHSYS 160	Sustainable Cities
EARTHSYS 105	Food and Community: New Visions for a Sustainable Future	EARTHSYS 164	Introduction to Physical Oceanography
EARTHSYS 105A	Ecology and Natural History of Jasper Ridge Biological Preserve	EARTHSYS 168	The Evolving Sphere of Food Security
EARTHSYS 105B	Ecology and Natural History of Jasper Ridge Biological Preserve	EARTHSYS 170	Environmental Geochemistry
EARTHSYS 106	World Food Economy	EARTHSYS 172	Australian Ecosystems: Human Dimensions and Environmental Dynamics
EARTHSYS 109	Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision	EARTHSYS 173	Aquaculture and the Environment: Science, History, and Policy
EARTHSYS 111	Biology and Global Change	EARTHSYS 175	California Coast: Science, Policy, and Law
EARTHSYS 112	Human Society and Environmental Change	EARTHSYS 177	Interdisciplinary Research Survival Skills
EARTHSYS 113	Earthquakes and Volcanoes	EARTHSYS 177C	Specialized Writing and Reporting: Environmental Journalism
EARTHSYS 116	Ecology of the Hawaiian Islands	EARTHSYS 179S	Seminar: Issues in Environmental Science, Technology and Sustainability
EARTHSYS 117	Earth Sciences of the Hawaiian Islands	EARTHSYS 180B	Principles and Practices of Sustainable Agriculture
EARTHSYS 118	Heritage, Environment, and Sovereignty in Hawaii	EARTHSYS 181	Urban Agriculture in the Developing World

EARTHSYS 182	Ecological Farm Management	EARTHSYS 277	Interdisciplinary Research Survival Skills
EARTHSYS 183	Food Matters: Agriculture in Film	EARTHSYS 277C	Specialized Writing and Reporting: Environmental Journalism
EARTHSYS 184	Climate and Agriculture	EARTHSYS 281	Urban Agriculture in the Developing World
EARTHSYS 185	Feeding Nine Billion	EARTHSYS 283	Food Matters: Agriculture in Film
EARTHSYS 187	FEED the Change: Redesigning Food Systems	EARTHSYS 284	Climate and Agriculture
EARTHSYS 188	Social and Environmental Tradeoffs in Climate Decision-Making	EARTHSYS 288	Social and Environmental Tradeoffs in Climate Decision-Making
EARTHSYS 195	Natural Hazards and Risk Communication	EARTHSYS 289A	FEED Lab: Innovating in the Local Food System
EARTHSYS 197	Directed Individual Study in Earth Systems	EARTHSYS 289B	FEED Lab: Innovating in the Local Food System
EARTHSYS 199	Honors Program in Earth Systems	EARTHSYS 290	Master's Seminar
EARTHSYS 200	Sustaining Action: Research, Analysis and Writing for the Public	EARTHSYS 297	Directed Individual Study in Earth Systems
EARTHSYS 210A	Senior Seminar	EARTHSYS 298	Earth Systems Book Review
EARTHSYS 210B	Senior Seminar	EARTHSYS 299	M.S. Thesis
EARTHSYS 210C	Senior Seminar	EARTHSYS 323	Stanford at Sea
EARTHSYS 211	Fundamentals of Modeling	EASTASN 117	Health and Healthcare Systems in East Asia
EARTHSYS 235	Podcasting the Anthropocene	EASTASN 217	Health and Healthcare Systems in East Asia
EARTHSYS 241	Remote Sensing of the Oceans	ECON 17N	Energy, the Environment, and the Economy
EARTHSYS 242	Remote Sensing of Land	ECON 106	World Food Economy
EARTHSYS 242A	Negotiating Sustainable Development	ECON 118	Development Economics
EARTHSYS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	ECON 126	Economics of Health and Medical Care
EARTHSYS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	ECON 127	Economics of Health Improvement in Developing Countries
EARTHSYS 250	Directed Research	ECON 155	Environmental Economics and Policy
EARTHSYS 251	Biological Oceanography	ECON 156	Marine Resource Economics and Conservation
EARTHSYS 252	Marine Chemistry	ECON 158	Regulatory Economics
EARTHSYS 256	Soil and Water Chemistry	ECON 214	Development Economics I
EARTHSYS 258	Geomicrobiology	ECON 216	Development Economics III
EARTHSYS 260	Internship	ECON 250	Environmental Economics
EARTHSYS 268	The Evolving Sphere of Food Security	ECON 251	Natural Resource and Energy Economics
EARTHSYS 272	Antarctic Marine Geology	ECON 253	Energy Markets: Theory and Evidence from Latin America
EARTHSYS 273	Aquaculture and the Environment: Science, History, and Policy	ECON 341	Public Economics and Environmental Economics Seminar
EARTHSYS 275	California Coast: Science, Policy, and Law	EDUC 100A	EAST House Seminar: Current Issues and Debates in Education
		EDUC 100B	EAST House Seminar: Current Issues and Debates in Education
		EDUC 100C	EAST House Seminar: Current Issues and Debates in Education
		EDUC 126A	Introduction to Public Service Leadership
		EDUC 126B	Public Service Leadership Program Practicum
		EDUC 224	Social Entrepreneurship and Social Innovation
		EDUC 224A	Social Entrepreneurship and Social Innovation
		EDUC 224B	Social Entrepreneurship and Social Innovation
		EDUC 230X	Social Enterprise

EDUC 267A	Curriculum and Instruction in Science	EESS 158	Geomicrobiology
EDUC 267B	Curriculum and Instruction in Science	EESS 162	Remote Sensing of Land
EDUC 267C	Curriculum and Instruction in Science	EESS 164	Fundamentals of Geographic Information Science (GIS)
EDUC 267E	Development of Scientific Reasoning and Knowledge	EESS 173	Aquaculture and the Environment: Science, History, and Policy
EDUC 267F	Development of Scientific Reasoning and Knowledge II	EESS 179S	Seminar: Issues in Environmental Science, Technology and Sustainability
EDUC 267G	Integrating the Garden into the Elementary Curriculum	EESS 181	Urban Agriculture in the Developing World
EDUC 357	Science and Environmental Education in Informal Contexts	EESS 183	Food Matters: Agriculture in Film
EDUC 359C	Science Literacy	EESS 184	Climate and Agriculture
EDUC 362X	The Science Curriculum: Values and Ideology in a Contested Terrain	EESS 208	Topics in Geobiology
EE 60N	Man versus Nature: Coping with Disasters Using Space Technology	EESS 211	Fundamentals of Modeling
EE 151	Sustainable Energy Systems	EESS 212	Measurements in Earth Systems
EE 237	Solar Energy Conversion	EESS 214	Introduction to geostatistics and modeling of spatial uncertainty
EE 293B	Fundamentals of Energy Processes	EESS 215	Earth System Dynamics
EEES 302	Challenges and Practices in Crossdisciplinary Research and Teaching	EESS 216	Terrestrial Biogeochemistry
EES 400	Research in Earth, Energy, and Environmental Sciences	EESS 217	Climate of the Cenozoic
EESS 10SC	In the Age of the Anthropocene: Coupled-Human Natural Systems of Southeast Alaska	EESS 218	Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions
EESS 12SC	Environmental and Geological Field Studies in the Rocky Mountains	EESS 219	Climate Variability during the Holocene: Understanding what is Natural Climate Change
EESS 38N	The Worst Journey in the World: The Science, Literature, and History of Polar Exploration	EESS 220	Physical Hydrogeology
EESS 42	The Global Warming Paradox II	EESS 221	Contaminant Hydrogeology and Reactive Transport
EESS 43	The Global Warming Paradox III	EESS 240	Advanced Oceanography
EESS 46N	Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough	EESS 241	Remote Sensing of the Oceans
EESS 49N	Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay	EESS 242	Antarctic Marine Geology
EESS 56Q	Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays	EESS 244	Marine Ecosystem Modeling
EESS 57Q	Climate Change from the Past to the Future	EESS 245	Advanced Biological Oceanography
EESS 61Q	Food and security	EESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
EESS 101	Environmental and Geological Field Studies in the Rocky Mountains	EESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation
EESS 105	Food and Community: New Visions for a Sustainable Future	EESS 249	Marine Stable Isotopes
EESS 106	World Food Economy	EESS 250	Elkhorn Slough Microbiology
EESS 111	Biology and Global Change	EESS 251	Biological Oceanography
EESS 112	Human Society and Environmental Change	EESS 252	Marine Chemistry
EESS 117	Earth Sciences of the Hawaiian Islands	EESS 253S	Hopkins Microbiology Course
EESS 118	Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions	EESS 256	Soil and Water Chemistry
EESS 141	Remote Sensing of the Oceans	EESS 258	Geomicrobiology
EESS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	EESS 259	Environmental Microbial Genomics
EESS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	EESS 260	Advanced Statistical Methods for Earth System Analysis
EESS 148	Introduction to Physical Oceanography	EESS 262	Remote Sensing of Land
EESS 151	Biological Oceanography	EESS 263	Topics in Advanced Geostatistics
EESS 152	Marine Chemistry	EESS 270	Analyzing land use in a globalized world
EESS 155	Science of Soils	EESS 273	Aquaculture and the Environment: Science, History, and Policy
EESS 156	Soil and Water Chemistry	EESS 280B	Principles and Practices of Sustainable Agriculture
		EESS 281	Urban Agriculture in the Developing World
		EESS 282	Ecological Farm Management
		EESS 283	Food Matters: Agriculture in Film
		EESS 284	Climate and Agriculture
		EESS 292	Directed Individual Study in Environmental Earth System Science
		EESS 300	Climate studies of terrestrial environments
		EESS 301	Topics in Environmental Earth System Science

EESS 305	Climate Change: An Earth Systems Perspective
EESS 306	From Freshwater to Oceans to Land Systems: An Earth System Perspective to Global Challenges
EESS 318	Global Land Use Change to 2050
EESS 322A	Seminar in Hydrogeology
EESS 322B	Seminar in Hydrogeology
EESS 323	Stanford at Sea
EESS 330	Advanced Topics in Hydrogeology
EESS 342	Geostatistics
EESS 342B	Geostatistics
EESS 342C	Geostatistics
EESS 363F	Oceanic Fluid Dynamics
EESS 385	Practical Experience in the Geosciences
EESS 398	Current Topics in Ecosystem Modeling
EESS 400	Graduate Research
ENERGY 24	Making Molehills out of Mountains: Energy and Development in Appalachia
ENERGY 101	Energy and the Environment
ENERGY 102	Renewable Energy Sources and Greener Energy Processes
ENERGY 104	Transition to sustainable energy systems
ENERGY 120	Fundamentals of Petroleum Engineering
ENERGY 120A	Flow Through Porous Media Laboratory
ENERGY 123	When Technology Meets Reality: An In-depth Look at the Deepwater Horizon Blowout and Oil Spill
ENERGY 125	Modeling and Simulation for Geoscientists and Engineers
ENERGY 130	Well Log Analysis I
ENERGY 141	Seismic Reservoir Characterization
ENERGY 146	Reservoir Characterization and Flow Modeling with Outcrop Data
ENERGY 153	Carbon Capture and Sequestration
ENERGY 154	Energy in Transition: Technology, Policy and Politics
ENERGY 155	Undergraduate Report on Energy Industry Training
ENERGY 158	Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull
ENERGY 160	Modeling Uncertainty in the Earth Sciences
ENERGY 167	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties
ENERGY 171	Energy Infrastructure, Technology and Economics
ENERGY 180	Oil and Gas Production Engineering
ENERGY 191	Optimization of Energy Systems
ENERGY 193	Undergraduate Research Problems
ENERGY 194	Special Topics in Energy and Mineral Fluids
ENERGY 227	Enhanced Oil Recovery
ENERGY 240	Geostatistics
ENERGY 241	Seismic Reservoir Characterization
ENERGY 246	Reservoir Characterization and Flow Modeling with Outcrop Data
ENERGY 253	Carbon Capture and Sequestration
ENERGY 260	Modeling Uncertainty in the Earth Sciences
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties
ENERGY 269	Geothermal Reservoir Engineering
ENERGY 271	Energy Infrastructure, Technology and Economics
ENERGY 280	Oil and Gas Production Engineering
ENERGY 291	Optimization of Energy Systems
ENERGY 293B	Fundamentals of Energy Processes
ENERGY 301	The Energy Seminar
ENGLISH 124	The American West
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use
ENGR 90	Environmental Science and Technology
ENGR 120	Fundamentals of Petroleum Engineering
ENGR 213	Solar Decathlon
ENVRES 200	Sustaining Action: Research, Analysis and Writing for the Public
ENVRES 215	Digital Storytelling for Researchers
ENVRES 240	Environmental Decision-Making and Risk Perception
ENVRES 250	Environmental Governance
ENVRES 270	Graduate Practicum in Environment and Resources
ENVRES 277C	Specialized Writing and Reporting: Environmental Journalism
ENVRES 280	Introduction to Environmental Science
ENVRES 290	Capstone Project Seminar in Environment and Resources
ENVRES 315	Environmental Research Design Seminar
ENVRES 320	Designing Environmental Research
ENVRES 330	Research Approaches for Environmental Problem Solving
ENVRES 380	Collaborating with the Future: Launching Large Scale Sustainable Transformations
ENVRES 399	Directed Research in Environment and Resources
ENVRINST 109	Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision
ENVRINST 177	Interdisciplinary Research Survival Skills
ENVRINST 198	Prehonors Seminar
ENVRINST 199	Interschool Honors Program in Environmental Science, Technology, and Policy
ENVRINST 220	The Social Ocean: Ocean Conservation, Management, and Policy
ETHICSOC 133	Ethics and Politics of Public Service
ETHICSOC 136R	Introduction to Global Justice
ETHICSOC 174A	Moral Limits of the Market
ETHICSOC 178M	Introduction to Environmental Ethics
ETHICSOC 278M	Introduction to Environmental Ethics
FEMGEN 129	Critical Issues in International Women's Health
FRENCH 168	Imagining the Oceans
GEOPHYS 20N	Predicting Volcanic Eruptions
GEOPHYS 50N	Planetary Habitability, World View, and Sustainability
GEOPHYS 60N	Man versus Nature: Coping with Disasters Using Space Technology
GEOPHYS 104	The Water Course

GEOPHYS 110	Earth on the Edge: Introduction to Geophysics	GEOPHYS 260	Rock Physics for Reservoir Characterization
GEOPHYS 112	Exploring Geosciences with MATLAB	GEOPHYS 262	Rock Physics
GEOPHYS 118	Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions	GEOPHYS 274	Journey to the Center of the Earth
GEOPHYS 120	Ice, Water, Fire	GEOPHYS 280	3-D Seismic Imaging
GEOPHYS 130	Introductory Seismology	GEOPHYS 287	Earthquake Seismology
GEOPHYS 141	Remote Sensing of the Oceans	GEOPHYS 288A	Crustal Deformation
GEOPHYS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	GEOPHYS 288B	Crustal Deformation
GEOPHYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	GEOPHYS 290	Tectonophysics & Global Tectonics
GEOPHYS 150	Geodynamics: Our Dynamic Earth	GEOPHYS 385B	Environmental Geophysics
GEOPHYS 162	Laboratory Methods in Geophysics	GERMAN 285	Environmentalism, Literature and Cultural Criticism
GEOPHYS 170	Global Tectonics	GES 1A	Introduction to Geology: The Physical Science of the Earth
GEOPHYS 171	Tectonics Field Trip	GES 1B	Introduction to Geology
GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods	GES 1C	Introduction to Geology: Dynamic Earth
GEOPHYS 184	Journey to the Center of the Earth	GES 4	Evolution and Extinction: Introduction to Historical Geology
GEOPHYS 185	Rock Physics for Reservoir Characterization	GES 5	Living on the Edge
GEOPHYS 187	Environmental Soundings Image Estimation	GES 8	Oceanography: An Introduction to the Marine Environment
GEOPHYS 190	Near-Surface Geophysics	GES 12SC	Environmental and Geological Field Studies in the Rocky Mountains
GEOPHYS 196	Undergraduate Research in Geophysics	GES 38N	The Worst Journey in the World: The Science, Literature, and History of Polar Exploration
GEOPHYS 200	Fluids and Flow in the Earth: Computational Methods	GES 39N	Forensic Geoscience: Stanford CSI
GEOPHYS 201	Frontiers of Geophysical Research at Stanford: Faculty Lectures	GES 40N	Diamonds
GEOPHYS 202	Reservoir Geomechanics	GES 42N	Landscapes and Tectonics of the San Francisco Bay Area
GEOPHYS 210	Basic Earth Imaging	GES 43Q	Environmental Problems
GEOPHYS 211	Environmental Soundings Image Estimation	GES 46Q	Environmental Impact of Energy Systems: What are the Risks?
GEOPHYS 218	Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions	GES 50Q	The Coastal Zone Environment
GEOPHYS 241A	Seismic Reservoir Characterization	GES 55Q	The California Gold Rush: Geologic Background and Environmental Impact
GEOPHYS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	GES 90	Introduction to Geochemistry
GEOPHYS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	GES 101	Environmental and Geological Field Studies in the Rocky Mountains
GEOPHYS 251	Structural Geology and Rock Mechanics	GES 102	Earth Materials: Introduction to Mineralogy
GEOPHYS 255	Report on Energy Industry Training	GES 103	Earth Materials: Rocks in Thin Section
GEOPHYS 257	Introduction to Computational Earth Sciences	GES 104	Introduction to Petrology
		GES 105	Introduction to Field Methods
		GES 107	Journey to the Center of the Earth
		GES 110	Structural Geology and Tectonics
		GES 111	Fundamentals of Structural Geology
		GES 115	Engineering Geology and Global Change
		GES 118	Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions
		GES 120	Planetary and Early Biological Evolution Seminar
		GES 121	What Makes a Habitable Planet?
		GES 122	Planetary Systems: Dynamics and Origins
		GES 123	Paleobiology

GES 128	Evolutionary History of Terrestrial Ecosystems	GES 262	Thermodynamics and Disorder in Minerals and Melts
GES 130	Soil Physics and Hydrology	GES 263	Introduction to Isotope Geochemistry
GES 131	Hydrologically-Driven Landscape Evolution	GES 266	Managing Nuclear Waste: Technical, Political and Organizational Challenges
GES 150	Senior Seminar: Issues in Earth Sciences	GES 267	Solution-Mineral Equilibria: Theory
GES 151	Sedimentary Geology and Petrography: Depositional Systems	GES 270	Environmental Geochemistry
GES 163	Introduction to Isotope Geochemistry	GES 272	Biomineralization
GES 170	Environmental Geochemistry	GES 273	Isotope Geochemistry Seminar
GES 171	Geochemical Thermodynamics	GES 277	Flood Basalts and Mass Extinctions
GES 180	Igneous Processes	GES 282	Interpretative Methods in Detrital Geochronology
GES 181	Metamorphic Processes	GES 284	Field Seminar on Eastern Sierran Volcanism
GES 183	California Desert Geologic Field Trip	GES 290	Departmental Seminar in Geological and Environmental Sciences
GES 184	Field Seminar on Eastern Sierran Volcanism	GES 291	GES Field Trips
GES 185	Volcanology	GES 292	Directed Reading with Geological and Environmental Sciences Faculty
GES 190	Research in the Field	GES 299	Field Research
GES 191	GES Field Trips	GES 310	Climate Change, Climate Variability, and Landscape Development
GES 192	Undergraduate Research in Geological and Environmental Sciences	GES 311	Interpretation of Tectonically Active Landscapes
GES 198	Special Problems in Geological and Environmental Sciences	GES 315	Literature of Structural Geology
GES 199	Honors Program	GES 328	Seminar in Paleobiology
GES 204A	Extraordinary Glimpses of Past Life	GES 336	Stanford Alpine Project Seminar
GES 206	Topics in Organismal Paleobiology	GES 340	Seminar on the Earth's Interior
GES 207	Journey to the Center of the Earth	GES 385	Practical Experience in the Geosciences
GES 208	Topics in Geobiology	GSBGEN 336	Energy Markets and Policy
GES 210	Geologic Evolution of the Western U.S. Cordillera	GSBGEN 337	Business Collaboration to Promote a Sustainable Food System
GES 211	Topics in Regional Geology and Tectonics	GSBGEN 532	Cleantech: Business Fundamentals and Public Policy
GES 212	Topics in Tectonic Geomorphology	GSBGEN 533	Sustainability as Market Strategy
GES 213	Topics in Sedimentary Geology	GSBGEN 537	The Role of Business in Sustainable Food Systems
GES 214	Topics in Paleobiology	GSBGEN 585	Social Innovation through Corporate Social Responsibility
GES 215	Structural Geology and Rock Mechanics	HISTORY 1B	Global History: The Early Modern World, 1300 to 1800
GES 216	Rock Fracture Mechanics	HISTORY 40	World History of Science
GES 217	Faults, Fractures, and Fluid Flow	HISTORY 42S	The Circle of Life: Visions of Nature in Modern Science, Religion, Politics and Culture
GES 220	Planetary and Early Biological Evolution Seminar	HISTORY 44	History of Women and Gender in Science, Medicine and Engineering
GES 221	What Makes a Habitable Planet?	HISTORY 47	History of South Africa
GES 222	Planetary Systems: Dynamics and Origins	HISTORY 102	History of the International System
GES 224	Modeling Transport and Transformations in the Environment	HISTORY 103D	Human Society and Environmental Change
GES 225	Contaminant Hydrogeology and Reactive Transport	HISTORY 106A	Global Human Geography: Asia and Africa
GES 228	Evolutionary History of Terrestrial Ecosystems	HISTORY 106B	Global Human Geography: Europe and Americas
GES 237	Surface and Near-Surface Hydrologic Response	HISTORY 140	World History of Science
GES 238	Soil Physics	HISTORY 144	History of Women and Gender in Science, Medicine and Engineering
GES 240	Geostatistics	HISTORY 147	History of South Africa
GES 246	Reservoir Characterization and Flow Modeling with Outcrop Data	HISTORY 151	The American West
GES 249	Petroleum Geochemistry in Environmental and Earth Science	HISTORY 226E	Famine in the Modern World
GES 250	Sedimentation Mechanics	HISTORY 232F	The Scientific Revolution
GES 251	Sedimentary Basins		
GES 252	Sedimentary Petrography		
GES 253	Petroleum Geology and Exploration		
GES 254	Carbonate Sedimentology		
GES 255	Basin and Petroleum System Modeling		
GES 257	Clastic Sequence Stratigraphy		
GES 258	Introduction to Depositional Systems		
GES 259	Stratigraphic Architecture		
GES 260	Laboratory Methods in Organic Geochemistry		

HISTORY 254	Popular Culture and American Nature
HISTORY 283	The New Global Economy, Oil and Origins of the Arab Spring
HISTORY 309E	History Meets Geography
HISTORY 326E	Famine in the Modern World
HISTORY 383	The New Global Economy, Oil and Origins of the Arab Spring
HISTORY 471A	Environmental History of Latin America
HISTORY 471B	Environmental History of Latin America
HRP 206	Meta-research: Appraising Research Findings, Bias, and Meta-analysis
HRP 214	Scientific Writing
HRP 216	Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research
HRP 220	BIOTECHNOLOGY LAW AND POLICY
HRP 223	Introduction to Data Management and Analysis in SAS
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies
HRP 226	Advanced Epidemiologic and Clinical Research Methods
HRP 228	Genetic Epidemiology
HRP 230	Cancer Epidemiology
HRP 231	Epidemiology of Infectious Diseases
HRP 236	Epidemiology Research Seminar
HRP 238	Genes and Environment in Disease Causation: Implications for Medicine and Public Health
HRP 241	Measuring Global Health
HRP 256	Economics of Health and Medical Care
HRP 259	Introduction to Probability and Statistics for Epidemiology
HRP 274	Design for Service Innovation
HRP 299	Directed Reading in Health Research and Policy
HUMBIO 2A	Genetics, Evolution, and Ecology
HUMBIO 2B	Culture, Evolution, and Society
HUMBIO 3B	Behavior, Health, and Development
HUMBIO 4B	Environmental and Health Policy Analysis
HUMBIO 5E	Science Education in Human Biology
HUMBIO 17SC	Darwin, Evolution, and Galapagos
HUMBIO 18SC	Conservation and Development Dilemmas in the Amazon
HUMBIO 19SC	Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa
HUMBIO 111	Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice
HUMBIO 111M	Marine Resource Economics and Conservation
HUMBIO 112	Conservation Biology: A Latin American Perspective
HUMBIO 113	The Human-Plant Connection
HUMBIO 114	Environmental Change and Emerging Infectious Diseases
HUMBIO 118	Theory of Ecological and Environmental Anthropology
HUMBIO 119	Demography: Health, Development, Environment
HUMBIO 121E	Ethnicity and Medicine
HUMBIO 122M	Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations
HUMBIO 125	Current Controversies in Women's Health
HUMBIO 126	Promoting Health Over the Life Course: Multidisciplinary Perspectives
HUMBIO 129	Critical Issues in International Women's Health
HUMBIO 129M	Measuring Global Health
HUMBIO 130	Human Nutrition
HUMBIO 151R	Biology, Health and Big Data
HUMBIO 152	Viral Lifestyles
HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges
HUMBIO 154A	Outbreaks, Epidemics, & Disease Control Systems
HUMBIO 155H	Humans and Viruses I
HUMBIO 158G	Genomics, Bioinformatics and Medicine
HUMBIO 159	Genes and Environment in Disease Causation: Implications for Medicine and Public Health
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context
HUMBIO 178	Ethics and Politics of Public Service
INTNLREL 1	Introduction to International Relations
INTNLREL 61Q	Food and security
INTNLREL 102	History of the International System
INTNLREL 136R	Introduction to Global Justice
IPS 201	Managing Global Complexity
IPS 203	Issues in International Economics
IPS 270	The Geopolitics of Energy
LAW 432	Modern Fossil Fuel Extraction
LAW 437	Water Law and Policy
LAW 515	Sustainable Energy: Business Opportunities and Public Policy
LAW 603	Environmental Law and Policy
LAW 622A	Environmental Law Clinic: Clinical Practice
LAW 622B	Environmental Law Clinic: Clinical Methods
LAW 622C	Environmental Law Clinic: Clinical Coursework
LAW 623	Advanced Environmental Law Clinic
MATSCI 11SC	Energy Technologies for a Sustainable Future
MATSCI 154	Thermodynamic Evaluation of Green Energy Technologies
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
MATSCI 302	Solar Cells
MATSCI 303	Principles, Materials and Devices of Batteries
ME 23Q	The Worldly Engineer
ME 24N	Designing the Car of the Future

ME 25N	Energy Sustainability and Climate Change	PEDS 150	Social and Environmental Determinants of Health
ME 70	Introductory Fluids Engineering	PEDS 250	Social and Environmental Determinants of Health
ME 185	Electric Vehicle Design	PHIL 23M	Justice and Climate Change
ME 206A	Entrepreneurial Design for Extreme Affordability	PHIL 25SI	The Animal-Human Relationship: Interdisciplinary Perspectives
ME 206B	Entrepreneurial Design for Extreme Affordability	PHIL 76	Introduction to Global Justice
ME 214	Good Products, Bad Products	PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence
ME 221	Green Design Strategies and Metrics	PHIL 167B	Philosophy, Biology, and Behavior
ME 222	Design for Sustainability	PHIL 174A	Moral Limits of the Market
ME 250	Internal Combustion Engines	PHIL 175A	Ethics and Politics of Public Service
ME 257	Turbine and Internal Combustion Engines	PHIL 178M	Introduction to Environmental Ethics
ME 260	Fuel Cell Science and Technology	PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence
ME 314	Good Products, Bad Products	PHIL 267B	Philosophy, Biology, and Behavior
ME 357	Turbine and Internal Combustion Engines	PHIL 274A	Moral Limits of the Market
ME 370A	Energy Systems I: Thermodynamics	PHIL 275A	Ethics and Politics of Public Service
ME 370B	Energy Systems II: Modeling and Advanced Concepts	PHIL 278M	Introduction to Environmental Ethics
ME 370C	Energy Systems III: Projects	PHYSICS 240	Introduction to the Physics of Energy
ME 371	Combustion Fundamentals	PHYSICS 241	Introduction to Nuclear Energy
ME 399	Fuel Cell Seminar	POLECON 230	Strategy Beyond Markets
MED 108Q	Human Rights and Health	POLECON 231	Strategy Beyond Markets: Challenges and Opportunities in Developing Economies
MED 231	Measuring Global Health	POLISCI 1	Introduction to International Relations
MED 274	Design for Service Innovation	POLISCI 1Z	Introduction to International Relations
MI 70Q	Photographing Nature	POLISCI 18SC	The Federal Government and the West
MI 155H	Humans and Viruses I	POLISCI 19N	Politics of Energy Efficiency
MLA 282	Indigenous Peoples and Environmental Problems	POLISCI 124A	The American West
MSE 52	Introduction to Decision Making	POLISCI 133	Ethics and Politics of Public Service
MSE 92Q	International Environmental Policy	POLISCI 134L	Introduction to Environmental Ethics
MSE 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	POLISCI 136R	Introduction to Global Justice
MSE 152	Introduction to Decision Analysis	POLISCI 241S	Spatial Approaches to Social Science
MSE 152W	Introduction to Decision Analysis	PSYCH 459	Frontiers in Interdisciplinary Biosciences
MSE 181	Issues in Technology and Work for a Postindustrial Economy	PUBLPOL 101	Politics and Public Policy
MSE 185	Global Work	PUBLPOL 103D	Ethics and Politics of Public Service
MSE 190	Methods and Models for Policy and Strategy Analysis	PUBLPOL 104	Economic Policy Analysis
MSE 197	Ethics, Technology, and Public Policy	PUBLPOL 121	Policy and Climate Change
MSE 243	Energy and Environmental Policy Analysis	PUBLPOL 125	Law and Public Policy
MSE 250A	Engineering Risk Analysis	PUBLPOL 194	Technology Policy
MSE 250B	Project Course in Engineering Risk Analysis	PUBLPOL 294	Technology Policy
MSE 252	Decision Analysis I: Foundations of Decision Analysis	RELIGST 106	Religion and the Environment: The Moral Meanings of Nature
MSE 264	Sustainable Product Development and Manufacturing	SOC 16N	African Americans and Social Movements
MSE 292	Health Policy Modeling	SOC 118	Social Movements and Collective Action
MSE 294	Climate Policy Analysis	SOC 160	Formal Organizations
MSE 295	Energy Policy Analysis	SOC 218	Social Movements and Collective Action
MSE 299	Voluntary Social Systems	SOC 260	Formal Organizations
MSE 352	Decision Analysis II: Professional Decision Analysis		
MSE 453	Decision Analysis Applications: Business Strategy and Public Policy		
NATIVEAM 109A	Federal Indian Law		
OBGYN 256	Current Controversies in Women's Health		
OIT 333	Design for Extreme Affordability		
OIT 334	Design for Extreme Affordability		

STATS 60	Introduction to Statistical Methods: Precalculus
STATS 110	Statistical Methods in Engineering and the Physical Sciences
STATS 141	Biostatistics
STATS 160	Introduction to Statistical Methods: Precalculus
STRAMGT 341	Achieving Social Impact
STS 131	Science Technology & Environmental Justice
STS 140	Science, Technology and Politics
STS 210	Ethics, Science, and Technology
SURG 231	Healthcare in Haiti and other Resource Poor Countries
URBANST 110	Utopia and Reality: Introduction to Urban Studies
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice
URBANST 114	Urban Culture in Global Perspective
URBANST 122	Ethics and Politics of Public Service
URBANST 124	Spatial Approaches to Social Science
URBANST 163	Land Use Control
URBANST 164	Sustainable Cities
URBANST 165	Sustainable Urban and Regional Transportation Planning

Total Units

0

Emmett Interdisciplinary Program in Environment and Resources (E-IPER)

Courses offered by the Emmett Interdisciplinary Program in Environment and Resources are listed under the subject code ENVRES on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/search?jsessionid=75B13D9BD401BF4435773811DC678716?view=catalog&catalog=&page=0&q=ENVRES&filter-catalognumber-ENVRES=on&filter-coursestatus-Active=on>).

Mission of the Program

The Emmett Interdisciplinary Program in Environment and Resources develops the knowledge, skills, perspectives, and ways of thinking needed to understand and help solve the world's most significant environmental and resources sustainability challenges. E-IPER strives to be a model for interdisciplinary graduate education. E-IPER offers a Ph.D. in Environment and Resources and a Joint M.S., the latter exclusively for students in Stanford's Graduate School of Business or Stanford Law School. E-IPER also offers a Dual M.S. for students in the School of Medicine. E-IPER's

home is the School of Earth Sciences; affiliated faculty come from all seven Stanford schools.

Graduate Programs in Environment and Resources

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The E-IPER Ph.D. and M.S. degrees are guided by comprehensive requirements created with faculty and student input and approved by E-IPER's Executive Committee. To access the current Ph.D. and M.S. degree requirement documents, see the E-IPER web site.

Learning Outcomes (Graduate)

Completion of the Ph.D. and M.S. degrees in Environment and Resources provides students with the knowledge, skills, perspectives, and ways of thinking needed to understand and help solve the world's most significant environmental and resources sustainability challenges.

Master of Science in Environment and Resources

Students may not apply directly for the M.S. in Environment and Resources degree. The M.S. is an option exclusively for M.B.A. students in the Graduate School of Business, J.D. students in the Stanford Law School, and M.D. students in the School of Medicine; in special cases for students pursuing a Ph.D. in another Stanford department; or for E-IPER Ph.D. students who do not continue in the Ph.D. degree program.

Joint Master's Degree

Students enrolled in a professional degree program in Stanford's Graduate School of Business or the Stanford Law School are eligible to apply for admission to the Joint M.S. in Environment and Resources Degree Program (JDP). Enrollment in the Joint M.S. Program allows students to pursue an M.S. degree concurrently with their professional degree and to count a defined number of units toward both degrees, resulting in the award of Joint M.B.A. and M.S. in Environment and Resources degree or a joint J.D. and M.S. in Environment and Resources degree.

The Joint M.B.A./M.S. degree program requires a total of 129 units to be completed over approximately eight academic quarters (compared to 105 units for the M.B.A. and 45 units for the M.S. if pursued as separate degrees).

The Joint J.D./M.S. degree program requires a minimum of 111 units, although it is possible that students may need to take additional units to satisfy the degree requirements for both the J.D. and M.S. The Joint J.D./M.S. may be completed in three years.

The student's program of study is subject to the approval of the student's faculty adviser and E-IPER staff. The joint degrees are conferred when the requirements for both the E-IPER M.S. and the professional degree programs have been met. For additional information, see the E-IPER website.

In addition to requirements for the professional degree, all Joint M.S. students are required to complete 45 units within the parameters outlined below and must achieve a 'B' (3.0) grade point average in all letter-graded courses taken toward the M.S. degree.

1. Completion of a required introductory core course and a capstone project seminar:

ENVRES 280 Introduction to Environmental Science

Units

2

ENVRES 290	Capstone Project Seminar in Environment and Resources *	1-3
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* The capstone project integrates the student's professional and M.S. degrees.

2. Completion of a minimum of four letter-graded courses from one Joint M.S. Course Track (specific track course listings below):
 - a. Energy
 - b. Climate and Atmosphere
 - c. Cleantech
 - d. Land Use and Agriculture
 - e. Oceans and Estuaries
 - f. Freshwater
 - g. Global, Community, and Environmental Health
 - h. Sustainable Built Environment
 - i. Sustainable Design
3. Completion of at least four additional 3-5 unit letter-graded elective courses at the 100-level or higher, which may be taken from one or more Course Tracks or elsewhere in the University.

Among the courses fulfilling the M.S. requirements, completion of at least 23 units at the 200-level or above.

Additional restrictions on course work that may fulfill the Joint M.S. degree include:

- A maximum of 5 units from courses that are identified as primarily consisting of guest lectures, such as the Energy Seminar or the Environmental Law Workshop, may be counted toward the joint M.S. degree.
- A maximum of 4 units of individual study courses, directed reading and independent research units (such as ENVRES 398 Directed Individual Study in Environment and Resources or ENVRES 399 Directed Research in Environment and Resources). One individual study course, if taken for 3-4 units, can be counted as one of the four elective courses.
- A maximum of 12 units from approved courses related to the environmental and resource fields from any professional school.

Dual Master's Degree

Students in the School of Medicine, or in special cases, students pursuing a Ph.D. in another Stanford department may apply to pursue the M.S. in Environment and Resources dual degree. For the dual degree, students must meet the University's minimum requirements for their stand-alone degree and also complete an additional 45 units for the M.S. in Environment and Resources. The student's program of study is subject to the approval of the student's faculty adviser and E-IPER staff. Completion of the M.S. is anticipated to require at least three quarters in addition to the quarters required for the student's other degree. For additional information, see the E-IPER website.

The student's program of study is subject to the approval of the student's faculty adviser and E-IPER staff. The two degrees are conferred when the requirements for both the E-IPER M.S. and the professional degree programs have been met. For application information, see the Admissions (<https://pangea.stanford.edu/programs/eiper/admissions>) page on the E-IPER website.

In addition to requirements for the stand-alone degree, students are required to complete 45 units within the parameters outlined below and must achieve a 'B' (3.0) grade point average in all letter-graded courses taken toward the M.S. degree.

1. Completion of a required introductory core course and a capstone project seminar:

ENVRES 280	Introduction to Environmental Science	2
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Units
2

ENVRES 290	Capstone Project Seminar in Environment and Resources *	1-3
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* The capstone project integrates the student's professional and M.S. degrees.

2. Completion of a minimum of four letter-graded courses from one M.S. Course Track (specific track course listings below):
 - Energy
 - Climate and Atmosphere
 - Cleantech
 - Land Use and Agriculture
 - Oceans and Estuaries
 - Freshwater
 - Global, Community, and Environmental Health
 - Sustainable Built Environment
 - Sustainable Design
3. Completion of at least four additional 3-5 unit letter-graded elective courses at the 100-level or higher, which may be taken from one or more Course Tracks or elsewhere in the University.

Among the courses fulfilling the M.S. requirements, completion of at least 23 units at the 200-level or above. .

Additional restrictions on course work that may fulfill the Dual M.S. degree include:

- A maximum of 5 units from courses that are identified as primarily consisting of guest lectures, such as the Energy Seminar or the Environmental Law Workshop may be counted toward the Dual M.S. degree.
- A maximum of 4 units of individual study courses, directed reading, and independent research (such as ENVRES 398 Directed Individual Study in Environment and Resources or ENVRES 399 Directed Research in Environment and Resources). One individual study course, if taken for 3-4 units, can be counted as one of the 4 elective courses.
- A maximum of 12 units from approved courses related to the environmental and resource fields from any professional school.

Joint M.S. and Dual M.S. Course Tracks

Students should consult Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site to determine course description, class schedule, location, eligibility, and prerequisites. Course tracks and other recommended courses are also available on the E-IPER website.

Energy

		Units
APPPHYS 219	Solid State Physics Problems in Energy Technology	3
BIOE 454	Synthetic Biology and Metabolic Engineering	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 207A	Energy Resources	3-5
CEE 217	Renewable Energy Infrastructure	3
CEE 236	Green Architecture	4
CEE 272R	Modern Power Systems Engineering	3
CHEMENG 454	Synthetic Biology and Metabolic Engineering	3
EARTHSYS 101	Energy and the Environment	3
EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes	3
EE 237	Solar Energy Conversion	3

EE 293B	Fundamentals of Energy Processes	3
ENERGY 101	Energy and the Environment	3
ENERGY 102	Renewable Energy Sources and Greener Energy Processes	3
ENERGY 104	Transition to sustainable energy systems	3
ENERGY 120	Fundamentals of Petroleum Engineering	3
ENERGY 226	Thermal Recovery Methods	3
ENERGY 227	Enhanced Oil Recovery	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 291	Optimization of Energy Systems	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENGR 120	Fundamentals of Petroleum Engineering	3
MATSCI 256	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
MATSCI 302	Solar Cells	3
MATSCI 303	Principles, Materials and Devices of Batteries	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
ME 260	Fuel Cell Science and Technology	3
ME 370A	Energy Systems I: Thermodynamics	3
ME 370B	Energy Systems II: Modeling and Advanced Concepts	4
ME 370C	Energy Systems III: Projects	3-5
MSE 243	Energy and Environmental Policy Analysis	3
MSE 295	Energy Policy Analysis	3

Climate and Atmosphere

		Units
BIO 117	Biology and Global Change	4
BIO 264	Biosphere-Atmosphere Interactions	4
CEE 172	Air Quality Management	3
CEE 263A	Air Pollution Modeling	3-4
CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 272S	Green House Gas Mitigation	1-3
CEE 278A	Air Pollution Fundamentals	3-4
CEE 278B	Atmospheric Aerosols	3
CEE 278C	Indoor Air Quality	2-3
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
EARTHSYS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
EARTHSYS 284	Climate and Agriculture	3-4
EESS 111	Biology and Global Change	4
EESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
EESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
EESS 284	Climate and Agriculture	3-4
ENERGY 253	Carbon Capture and Sequestration	3-4
GEOPHYS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3

GEOPHYS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
MSE 294	Climate Policy Analysis	3

Cleantech

		Units
APPPHYS 219	Solid State Physics Problems in Energy Technology	3
BIOE 355	Advanced Biochemical Engineering	3
BIOE 454	Synthetic Biology and Metabolic Engineering	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 207A	Energy Resources	3-5
CEE 215	Goals and Methods of Sustainable Building Projects	3
CEE 217	Renewable Energy Infrastructure	3
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 272R	Modern Power Systems Engineering	3
CEE 274A	Environmental Microbiology I	3
CEE 274B	Microbial Bioenergy Systems	3
CEE 275B	Process Design for Environmental Biotechnology	3
CHEMENG 274	Environmental Microbiology I	3
CHEMENG 355	Advanced Biochemical Engineering	3
CHEMENG 454	Synthetic Biology and Metabolic Engineering	3
CHEMENG 456	Microbial Bioenergy Systems	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 269	Geothermal Reservoir Engineering	3
MATSCI 302	Solar Cells	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
ME 221	Green Design Strategies and Metrics	2
ME 222	Design for Sustainability	2-3
ME 260	Fuel Cell Science and Technology	3
MSE 264	Sustainable Product Development and Manufacturing	3-4

Land Use and Agriculture

		Units
BIO 101	Ecology	4
BIO 117	Biology and Global Change	4
BIO 121	Biogeography	3
BIO 144	Conservation Biology: A Latin American Perspective	3
BIO 216	Terrestrial Biogeochemistry	3
BIO 264	Biosphere-Atmosphere Interactions	4
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 155	Science of Soils	3-4
EARTHSYS 242	Remote Sensing of Land	4
EARTHSYS 256	Soil and Water Chemistry	1-4
EARTHSYS 273	Aquaculture and the Environment: Science, History, and Policy	3
EARTHSYS 281	Urban Agriculture in the Developing World	3-4
EARTHSYS 284	Climate and Agriculture	3-4
EESS 111	Biology and Global Change	4
EESS 155	Science of Soils	3-4
EESS 216	Terrestrial Biogeochemistry	3
EESS 256	Soil and Water Chemistry	1-4

EESS 262	Remote Sensing of Land	4
EESS 273	Aquaculture and the Environment: Science, History, and Policy	3
EESS 280B	Principles and Practices of Sustainable Agriculture	3-4
EESS 281	Urban Agriculture in the Developing World	3-4
EESS 284	Climate and Agriculture	3-4
HUMBIO 112	Conservation Biology: A Latin American Perspective	3
URBANST 163	Land Use Control	4
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5

Oceans and Estuaries

		Units
BIO 274S	Hopkins Microbiology Course	3-12
BIOHOPK 263H	Oceanic Biology	4
BIOHOPK 272H	Marine Ecology: From Organisms to Ecosystems	5
BIOHOPK 274	Hopkins Microbiology Course	3-12
BIOHOPK 285H	Ecology and Conservation of Kelp Forest Communities	5
CEE 262D	Introduction to Physical Oceanography	4
CEE 272	Coastal Contaminants	3-4
CEE 274S	Hopkins Microbiology Course	3-12
CEE 275A	California Coast: Science, Policy, and Law	3-4
EARTHSYS 241	Remote Sensing of the Oceans	3-4
EARTHSYS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
EARTHSYS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
EARTHSYS 258	Geomicrobiology	3
EARTHSYS 273	Aquaculture and the Environment: Science, History, and Policy	3
EARTHSYS 275	California Coast: Science, Policy, and Law	3-4
EESS 241	Remote Sensing of the Oceans	3-4
EESS 244	Marine Ecosystem Modeling	3
EESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
EESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
EESS 253S	Hopkins Microbiology Course	3-12
EESS 258	Geomicrobiology	3
EESS 273	Aquaculture and the Environment: Science, History, and Policy	3
GEOPHYS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
GEOPHYS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3

Freshwater

		Units
CEE 101B	Mechanics of Fluids	4
CEE 177	Aquatic Chemistry and Biology	4
CEE 260A	Physical Hydrogeology	4
CEE 260C	Contaminant Hydrogeology and Reactive Transport	4
CEE 262A	Hydrodynamics	3-4
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 262E	Lakes and Reservoirs	2-3

CEE 264A	Rivers, Streams, and Canals	3-4
CEE 265A	Sustainable Water Resources Development	3
CEE 265C	Water Resources Management	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 266A	Watersheds and Wetlands	3
CEE 266B	Floods and Droughts, Dams and Aqueducts	3
CEE 266D	Water Resources and Water Hazards Field Trips	2
CEE 268	Groundwater Flow	3-4
CEE 270	Movement and Fate of Organic Contaminants in Waters	3
CEE 271A	Physical and Chemical Treatment Processes	3
CEE 271B	Environmental Biotechnology	4
CEE 273	Aquatic Chemistry	3
CEE 273A	Water Chemistry Laboratory	3
CEE 275B	Process Design for Environmental Biotechnology	3
EARTHSYS 273	Aquaculture and the Environment: Science, History, and Policy	3
EESS 220	Physical Hydrogeology	4
EESS 221	Contaminant Hydrogeology and Reactive Transport	4
EESS 273	Aquaculture and the Environment: Science, History, and Policy	3

Global, Community, and Environmental Health

		Units
ANTHRO 173	Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice	3
ANTHRO 262	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 263	Conservation and Evolutionary Ecology	5
ANTHRO 266	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	3-5
ANTHRO 277	Environmental Change and Emerging Infectious Diseases, Japanese Society and Culture	3-5,5
ANTHRO 282	Medical Anthropology	4
BIO 102	Demography: Health, Development, Environment	3
BIO 117	Biology and Global Change	4
CEE 260C	Contaminant Hydrogeology and Reactive Transport	4
CEE 263A	Air Pollution Modeling	3-4
CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 265A	Sustainable Water Resources Development	3
CEE 265C	Water Resources Management	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 270	Movement and Fate of Organic Contaminants in Waters	3
CEE 272	Coastal Contaminants	3-4
CEE 274D	Pathogens and Disinfection	3
CEE 274E	Pathogens in the Environment	3
CEE 276	Introduction to Human Exposure Analysis	3
CEE 276E	Environmental Toxicants	2-3
CEE 278A	Air Pollution Fundamentals	3-4
CEE 278B	Atmospheric Aerosols	3
CEE 278C	Indoor Air Quality	2-3
EARTHSYS 111	Biology and Global Change	4
EESS 111	Biology and Global Change	4

EESS 221	Contaminant Hydrogeology and Reactive Transport	4			Units
HUMBIO 111	Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice	3	ENVRES 300	Introduction to Resource, Energy and Environmental Economics *	3
HUMBIO 119	Demography: Health, Development, Environment	3	ENVRES 315	Environmental Research Design Seminar	1
HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges	4	ENVRES 320	Designing Environmental Research	3-4
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context	4	ENVRES 330 & ENVRES 398	Research Approaches for Environmental Problem Solving and Directed Individual Study in Environment and Resources	4-12

Sustainable Built Environment

		Units
CEE 100	Managing Sustainable Building Projects	4
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 215	Goals and Methods of Sustainable Building Projects	3
CEE 224A	Sustainable Development Studio	1-5
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 236	Green Architecture	4
CEE 248	Real Estate Development	3
CEE 248G	Certifying Green Buildings	1
CEE 265A	Sustainable Water Resources Development	3
URBANST 160	Environmental Policy and the City in U.S. History	5
URBANST 163	Land Use Control	4
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5

Sustainable Design

		Units
ANTHRO 332	Transformative Design	3-5
BIOE 281	Biomechanics of Movement	3
CEE 226	Life Cycle Assessment for Complex Systems	3-4
ENGR 210	Perspectives in Assistive Technology (ENGR 110)	1-3
ENGR 231	Transformative Design	3-5
ENVRES 380	Collaborating with the Future: Launching Large Scale Sustainable Transformations	3-4
ME 216A	Advanced Product Design: Needfinding	3-4
ME 221	Green Design Strategies and Metrics	2
ME 222	Design for Sustainability	2-3
ME 281	Biomechanics of Movement	3
ME 283	Tissue Mechanics and Mechanobiology	3
ME 315	The Designer in Society	3
POLISCI 337T	Designing Liberation Technology	3-4

Master of Science

In exceptional circumstances, E-IPER offers a Master of Science degree for students in E-IPER's Ph.D. program who opt to complete their training with an M.S. degree or who do not advance to candidacy for the Ph.D. degree. Admission directly to the M.S. program is not allowed. Requirements for the M.S. include:

1. Completion of a minimum of 45 units at or above the 100-level, of which 23 units must be at or above the 200-level.
2. Completion of the E-IPER Ph.D. core curriculum, each with a letter grade of 'B' or higher, comprising:

*Students admitted prior to 2014-15 must consult with E-IPER staff regarding an allowable replacement for this course.

Additional courses may be chosen in consultation with the student's lead advisers. Students may take no more than 6 of the required 45 units credit/no credit and must maintain at least a "B" (3.0) grade point average in all courses taken for the M.S. degree. Directed research and independent study may count for a maximum of 8 units of the 45 required units. The M.S. degree does not have an M.S. with thesis option. Students may write a M.S. thesis, but it is not formally recognized by the University.

Doctor of Philosophy in Environment and Resources

E-IPER's Ph.D. requirements are updated annually and lay out a scaffold of advising meetings, core courses, program activities, and milestones to guide students' progress. Each student works with a faculty advising team from different areas of research to design a course of study that allows the student to develop and exhibit: a) familiarity with analytical tools and research approaches for interdisciplinary problem solving, and a mastery of those tools and approaches central to the student's thesis work; b) interdisciplinary breadth as determined by faculty advisers and student; and c) depth in at least two distinct Fields of Inquiry.

Program-specific Ph.D. requirements are outlined in detail in the current year requirements and are summarized below:

1. In the first year, completion of the Ph.D. core course sequence:

		Units
EARTHSCI 300	Earth Sciences Seminar	1
ENVRES 300	Introduction to Resource, Energy and Environmental Economics	3
ENVRES 315	Environmental Research Design Seminar	1
ENVRES 320	Designing Environmental Research	3-4
ENVRES 330 & ENVRES 398	Research Approaches for Environmental Problem Solving and Directed Individual Study in Environment and Resources	4-12

2. Demonstration of breadth of knowledge related to environment and resources in the form of courses, independent study, and/or evidence of proficiency through prior course work or experience. Fulfillment of interdisciplinary breadth requirement must be certified by the student's lead faculty advisers and committee members.
3. Fulfillment of depth in the student's two chosen fields of inquiry through additional courses, research, and/or independent studies as determined by the student and his/her faculty advisers and committee members. Fields of Inquiry are the central focus of a student's dissertation research. Students have the freedom to define and choose the Fields of Inquiry in which they would like to develop depth of understanding through the course of their Ph.D. and which are distinct enough to ensure that the student's research is interdisciplinary. Each Field of Inquiry must be mapped to a corresponding faculty adviser. As part of their Qualifying Exam, students are required to submit a detailed essay describing: the two Fields of Inquiry, mapping these Fields of Inquiry from the larger disciplines on which their Fields of

Inquiry draw; how rigor is understood and achieved in these Fields; the importance and applicability of these Fields to the student's research questions; and how the student's work will combine these two Fields of Inquiry to yield an interdisciplinary research project achieving scholarly rigor.

4. Completion of quarterly meetings with advisers during the first year, and at minimum, annual meetings thereafter.
5. Submission of a Candidacy Plan by end of Spring Quarter of the second year, for review at the Second Year committee Meeting of the Minds and subject to the approval of E-IPER's Faculty Director. The Candidacy Plan should document how the student has fulfilled the program requirements to date and include a summary of research ideas and a list of faculty who might serve as qualifying exam committee members.
6. Completion of the oral qualifying exam and completion of the requirements for candidacy, including at least 25 letter-graded graduate course units (200 level and above) with at least a "B" (3.0) average, by the end of Winter Quarter of the third year. The oral qualifying exam committee should include the student's two lead advisers and 2-3 other faculty with expertise in the student's research area. The majority of the oral qualifying exam committee should be members of the Academic Council; the chair of the committee must be an Academic Council member and may not be one of the student's two lead advisers. In exceptional cases, the committee may include a member-at-large who is not a Stanford faculty member as a fourth or fifth member.
7. Completion of a written dissertation, approved by the student's dissertation reading committee consisting of the student's lead advisers and at least one other member, and passage of the University oral examination in defense of the dissertation following the guidelines outlined in the "Graduate Degrees" section of this bulletin. The University oral examination committee comprises the student's two lead advisers, at least two additional members, and a chair who is appointed in a department outside that of the lead advisers, all of whom are normally Academic Council members. Appointment of a non-Academic Council member must be petitioned and approved by the Faculty Director.

In addition to the requirements listed above, all Ph.D. students must:

1. Serve as a teaching assistant (TA) for at least one quarter in a course with a discussion section or with an opportunity to lecture in at least two class sessions, in any department or program, including but not limited to ENVRES 320 Designing Environmental Research or ENVRES 330 Research Approaches for Environmental Problem Solving. Seminars, including Introductory Seminars, may not be used to fulfill this requirement. Students should fulfill the teaching requirement by the end of the third year unless they obtain a firm commitment from a faculty member to TA a future course.
2. On an ongoing basis, submit grant proposals for external funding, defined as fellowship and/or research funds provided by a government agency, a private foundation, or a University entity other than E-IPER or the School of Earth Sciences.
3. Participate each year in a Spring Quarter annual review in which the student and lead advisers submit progress reports for review by the E-IPER Academic Guidance Committee.

Faculty Director: Peter Vitousek (Biology)

Associate Director: Deborah Wojcik

Faculty: Nicole Ardoin (Education, Woods Institute for the Environment), Kevin Arrigo (Environmental Earth System Science), Kenneth J. Arrow (Economics, emeritus), Gregory Asner (Global Ecology, Carnegie Institution), Shilajeet Banerjee (Human-Sciences and Technologies Advanced Research Institute), Stephen Barley (Management Science and Engineering), William Barnett (Business), Michele Barry (Medicine, Woods Institute for the Environment), Sally M. Benson (Energy Resources Engineering, Global Climate and Energy Program, Woods Institute for the

Environment), Sarah L. Billington (Civil and Environmental Engineering), Douglas W. Bird (Anthropology), Rebecca Bliege Bird (Anthropology), Barbara Block (Biology, Woods Institute for the Environment), Alexandria Boehm (Civil and Environmental Engineering), Adam Brandt (Energy Resources Engineering), Jef Caers (Energy Resources Engineering), Ken Caldeira (Global Ecology, Carnegie Institution), Margaret Caldwell (Law), Karen Casciotti (Environmental Earth System Science), Page Chamberlain (Environmental Earth System Science), Joshua Cohen (Political Science), Craig S. Criddle (Civil and Environmental Engineering, Woods Institute for the Environment), Larry B. Crowder (Biology, Woods Institute for the Environment), Lisa Curran (Anthropology, Woods Institute for the Environment), Gretchen C. Daily (Biology, Woods Institute for the Environment), Jennifer Davis (Civil and Environmental Engineering, Woods Institute for the Environment), Noah Diffenbaugh (Environmental Earth System Science, Woods Institute for the Environment), Rodolfo Dirzo (Biology, Woods Institute for the Environment), Robert B. Dunbar (Environmental Earth System Science, Woods Institute for the Environment), William H. Durham (Anthropology, Woods Institute for the Environment), Anne Ehrlich (Biology), Paul Ehrlich (Biology, Woods Institute for the Environment), Gary Ernst (Geological and Environmental Sciences, emeritus), Walter Falcon (Woods Institute for the Environment, Freeman Spogli Institute for International Studies, emeritus), Scott Fendorf (Environmental Earth System Science, Woods Institute for the Environment), James Ferguson (Anthropology), Christopher B. Field (Global Ecology, Carnegie Institution, Woods Institute for the Environment), Martin Fischer (Civil and Environmental Engineering), Zephyr Frank (History), David Freyberg (Civil and Environmental Engineering, Woods Institute for the Environment), Oliver Fringer (Civil and Environmental Engineering), Tadashi Fukami (Biology), Margot Geritsen (Energy Resources Engineering), Steven Gorelick (Environmental Earth System Science, Woods Institute for the Environment), Mark Granovetter (Sociology), Elizabeth Hadly (Biology, Woods Institute for the Environment), Dan Iancu (Business), Mark Jacobson (Civil and Environmental Engineering, Woods Institute for the Environment), James Holland Jones (Anthropology, Woods Institute for the Environment), Terry Karl (Political Science), David Kennedy (History, Woods Institute for the Environment), Donald Kennedy (Biology, Woods Institute for the Environment, emeritus), Julie Kennedy (Environmental Earth System Science, Woods Institute for the Environment), Herve Kieffel (Management Science and Engineering), Brian Knutson (Psychology), Charles D. Kolstad (Stanford Institute for Economic Policy Research, Precourt Institute for Energy), Jeffrey Koseff (Civil and Environmental Engineering, Woods Institute for the Environment), Anthony Kovscek (Energy Resources Engineering), Eric Lambin (Environmental Earth System Science, Woods Institute for the Environment), Raymond Levitt (Civil and Environmental Engineering, Woods Institute for the Environment), David Lobell (Environmental Earth System Science, Woods Institute for the Environment), Stephen P. Luby (Medicine, Woods Institute for the Environment), Richard Luthy (Civil and Environmental Engineering, Woods Institute for the Environment), Janet Martinez (Law), Gilbert M. Masters (Civil and Environmental Engineering, emeritus), Michael D. Mastrandrea (Woods Institute for the Environment), Pamela Matson (Woods Institute for the Environment, Dean, School of Earth Sciences), Douglas McAdam (Sociology), Daniel McFarland (Education), Michael D. McGehee (Materials Science and Engineering), Lynn Meskell (Anthropology), Anna Michalak (Global Ecology, Carnegie Institution), Fiorenza Micheli (Biology), Grant Miller (Medicine), Stephen Monismith (Civil and Environmental Engineering, Woods Institute for the Environment), Harold Mooney (Biology, Woods Institute for the Environment, emeritus), Clayton Nall (Political Science), Rosamond Naylor (Environmental Earth System Science, Woods Institute for the Environment), Leonard Ortolano (Civil and Environmental Engineering), Stephen Palumbi (Biology, Woods Institute for the Environment), Erica Plambeck (Business, Woods Institute for the Environment), Walter W. Powell (Education), Dariush Rafinejad (Management Science and Engineering), Ram Rajagopal (Civil and Environmental Engineering), Hayagreeva Rao (Business), Stefan J. Reichelstein (Business, Woods

Institute for the Environment), Thomas N. Robinson (Medicine), Terry L. Root (Woods Institute for the Environment), Robert Sapolsky (Biology), Debra Satz (Philosophy), Gary Schoolnik (Medicine, Woods Institute for the Environment), Richard Scott (Sociology), Deborah Sivas (Law), Sarah A. Soule (Business), Charles Sprenger (Economics), Stephen Stedman (Freeman Spogli Institute for International Studies), James Sweeney (Management Science and Engineering, Precourt Energy Efficiency Center), Leif Thomas (Environmental Earth System Science), Barton Thompson (Law, Woods Institute for the Environment), Shripad Tuljapurkar (Biology), Peter Vitousek (Biology), Michael Wara (Law, Woods Institute for the Environment), Jeremy Weinstein (Political Science), John Weyant (Management Science and Engineering, Precourt Energy Efficiency Center), Richard White (History), Jennifer Wilcox (Energy Resources Engineering), Michael Wilcox (Anthropology), Mikael Wolfe (History), Mark Zoback (Geophysics)

Energy Resources Engineering

Courses offered by the Department of Energy Resources Engineering are listed under the subject code ENERGY on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENERGY&filter-catalognumber-ENERGY=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENERGY&filter-catalognumber-ENERGY=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENERGY&filter-catalognumber-ENERGY=on>).

The Department of Energy Resources Engineering (ERE) awards the following degrees: the Bachelor of Science, Master of Science, Engineer, and Doctor of Philosophy in Energy Resources Engineering. The department also awards the Master of Science, Engineer, and Doctor of Philosophy in Petroleum Engineering. Consult the ERE student services office to determine the relevant program.

Energy resources engineers are concerned with the design of processes for energy recovery. Included in the design process are characterizing the spatial distribution of hydrocarbon and geothermal reservoir properties, drilling wells, designing and operating production facilities, selecting and implementing methods for enhancing fluid recovery, examining the environmental aspects of petroleum and geothermal exploration and production, monitoring reservoirs, and predicting recovery process performance.

The program also has a strong interest in related energy topics such as renewable energy, global climate change, carbon capture and sequestration, clean energy conversions (e.g., "clean coal"), and energy systems. The Energy Resources Engineering curriculum provides a sound background in basic sciences and their application to practical problems to address the complex and changing nature of the field. Course work includes the fundamentals of chemistry, computer science, engineering, geology, geophysics, mathematics, and physics. Applied courses cover most aspects of energy resources engineering and some related fields such as geothermal engineering and geostatistics. The curriculum emphasizes the fundamental aspects of fluid flow in the subsurface. These principles apply equally well to optimizing oil recovery from petroleum reservoirs, geothermal energy production and remediating contaminated groundwater systems.

Faculty and graduate students conduct research in areas including: enhanced oil recovery by thermal means, gas injection, and the use of chemicals; geostatistical reservoir characterization and mathematical modeling; geothermal engineering; natural gas engineering; production optimization;

data assimilation and uncertainty modeling; properties of petroleum fluids; well test analysis; carbon sequestration; clean energy conversions; and energy system modeling and optimization. Undergraduates are encouraged to participate in research projects.

The department is housed in the Green Earth Sciences Building. It operates laboratories for research in enhanced oil recovery processes, geological carbon storage operations, clean energy conversions, and geothermal engineering. Students have access to a variety of computers, computing platforms and software for research and course work.

Mission of the Undergraduate Program in Energy Resources Engineering

The mission of the Energy Resources Engineering major is to provide students with the engineering skills and foundational knowledge needed to flourish as technical leaders within the energy industry. Such skills and knowledge include resource assessment, choices among energy alternatives, and carbon management, as well as the basic scientific background and technical skills common to engineers. The curriculum is designed to prepare students for immediate participation in many aspects of the energy industry and graduate school.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. apply skills developed in fundamental courses to engineering problems.
2. research, analyze, and synthesize solutions to an original and contemporary energy problem.
3. work independently and as part of a team to develop and improve engineering solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.

Graduate Programs in Energy Resources Engineering

The Energy Resources Engineering department offers two distinct degree programs at both the M.S and Ph.D. levels. One program leads to the degrees of M.S. or Ph.D. in Petroleum Engineering, and the other leads to the degrees of M.S. or Ph.D. in Energy Resources Engineering. The Engineer degree, which is offered in either Petroleum Engineering or Energy Resources Engineering, is an extended form of the M.S. degree with additional course work and research.

Learning Outcomes (Graduate)

The objective is to prepare students to be technical leaders in the energy industry, academia and research organizations through completion of fundamental courses in the major field and in related sciences, as well as through independent research. Students are expected to:

1. apply skills developed in fundamental courses to engineering problems.
2. research, analyze, and synthesize solutions to an original and contemporary energy problem.
3. work independently and as part of a team to develop and improve engineering solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.

5. MS students are expected to develop in-depth technical understanding of energy problems at an advanced level.
6. Ph.D. students are expected to complete a scientific investigation that is significant, challenging and original.

Bachelor of Science in Energy Resources Engineering

The four-year program leading to the B.S. degree provides a foundation for careers in many facets of the energy industry. The curriculum includes basic science and engineering courses that provide sufficient depth for a wide spectrum of careers in the energy and environmental fields.

One of the goals of the program is to provide experience integrating the skills developed in individual courses to address a significant design problem. In ENERGY 199 Senior Project and Seminar in Energy Resources, taken in the senior year, student teams identify and propose technical solutions for an energy-resource related problem of current interest.

Program

The requirements for the B.S. degree in Energy Resources Engineering are similar, but not identical, to those described in the "School of Engineering" section of this bulletin. Students must satisfy the University general education, writing, and language requirements. The normal Energy Resources Engineering undergraduate program automatically satisfies the University General Education Requirements (GERs) in the Disciplinary Breadth areas of Natural Sciences, Engineering and Applied Sciences, and Mathematics.

Engineering fundamentals courses and Energy Resources Engineering depth and elective courses must be taken for a letter grade.

The Energy Resources Engineering undergraduate curriculum is designed to prepare students for participation in the energy industry or for graduate studies, while providing requisite skills to evolve as the energy landscape shifts over the next half century. The program provides a background in mathematics, basic sciences, and engineering fundamentals such as multiphase fluid flow in the subsurface. In addition, the curriculum is structured with flexibility that allows students to explore energy topics of particular individual interest and to study abroad.

In brief, the unit and subject requirements are:

	Units
Energy Resources Core	15-16
Energy Resources Depth	18
Mathematics	25
Engineering Fundamentals and Depth	20-24
Science	29-32
Technology in Society	3-5
University Requirements: IHUM, GERs, Writing, Language	60-70
Total Units	170-190

The following courses constitute the normal program leading to a B.S. in Energy Resources Engineering. The program may be modified to meet a particular student's needs and interests with the advisor's prior approval.

Required Core in Energy Resources Engineering

The following courses constitute the core program in Energy Resources Engineering

ENERGY 101	Energy and the Environment	3
ENERGY 104	Transition to sustainable energy systems	3

ENERGY 120	Fundamentals of Petroleum Engineering	3
ENERGY 160	Modeling Uncertainty in the Earth Sciences	3
ENERGY 199	Senior Project and Seminar in Energy Resources (WIM)	3-4

Mathematics

Select one of the following Series (A or B): 10

Series A

MATH 41	Calculus	
MATH 42	Calculus	

Series B

MATH 19	Calculus	
MATH 20	Calculus	
MATH 21	Calculus	

And the following (CME series recommended):

CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	

CME 102	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	

CME 104	Linear Algebra and Partial Differential Equations for Engineers	5
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or MATH 52 Integral Calculus of Several Variables

Science

CHEM 31A	Chemical Principles I	5
or CHEM 31X	Chemical Principles Accelerated	

CHEM 31B	Chemical Principles II	5
or CHEM 31X	Chemical Principles Accelerated	

CHEM 33	Structure and Reactivity	5
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PHYSICS 41	Mechanics	4
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PHYSICS 43	Electricity and Magnetism	4
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PHYSICS 45	Light and Heat	4
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PHYSICS 46	Light and Heat Laboratory	1
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GES 1A	Introduction to Geology: The Physical Science of the Earth	4-5
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or GES 1C Introduction to Geology: Dynamic Earth

Engineering Fundamentals

CS 106A	Programming Methodology	3-5
or CS 106X	Programming Abstractions (Accelerated)	

CS 106B	Programming Abstractions	3-5
or CS 106X	Programming Abstractions (Accelerated)	

ENGR 14	Intro to Solid Mechanics	4
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ENGR 30	Engineering Thermodynamics	3
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CEE 146A	Engineering Economy	3
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or ECON 155	Environmental Economics and Policy	
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or ECON 250	Environmental Economics	
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or ECON 251	Natural Resource and Energy Economics	
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ME 70	Introductory Fluids Engineering	4
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Technology in Society, 1 course

Earth and Energy Depth Concentration

Choose courses from the list below for a total of at least 18 units. At least one course must be completed in each category. Courses must be planned in consultation with the student's academic advisor. Appropriate substitutions are allowed with the consent of the advisor.

Units

Fluid Flow and the Subsurface

Units

ENERGY 120A	Flow Through Porous Media Laboratory	1
ENERGY 121	Fundamentals of Multiphase Flow	3
ENERGY 130	Well Log Analysis I	3
ENERGY 175	Well Test Analysis	3
ENERGY 180	Oil and Gas Production Engineering	3
ENGR 62	Introduction to Optimization	4
GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods	3
3D Modeling of Subsurface Structures		
ENERGY 125	Modeling and Simulation for Geoscientists and Engineers	3
ENERGY 141	Seismic Reservoir Characterization	3-4
ENERGY 146	Reservoir Characterization and Flow Modeling with Outcrop Data	3
GEOPHYS 112	Exploring Geosciences with MATLAB	1-3
GEOPHYS 182	Reflection Seismology	3
GES 151	Sedimentary Geology and Petrography: Depositional Systems	4
GEOPHYS 183	Reflection Seismology Interpretation	1-4
GEOPHYS 185	Rock Physics for Reservoir Characterization	3
GEOPHYS 186	Tectonophysics & Global Tectonics	3
Earth and Energy Systems		
ENERGY 102	Renewable Energy Sources and Greener Energy Processes	3
ENERGY 153	Carbon Capture and Sequestration	3-4
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 191	Optimization of Energy Systems	3-4
ENERGY 301	The Energy Seminar	1
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 70	Environmental Science and Technology	3
CEE 176B	Electric Power: Renewables and Efficiency	3-4
GEOPHYS 150	Geodynamics: Our Dynamic Earth	3
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
GEOPHYS 120	Ice, Water, Fire	3-5
GEOPHYS 150	Geodynamics: Our Dynamic Earth	3

Honors Program

The program in Energy Resources Engineering leading to the Bachelor of Science with Honors provides an opportunity for independent study and research on a topic of special interest and culminates in a written report and oral presentation.

The Honors Program is open to students with a grade point average (GPA) of at least 3.5 in all courses required for the ERE major and minimum of 3.0 in all University course work. Qualified students intending to pursue honors must submit an Honors Program Application to the Undergraduate Program Director no later than the eighth week of their ninth quarter, but students are encouraged to apply to the program during Winter Quarter of their junior year. The application includes a short form, an unofficial transcript, and a 2-3 page research proposal prepared by the student and endorsed by a faculty member who will serve as the research advisor.

Upon approval, students enroll in the Honors Program via Axxess. Students must enroll in a total of 9 units of ENERGY 193 Undergraduate Research Problems; these units may be spread out over the course of the senior year, and may include previous enrollment units for the same research project. Research undertaken for the Honors Program cannot be used as a substitute for regularly required courses. A formal written report must be submitted to the student's research advisor no later than the fourth week of the student's

final quarter, and the report must be read, approved, and signed by the student's faculty advisor and a second member of the faculty. Each honors candidate must make an oral presentation of his or her research results.

Minor in Energy Resources Engineering

The minor in Energy Resources Engineering requires the following three courses plus three additional electives. Courses must be planned in consultation with an ERE advisor. Appropriate substitutions are allowed with the consent of the advisor.

Required courses

		Units
ENERGY 101	Energy and the Environment	3
ENERGY 120	Fundamentals of Petroleum Engineering	3
ENERGY 160	Modeling Uncertainty in the Earth Sciences	3

Elective courses

Select at least three of the following:

ENERGY 102	Renewable Energy Sources and Greener Energy Processes	
ENERGY 104	Transition to sustainable energy systems	
ENERGY 121	Fundamentals of Multiphase Flow	
ENERGY 125	Modeling and Simulation for Geoscientists and Engineers	
ENERGY 130	Well Log Analysis I	
ENERGY 141	Seismic Reservoir Characterization	
ENERGY 146	Reservoir Characterization and Flow Modeling with Outcrop Data	
ENERGY 153	Carbon Capture and Sequestration	
ENERGY 269	Geothermal Reservoir Engineering	
ENERGY 175	Well Test Analysis	
ENERGY 180	Oil and Gas Production Engineering	
GEOPHYS 182	Reflection Seismology	
GES 151	Sedimentary Geology and Petrography: Depositional Systems	

Master of Science in Petroleum Engineering

The objective is to prepare the student for professional work in the energy industry, or for doctoral studies, through completion of fundamental courses in the major field and in related sciences as well as independent research.

Students entering the graduate program are expected to have an undergraduate-level engineering or physical science background. Competence in computer programming in a high-level language (CS 106X Programming Abstractions (Accelerated) or the equivalent) and knowledge of engineering and geological fundamentals (ENERGY 120 Fundamentals of Petroleum Engineering, ENERGY 130 Well Log Analysis I, and GES 151 Sedimentary Geology and Petrography: Depositional Systems) are prerequisites for taking most graduate courses.

The following are minimum requirements for a student in the Department of Energy Resources Engineering to remain in good academic standing regarding course work:

1. no more than one incomplete grade at any time
2. a cumulative grade point average (GPA) of 3.0
3. a grade point average (GPA) of 2.7 each quarter
4. a minimum of 15 units completed within each two quarter period (excluding Summer Quarter).

Unless otherwise stated by the instructor, incomplete grades in courses within the department are changed to 'NP' (not passed) at the end of the quarter after the one in which the course was given. This one quarter limit is a different constraint from the maximum one-year limit allowed by the University.

Academic performance is reviewed each quarter by a faculty committee. At the beginning of the next quarter, any student not in good academic standing receives a letter from the committee or department chair stating criteria that must be met for the student to return to good academic standing. If the situation is not corrected by the end of the quarter, possible consequences include termination of financial support, termination of departmental privileges, and termination from the University.

Students funded by research grants or fellowships from the department are expected to spend at least half of their time (a minimum of 20 hours per week) on research. Continued funding is contingent upon satisfactory research effort and progress as determined by the student's adviser. After Autumn Quarter of the first year, students receive a letter from the department chair concerning their research performance. If problems are identified and they persist through the second quarter, a warning letter is sent. Problems persisting into a third quarter may lead to loss of departmental support including tuition and stipend. Similar procedures are applied in subsequent years.

A balanced master's degree program including engineering course work and research requires a minimum of one maximum-tuition academic year beyond the baccalaureate to meet the University residence requirements. Most full-time students spend at least one additional summer to complete the research requirement. An alternative master's degree program based only on course work is available, also requiring at least one full tuition academic year to meet University residence requirements.

M.S. students who anticipate continuing in the Ph.D. program should follow the research option. M.S. students receiving financial aid normally require two academic years to complete the degree. Such students must take the research option.

The candidate must fulfill the following requirements:

1. Register as a graduate student for at least 45 units.
2. Submit a program proposal for the Master's degree approved by the adviser during the first quarter of enrollment.
3. Complete 45 units with a grade point average (GPA) of at least 3.0. This requirement is satisfied by taking the core sequence, selecting one of the seven elective sequences, an appropriate number of additional courses from the list of technical electives, and completing 6 units of master's level research. Students electing the course work only M.S. degree are strongly encouraged to select an additional elective sequence in place of the research requirement. Students interested in continuing for a Ph.D. are expected to choose the research option and enroll in 6 units of ENERGY 361 Master's Degree Research in Energy Resources Engineering. All courses must be taken for a letter grade.
4. Students entering without an undergraduate degree in Petroleum Engineering must make up deficiencies in previous training. Not more than 10 units of such work may be counted as part of the minimum total of 45 units toward the M.S. degree.

Research subjects include certain groundwater hydrology and environmental problems, energy industry management, flow of non-Newtonian fluids, geothermal energy, natural gas engineering, oil and gas recovery, pipeline transportation, production optimization, reservoir

characterization and modeling, carbon sequestration, reservoir engineering, reservoir simulation, and transient well test analysis.

Recommended Courses and Sequences

The following list is recommended for most students. With the prior special consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

Core Sequence

		Units
ENERGY 175	Well Test Analysis	3
or ENERGY 130	Well Log Analysis I	
ENERGY 221	Fundamentals of Multiphase Flow	3
ENERGY 222	Advanced Reservoir Engineering ¹	3
ENERGY 246	Reservoir Characterization and Flow Modeling with Outcrop Data	3
ENERGY 251	Thermodynamics of Equilibria ²	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
Total Units		21

Elective Sequence

		Units
Select one of the following Series:		9-14
Crustal Fluids:		
GEOPHYS 200	Fluids and Flow in the Earth: Computational Methods	
EESS 220	Physical Hydrogeology	
EESS 221	Contaminant Hydrogeology and Reactive Transport	
Environmental:		
ENERGY 227	Enhanced Oil Recovery	
EESS 221	Contaminant Hydrogeology and Reactive Transport	
And two of the following:		
ENERGY 240	Geostatistics	
ENERGY 260	Modeling Uncertainty in the Earth Sciences	
CEE 270	Movement and Fate of Organic Contaminants in Waters	
CEE 273	Aquatic Chemistry	
CEE 274A	Environmental Microbiology I	
Enhanced Recovery:		
EESS 220	Physical Hydrogeology	
ENERGY 225	Theory of Gas Injection Processes	
ENERGY 226	Thermal Recovery Methods	
ENERGY 227	Enhanced Oil Recovery	
Geostatistics and Reservoir Modeling:		
ENERGY 240	Geostatistics	
ENERGY 241	Seismic Reservoir Characterization	
GEOPHYS 182	Reflection Seismology	
or GEOPHYS 262	Rock Physics	
Geothermal:		
ENERGY 269	Geothermal Reservoir Engineering	
or ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	

CHEMENG 120B	Energy and Mass Transport
ME 131A	Heat Transfer
Reservoir Performance:	
ENERGY 223	Reservoir Simulation
ENERGY 280	Oil and Gas Production Engineering
GEOPHYS 202	Reservoir Geomechanics
Simulation and Optimization:	
ENERGY 223	Reservoir Simulation
ENERGY 224	Advanced Reservoir Simulation
ENERGY 284	Optimization and Inverse Modeling
Renewable Energy:	
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
ENERGY 293B	Fundamentals of Energy Processes
ENERGY 293C	Energy from Wind and Water Currents
Total Units	9-14

Research Sequence

ENERGY 361	Master's Degree Research in Energy Resources Engineering ¹	1-6
Total Units		1-6

¹ Students choosing the company sponsored course-work-only for the M.S. degree may substitute an additional elective sequence in place of the research.

Technical Electives

Technical electives from the following list of advanced-level courses usually complete the M.S. program. In unique cases, when justified and approved by the adviser prior to taking the course, courses listed here may be substituted for courses listed above in the elective sequences.

		Units
ENERGY 130	Well Log Analysis I	3
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 230	Advanced Topics in Well Logging	3
ENERGY 260	Modeling Uncertainty in the Earth Sciences	3
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 273	Special Topics in Energy Resources Engineering	1-3
ENERGY 280	Oil and Gas Production Engineering	3
ENERGY 281	Applied Mathematics in Reservoir Engineering	3
ENERGY 284	Optimization and Inverse Modeling	3
ENERGY 301	The Energy Seminar	1
CME 204	Partial Differential Equations in Engineering	3
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3
GEOPHYS 182	Reflection Seismology	3
GEOPHYS 190	Near-Surface Geophysics	3
GEOPHYS 202	Reservoir Geomechanics	3

Master of Science in Energy Resources Engineering

The objective of the M.S. degree in Energy Resources Engineering is to prepare the student either for a professional career or for doctoral studies. Students in the M.S. degree program must fulfill the following:

- Complete a 45-unit program of study. The degree has two options:
 - a course work degree, requiring 45 units of course work
 - a research degree, of which a minimum of 39 units must be course work, with the remainder consisting of no more than 6 research units.
- Course work units must be divided among two or more scientific and/or engineering disciplines and can include the core courses required for the Ph.D. degree.
- All courses must be taken for a letter grade.
- The program of study must be approved by the academic adviser and the department graduate program committee.
- Students taking the research-option degree are required to complete an M.S. thesis, approved by the student's thesis committee.

Recommended Courses and Sequences

The following list is recommended for most students. With the prior consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

Core Sequence

		Units
ENERGY 221	Fundamentals of Multiphase Flow	3
ENERGY 246	Reservoir Characterization and Flow Modeling with Outcrop Data	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
mse 248		
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3
Total Units		21-22

Subject Sequence Alternatives

		Units
Select one of the following Series:		15
Geothermal:		
ENERGY 223	Reservoir Simulation	
ENERGY 269	Geothermal Reservoir Engineering	
CHEMENG 120B	Energy and Mass Transport	
GES 217	Faults, Fractures, and Fluid Flow	
ME 131A	Heat Transfer	
ME 370A	Energy Systems I: Thermodynamics	
Low Carbon Energy:		
Select three of the following:		
ENERGY 104	Transition to sustainable energy systems	
ENERGY 223	Reservoir Simulation	
ENERGY 251	Thermodynamics of Equilibria	

ENERGY 256	Electronic Structure Theory and Applications to Chemical Kinetics (formerly ENERGY 252)
ENERGY 269	Geothermal Reservoir Engineering
ENERGY 291	Optimization of Energy Systems
CHEMENG 130	Separation Processes
GES 170	Environmental Geochemistry
GES 171	Geochemical Thermodynamics
ME 370A	Energy Systems I: Thermodynamics
ME 370B	Energy Systems II: Modeling and Advanced Concepts
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
Modeling Natural Resources:	
Select three of the following:	
ENERGY 240	Geostatistics
ENERGY 241	Seismic Reservoir Characterization
ENERGY 260	Modeling Uncertainty in the Earth Sciences
ENERGY 284	Optimization and Inverse Modeling
GEOPHYS 200	Fluids and Flow in the Earth: Computational Methods
GEOPHYS 262	Rock Physics
Oil and Gas:	
ENERGY 104	Transition to sustainable energy systems
ENERGY 222	Advanced Reservoir Engineering
ENERGY 223	Reservoir Simulation
ENERGY 240	Geostatistics
or ENERGY 260	Modeling Uncertainty in the Earth Sciences
ENERGY 251	Thermodynamics of Equilibria

Total Units 15

Technical Electives

		Units
ENERGY 104	Transition to sustainable energy systems	3
ENERGY 120	Fundamentals of Petroleum Engineering	3
ENERGY 130	Well Log Analysis I	3
Any 200-level ENERGY course		
ENERGY 301	The Energy Seminar	1
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Programming for Scientists and Engineers	3
EARTHSYS 247		
ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5
GES 217	Faults, Fractures, and Fluid Flow	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
ME 131A	Heat Transfer	3-5
ME 260	Fuel Cell Science and Technology	3
ME 370A	Energy Systems I: Thermodynamics	3
ME 370B	Energy Systems II: Modeling and Advanced Concepts	4
MSE 248		3-4

Coterminal B.S. and M.S. Program in Energy Resources Engineering

The coterminal B.S./M.S. program offers an opportunity for Stanford University students to pursue a graduate experience while completing the B.S. degree in any relevant major. Energy Resources Engineering graduate students generally come from backgrounds such as chemical, civil, or mechanical engineering; geology or other earth sciences; or physics or chemistry. Students should have a background at least through MATH 53 Ordinary Differential Equations with Linear Algebra and CS 106A Programming Methodology before beginning graduate work in this program.

The two types of M.S. degrees, the course work only degree and the research degree, as well as the courses required to meet degree requirements, are described below in the M.S. section. Both degrees require 45 units and may take from one to two years to complete depending on circumstances unique to each student.

Requirements to enter the program are: two letters of recommendation from faculty members or job supervisors, a statement of purpose, scores from the GRE general test, and a copy of Stanford University transcripts. While the department does not require any specific GPA or GRE score, potential applicants are expected to compete favorably with graduate student applicants.

A Petroleum Engineering or Energy Resources Engineering master's degree can be used as a terminal degree for obtaining a professional job in the petroleum or energy industries, or in any related industry where analyzing flow in porous media or computer simulation skills are required. It can also be a stepping stone to a Ph.D. degree, which usually leads to a professional research job or an academic position.

Students should apply to the program any time after they have completed 105 undergraduate units, and in time to take ENERGY 120 Fundamentals of Petroleum Engineering, the basic introductory course in Autumn Quarter of the year they wish to begin the program. Contact the Department of Energy Resources Engineering to obtain additional information.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Doctor of Philosophy in Petroleum Engineering or Energy Resources Engineering

The Ph.D. degree is conferred upon demonstration of high achievement in independent research and by presentation of the research results in a written dissertation and oral defense.

The following are minimum requirements for a student in the Department of Energy Resources Engineering to remain in good academic standing regarding course work:

1. no more than one incomplete grade at any time
2. a cumulative grade point average (GPA) of 3.25
3. a grade point average (GPA) of 2.7 each quarter
4. a minimum of 15 units completed within each two quarter period (excluding Summer Quarter).

Unless otherwise stated by the instructor, incomplete grades in courses within the department are changed to 'NP' (not passed) at the end of the

quarter after the one in which the course was given. This one quarter limit is a different constraint from the maximum one-year limit allowed by the University.

Academic performance is reviewed each quarter by a faculty committee. At the beginning of the next quarter, any student not in good academic standing receives a letter from the committee or department chair stating criteria that must be met for the student to return to good academic standing. If the situation is not corrected by the end of the quarter, possible consequences include termination of financial support, termination of departmental privileges, and termination from the University.

Students funded by research grants or fellowships from the department are expected to spend at least half of their time (a minimum of 20 hours per week) on research. Continued funding is contingent upon satisfactory research effort and progress as determined by the student's adviser. After Autumn Quarter of the first year, students receive a letter from the department chair concerning their research performance. If problems are identified and they persist through the second quarter, a warning letter is sent. Problems persisting into a third quarter may lead to loss of departmental support including tuition and stipend. Similar procedures are applied in subsequent years.

The Ph.D. degree is awarded primarily on the basis of completion of significant, original research. Extensive course work and a minimum of 90 units of graduate work beyond the master's degree are required. Doctoral candidates planning theoretical work are encouraged to gain experimental research experience in the M.S. program. Ph.D. students receiving financial assistance are limited to 10 units per quarter and often require more than three years to complete the Ph.D. beyond the M.S. degree.

In addition to University and the Department of Energy Resources Engineering basic requirements for the doctorate, the Petroleum Engineering Ph.D. and Energy Resources Engineering Ph.D. degrees have the following requirements:

1. Students must complete a minimum of 36 course units and a minimum of 36 research units (a total of 90 units) beyond the M.S. degree. The research adviser may specify additional courses beyond the minimum requirements. At least half of the classes must be at a 200 level or higher and all must be taken for a letter grade. Students with an M.S. degree or other specialized training from outside ERE are generally expected to include ENERGY 221 Fundamentals of Multiphase Flow, and ENERGY 240 Geostatistics, or their equivalents. The number and distribution of courses to be taken is determined with input from the research advisers and department graduate program committee.
2. To achieve candidacy (usually during or at the end of the first year of enrollment), the student must complete 24 units of letter-graded course work beyond the M.S. degree, develop a written Ph.D. research proposal, and choose a dissertation committee.
3. The research adviser(s) and two other faculty members comprise the dissertation reading committee. Upon completion of the dissertation, the student must pass a University oral examination in defense of the dissertation.
4. Complete 135 units of total graduate work (usually 90 units beyond the M.S. degree).
5. Act as a teaching assistant at least once, and enroll in ENERGY 359 Teaching Experience in Energy Resources Engineering.

36 units of course work is a minimum; in some cases the research adviser may specify additional requirements to strengthen the student's expertise in particular areas. The 36 units of course work does not include required teaching experience (ENERGY 359 Teaching Experience in Energy Resources Engineering) nor required research seminars. Courses must be taken for a letter grade, and a grade point average (GPA) of at least 3.25 must be maintained.

The dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy. Candidates who fail to meet

this deadline must submit an Application for Extension of Candidacy for approval by the department chair if they wish to continue in the program.

Ph.D. students entering the department are required to hold an M.S. degree in a relevant science or engineering discipline. Students wishing to follow the Ph.D. program in Petroleum Engineering must hold an M.S. degree (or equivalent) in Petroleum Engineering. Students following the Ph.D. program in Energy Resources Engineering must hold an M.S. degree (or equivalent), although it need not be in Energy Resources Engineering.

After the second quarter at Stanford, a faculty committee evaluates the student's progress. If a student is found to be deficient in course work and/or research, a written warning is issued. After the third quarter, the faculty committee decides whether or not funding should be continued for the student. Students denied funding after the third quarter are advised against proceeding with the Ph.D. proposal, though the student may choose to proceed under personal funding.

Ph.D. Degree Qualification

The procedure for Ph.D. qualification is identical for individuals who entered the department as an M.S. or a Ph.D. student. For students completing an MS in the department, the student formally applies to the Ph.D. program in the second year of the M.S. degree program. The student is considered for admission to the Ph.D. program along with external applicants. The admission decision is based primarily upon research progress and course work.

There are two steps to the qualification procedure. Students first take a preliminary written exam that is offered at the beginning of Autumn Quarter. The exam focuses upon synthesis of knowledge acquired from core courses in ERE or PE. Exams are different for ERE and PE Ph.D. students, but share a goal of having students exhibit capability to solve an engineering problem. Students continuing within the department take the exam at the beginning of their first quarter as Ph.D. students. Students who completed their M.S. outside of the department take the exam at the beginning of their fourth quarter as PhD students. A student who does not pass the exam may not be allowed to take the exam a second time.

Any student who does not pass the written exam is considered to have failed the qualifying exam. Any student who is deemed to have not made sufficient research progress may not be allowed to take the preliminary exam and research progress shall be taken into account for pass, fail, and retake decisions.

A written Ph.D. proposal and oral defense are the main components of the second step. The written proposals are reviewed by three faculty members. Students are provided a template of what constitutes an acceptable proposal. Students subsequently make an oral presentation of their proposal to three faculty members including material such as a literature review, identification of key unanswered research questions, proposed work outline, and an oral presentation.

Following the presentation, the student is questioned on the research topic and general field of study. The student can pass, pass with qualifications requiring more classes or teaching assistantships, or fail. Students who completed their MS in the department prepare and defend their proposal in their third quarter (not counting summer) as a Ph.D. student. Their adviser may request an additional quarter given extenuating circumstances such as a major change in research focus between M.S. and Ph.D. programs. Students who completed their MS outside of the department complete the proposal in their fourth quarter (not counting summer) of study.

Course Work

The 36 units of course work may include graduate courses in Energy Resources Engineering (numbered 200 and above) and courses chosen from the following list. Other courses may be substituted with prior approval of the adviser. In general, non-technical courses are not approved.

Students who enter directly into the Ph.D. program after receiving an M.S. degree from another university are expected to show expertise in

the core courses required for Stanford's M.S. degree in Energy Resources Engineering, either by including those courses in their Ph.D. degree or by showing that they have taken equivalent courses during their M.S. degree.

For a Ph.D. in Energy Resources Engineering, 12 of the 36 required course units must be completed from the following list of courses. If the student has not taken ENERGY 293A Solar Cells, Fuel Cells, and Batteries:

Materials for the Energy Solution, ENERGY 293B Fundamentals of Energy Processes, ENERGY 293C Energy from Wind and Water Currents or their equivalent during the M.S., then these courses must be taken during the Ph.D. (they will satisfy 9 of the required 12 units).

		Units
Required to take 12 units from the following list:		
ENERGY 104	Transition to sustainable energy systems	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 256	Electronic Structure Theory and Applications to Chemical Kinetics (formerly ENERGY 252)	3
ENERGY 260	Modeling Uncertainty in the Earth Sciences	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 291	Optimization of Energy Systems	3-4
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3
ENERGY 301	The Energy Seminar	1
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 268	Groundwater Flow	3-4
CME 206	Introduction to Numerical Methods for Engineering	3
CME 302	Numerical Linear Algebra	3
CME 306	Numerical Solution of Partial Differential Equations	3
EESS 221/CEE 260C	Contaminant Hydrogeology and Reactive Transport	4
CHEMENG 130	Separation Processes	3
CHEMENG 340	Molecular Thermodynamics	3
EARTHSYS 247		
ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5
GES 170	Environmental Geochemistry	4
GES 171	Geochemical Thermodynamics	3
GES 217	Faults, Fractures, and Fluid Flow	3
GES 253	Petroleum Geology and Exploration	0
GEOPHYS 182	Reflection Seismology	3
GEOPHYS 202	Reservoir Geomechanics	3
GEOPHYS 262	Rock Physics	3
ME 131A	Heat Transfer	3-5
ME 250	Internal Combustion Engines	3
ME 260	Fuel Cell Science and Technology	3
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	0
ME 370A	Energy Systems I: Thermodynamics	3
ME 370B	Energy Systems II: Modeling and Advanced Concepts	4
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
MSE 248		3-4

Ph.D. Minor in Petroleum Engineering or Energy Resources Engineering

To be recommended for a Ph.D. degree with Petroleum Engineering or Energy Resources Engineering as a minor subject, a student must take 20 units of graduate-level lecture courses in the department. These courses must include ENERGY 221 Fundamentals of Multiphase Flow and ENERGY 222 Advanced Reservoir Engineering for the Petroleum Engineering minor, or ENERGY 293A Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution and ENERGY 293B Fundamentals of Energy Processes and ENERGY 293C Energy from Wind and Water Currents for the Energy Resources Engineering minor. The remaining courses should be selected from:

		Units
ENERGY 175	Well Test Analysis	3
ENERGY 223	Reservoir Simulation	3-4
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 225	Theory of Gas Injection Processes	3
ENERGY 227	Enhanced Oil Recovery	3
ENERGY 240	Geostatistics	2-3
ENERGY 241	Seismic Reservoir Characterization	3-4
ENERGY 251	Thermodynamics of Equilibria	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 256	Electronic Structure Theory and Applications to Chemical Kinetics (formerly ENERGY 252)	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 280	Oil and Gas Production Engineering	3
ENERGY 281	Applied Mathematics in Reservoir Engineering	3
ENERGY 284	Optimization and Inverse Modeling	3

Emeriti: (Professors) Khalid Aziz, John W. Harbaugh, André Journel*

Chair: Anthony Kovscek

Professors: Sally M. Benson, Jef Caers, Louis J. Durlofsky, Roland N. Horne, Anthony R. Kovscek, Franklin M. Orr, Jr., Hamdi Tchelepi

Associate Professors: Margot Gerritsen, Tapan Mukerji**

Assistant Professors: Adam Brandt, Jennifer Wilcox

Courtesy Professors: Stephan A. Graham, Mark Jacobson

Lecturers: Louis M. Castanier, Denis V. Voskov, Anne Macfarlane, Eric Stoutenburg

Consulting Professors: Alexandre Boucher, Warren K. Kourt, Robert G. Lindblom, Kiran Pande, Victor Pereyra, Marco R. Thiele, Birol Dindoruk, Stuart MacMillan, Richard Sears

* Joint appointment with Geological and Environmental Sciences

** Joint appointment with Geophysics

Earth System Science

Courses offered by the Department of Environmental Earth System Science are listed under the subject code EESS on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EESS&filter-catalognumber-EESS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/>)

CourseSearch/search?view=catalog&catalog=&page=0&q=EESS&filter-catalognumber-EESS=on) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EESS&filter-catalognumber-EESS=on>).

On April 16, 2015, the Senate of the Academic Council approved the change of name for the department to become the Department of Earth System Science. Prior to April 16, the department was named the Department of Environmental Earth System Science.

Earth System Science studies the planet's oceans, lands, and atmosphere as an integrated system, with an emphasis on changes occurring during the current period of overwhelming human influence, the Anthropocene. Faculty and students within the department use the principles of biology, chemistry, and physics to study problems involving processes occurring at the Earth's surface, such as climate change and global nutrient cycles, providing a foundation for problem solving related to environmental sustainability and global environmental change.

Graduate Programs in Earth System Science

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Learning Objectives (Graduate)

The objectives of the doctoral program in Earth System Science are to enable students to develop the skills needed to conduct original investigations in environmental and earth system sciences, to interpret the results, and to present the data and conclusions in a publishable manner. Graduates should develop strong communication skills with the ability to teach and communicate effectively with the public.

The objectives of the master's program in Earth System Science is to continue a student's training in one of the earth science disciplines and to prepare students for a professional career or doctoral studies.

On April 16, 2015, the Senate of the Academic Council approved the Master of Science in Earth System Science. Students who matriculated into the Master of Science in Environmental Earth System Science have the option of changing the name of their degree to Earth System Science. Degree requirements remain the same.

Master of Science in Environmental Earth System Science

The University's requirements for M.S. degrees are outlined in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. Additional departmental requirements include the following:

1. Completion of core course work:
- 2.

		Units
EESS 211	Fundamentals of Modeling	3-5
EESS 212	Measurements in Earth Systems	3-4
EESS 215	Earth System Dynamics	2
EARTHSCI 300	Earth Sciences Seminar	1

3. Enrollment in EESS 301 Topics in Environmental Earth System Science, each quarter during the academic year.
4. A minimum of 45 units of course work at the 100 level or above.

5. Half of the courses used to satisfy the 45-unit requirement must be intended primarily for graduate students, usually at the 200 level or above.
6. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement.
7. Some students may be required to make up background deficiencies in addition to these basic requirements.
8. By the end of Winter Quarter of the first year in residence, a student must complete at least three courses taught by a minimum of two different department faculty members.
9. Serve as a teaching assistant in at least two quarters during their graduate career.

The department's graduate coordinator, in coordination with the departmental faculty, appoints an academic adviser prior to registration with appropriate consideration of the student's background, interests, and professional goals. In consultation with the adviser, the student plans a program of course work for the first year. The faculty adviser is charged with designing the curriculum in consultation with the student specific to the research topic. Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis who must be approved by the graduate coordinator; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

Master of Science, Course Work Only Option

The course-work-only M.S. for EESS Ph.D. students requires 45 unduplicated units of which all 45 must be course work (non-research, non-independent study, non-thesis units). All required units must be in courses at the 100-level or above, 50 percent of those units must be in graduate-level courses (generally, at the 200-level or above). No units are awarded for course work completed elsewhere (i.e., not eligible to transfer-in units). All 45 units can be applied to the 135 unit requirement for the Ph.D. The remaining 90 units can consist of all research units

On April 16, 2015, the Senate of the Academic Council approved the Doctor of Philosophy in Earth System Science. Students who matriculated into the Doctor of Philosophy in Environmental Earth System Science have the option of changing the name of their degree to Earth System Science. Degree requirements remain the same.

Doctor of Philosophy in Environmental Earth System Science

The University's requirements for the Ph.D. degree are outlined in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. A summary of additional department requirements follows:

1. Completion of core course work:
- 2.

		Units
EESS 211	Fundamentals of Modeling	3-5
EESS 212	Measurements in Earth Systems	3-4
EESS 215	Earth System Dynamics	2
EARTHSCI 300	Earth Sciences Seminar	1

3. Enrollment in EESS 301 Topics in Environmental Earth System Science, each quarter during the academic year.

4. By the end of Winter Quarter of their first year in residence, students must complete at least three courses taught by a minimum of two different departmental faculty members.
5. Completion of required courses in their individual program or in their specialized area of study with a grade point average (GPA) of 3.0 (B) or higher, or demonstrate that they have completed the equivalents elsewhere.
6. Completion of a minimum of four letter grade courses of at least three units each from four different faculty members on the Academic Council in the University.
7. Serve as a teaching assistant in at least four quarters during their graduate career.
8. During Spring Quarter of each year, students must undergo an annual review by their thesis committee to allow the committee to monitor the progress of the student and make recommendations, where necessary.
9. Qualify for candidacy for the Ph.D. by the end of the sixth quarter in residence, excluding summers. Department procedures require selection of a faculty thesis adviser, preparation of a written research proposal, approval of this proposal by the thesis adviser, selection of a committee for the Ph.D. qualifying examination, and approval of the membership by the graduate coordinator and chair of the department. The research examination consists of three parts: oral presentation of a research proposal; examination on the research proposal; and examination on subject matter relevant to the proposed research. The exam should take place prior to May 1 so that its outcome is known at the time of the annual spring evaluation of graduate students.

Upon qualifying for Ph.D. candidacy, the student and thesis adviser, who must be a department faculty member, choose a research committee that includes a minimum of two faculty members in the University in addition to the adviser. Annually, in the month of March or April, the candidate must organize a meeting of the full research committee to present a progress report covering the past year and provide expected goals for the coming year.

Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research; curriculum must also be developed with the supervision of the committee, which should be designed to provide a rigorous foundation for the research area. The format of the dissertation must meet University guidelines. The student is urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.

The doctoral dissertation is defended in the University oral examination. The department appoints the research adviser and two other members of the research committee to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

Co-Chairs: Scott Fendorf, Eric Lambin

Professors: Kevin Arrigo, C. Page Chamberlain, Robert Dunbar, Scott Fendorf, Christopher Field¹, Steven Gorelick, Robert Jackson^{2,3}, Julie Kennedy, Eric Lambin³, Pamela Matson (Dean), Rosamond Naylor^{3,4}

Associate Professors: Noah Diffenbaugh², Christopher Francis, David Lobell^{3,4}

Assistant Professors: Marshall Burke⁴, Karen Casciotti, Balakanapathy Rajaratnam⁵, Leif Thomas, Paula Welander

Courtesy Professors: Gregory Asner, Ken Caldeira, Anna Michalak, Peter Vitousek

Visiting Professors: Andreas Mulch, Hans Nelson, Christopher Oze, Roger Summons

¹Joint appointment with Biology

²Joint appointment with the Precourt Institute for Energy

³Joint appointment with the Woods Institute for the Environment

⁴Joint appointment with the Freeman Spogli Institute for International Studies

⁵Joint appointment with Statistics

Geological Sciences

Courses offered by the Department of Geological Sciences are listed under the subject code GES on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GES&filter-catalognumber-GES=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GES&filter-catalognumber-GES=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GES&filter-catalognumber-GES=on>).

On April 16, 2015, the Senate of the Academic Council approved the change of name for the department to become the Department of Geological Sciences. Prior to April 16, the department was named the Department of Geological and Environmental Sciences.

The geological and environmental sciences are naturally interdisciplinary, and include: the study of earth materials, earth processes, and how they have changed over Earth's 4.56 billion year history. More specifically, courses and research within the department address: the chemical and physical makeup and properties of minerals, rocks, soils, sediments, and water; the formation and evolution of Earth and other planets; the processes that deform Earth's crust and shape Earth's surface; the stratigraphic, paleobiological, and geochemical records of Earth history including changes in climate, oceans, and atmosphere; present-day, historical, and long-term feedbacks between the geosphere and biosphere, and the origin and occurrence of our natural resources.

The department's research is critical to the study of natural hazards (earthquakes, volcanic eruptions, landslides, and floods), environmental and geological engineering, surface and groundwater management, the assessment, exploration, and extraction of energy, mineral and water resources, ecology and conservation biology, remediation of contaminated water and soil, geological mapping and land use planning, and human health and the environment.

A broad range of instrumentation for elemental and radiogenic/stable isotope analysis is available, including ion microprobe, electron microprobe, thermal and gas source mass spectrometry, inductively coupled plasma mass spectrometry and nuclear magnetic resonance. The Center for Materials Research and facilities at the SLAC National Accelerator Laboratory, Stanford Synchrotron Radiation Laboratory (SSRL), and the U.S. Geological Survey in nearby Menlo Park are also available for the department's research. Branner Library, devoted exclusively to the Earth Sciences, represents one of the department's most important resources. The department also maintains rock preparation (crushing, cutting, polishing), mineral separation, and microscopy facilities.

Mission of the Undergraduate Program in Geological Sciences

The purpose of the undergraduate program in Geological Sciences is to provide students with a broad background in the fundamentals of the Earth sciences and the quantitative, analytical, and communications skills necessary to conduct research and think critically about questions involving the Earth. The major provides excellent preparation for graduate school and

careers in geological and environmental consulting, land use planning, law, teaching, and other professions in which an understanding of the Earth and a background in science are important.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to develop and demonstrate:

1. an understanding of fundamental concepts in Earth science.
2. the ability to collect, analyze, and interpret geological and environmental data using a variety of techniques to test hypotheses.
3. the ability to address real geological and/or environmental problems in the field.
4. the ability to communicate scientific knowledge orally, visually, and in writing.

Graduate Programs in Geological Sciences

Graduate Studies in the Department of Geological Sciences involve academic course work and independent research. Students are prepared for careers as professional scientists in research, education, or the application of the earth sciences to mineral, energy, and water resources. Programs lead to the M.S., Engineer, and Ph.D. degrees. Course programs in the areas of faculty interest are tailored to the student's needs and interests with the aid of his or her research adviser. Students are encouraged to include in their program courses offered in other departments in the School of Environmental Earth System Science as well as in other departments in the University. Diplomas designate degrees in Geological and Environmental Sciences or Geological Sciences and may also indicate the following specialized fields of study: Geostatistics and Hydrogeology.

Learning Outcomes (Graduate)

The purpose of the master's program in Geological Sciences is to continue a student's training in one of a broad range of earth science disciplines and to prepare students for either a professional career or doctoral studies.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and the ability to conduct independent research. To this end, the objectives of the doctoral program are to enable students to develop the skills needed to conduct original investigations in a particular discipline or set of disciplines in the earth sciences, to interpret the results, and to present the data and conclusions in a publishable manner.

On April 16, 2015, the Senate of the Academic Council approved the Bachelor of Science in Geological Sciences. Students who declared the Bachelor of Science in Geological and Environmental Sciences have the option of changing the name of their degree to Geological Sciences. Degree requirements remain the same.

Bachelor of Science in Geological and Environmental Sciences

The major consists of five interrelated components:

1. *Earth Sciences Fundamentals*—Students must complete a set of core courses that introduce the properties of Earth materials, the processes that change the Earth, and the timescales over which those processes act. These courses provide a broad foundational knowledge that can

lead to specialization in many different disciplines of the geological and environmental sciences.

2. *Quantitative and Analytical Skills*—Students must complete adequate course work in mathematics, chemistry, and physics or biology. In addition, they learn analytical techniques specific to the Earth sciences through the laboratory component of courses.
3. *Advanced Course Work and Research*—Students gain breadth and depth in upper-level electives and are encouraged to apply these skills and knowledge to problems in the Earth sciences through directed research.
4. *Field Research Skills*—Most GES courses include field trips and/or field-based projects. In addition, students must complete at least six weeks of field research through departmental offerings (GES 105 Introduction to Field Methods and GES 190 Research in the Field), in which they learn and apply field techniques, field mapping, and the prepare a written report.
5. *Communication Skills*—To fulfill the Writing in the Major requirement, students take a writing-intensive senior seminar (GES 150 Senior Seminar: Issues in Earth Sciences), in which they give both oral and written presentations that address current research in the earth sciences.

The major requires at least 93 units; letter grades are required in all courses if available. Students interested in the GES major should consult with the undergraduate program coordinator for information about options within the curriculum.

Course Sequence (93-110 units total)

Core Requirement

Students are required to take all of the following:

		Units
Select one of the following:		4-5
GES 1A	Introduction to Geology: The Physical Science of the Earth	
GES 1B	Introduction to Geology	
GES 1C	Introduction to Geology: Dynamic Earth	
GES 4	Evolution and Extinction: Introduction to Historical Geology	4
GES 90	Introduction to Geochemistry	3-4
GES 102	Earth Materials: Introduction to Mineralogy	4
GES 103	Earth Materials: Rocks in Thin Section	3
GES 104	Introduction to Petrology	4
GES 105	Introduction to Field Methods	3
GES 150	Senior Seminar: Issues in Earth Sciences	3
GES 190	Research in the Field (see below for more information)	4
Total Units		32-34

Breadth in the Discipline Requirement

To gain understanding of the breadth of subject areas within the geological and environmental sciences, students are required to take one course from each of the following seven groups (22-28 units).

Environmental Geology and Surface Processes

The chemical and physical properties of the solid, aqueous, and gaseous phases comprising Earth's surface environment, their natural compositional

variations and biogeochemical interactions, and the processes that affect their distribution and stability.

EESS 155	Science of Soils
or GES 130	Soil Physics and Hydrology
or GES 131	Hydrologically-Driven Landscape Evolution
or GES 170	Environmental Geochemistry

Structural Geology and Tectonics

The nature, description, and modeling of deformation of earth materials in response to tectonic forces. Processes of plate tectonics, mountain building, and sedimentary basin formation. The origin and evolution of geologic structures including folds, faults, fabrics, and fractures.

GES 110	Structural Geology and Tectonics
or GES 111	Fundamentals of Structural Geology

Earth Materials and Geochemistry

The materials that comprise the Earth and how they can be used to deduce geological processes over time. The fundamental chemical and geologic processes responsible for the abundance and distribution of elements and their isotopes.

GES 107	Journey to the Center of the Earth
or GES 163	Introduction to Isotope Geochemistry
or GES 180	Igneous Processes
or GES 185	Volcanology

Sedimentary Systems

The processes of weathering, erosion, transportation, and deposition, interpretation of depositional environments, the formation and evolution of sediments and sedimentary basins, and the evolution of sedimentary systems over geologic time.

GES 151	Sedimentary Geology and Petrography: Depositional Systems
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Biogeosciences

The origin and evolution of life on Earth, the influence of biological processes on Earth's surface environments, and the role of geological processes in shaping large-scale evolutionary patterns.

GES 123	Paleobiology
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Geophysics

The integration of physics, mathematics, and geology to study Earth processes using remote sensing, modeling, experiments, and direct observations.

GEOPHYS 110	Earth on the Edge: Introduction to Geophysics
or GEOPHYS 120	Ice, Water, Fire
or GEOPHYS 130	Introductory Seismology

Geospatial Statistics and Computer Science

Statistical techniques specific to the geosciences that facilitate analysis of three- and four-dimensional data; computer programming and modeling.

Units
3-4

EARTHSCI 211	Introduction to Programming for Scientists and Engineers	Units	3-4
or CS 106A	Programming Methodology		
or ENERGY 125	Modeling and Simulation for Geoscientists and Engineers		
or ENERGY 160	Modeling Uncertainty in the Earth Sciences		
or EESS 164	Fundamentals of Geographic Information Science (GIS)		
or GEOPHYS 112	Exploring Geosciences with MATLAB		

Depth in the Discipline Requirement (10 Units)

Units
3-5

To allow students to go into greater depth in the major, students must complete at least 10 units of electives drawn primarily from the list above and other upper-level courses in GES (including graduate-level courses). Additional courses in Geophysics, EESS, and ERE may be counted towards the elective units if they allow a student to pursue a topic in depth; these options should be discussed with an adviser. A maximum of 3 elective units may be fulfilled by:

Units
3-4

GES 192	Undergraduate Research in Geological and Environmental Sciences	Units	
GES 197	Senior Thesis		
GES 198	Special Problems in Geological and Environmental Sciences		
	Advanced Seminars		

Honors research (GES 199 Honors Program) may fulfill up to 4 elective units.

Required Supporting Mathematics (15 Units)

Units
4

This requirement may also be fulfilled by Advanced Placement credit. Choose one of the following equivalent series:

	Select one of the following series:	Units	
	Series A		
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus		10
	Series B		
MATH 41 & MATH 42	Calculus and Calculus		10
	And one of the following:		
MATH 51	Linear Algebra and Differential Calculus of Several Variables		5
or MATH 52	Integral Calculus of Several Variables		
or MATH 53	Ordinary Differential Equations with Linear Algebra		
or CME 100	Vector Calculus for Engineers		
or CME 102	Ordinary Differential Equations for Engineers		
or CME 104	Linear Algebra and Partial Differential Equations for Engineers		

Required Supporting Cognate Sciences (15-23 Units)

Advanced placement credit may be accepted for these courses as determined by the relevant departments.

Chemistry

CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II Chemical Principles Accelerated	5-10
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or a score of 4-5 on the Chemistry AP exam

And one of the following:

CHEM 135 or CHEM 171 or GES 171	Physical Chemical Principles Physical Chemistry I Geochemical Thermodynamics	3
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In addition to chemistry, students may choose between introductory sequences in biology and physics. This choice should be made after discussion with an adviser and based on a student's interests.

Biology

BIO 41 or BIO 44X	Genetics, Biochemistry, and Molecular Biology Core Molecular Biology Laboratory	5
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And one of the following:

BIO 105A & BIO 105B	Ecology and Natural History of Jasper Ridge Biological Preserve and Ecology and Natural History of Jasper Ridge Biological Preserve	5-8
or BIO 42	Cell Biology and Animal Physiology	
or BIO 43	Plant Biology, Evolution, and Ecology	
or BIO 44Y	Core Plant Biology & Eco Evo Laboratory	

Or

Physics

Select one of the following Series: 8-9

Series A

PHYSICS 21 & PHYSICS 22 & PHYSICS 23 & PHYSICS 24	Mechanics and Heat and Mechanics and Heat Laboratory and Electricity and Optics and Electricity and Optics Laboratory	8
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Series B

PHYSICS 41 & PHYSICS 43 & PHYSICS 44	Mechanics and Electricity and Magnetism and Electricity and Magnetism Lab	9
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Series C

PHYSICS 41 & PHYSICS 45 & PHYSICS 46	Mechanics and Light and Heat and Light and Heat Laboratory	9
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Field Research

Field research skills are a critical component of the undergraduate curriculum in GES. The conventional and most straightforward way for undergraduates to meet the field requirement is to take the two GES courses (GES 105 Introduction to Field Methods and GES 190 Research in the Field) that are offered every year:

- GES 105 Introduction to Field Methods, is a two-week introduction to field techniques and geologic mapping that is taught every year in the White Mountains of eastern California prior to the start of Autumn Quarter in September. This course gives students the tools to undertake geologic research in the field. GES 105 Introduction to Field Methods is required of all GES majors and is the framework upon which all subsequent undergraduate field-related instruction is based.
- GES 190 Research in the Field, gives GES undergraduates additional training in field research. This course provides undergraduates with a team-based experience of collecting data to answer research questions and is directed by faculty and graduate students. Offered in June and/or September.

Units By taking GES 105 Introduction to Field Methods and two iterations of GES 190 Research in the Field, GES undergraduates develop the broad experience and confidence necessary to go out and evaluate a geological or environmental geology question by collecting field-based data. The main goal is that, upon graduation, GES undergraduates will be able to plan and execute independent field research.

It is also possible to substitute non-Stanford courses to allow flexibility in fulfilling the field requirement. A modified version of an existing field-based course such as Stanford at Sea/Australia/Hawaii may fulfill one GES 190 Research in the Field requirement. To receive credit for GES 190, a proposal must be filed at the end of Winter Quarter with the field program committee which evaluates it for suitability. Students subsequently enroll in GES 190 with a specific instructor or their faculty mentor who evaluates the final report from the fieldwork.

GES 190 Research in the Field can also be satisfied by enrolling in a single four-to-six week geology field camp offered by another institution. This externally administered experience can substitute for two GES 190 courses, subject to approval by the Undergraduate Curriculum Committee.

Engineering Geology and Hydrogeology Undergraduate Specialized Curriculum

The Engineering Geology and Hydrogeology curriculum is intended for undergraduates interested in the application of geological and engineering data and principles to the study of rock, soil, and water to recognize and interpret geological and environmental factors affecting engineering structures and groundwater resources. Students learn to characterize and assess the risks associated with natural geological hazards, such as landslides and earthquakes, and with groundwater flow and contamination. The curriculum prepares students for graduate programs and professional careers in engineering, environmental geology, geology, geotechnical engineering, and hydrogeology. Students interested in this curriculum should contact a faculty adviser: Professor Loague, Pollard, or Hilley.

GES majors who elect the Engineering Geology and Hydrogeology curriculum are expected to complete a core course sequence and a set of courses in supporting sciences and mathematics. The core courses come from Earth Sciences and Engineering. Any substitutions for core courses must be approved by the faculty adviser and through a formal petition to the undergraduate program director. In addition, four elective courses, consistent with the core curriculum and required of all majors, are to be chosen with the advice and consent of the adviser. Typically, electives are chosen from the list below. Letter grades are required if available.

Course Sequence (85-101 Units Total)

Required Geological and Environmental Sciences (33-35 Units)

		Units
GES 1A	Introduction to Geology: The Physical Science of the Earth	4-5
or GES 1B	Introduction to Geology	
or GES 1C	Introduction to Geology: Dynamic Earth	
GES 102	Earth Materials: Introduction to Mineralogy	4
GES 104	Introduction to Petrology	4
GES 111	Fundamentals of Structural Geology	3
GES 115	Engineering Geology and Global Change	3
GES 150	Senior Seminar: Issues in Earth Sciences	3

EESS 164	Fundamentals of Geographic Information Science (GIS)	4
EESS 220	Physical Hydrogeology	4
ENERGY 160	Modeling Uncertainty in the Earth Sciences	3-4
GEOPHYS 190	Near-Surface Geophysics	3
Total Units		35-37

Required Engineering (18-21 Units)

		Units
CEE 101A	Mechanics of Materials	4
or ME 80	Mechanics of Materials	
CEE 101B	Mechanics of Fluids	4
CEE 101C	Geotechnical Engineering	3-4
CS 106A	Programming Methodology	3-5
ENGR 14	Intro to Solid Mechanics	4
Total Units		18-21

Required Supporting Sciences and Mathematics (23-29 Units)

		Units
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	5-10
or CHEM 31X	Chemical Principles Accelerated	
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 52	Integral Calculus of Several Variables	5
MATH 53	Ordinary Differential Equations with Linear Algebra	5
PHYSICS 41	Mechanics	4
Total Units		24-29

Suggested Electives Electives (11-16 Units)

Choose four courses from the following list or, with faculty approval, four related courses:

		Units
CEE 101D	Computations in Civil and Environmental Engineering	3
CEE 180	Structural Analysis	4
CEE 270	Movement and Fate of Organic Contaminants in Waters	3
CEE 293	Foundations and Earth Structures	3
CEE 296	Special Topics in Fluid-Solid Interactions	2
EESS 221	Contaminant Hydrogeology and Reactive Transport	4
ENGR 30	Engineering Thermodynamics	3
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	4
GEOPHYS 112	Exploring Geosciences with MATLAB	1-3
GES 130	Soil Physics and Hydrology	3
GES 131	Hydrologically-Driven Landscape Evolution	3
GES 217	Faults, Fractures, and Fluid Flow	3
GES 237	Surface and Near-Surface Hydrologic Response	3
MATSCI 151	Microstructure and Mechanical Properties	3-4
ME 80	Mechanics of Materials	4

Honors Program

The honors program provides an opportunity for year-long independent study and research on a topic of special interest, culminating in a written thesis. Students select research topics in consultation with the faculty adviser of their choosing. Research undertaken for the honors program may be of a theoretical, field, or experimental nature, or a combination of these approaches. The honors program is open to students with a GPA of at least 3.5 in GES courses and 3.0 in all University course work. Modest financial support is available from several sources to help defray laboratory and field expenses incurred in conjunction with honors research. Interested students must submit an application, including a research proposal, to the department by the end of their junior year.

Upon approval of the research proposal and entrance to the program, course credit for the honors research project and thesis preparation is assigned by the student's faculty adviser within the framework of GES 199 Honors Program; the student must complete a total of 9 units over the course of the senior year. Up to 4 units of GES 199 may be counted towards the elective requirement, but cannot be used as a substitute for regularly required courses.

Both a written and oral presentation of research results are required. The thesis must be read, approved, and signed by the student's faculty adviser and a second member of the faculty. In addition, honors students must participate in the GES Honors Symposium in which they present their research to the broader community. Honors students in GES are also eligible for the Firestone medal, awarded by Undergraduate Advising and Research (<http://ual.stanford.edu>) for exceptional theses.

On April 16, 2015, the Senate of the Academic Council approved the minor in Geological Sciences. Students who declared the minor in Geological and Environmental Sciences have the option of changing the name of their minor to Geological Sciences. Minor requirements remain the same.

Minor in Geological and Environmental Sciences

The minor in GES consists of a small set of required courses plus 12 elective units. A wide variety of courses may be used to satisfy these elective requirements. All courses must be taken for a letter grade.

Required Courses

		Units
GES 1A	Introduction to Geology: The Physical Science of the Earth	4-5
or GES 1B	Introduction to Geology	
or GES 1C	Introduction to Geology: Dynamic Earth	
GES 4	Evolution and Extinction: Introduction to Historical Geology	4
GES 102	Earth Materials: Introduction to Mineralogy	4
GES 104	Introduction to Petrology	4
Total Units		16-17

Electives (12 Units)

Students must take a minimum of 12 additional units drawn primarily from the Breadth in the Discipline list in the GES major (<http://www.stanford.edu/dept/registrar/bulletin/5038.htm>); a majority of units must be from classes within the GES department. Up to 3 units of Stanford Introductory Seminars in GES may be counted.

Students pursuing a minor in GES are encouraged to participate in the senior seminar (GES 150 Senior Seminar: Issues in Earth Sciences) and in field research (GES 105 Introduction to Field Methods)

On April 16, 2015, the Senate of the Academic Council approved the Master of Science in Geological Sciences. Students who matriculated into the Master of Science in Geological and Environmental Sciences have the option of changing the name of their degree to Geological Sciences. Degree requirements remain the same.

Coterminal B.S. and M.S. Degrees in Geological and Environmental Sciences

The coterminal B.S./M.S. program offers students the opportunity to pursue graduate research and an M.S. degree concurrently with or subsequent to their B.S. studies. The M.S. degree can serve as an entrance to a professional degree in subdisciplines within the Earth sciences such as engineering geology and environmental geology, or to graduate course work and research as an intermediate step in pursuit of the Ph.D. Regardless of professional goals, coterminal B.S./M.S. students are treated as members of the graduate community and are expected to meet all of the standards set for regular M.S. students. Applicants must have earned no fewer than 120 units toward graduation, and must submit their application no later than the quarter prior to the expected completion of their undergraduate degree, normally the Winter Quarter prior to Spring Quarter graduation. The application includes a statement of purpose, a current Stanford transcript, official Graduate Record Examination (GRE) scores, letters of recommendation from two members of the Stanford faculty (at least one of whom must be in the GES department), and a list of courses in which they intend to enroll to fulfill the M.S. degree requirements. Specific research interests should be noted in the statement of purpose and discussed with a member of the GES faculty prior to submission of the application. Coterminal students must complete a thesis describing research results.

The University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, also see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Students must meet all requirements for both the B.S. and M.S. degrees. Students may either:

1. complete 180 units required for the B.S. degree and then complete three full-time quarters (45 units at the 100-level or above) for the M.S. degree
2. or, complete a total of fifteen quarters during which the requirements of the two degrees are fulfilled concurrently.

At least half of the courses used to satisfy the 45-unit requirement must be designated as being primarily for graduate students, normally at the 200-level or above. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement. Further information about this program may be obtained from the GES office.

Admission

For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores.

Master of Science in Geological and Environmental Sciences Objectives

The purpose of the master's program in Geological and Environmental Sciences is to continue a student's training in one of a broad range of earth science disciplines and to prepare students for either a professional career or doctoral studies.

Procedures

The graduate coordinator of the department appoints an academic adviser during registration with appropriate consideration of the student's background, interests, and professional goals. In consultation with the adviser, the student plans a program of course work for the first year. The student should select a thesis adviser within the first year of residence and submit to the thesis adviser a proposal for thesis research as soon as possible. The academic adviser supervises completion of the department requirements for the M.S. program (as outlined below) until the research proposal has been accepted; responsibility then passes to the thesis adviser. The student may change either thesis or academic advisers by mutual agreement and after approval of the graduate coordinator.

Requirements

The University's requirements for M.S. degrees are outlined in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. Practical training (GES 385 Practical Experience in the Geosciences) may be required by some programs, with adviser approval, depending on the background of the student. Additional department requirements include the following:

1. A minimum of 45 units of course work at the 100 level or above.
 - a. Half of the courses used to satisfy the 45-unit requirement must be intended as being primarily for graduate students, usually at the 200 level or above.
 - b. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement.
 - c. Some students may be required to make up background deficiencies in addition to these basic requirements.
2. By the end of Winter Quarter of their first year in residence, students must complete at least three graduate level courses taught by a minimum of two different GES faculty members.
3. Each student must have a research adviser who is a faculty member in the department and is within the student's thesis topic area or specialized area of study.
4. Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence.
5. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis, who must be approved by the graduate coordinator; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

Engineer Degree in Geological and Environmental Sciences

The Engineer degree is offered as an option for students in applied disciplines who wish to obtain a graduate education extending beyond that of an M.S., yet do not have the desire to conduct the research needed to obtain a Ph.D. A minimum of two years (six quarters) of graduate

study is required. The candidate must complete 90 units of course work, no more than 10 of which may be applied to overcoming deficiencies in undergraduate training. The student must prepare a substantial thesis that meets the approval of the thesis adviser and the graduate coordinator.

On April 16, 2015, the Senate of the Academic Council approved the Doctor of Philosophy in Geological Sciences. Students who matriculated into the Doctor of Philosophy in Geological and Environmental Sciences have the option of changing the name of their degree to Geological Sciences. Degree requirements remain the same.

Doctor of Philosophy in Geological and Environmental Sciences

Objectives

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and the ability to conduct independent research. To this end, the objectives of the doctoral program are to enable students to develop the skills needed to conduct original investigations in a particular discipline or set of disciplines in the earth sciences, to interpret the results, and to present the data and conclusions in a publishable manner.

Admission

For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores. Previously admitted students who wish to change their degree objective from M.S. to Ph.D. must petition the GES Admissions Committee.

Requirements

The University's requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 43)" section of this bulletin. Practical training (GES 385 Practical Experience in the Geosciences) may be required by some programs, with adviser approval, depending on the background of the student. A summary of additional department requirements is presented below:

1. Ph.D. students must complete the required courses in their individual program or in their specialized area of study with a grade point average (GPA) of 3.0 (B) or higher, or demonstrate that they have completed the equivalents elsewhere. Ph.D. students must complete a minimum of four graduate level, letter-grade courses of at least 3 units each from four different faculty members on the Academic Council in the University. By the end of Spring Quarter of their first year in residence, students must complete at least three graduate level courses taught by a minimum of two different GES faculty members.
2. Each student must qualify for candidacy for the Ph.D. by the end of the sixth quarter in residence, excluding summers. Department procedures require selection of a faculty thesis adviser, preparation of a written research proposal, approval of this proposal by the thesis adviser, selection of a committee for the Ph.D. qualifying examination, and approval of the membership by the graduate coordinator and chair of the department. The research examination consists of three parts: oral presentation of a research proposal, examination on the research proposal, and examination on subject matter relevant to the proposed research. The exam should be scheduled prior to May 1, so

that the outcome of the exam is known at the time of the annual spring evaluation of graduate students.

3. Upon qualifying for Ph.D. candidacy, the student and thesis adviser, who must be a department faculty member, choose a research committee that includes a minimum of two faculty members in the University in addition to the adviser. Annually, in the month of March or April, the candidate must organize a meeting of the research committee to present a brief progress report covering the past year.
4. Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research. The format of the dissertation must meet University guidelines. The student is strongly urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.
5. The doctoral dissertation is defended in the University oral examination. The research adviser and two other members of the research committee are determined to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

Ph.D. Minor in Geological and Environmental Sciences

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in Geological and Environmental Sciences must complete, with a GPA of 3.0 (B) or better, 20 units in the geosciences in lecture courses intended for graduate students. The selection of courses must be approved by the student's GES adviser and the department chair.

Emeriti: (Professors) Atilla Aydin, Robert Coleman, Robert R. Compton, Marco T. Einaudi, W. Gary Ernst,* John W. Harbaugh, James C. Ingle, Jr.,* Andre G. Journel, Juhn G. Liou, Ronald J. P. Lyon, Michael McWilliams, J. Michael Moldowan, George A. Parks

Chair: Gordon E. Brown, Jr.

Associate Chair: Jonathan Payne

Professors: Dennis K. Bird, Gordon E. Brown, Jr., Rodney C. Ewing, Stephan A. Graham, Keith Loague, Donald R. Lowe, Gail A. Mahood, Elizabeth L. Miller, David D. Pollard, Jonathan F. Stebbins

Associate Professors: C. Kevin Boyce, George Hilley, Wendy Mao, Jonathan Payne

Assistant Professors: Katherine Maher, Jessica Warren

Professors (Research): Martin J. Grove

Courtesy Professors: Page Chamberlain, Elizabeth Hadly, Simon L. Klemperer, Anders R. Nilsson, Alfred M. Spormann

Lecturer: Kenneth Befus, Sara Cina, Bob Jones

Consulting Professors: Brent R. Constantz, Thomas L. Holzer, Carolyn Lampe, Jack J. Lissauer, Leslie B. Magoon, Timothy R. McHargue, Kristian E. Meisling, Kenneth Peters, Allegra Scheirer

Consulting Associate Professor: Jorge A. Vazquez

Visiting Professors: James Badro, Carl Jacobson, Friedhelm von Blanckenburg, Sandra Wyld

* Recalled to active duty

Cognate Courses

Many courses offered within the School of Earth Sciences, as well as courses in other schools with a significant Earth sciences component, may be used in satisfaction of optional requirements for the Geological and

Environmental Sciences degree. Undergraduates should discuss the options available to them with the undergraduate program coordinator; graduate students should discuss options with their advisers.

The following courses outside the School of Earth Sciences are particularly applicable:

		Units
BIO 121	Biogeography	3
BIO 136	Evolutionary Paleobiology	4
BIOHOPK 182H	Stanford at Sea	16
CEE 63	Weather and Storms	3
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 101A	Mechanics of Materials	4
CEE 101B	Mechanics of Fluids	4
CEE 101C	Geotechnical Engineering	3-4
CEE 161A	Rivers, Streams, and Canals	3-4
CEE 164	Introduction to Physical Oceanography	4
CEE 166A	Watersheds and Wetlands	3
CEE 173A	Energy Resources	3-5

Overseas Studies Courses in Geological and Environmental Sciences

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPFLOR 52	Mass Extinctions and the Geology of Italy	4

Geophysics

Courses offered by the Department of Geophysics are listed under the subject code GEOPHYS on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GEOPHYS&filter-catalognumber-GEOPHYS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GEOPHYS&filter-catalognumber-GEOPHYS=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GEOPHYS&filter-catalognumber-GEOPHYS=on>).

Geophysics is the branch of Earth science concerned with exploring and analyzing active processes of the Earth through physical measurement. The undergraduate and graduate programs are designed to provide a background of fundamentals in science, and courses to coordinate these fundamentals with the principles of geophysics. The program leading to the Bachelor of Science (B.S.) in Geophysics permits many electives and a high degree of flexibility for each student. Graduate programs provide specialized training

for professional work in resource exploration, research, and education, and lead to the degrees of Master of Science and Doctor of Philosophy.

The Department of Geophysics is housed in the Ruth Watis Mitchell Earth Sciences Building. It has numerous research facilities, among which are a state-of-the-art broadband seismic recording station, high pressure and temperature rock properties and rock deformation laboratories, various instruments for field measurements including seismic recorders, nine dual frequency GPS receivers, and field equipment for measuring in-situ stress at great depth. Current research activities include crustal deformation; earthquake seismology and earthquake mechanics; reflection, refraction, and tomographic seismology; rock mechanics, rock physics; seismic studies of the continental lithosphere; remote sensing; environmental geophysics; and synthetic aperture radar studies.

Mission of the Undergraduate Program in Geophysics

The mission of the undergraduate program in Geophysics is to expose students to a broad spectrum of geophysics, including resource exploration, environmental geophysics, seismology, and tectonics. Students in the major obtain a solid foundation in the essentials of mathematics, physics, and geology, and build upon that foundation with advanced course work in Geophysics to develop the in-depth knowledge they need to pursue advanced graduate study and professional careers in government or the private sector.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. understand the physics and geology that form the basis for geophysical observation and measurement.
2. understand Earth structure and evolution.
3. identify the physical processes governing the behavior of common geophysical systems.
4. be able to explain the principles of applying geophysical methods to societally relevant problems, including natural hazards, resource exploration and management, and environmental issues.
5. be able to quantitatively describe the behavior of natural systems and the principles of geophysical measurement with physics-based mathematical models.
6. investigate these models by solving the governing equations with a combination of analytical and computational methods.
7. make their own observations with a variety of geophysical instruments, and reduce, model, and interpret their data and uncertainties.
8. effectively communicate their scientific knowledge through written and oral presentations.
9. be able to interpret and evaluate the published literature and oral and poster presentations at national meetings.

Graduate Programs in Geophysics

University requirements for the M.S. and Ph.D. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. Lecture course units applied to graduate degree program requirements must be taken for a letter grade if the course is offered for a letter grade.

Learning Outcomes (Graduate)

The objective of the graduate program in Geophysics is to prepare students to be leaders in the geophysics industry, academia, and research organizations through completion of fundamental courses in the major field and in related sciences, as well as through independent research. Students are expected to:

1. apply skills developed in fundamental courses to geophysical problems.
2. research, analyze, and synthesize solutions to an original and contemporary geophysics problem.
3. work independently and as part of a team to develop and improve geophysics solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.
5. master's students are expected to develop in-depth technical understanding of geophysics problems at an advanced level.
6. doctoral students are expected to complete a scientific investigation that is significant, challenging and original.

Bachelor of Science in Geophysics

The following courses are required for the B.S. degree in Geophysics. A written report on original research or an honors thesis is also required through participation in and GEOPHYS 199 Senior Seminar: Issues in Earth Sciences in Autumn Quarter of the senior year. Seniors in Geophysics who expect to do graduate work should take the Graduate Record Examination (GRE) early in their final undergraduate year.

Optional Pre-Major Class

GEOPHYS 113

Units
3

Geophysics Core Courses (29-32 units)

Students must take all of the following:

	Units
GEOPHYS 110 Earth on the Edge: Introduction to Geophysics	3
GEOPHYS 120 Ice, Water, Fire	3-5
GEOPHYS 130 Introductory Seismology	3
GEOPHYS 150 Geodynamics: Our Dynamic Earth	3
GEOPHYS 162 Laboratory Methods in Geophysics	2-3
or PHYSICS 67 Introduction to Laboratory Physics	
GEOPHYS 190 Near-Surface Geophysics	3
GEOPHYS 196 Undergraduate Research in Geophysics (or approved research internship)	5
GEOPHYS 197 Senior Thesis in Geophysics	3
or GEOPHYS 198 Honors Program	
GEOPHYS 199 Senior Seminar: Issues in Earth Sciences	3
GEOPHYS 201 Frontiers of Geophysical Research at Stanford: Faculty Lectures	1
Total Units	29-32

Geophysics Breadth Courses (18-29 units)

Choose six upper-level courses, one from each of the following six areas (but an additional Geophysics class may substitute for either the Physics of the Geology breadth areas):

1. Resources, hazards, and the environment

	Units
Select one of the following:	3
GEOPHYS 182 Reflection Seismology	
GEOPHYS 183 Reflection Seismology Interpretation	
GEOPHYS 185 Rock Physics for Reservoir Characterization	
ENERGY 120 Fundamentals of Petroleum Engineering	
GES 130 Soil Physics and Hydrology	
GES 131 Hydrologically-Driven Landscape Evolution	
Total Units	3

2. Whole-Earth Geophysics

	Units
Select one of the following:	3
EESS 141 Remote Sensing of the Oceans	
GEOPHYS 170 Global Tectonics	
GEOPHYS 184 Journey to the Center of the Earth	
GEOPHYS 186 Tectonophysics & Global Tectonics (Tectonophysics & Global Tectonics)	3
Total Units	6

3. Numerical and computational methods

	Units
Select one of the following:	3-4
GEOPHYS 187 Environmental Soundings Image Estimation	
GEOPHYS 281 Geophysical Inverse Problems	
EARTHSCI 211 Introduction to Programming for Scientists and Engineers	
ENERGY 160 Modeling Uncertainty in the Earth Sciences	
EE 102A Signal Processing and Linear Systems I	
CME 108 Introduction to Scientific Computing	
CS 106A Programming Methodology & CS 106B and Programming Abstractions	
PHYSICS 113 Computational Physics	

4. Geophysical fluid dynamics

	Units
Select one of the following:	3-4

GEOPHYS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
GEOPHYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation
GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods
ENERGY 121	Fundamentals of Multiphase Flow
CEE 164	Introduction to Physical Oceanography
EESS 220	Physical Hydrogeology

5. Physics

Select one of the following:

CEE 101A	Mechanics of Materials	Units	4
EE 141			
ME 80	Mechanics of Materials		
PHYSICS 110	Advanced Mechanics		
PHYSICS 120	Intermediate Electricity and Magnetism I		

6. Geology

Select one of the following:

GES 102	Earth Materials: Introduction to Mineralogy	Units	3-5
GES 110	Structural Geology and Tectonics		
GES 111	Fundamentals of Structural Geology		
GES 151	Sedimentary Geology and Petrography: Depositional Systems		

Supporting Mathematics Courses

Students must take one of the following series (15 or 19 units):

CME 100	Vector Calculus for Engineers	Units	5
CME 102	Ordinary Differential Equations for Engineers		5
CME 104	Linear Algebra and Partial Differential Equations for Engineers		5

(MATH 51 (MATH 51M recommended), MATH 52, and MATH 53 plus either GEOPHYS 112 or CME 192 may substitute for CME series)

Supporting Science Courses

Students must take all of the following (8-27 units):

GES 1A	Introduction to Geology: The Physical Science of the Earth	Units	4-5
or GES 1B	Introduction to Geology		
or GES 1C	Introduction to Geology: Dynamic Earth		
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II		5-10
or CHEM 31X	Chemical Principles Accelerated		
or a score of 5 on the Chemistry AP exam			
PHYSICS 41	Mechanics		4
or PHYSICS 61	Mechanics and Special Relativity		

or a score of 4-5 on the Physics C Mechanics AP exam			
PHYSICS 43	Electricity and Magnetism		4
or PHYSICS 63	Electricity, Magnetism, and Waves		
or a score of 4-5 on the Physics C E & M AP exam			
PHYSICS 45	Light and Heat		4
or PHYSICS 65	Quantum and Thermal Physics		

Optional Field Class

GES 105	Introduction to Field Methods		3
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Honors Program

The department offers a program leading to the B.S. degree in Geophysics with honors. The guidelines are:

1. Select a research project, either theoretical, field, or experimental, that has the approval of an adviser.
2. Submit a proposal to the department, which decides on its suitability as an honors project. Necessary forms are in the department office.
3. Course credit for the project is assigned by the adviser within the framework of GEOPHYS 198 Honors Program.
4. The decision whether a given independent study project does or does not merit an award of honors is made jointly by the department and the student's adviser. This decision is based on the quality of both the honors work and the student's other work in Earth Sciences.
5. The work done on the honors program cannot be used as a substitute for regularly required courses.

Minor in Geophysics

The Geophysics minor provides students with a general knowledge of Geophysics in addition to a background in the related fields of physics, mathematics, and geology. The minor consists of one required class (3 units), three electives (min. 9 units), and supporting classes in geology, mathematics, and physics.

Curriculum

1. Required course:

GEOPHYS 110	Earth on the Edge: Introduction to Geophysics	Units	3
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2. Plus three additional approved electives, typically chosen from:

Select three of the following: 9			
GEOPHYS 120	Ice, Water, Fire		
GEOPHYS 130	Introductory Seismology		
GEOPHYS 141	Remote Sensing of the Oceans		
GEOPHYS 150	Geodynamics: Our Dynamic Earth		
GEOPHYS 162	Laboratory Methods in Geophysics		
GEOPHYS 184	Journey to the Center of the Earth		
GEOPHYS 186	Tectonophysics & Global Tectonics		
GEOPHYS 190	Near-Surface Geophysics		

3. Supporting Math & Science:

		Units
GES 1A	Introduction to Geology: The Physical Science of the Earth	4-5
or GES 1B	Introduction to Geology	
or GES 1C	Introduction to Geology: Dynamic Earth	
CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
PHYSICS 21	Mechanics and Heat	8
or PHYSICS 22	Mechanics and Heat Laboratory	
or PHYSICS 23	Electricity and Optics	
or PHYSICS 24	Electricity and Optics Laboratory	
or PHYSICS 41	Mechanics	
& PHYSICS 43	and Electricity and Magnetism	
or PHYSICS 41	Mechanics	
& PHYSICS 45	and Light and Heat	
or equivalent AP scores		

Coterminal B.S./M.S. Program in Geophysics

The Department offers a coterminal M.S. degree for students wishing to obtain more specialized training in Geophysics than is normally possible during study for the B.S. degree alone. An M.S. degree should be considered as the professional degree in Geophysics, and is aimed at students wishing to work in a related industry, or students desiring more focused academic study in the field than the B.S. program allows.

The coterminal M.S. degree in Geophysics is offered in conjunction with any relevant undergraduate program at Stanford. Geophysics students often enter the department with degrees in Earth sciences, mathematics, physics, chemistry, or other natural science or engineering fields. Any of these are suitable for the coterminal Geophysics program, and interested students are encouraged to discuss their own background with a Geophysics faculty member.

The requirements for entry into the coterminal M.S. program are submission of a transcript, a statement of purpose, and at least two letters of recommendation. Applications with a letter of recommendation from a Geophysics faculty are generally considered the strongest. Additional letters from other academic or work-related persons also strengthen the application. There are no specific GPA requirements for entry, but the Department looks for proven performance in a rigorous undergraduate curriculum as a prerequisite for admission.

Undergraduates with at least junior-level standing may apply, and applications should be submitted by the Autumn Quarter of the senior year. The graduation requirements to obtain the degree are identical to those for the regular Geophysics master's degree. Contact the Department of Geophysics student services officer for additional information.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Master of Science in Geophysics Objectives

To enhance the student's training for professional work in geophysics through the completion of fundamental courses, both in the major fields and in related sciences, and to begin independent work and specialization.

Degree Requirements

The candidate must complete 45 units from the following groups of courses:

1. Complete 15 units of Geophysics lecture courses with at least 9 units numbered 200 or higher.
2. Complete six units numbered 100 or higher and three units of 200-level, non-Geophysics lecture courses in earth sciences.
3. Complete one to four electives selected from courses numbered 100 or higher from mathematics, chemistry, engineering, physics, relevant biology, computer science, ecology, hydrology, or earth science. At least one course must be numbered 200 or higher.
4. At least 9, but not more than 18, of the 45 units must be independent work on a research problem resulting in a written report accepted and archived by the candidate's faculty adviser. Normally, this research is undertaken as part of the candidate's participation in multiple quarters of research seminar (GEOPHYS 385 series). A summer internship is encouraged as a venue for research, but no academic credit is given.
5. Submit a program proposal for approval by a faculty adviser in the first quarter of enrollment.
6. Each candidate must present and defend the results of his or her research at a public oral presentation attended by at least two faculty members; and turn in a thesis/report to adviser.
7. Students are required to attend department seminars.

Doctor of Philosophy in Geophysics Objectives

The Ph.D. degree is conferred upon evidence of high attainment in Geophysics and ability to conduct an independent investigation and present the results of such research.

Transfer Credit

An incoming student with a relevant master of science degree may apply for a departmental waiver of up to 12 units of the 30 lecture units required for the Ph.D. degree, for certain courses as approved by the departmental graduate faculty adviser. Credit for courses generally requires that students identify an equivalent Stanford course and obtain the signature of the Stanford faculty responsible for that course, stating its equivalence.

Requirements for the Degree

A minimum of 135 units of graduate study at Stanford must be satisfactorily completed. Required courses must be taken for a letter grade, if offered. Students are required to attend the department seminars, and to complete sufficient units of independent work on a research problem to meet the 135-unit University requirement. 12 units must be met by participation in the GEOPHYS 385 series, or equivalent series in other departments with approval of the adviser and graduate coordinator. Students are encouraged to participate in the GEOPHYS 385 series from more than one faculty

member or group and relevant equivalent series in other departments. Students with a Master's degree may waive up to 12 units for approved courses.

ENGR 202W Technical Writing, is recommended but not required.

The student's record must indicate outstanding scholarship, and deficiencies in previous training must be removed. Experience as a teaching assistant (quarter-time for at least two academic quarters) is required for the Ph.D. degree. For more information, see the Geophysics Administrative Guide, section 1.4.1.

The student must pass the departmental oral examination by the end of the sixth academic quarter (third academic quarter for students with an M.S. degree); prepare under faculty supervision a dissertation that is a contribution to knowledge and the result of independent work expressed in satisfactory form; and pass the University oral examination.

The Ph.D. dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy. Upon formal acceptance into a research group, the student and faculty adviser form a supervising committee consisting of at least three members who are responsible for overseeing satisfactory progress toward the Ph.D. degree. At least two committee members must be Geophysics faculty members. The committee conducts the department oral examination, and meets thereafter annually with the student to review degree progress. The Geophysics faculty monitors progress of all students who have not yet passed their department oral examination by carrying out an annual performance appraisal at a closed faculty meeting.

Course requirements

1. *Geophysics*: 12 units, lecture courses numbered 200 and above, from 4 different Geophysics faculty with different research specializations. These units cannot be waived.
2. *Additional Geophysics*: 3 units, lecture courses numbered 150 and above
3. *School of Earth Sciences (non-Geophysics)*: 3 units, lecture courses numbered 100 or above
4. *Mathematics (numbered 100 or above), Science, and Engineering (non-School of Earth Sciences)*: 6 units, lecture courses numbered 200 or above
5. *Any of the above categories*: 6 units, lecture courses numbered 200 or above
6. *Total required units*: 30 units.

Ph.D. Department Examination Requirement

1. One research proposal (10-20 pages) with a completed component that outlines a plan of research for 2-3 years
2. Second scientific proposal or paper (4-10 pages) with a professor in another area
3. An oral presentation with the student's advising committee on both the research proposal (~30-40 min) and the second proposal/paper (~10 min), with questions by the committee constituting the qualifying exam.

Second Project

The purpose of the second research project is to add breadth to Ph.D. study and give the student the opportunity, ability and confidence to carry out research in multiple areas.

Description/Scope:

The second project should stand alone as a separate piece of work from the primary research project.

- The second project must be in Geophysics or a closely related discipline
- The topic must be substantially different from the topic of the Ph.D. thesis; i.e., it should not be the same method applied to a different problem, or a different method applied to the same problem.
- The second project should be supervised by a Stanford Geophysics faculty member (Academic Council or research faculty) who does not serve as the primary research adviser, and who must be in a separate research group. Exceptions allowing for second project advisers who are not Stanford Geophysics faculty must be approved by both the research adviser and the Director of Graduate Studies.
- Completion of the second project ideally results in a publication in the refereed literature, or a presentation at a scientific conference.
- Most students are expected to complete the second research project as part of their Ph.D. studies. However, the department allows an option of meeting academic breadth requirements through additional focused course work; see the Geophysics (<https://pangea.stanford.edu/departments/geophysics/academics/graduate-program/graduation-requirements>) web site for further information on program requirements and the coursework breadth option.

Chair: Howard Zebker

Associate Chair: Biondo Biondi

Professors: Greg Beroza, Biondo Biondi, Jerry M. Harris, Simon Klempner, Rosemary J. Knight, Paul Segall, Norman H. Sleep, Howard Zebker,* Mark D. Zoback

Assistant Professors: Eric Dunham, Jesse Lawrence, Tiziana Vanorio, Jenny Suckale

Professor (Research): Gerald M. Mavko

Associate Professor (Research): Tapan Mukerji***

Emeriti: Jon Claerbout, Antony Fraser-Smith,* Robert Kovach, Amos Nur, Joan Roughgarden,** George A. Thompson

Courtesy Professors: Stephan A. Graham, Wendy Mao, David D. Pollard

Consulting Faculty: Antoine Guitton, Dave Nichols, Shuki Ronen, Stewart Levin, Mary Lou Zoback

Senior Research Scientists: Robert Clapp, Jack Dvorkin

* Joint appointment with Electrical Engineering

** Joint appointment with Biological Sciences

*** Joint appointment with Energy Resources Engineering

Graduate School of Education

Courses offered by the Graduate School of Education are listed under the subject code EDUC on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EDUC&filter-catalognumber-EDUC=on>) web site.

Aiming towards the ideal of enabling all people to achieve maximum benefit from their educational experiences, the Graduate School of Education seeks to continue as a world leader in ground-breaking, cross-disciplinary inquiries that shape educational practices, their conceptual underpinnings, and the professions that serve the enterprise. The Graduate School of Education prepares scholars, teachers, teacher educators, policy analysts, evaluators, researchers, administrators, and other educational specialists. Two graduate degrees with specialization in education are granted by the University: Master of Arts and Doctor of Philosophy. While no undergraduate majors are offered, the school offers a number of courses for undergraduates, an undergraduate minor and undergraduate honors program, and a variety of tutoring programs.

The Graduate School of Education is organized into three program area committees: Curriculum Studies and Teacher Education (CTE); Developmental and Psychological Sciences (DAPS); and Social Sciences, Humanities, and Interdisciplinary Policy Studies in Education (SHIPS).

In addition, several cross-area programs are sponsored by faculty from more than one area. These programs include the doctoral program in Learning Sciences and Technology Design (LSTD); two master's level programs: the Stanford Teacher Education Program (STEP) and the Learning, Design, and Technology Program (LDT); and the undergraduate honors and minor programs.

These program area committees function as administrative units that act on admissions, plan course offerings, assign advisers, and determine program requirements. Various concentrations exist within most of these areas. Faculty members are affiliated primarily with one area but may participate in several programs. While there is a great deal of overlap and interdisciplinary emphasis across areas and programs, students are affiliated with one area committee or program and must meet its degree requirements.

Detailed information about admission and degree requirements, faculty members, and specializations related to these area committees and programs can be found in the Academics section of the School's website (<https://ed.stanford.edu/academics>).

The Graduate School of Education offers an eight-week summer session for admitted students only. The school offers no correspondence or extension courses, and in accordance with University policy, no part-time enrollment is allowed. Work in an approved internship or as a research assistant is accommodated within the full-time program of study.

Undergraduate Programs in Education

The Graduate School of Education offers a minor and an honors program at the undergraduate level. Further information about these programs can be found at the Graduate School of Education (<https://ed.stanford.edu/academics>) web site.

Regardless of whether they are enrolled in one of these undergraduate programs, undergraduates are also welcome in many graduate-level courses at the GSE.

Graduate Programs in Education

The Graduate School of Education offers Master of Arts and Doctor of Philosophy degrees in several programs described below. University and Graduate School of Education requirements must be met for each degree. The University requirements are detailed in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. Students are urged to read this section carefully, noting residency, tuition, and registration requirements. A student who wishes to enroll for graduate work in the Graduate School of Education must be admitted to graduate standing by one of the school's area committees and with the approval of the Associate Dean of Student Affairs.

Complete information about admissions procedures and requirements is available from Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>), or at the Graduate School of Education (<https://ed.stanford.edu/admissions>) web site. All applicants, except coterminal applicants, must submit scores from the Graduate Record Examination General Test (verbal, quantitative, and analytical or analytical writing areas); TOEFL scores are also required from those whose first language is not English. Applicants to the Stanford Teacher Education Program are also required to submit specific test scores or acceptable equivalents as required by the California Commission on Teacher Credentialing; see the section on STEP. Test information is available at the Graduate School of Education (<https://ed.stanford.edu/admissions>) web site.

Honors Program in Education

An honors program in Education is available to undergraduates to supplement their regular majors by applying their studies to the field of education, broadly conceived. This program enables qualified undergraduates at Stanford to extend the training in their major field of study by pursuing additional courses and a research thesis in a related area in the study of education.

Students apply for entry during the junior year. Application information can be found at the Graduate School of Education (<https://ed.stanford.edu/academics/undergraduate/honors>) web site. The current director of the honors program is Professor John Willinsky.

Near the end of Spring Quarter, successful candidates for honors present brief reports of their work and findings at a mini-conference that all the honors students in Education, as well as other members of the academic community, attend.

Required Coursework:

1. Students are required to enroll in the Undergraduate Honors Seminar during their senior year: EDUC 199A Undergraduate Honors Seminar (Autumn, 3 credits), EDUC 199B Undergraduate Honors Seminar (Winter, 1 credit), and EDUC 199C Undergraduate Honors Seminar (Spring, 1 credit)
2. Students are required to enroll in Honors Research (EDUC 140 Honors Research) with their adviser during Winter and Spring quarters of their senior year. The number of units is to be determined in consultation with the faculty adviser.
3. Students must complete a minimum of 3 courses taken for a minimum of 3 units each in Education (EDUC units). All courses must be taken for a letter grade. Coursework completed for the Honors program in Education should address varied topics in the field of education, and must be approved by the Honors Director and student's faculty adviser.

Minor in Education (Undergraduate)

The Graduate School of Education awards an undergraduate minor in the field of Education. The minor is structured to provide a substantial introduction to education through a broad-based and focused study of educational research, theory and practice. The goals of the minor are to allow undergraduates to develop an understanding of the core issues facing educators and policymakers, to make connections to their major programs of study, and to provide rigorous preparation for graduate studies in education.

Students interested in pursuing an undergraduate minor in Education begin by contacting the minor director (Jennifer Lynn Wolf, jlwolf@stanford.edu), who is responsible for advising all candidates and approving each student's minor plan of study. Applications for the minor are due no later than the second quarter of the junior year.

The Education minor requires three core courses to ensure coverage of the disciplines of the field, while allowing flexibility for students wanting to pursue specific interests within Education. In order to graduate with a minor in Education, undergraduates must complete the minor program of study as described here, for a total of not less than 20 units and not more than 30 units, with a minimum of six courses.

Course Requirements and Distribution

- All minor students are required to take the minor core course:

		Units
EDUC 101	Introduction to Teaching and Learning	4

- All students are also required to take two foundational courses, such as the following:

		Units
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 110	Sociology of Education: The Social Organization of Schools	4
EDUC 120C	Education and Society	4-5
EDUC 201	History of Education in the United States	3-5
EDUC 204	Introduction to Philosophy of Education	3

- Each student identifies a subfield of study in which to take at least three elective courses. Established subfields of study within the School of Education include: Teaching and Learning; Education Research and Policy; and Educational Technology. Suitable elective courses include:

- Subfield 1: Teaching and Learning—

		Units
EDUC 103A	Tutoring: Seeing a Child through Literacy	4
EDUC 111	The Young Adult Novel: A Literature For and About Adolescents	4
EDUC 112X	Urban Education	3-4
EDUC 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 171	Early Childhood Education Practicum	2-4
EDUC 256	Psychological and Educational Resilience Among Children and Youth	4
EDUC 357	Science and Environmental Education in Informal Contexts	3-4

- Subfield 2: Education Research and Policy—

		Units
EDUC 117	Research and Policy on Postsecondary Access	3
EDUC 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
EDUC 165	History of Higher Education in the U.S.	3-5
EDUC 197	Education, Gender, and Development	4
EDUC 218	Topics in Cognition and Learning: Executive Function	3
EDUC 223	Good Districts and Good Schools: Research, Policy, and Practice	3-4
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4

- Subfield 3: Learning Design and Technology—

		Units
EDUC 139X	Educating Young STEM Thinkers	3-5
EDUC 303X	Designing Learning Spaces	3-4
EDUC 328	Topics in Learning and Technology: Core Mechanics for Learning	3
EDUC 333A	Understanding Learning Environments	3
EDUC 342	Child Development and New Technologies	3

- Course work completed for the Education Minor must meet the following criteria:

- All courses must be taken for a letter grade.
- All courses must be completed with a minimum GPA of 3.0.
- Courses used to fulfill the minor may not be used to fulfill any other department degree requirements (major or minor).
- All courses must be taken at Stanford University.

Coterminal Bachelor's and Master's Program in Education

The Graduate School of Education admits a small number of students from undergraduate departments within the University into a coterminal bachelor's and master's program. For information about the coterminal option through the Stanford Teacher Education Program (STEP), see the details under STEP. Students in this program receive the bachelor's degree in their undergraduate major and the master's degree in Education. Approval of the student's undergraduate department and admission to the School of Education M.A. program are required. Undergraduates may apply when they have completed at least 120 units toward graduation (UTG). The number of units required for the M.A. degree depends on the program requirements within the Graduate School of Education; the minimum is 45 units.

Applicants may learn more about the coterminal application process and download the application from the Graduate School of Education's (<https://ed.stanford.edu/admissions/application-reqs>) web site.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Master of Arts in Education

The M.A. degree is conferred by the University upon recommendation of the faculty of the Graduate School of Education. The minimum unit requirement is 45 quarter units earned at Stanford as a graduate student. Students must maintain a grade point average (GPA) of 3.0 or better in courses applicable to the degree, and a minimum of 27 units must be taken in the Graduate School of Education. Students typically enroll in 15 to

18 units per quarter. They must enroll in at least 11 units of work each quarter unless their program makes special provision for a lower quarterly minimum. Master's students should obtain detailed program requirements from the Master's Handbook (<https://ed.stanford.edu/academics/masters-handbook>). Some programs require a final project or scholarly paper. Additional detailed information regarding program content, entrance, and degree requirements is available at the Graduate School of Education's (<https://ed.stanford.edu/admissions/application-reqs>) web site. Before the program begins, each student is assigned a faculty adviser from the appropriate area committee to begin early planning of a coherent program.

Master of Arts degrees are offered for the following specializations:

- Curriculum and Teacher Education. (CTE) (This is not a credentialing program; see STEP below.)
- International Comparative Education (ICE)
- International Education Policy Analysis (IEPA)
- Joint Degree with Graduate School of Business (M.B.A./M.A.)
- Joint Degree with Law School (J.D./M.A.)
- Joint Degree with Public Policy Program (M.A./M.P.P.)
- Learning, Design, and Technology (LDT)
- Policy, Organization, and Leadership Studies (POLS)

In addition, an M.A. degree with a teaching credential is offered in the Stanford Teacher Education Program.

Stanford Teacher Education Program (STEP)

STEP is a 12-month, full-time program leading to a Master of Arts and a preliminary California teaching credential. STEP offers a Master of Arts in Education that prepares program graduates for careers as teachers in single or multiple subject classrooms. STEP Elementary prepares students to become teachers in multiple subject classrooms. STEP Secondary prepares students to become teachers of English, World Languages (French, German, Japanese, Mandarin, Spanish), Mathematics, Science (biology, chemistry, earth science, physics), and History/Social Science. STEP seeks to prepare and support teacher candidates to work with diverse learners to achieve high intellectual, academic, and social standards by creating equitable and successful schools and classrooms.

The 12-month STEP year begins in June with a summer quarter of intensive academic preparation and placement in a local summer school. During the academic year, students continue their course work and begin year-long field placements under the guidance of expert teachers in local schools. The Master of Arts and teaching credential require a minimum of 45 quarter units, taken during four quarters of continuous residency.

Stanford undergraduates who enroll in STEP through the coterminal program must complete their undergraduate coursework and have their bachelor's degree conferred prior to beginning in the STEP year. Coterminal STEP students graduate with a Master of Arts in Education and a recommendation for a preliminary California teaching credential.

Applicants to STEP Elementary are required to pass the California Basic Educational Skills Test (CBEST), an approved out of state basic skills exam, or CSET: Writing Skills. Applicants must also pass the California Multiple Subject Examination for Teachers (CSET), and the Reading Instruction Competence Assessment Test (RICA).

Applicants to STEP Secondary are required to pass the California Basic Educational Skills Test (CBEST) or an approved out of state basic skills exam, and must demonstrate subject matter competence in one of two ways:

1. by passing the California Subject Examination for Teachers (CSET) in their content area; or
2. by completing a California state-approved subject matter preparation program.

Further information regarding admission requirements, course work, and credential requirements is available at the Stanford Teacher Education Program website. (<https://gse-step.stanford.edu>)

Doctoral Degrees in Education

The Graduate School of Education offers the Doctor of Philosophy (Ph.D.) degree in all program area committees. The degree is conferred by the University upon recommendation by the faculty of the Graduate School of Education and the University Committee on Graduate Studies. The Ph.D. requires a minimum of 135 units of course work and research completed at Stanford beyond the baccalaureate degree. Students may transfer up to 45 units of graduate course work. Students must consult with the doctoral programs officer if they intend to transfer prior course work. Students must maintain a grade point average (GPA) of 3.0 (B) or better in courses applicable to the degree.

Students should note that admission to the doctoral program does not constitute admission to candidacy for the degree. Students must qualify and apply for candidacy by the end of their second year of study and should obtain information about procedures and requirements during their first year from the doctoral programs officer in Cubberley 135.

The Ph.D. degree is designed for students who are preparing for research work in public school systems, branches of government, or specialized institutions; teaching roles in education in colleges or universities, and research connected with such teaching; or other careers in educational scholarship and research.

Ph.D. students must complete a minor in another discipline taught outside the school, or hold an acceptable master's degree outside the field of education, or complete an approved individually designed distributed minor that combines relevant advanced work taken in several disciplines outside the school.

Upon admission, the admitting area committee assigns an initial adviser from its faculty who works with the student to establish an appropriate and individualized course of study, a relevant minor, and project research plans. Other faculty members may also be consulted in this process. Details about administrative and academic requirements for each area committee and the Graduate School of Education, along with the expected time frame to complete program milestones, are given in the publication Graduate School of Education Doctoral Degree Handbook, available for download at <http://ed.stanford.edu/academics/doctoral-handbook>.

The following doctoral specializations, with their sponsoring area and concentration, are offered:

- Anthropology of Education (SHIPS)
- Developmental and Psychological Sciences (DAPS)
- Economics of Education (SHIPS)
- Educational Linguistics (SHIPS)
- Educational Policy (SHIPS)
- Elementary Education (CTE)
- Higher Education (SHIPS)
- History/Social Science Education (CTE)
- History of Education (SHIPS)
- International Comparative Education (SHIPS)
- Learning Sciences and Technology Design (CTE, DAPS, SHIPS)
- Linguistics (SHIPS)
- Literacy, Language, and English Education (CTE)
- Mathematics Education (CTE)
- Organizational Studies (SHIPS)
- Philosophy of Education (SHIPS)
- Race, Inequality, and Language in Education (SHIPS)
- Science Education (CTE)

- Sociology of Education (SHIPS)
- Teacher Education (CTE)

Ph.D. Minor in Education

Candidates for the Ph.D. degree in other departments or schools of the University may elect to minor in Education. Requirements include a minimum of 20 quarter units of graduate course work in Education and a field of concentration. Students choosing to minor in Education should meet with the Associate Dean for Student Affairs to determine a suitable course of study early in their program.

Emeriti: (Professors) J. Myron Atkin, John Baugh, Edwin M. Bridges, Robert C. Calfee, Larry Cuban, James Greeno, Edward Haertel, Michael Kamil, Michael W. Kirst, Henry M. Levin, Richard Lyman (President Emeritus), James G. March, William F. Massy, Milbrey McLaughlin, Nel Noddings, Ingram Olkin, Denis C. Phillips, Thomas Rohlen, Richard J. Shavelson, Lee S. Shulman, Claude Steele, Myra H. Strober, Patrick Suppes, Carl E. Thoresen, David B. Tyack, Decker F. Walker, Hans Weiler

Dean: Deborah Stipek

Associate Dean for Faculty Affairs: Francisco O. Ramirez

Associate Dean for Student Affairs: Eamonn Callan

Senior Associate Dean for Administration: Stephen Olson

Associate Dean for External Relations: Rebecca T. Smith

Assistant Dean for Academic Services: Shu-Ling Chen

Assistant Dean for HR, Faculty Affairs, Facilities, and Admin Support: Priscilla Fiden

Assistant Dean for Information Technology and CTO: Paul Kim

Professors: H. Samy Alim, Arnetha Ball, Jo Boaler, Hilda Borko, Eamonn Callan, Martin Carnoy, Prudence Carter, Geoffrey Cohen, William Damon, Linda Darling-Hammond, Tom Dee, Claude Goldenberg, Pamela Grossman, Patricia J. Gumpert, Kenji Hakuta, Connie Juel, John D. Krumboltz, David F. Labaree, Teresa D. LaFromboise, Susanna Loeb, Bruce D. McCandliss, Raymond P. McDermott, Daniel A. McFarland, Jonathan Osborne, Amado M. Padilla, Roy Pea, Walter Powell, Francisco O. Ramirez, Sean Reardon, Daniel Schwartz, Deborah J. Stipek, Guadalupe Valdés, Carl Wieman, John Willinsky, Sam Wineburg

Associate Professors: Anthony L. Antonio, Brigid J. Barron, Eric Bettinger, Bryan Brown, Ari Y. Kelman, David Rogosa, Mitchell Stevens

Assistant Professors: Nicole M. Ardoin, Maren Songmy Aukerman, Paulo Blikstein, Leah Gordon, Jennifer Langer-Osuna, Jelena Obradovi#, Candace Thille

Professors (Teaching): Shelley Goldman, Rachel Lotan

Associate Professors (Teaching): David Brazer, Ira Lit, Christine Min Wotipka

Professor (Research): David Plank

Associate Professor (Research): Janet Carlson

Assistant Professor (Research): Michelle Reininger

Courtesy Professors: Richard Banks, Stephen Barley, Albert Camarillo, Carol Dweck, Eric Hanushek, William Koski, John C. Mitchell, Terry Moe, Clifford Nass, Brad Osgood, John Rickford, Cecilia Ridgeway, Caroline Winterer

Courtesy Associate Professors: Stephen Cooper, Robert Reich

Courtesy Professor (Teaching): Don Barr

Courtesy Assistant Professor: Shashank Joshi

Affiliated Faculty: Prashant Loyalka

Senior Lecturers: Gay Hoagland, Denise Pope, Ann Porteus, Jennifer Wolf

Overseas Studies Courses in Education

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

Units

ExploreCourses No courses found: explorecourses:OSP::educ

School of Engineering

Courses offered by the School of Engineering are listed under the subject code ENGR on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENGR&filter-catalognumber-ENGR=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENGR&filter-catalognumber-ENGR=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENGR&filter-catalognumber-ENGR=on>).

The School of Engineering offers undergraduate programs leading to the degree of Bachelor of Science (B.S.), programs leading to both B.S. and Master of Science (M.S.) degrees, other programs leading to a B.S. with a Bachelor of Arts (B.A.) in a field of the humanities or social sciences, dual-degree programs with certain other colleges, and graduate curricula leading to the degrees of M.S., Engineer, and Ph.D.

The school has nine academic departments: Aeronautics and Astronautics, Bioengineering, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, Management Science and Engineering, Materials Science and Engineering, and Mechanical Engineering. These departments and one interdisciplinary program, the Institute for Computational and Mathematical Engineering, are responsible for graduate curricula, research activities, and the departmental components of the undergraduate curricula.

In research where faculty interest and competence embrace both engineering and the supporting sciences, there are numerous programs within the school as well as several interschool activities, including the Army High Performance Computing Research Center, Biomedical Informatics Training Program, Center for Integrated Systems, Center for Work, Technology, and Organization, Collaboratory for Research on Global Projects, National Center for Physics-Based Simulation in Biology, Center for Position, Navigation, and Time, the Energy Modeling Forum, the NIH Biotechnology Graduate Training Grant in Chemical Engineering, and the Stanford Technology Ventures Program. Energy Resources Engineering (formerly Petroleum Engineering) is offered through the School of Earth Sciences.

The School of Engineering's Hasso Plattner Institute of Design (<http://dschool.stanford.edu>) brings together students and faculty in engineering, business, education, medicine, and the humanities to learn design thinking and work together to solve big problems in a human-centered way.

The Woods Institute for the Environment (<http://environment.stanford.edu>) brings together faculty, staff, and students from the schools, institutes and centers at Stanford to conduct interdisciplinary research, education, and outreach to promote an environmentally sound and sustainable world.

The School of Engineering's Office of Student Affairs offers a variety of international programs and experiences for undergraduate and graduate students focusing on engineering fields. For more information, please see <http://engineering.stanford.edu/portals/student/jobs-and-internships/global-engineering-programs>. The School of Engineering also has an exchange program available exclusively to graduate students whose research would benefit from collaboration with Chinese academic institutions.

Instruction in Engineering is offered primarily during Autumn, Winter, and Spring quarters of the regular academic year. During the Summer Quarter, a small number of undergraduate and graduate courses are offered.

Undergraduate Programs in the School of Engineering

The principal goals of the undergraduate engineering curriculum are to provide opportunities for intellectual growth in the context of an

engineering discipline, for the attainment of professional competence, and for the development of a sense of the social context of technology. The curriculum is flexible, with many decisions on individual courses left to the student and the adviser. For a student with well-defined educational goals, there is often a great deal of latitude.

In addition to the special requirements for engineering majors described below, all undergraduate engineering students are subject to the University general education, writing, and foreign language requirements outlined in the first pages of this bulletin. Depending on the program chosen, students have the equivalent of from one to three quarters of free electives to bring the total number of units to 180.

The School of Engineering's *Handbook for Undergraduate Engineering Programs* is the definitive reference for all undergraduate engineering programs. It is available online at <http://ughb.stanford.edu> and provides detailed descriptions of all undergraduate programs in the school, as well as additional information about extracurricular programs and services. Because it is revised in the summer, and updates are made to the web site on a continuing basis, the handbook reflects the most up-to-date information on School of Engineering programs for the academic year.

Accreditation

The Accreditation Board for Engineering and Technology (ABET) accredits college engineering programs nationwide using criteria and standards developed and accepted by U.S. engineering communities. At Stanford, the following undergraduate programs are accredited:

- Chemical Engineering
- Civil Engineering
- Mechanical Engineering

In ABET-accredited programs, students must meet specific requirements for engineering science, engineering design, mathematics, and science course work. Students are urged to consult the *School of Engineering Handbook for Undergraduate Engineering Programs* and their adviser.

Accreditation is important in certain areas of the engineering profession; students wishing more information about accreditation should consult their department office or the office of the Senior Associate Dean for Student Affairs in 135 Huang Engineering Center.

Policy on Satisfactory/No Credit Grading and Minimum Grade Point Average

All courses taken to satisfy major requirements (including the requirements for mathematics, science, engineering fundamentals, Technology in Society, and engineering depth) for all engineering students (including both department and School of Engineering majors) must be taken for a letter grade if the instructor offers that option.

For departmental majors, the minimum combined GPA (grade point average) for all courses taken in fulfillment of the Engineering Fundamentals requirement and the Engineering Depth requirement is 2.0. For School of Engineering majors, the minimum GPA on all engineering courses taken in fulfillment of the major requirements is 2.0.

Admission

Any students admitted to the University may declare an engineering major if they elect to do so; no additional courses or examinations are required for admission to the School of Engineering.

Recommended Preparation Freshman

Students who plan to enter Stanford as freshmen and intend to major in engineering should take the highest level of mathematics offered in high school. (See the "Mathematics (<http://www.stanford.edu/dept/registrar/bulletin/6023.htm>)" section of this bulletin for information on advanced placement in mathematics.) High school courses in physics and chemistry are strongly recommended, but not required. Additional elective course work in the humanities and social sciences is also recommended.

Transfer Students

Students who do the early part of their college work elsewhere and then transfer to Stanford to complete their engineering programs should follow an engineering or pre-engineering program at the first school, selecting insofar as possible courses applicable to the requirements of the School of Engineering, that is, courses comparable to those described under "Undergraduate Programs (<http://www.stanford.edu/dept/registrar/bulletin/5144.htm>)." In addition, students should work toward completing the equivalent of Stanford's foreign language requirement and as many of the University's General Education Requirements (GERs) as possible before transferring. Some transfer students may require more than four years (in total) to obtain the B.S. degree. However, Stanford affords great flexibility in planning and scheduling individual programs, which makes it possible for transfer students, who have wide variations in preparation, to plan full programs for each quarter and to progress toward graduation without undue delay.

Transfer credit is given for courses taken elsewhere whenever the courses are equivalent or substantially similar to Stanford courses in scope and rigor. The policy of the School of Engineering is to study each transfer student's preparation and make a reasonable evaluation of the courses taken prior to transfer by means of a petition process. Inquiries may be addressed to the Office of Student Affairs in 135 Huang Engineering Center. For more information, see the transfer credit section of the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.

Degree Program Options

In addition to the B.S. degrees offered by departments, the School of Engineering offers two other types of B.S. degrees:

- Bachelor of Science in Engineering (see subplan majors listed below)
- Bachelor of Science for Individually Designed Majors in Engineering (IDMEN)

There are eight Engineering B.S. subplans that have been proposed by cognizant faculty groups and pre-approved by the Undergraduate Council:

- Aeronautics and Astronautics
- Architectural Design
- Atmosphere/Energy
- Biomechanical Engineering
- Biomedical Computation
- Engineering Physics
- Product Design.

The B.S. for an Individually Designed Major in Engineering has also been approved by the council.

Curricula for majors are offered by the departments of:

- Bioengineering
- Chemical Engineering
- Civil and Environmental Engineering
- Computer Science
- Electrical Engineering

- Management Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering

Curricula for majors in these departments have the following components:

- 36-45 units of mathematics and science (see Basic Requirements 1 and 2 at the end of this section)
- engineering fundamentals (three course minimum, at least one of which must be unspecified by the department, see Basic Requirement 3)
- Technology in Society (TIS) (one course minimum, see Basic Requirement 4)
- engineering depth (courses such that the total number of units for Engineering Fundamentals and Engineering Depth is between 60 and 72)
- ABET accredited majors must meet a minimum number of Engineering Science and Engineering Design units; (see Basic Requirement 5)

Consult the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>) for additional information.

Dual and Coterminal Programs

A Stanford undergraduate may work simultaneously toward two bachelor's degrees or toward a bachelor's and a master's degree, that is, B.A. and M.S., B.A. and M.A., B.S. and M.S., or B.S. and M.A. The degrees may be granted simultaneously or at the conclusion of different quarters. Five years are usually required for a dual or coterminal program or for a combination of these two multiple degree programs. For further information, inquire with the School of Engineering's student affairs office, 135 Huang Engineering Center, or with department contacts listed in the Handbook for Undergraduate Engineering Programs, available at <http://ughb.stanford.edu>.

Dual B.A. and B.S. Degree Program—To qualify for both degrees, a student must:

1. complete the stated University and department requirements for each degree
2. complete 15 full-time quarters, or 3 full-time quarters after completing 180 units
3. complete a total of 225 units (180 units for the first bachelor's degree plus 45 units for the second bachelor's degree)

Coterminal Bachelor's and Master's Degree Program—A Stanford undergraduate may be admitted to graduate study for the purpose of working simultaneously toward a bachelor's degree and a master's degree, in the same or different disciplines. To qualify for both degrees, a student must:

1. complete, in addition to the 180 units required for the bachelor's degree, the number of units required by the graduate department for the master's degree which in no event is fewer than the University minimum of 45 units
2. complete the requirements for the bachelor's degree (department, school, and University) and apply for conferral of the degree at the appropriate time
3. complete the department and University requirements for the master's degree and apply for conferral of the degree at the appropriate time

A student may complete the bachelor's degree before completing the master's degree, or both degrees may be completed in the same quarter.

Admission to the coterminal program requires admission to graduate status by the pertinent department. Admission criteria vary from department to department.

Procedure for Applying for Admission to Coterminial Degree Programs

A Stanford undergraduate may apply to the pertinent graduate department using the University coterminial application form after completing 120 bachelor's degree units. Application deadlines vary by department, but in all cases the student must apply early enough to allow a departmental decision at least one quarter in advance of the anticipated date of conferral of the bachelor's degree.

Students should refer to the University Registrar's Office or its web site for details about when courses begin to count toward the master's degree requirements and when graduate tuition is assessed; this may affect the decision about when to apply for admission to graduate status.

The University requirements for the coterminial M.A. are described in the "Coterminial Bachelor's and Master's Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4874.htm>)" section of this bulletin. For University coterminial degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Graduate Programs in the School of Engineering Admission

Application for admission with graduate standing in the school should be made to the graduate admissions committee in the appropriate department or program. While most graduate students have undergraduate preparation in an engineering curriculum, it is feasible to enter from other programs, including chemistry, geology, mathematics, or physics.

For further information and application instructions, see the department sections in this bulletin or <http://gradadmissions.stanford.edu>. Stanford undergraduates may also apply as coterminial students; details can be found under "Degree Program Options" in the "Undergraduate Programs in the School of Engineering (<http://www.stanford.edu/dept/registrar/bulletin/5144.htm>)" section of this bulletin.

Fellowships and Assistantships

Departments and divisions of the School of Engineering award graduate fellowships, research assistantships, and teaching assistantships each year.

Curricula in the School of Engineering

For further details about the following programs, see the department sections in this bulletin.

Related aspects of particular areas of graduate study are commonly covered in the offerings of several departments and divisions. Graduate students are encouraged, with the approval of their department advisers, to choose courses in departments other than their own to achieve a broader appreciation of their field of study. For example, most departments in the school offer courses concerned with nanoscience, and a student interested in an aspect of nanotechnology can often gain appreciable benefit from the related courses given by departments other than her or his own.

Departments and programs of the school offer graduate curricula as follows:

Aeronautics and Astronautics

- Aeroelasticity and Flow Simulation
- Aircraft Design, Performance, and Control

- Applied Aerodynamics
- Autonomy
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Computational Mechanics and Dynamical Systems
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Materials and Structures
- Decision Making Under Uncertainty
- Direct and Large-Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hybrid Propulsion
- Hypersonic and Supersonic Flow
- Micro and Nano Systems and Materials
- Multidisciplinary Design Optimization
- Navigation Systems (especially GPS)
- Optimal Control, Estimation, System Identification
- Sensors for Harsh Environments
- Space Debris Characterization
- Space Environment Effects on Spacecraft
- Space Plasmas
- Spacecraft Design and Satellite Engineering
- Turbulent Flow and Combustion

Bioengineering

- Biomedical Computation
- Biomedical Devices
- Biomedical Imaging
- Cell and Molecular Engineering
- Regenerative Medicine

Chemical Engineering

- Applied Statistical Mechanics
- Biocatalysis
- Biochemical Engineering
- Bioengineering
- Biophysics
- Computational Materials Science
- Colloid Science
- Dynamics of Complex Fluids
- Energy Conversion
- Functional Genomics
- Hydrodynamic Stability
- Kinetics and Catalysis
- Microrheology
- Molecular Assemblies
- Nanoscience and Technology
- Newtonian and Non-Newtonian Fluid Mechanics
- Polymer Physics
- Protein Biotechnology
- Renewable Fuels
- Semiconductor Processing
- Soft Materials Science
- Solar Utilization
- Surface and Interface Science
- Transport Mechanics

Civil and Environmental Engineering

- Atmosphere/Energy
- Construction Engineering and Management
- Design/Construction Integration
- Environmental Engineering and Science
- Environmental Fluid Mechanics and Hydrology
- Environmental and Water Studies
- Geomechanics
- Structural Engineering
- Sustainable Design and Construction

Computational and Mathematical Engineering

- Applied and Computational Mathematics
- Computational Biology
- Computational Fluid Dynamics
- Computational Geometry and Topology
- Computational Geosciences
- Computational Medicine
- Data Science
- Discrete Mathematics and Algorithms
- Numerical Analysis
- Optimization
- Partial Differential Equations
- Stochastic Processes
- Uncertainty Quantification
- Financial Mathematics

Computer Science

See <http://forum.stanford.edu/research/areas.php> for a comprehensive list.

- Algorithmic Game Theory
- Artificial Intelligence
- Autonomous Agents
- Biomedical Computation
- Compilers
- Complexity Theory
- Computational and Cognitive Neuroscience
- Computational Biology
- Computational Geometry and Topology
- Computational Logic
- Computational Photography
- Computational Physics
- Computer Architecture
- Computer Graphics
- Computer Security
- Computer Science Education
- Computer Vision
- Cryptography
- Database Systems
- Data Center Computing
- Data Mining
- Design and Analysis of Algorithms
- Digital Libraries
- Distributed and Parallel Computation
- Distributed Systems

- Electronic Commerce
- Formal Verification
- Haptic Display of Virtual Environments
- Human-Computer Interaction
- Image Processing
- Information and Communication Technologies for Development
- Information Management
- Learning Theory
- Machine Learning
- Mathematical Theory of Computation
- Mobile Computing
- Multi-Agent Systems
- Nanotechnology-enabled Systems
- Natural Language and Speech Processing
- Networking and Internet Architecture
- Operating Systems
- Parallel Computing
- Probabilistic Models and Methods
- Programming Systems/Languages
- Robotics
- Robust System Design
- Scientific Computing and Numerical Analysis
- Sensor Networks
- Social and Information Networks
- Social Computing
- Ubiquitous and Pervasive Computing
- Visualization
- Web Application Infrastructure

Electrical Engineering

- Biomedical Devices and Bioimaging
- Communication Systems: Wireless, Optical, Wireline
- Control, Learning, and Optimization
- Electronic and Magnetic Devices
- Energy: Solar Cells, Smart Grid, Load Control
- Environmental and Remote Sensing: Sensor Nets, Radar Systems, Space
- Fields and Waves
- Graphics, HCI, Computer Vision, Photography
- Information Theory and Coding: Image and Data Compression, Denoising
- Integrated Circuit Design: MEMS, Sensors, Analog, RF
- Network Systems and Science: Next Gen Internet, Wireless Networks
- Nano and Quantum Science
- Photonic Devices
- Systems Software: OS, Compilers, Languages
- Systems Hardware: Architecture, VLSI, Embedded Systems
- VLSI Design

Management Science and Engineering

- Decision and Risk Analysis
- Dynamic Systems
- Economics
- Entrepreneurship
- Finance

- Information
- Marketing
- Optimization
- Organization Behavior
- Organizational Science
- Policy
- Production
- Stochastic Systems
- Strategy

Materials Science and Engineering

- Biomaterials
- Ceramics and Composites
- Computational Materials Science
- Electrical and Optical Behavior of Solids
- Electron Microscopy
- Fracture and Fatigue
- Imperfections in Crystals
- Kinetics
- Magnetic Behavior of Solids
- Magnetic Storage Materials
- Nanomaterials
- Photovoltaics
- Organic Materials
- Phase Transformations
- Physical Metallurgy
- Solid State Chemistry
- Structural Analysis
- Thermodynamics
- Thin Films
- X-Ray Diffraction

Mechanical Engineering

- Biomechanics
- Combustion Science
- Computational Mechanics
- Controls
- Design of Mechanical Systems
- Dynamics
- Environmental Science
- Experimental Stress and Analysis
- Fatigue and Fracture Mechanics
- Finite Element Analysis
- Fluid Mechanics
- Heat Transfer
- High Temperature Gas Dynamics
- Kinematics
- Manufacturing
- Mechatronics
- Product Design
- Robotics
- Sensors
- Solids
- Thermodynamics
- Turbulence

For more information on the ME graduate curriculum, please see the Graduate Bulletin and Graduate student handbook.

Bachelor of Science in the School of Engineering

Departments within the School of Engineering offer programs leading to the B.S. degree in the following fields:

- Chemical Engineering
- Civil Engineering
- Computer Science
- Electrical Engineering
- Environmental Engineering (no longer offered after 2014-15)
- Environmental Systems Engineering
- Management Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering

The School of Engineering itself offers interdisciplinary programs leading to the B.S. degree in Engineering with specializations in:

- Aeronautics and Astronautics
- Architectural Design
- Atmosphere/Energy
- Bioengineering
- Biomechanical Engineering
- Biomedical Computation
- Engineering Physics
- Product Design

In addition, students may elect a B.S. in an Individually Designed Major in Engineering.

Bachelor of Arts and Science (B.A.S.) in the School of Engineering

This degree is available to students who complete both the requirements for a B.S. degree in engineering and the requirements for a major or program ordinarily leading to the B.A. degree. For more information, see the "Undergraduate Degrees (p. 24)" section of this bulletin.

Independent Study, Research, and Honors

The departments of Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, and Mechanical Engineering, as well as the faculty overseeing the Architectural Design, Atmosphere/Energy, Bioengineering, Biomechanical Engineering, Biomedical Computing, and Engineering Physics majors, offer qualified students opportunities to do independent study and research at an advanced level with a faculty mentor in order to receive a Bachelor of Science with honors. An honors option is also available to students pursuing an independently designed major, with the guidance and approval of their adviser.

Petroleum Engineering

Petroleum Engineering is offered by the Department of Energy Resource Engineering in the School of Earth Sciences. Consult the "Energy Resources Engineering (p. 130)" section of this bulletin for requirements. School of Engineering majors who anticipate summer jobs or career

positions associated with the oil industry should consider enrolling in ENGR 120.

Programs in Manufacturing

Programs in manufacturing are available at the undergraduate, master's, and doctorate levels. The undergraduate programs of the departments of Civil and Environmental Engineering, Management Science and Engineering, and Mechanical Engineering provide general preparation for any student interested in manufacturing. More specific interests can be accommodated through Individually Designed Majors in Engineering (IDMENs).

Basic Requirements

Basic Requirement 1 (Mathematics)

Engineering students need a solid foundation in the calculus of continuous functions, linear algebra, an introduction to discrete mathematics, and an understanding of statistics and probability theory. Students are encouraged to select courses on these topics. To meet ABET accreditation criteria, a student's program must include the study of differential equations. Courses that satisfy the math requirement are listed at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

Basic Requirement 2 (Science)

A strong background in the basic concepts and principles of natural science in such fields as biology, chemistry, geology, and physics is essential for engineering. Most students include the study of physics and chemistry in their programs. Courses that satisfy the science requirement are listed at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

Basic Requirement 3 (Engineering Fundamentals)

The Engineering Fundamentals requirement is satisfied by a nucleus of technically rigorous introductory courses chosen from the various engineering disciplines. It is intended to serve several purposes. First, it provides students with a breadth of knowledge concerning the major fields of endeavor within engineering. Second, it allows the incoming engineering student an opportunity to explore a number of courses before embarking on a specific academic major. Third, the individual classes each offer a reasonably deep insight into a contemporary technological subject for the interested non-engineer.

The requirement is met by taking three courses from the following list, at least one of which is chosen by the student rather than by the department:

		Units
ENGR 10	Introduction to Engineering Analysis	4
ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ENGR 20	Introduction to Chemical Engineering (same as CHEMENG 20)	3
ENGR 25B	Biotechnology ¹	3
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use (same as CHEMENG 25E) ¹	3
ENGR 30	Engineering Thermodynamics	3
ENGR 40	Introductory Electronics ^{1,2}	5
ENGR 40A	Introductory Electronics	3
ENGR 40M	An Intro to Making: What is EE	3-5

ENGR 40P	Physics of Electrical Engineering ¹	5
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis ^{1,2}	4
ENGR 50E	Introduction to Materials Science, Energy Emphasis ¹	4
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis ¹	4
ENGR 60	Engineering Economy	3
ENGR 62	Introduction to Optimization (same as MS&E 111)	4
ENGR 70A/CS 106A	Programming Methodology ¹	5
ENGR 70B/CS 106B	Programming Abstractions ¹	5
ENGR 70X/CS 106X	Programming Abstractions (Accelerated) ¹	5
ENGR 80	Introduction to Bioengineering (same as BIOE 80)	4
ENGR 90	Environmental Science and Technology (same as CEE 70)	3

- ¹ Only one course from each numbered series can be used in the Engineering Fundamentals category within a major program.
- ² ENGR 40 Introductory Electronics and ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis may be taken on video at some of Stanford's Overseas Centers.

Basic Requirement 4 (Technology in Society)

It is important for the student to obtain a broad understanding of engineering as a social activity. To foster this aspect of intellectual and professional development, all engineering majors must take one course devoted to exploring issues arising from the interplay of engineering, technology, and society. Courses that fulfill this requirement are listed online at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

Basic Requirement 5 (Engineering Topics)

In order to satisfy ABET (Accreditation Board for Engineering and Technology) requirements, a student majoring in Chemical, Civil, or Mechanical Engineering must complete one and a half years of engineering topics, consisting of a minimum of 68 units of Engineering Fundamentals and Engineering Depth appropriate to the student's field of study. In most cases, students meet this requirement by completing the major program core and elective requirements. A student may need to take additional courses in Depth in order to fulfill the minimum requirement. Appropriate courses assigned to fulfill each major's program are listed online at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

Experimentation

Chemical Engineering, Civil Engineering, and Mechanical Engineering must include experimental experience appropriate to the discipline. Lab courses taken in the sciences, as well as experimental work taken in courses within the School of Engineering, will fulfill this requirement.

Overseas Studies Courses in Engineering

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses web site (<http://>)

explorecourses.stanford.edu) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

Aeronautics and Astronautics (AA)

Mission of the Undergraduate Program in Aeronautics and Astronautics

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, space exploration, air and space-based telecommunication industries, teaching, research, military service, and many related technology-intensive fields.

Completion of the undergraduate program in Aeronautics and Astronautics leads to the conferral of the Bachelor of Science in Engineering. The subplan "Aeronautics and Astronautics" appears on the transcript and on the diploma.

Requirements

Mathematics

24 units minimum ¹		
MATH 41	Calculus (or AP Calculus)	5
MATH 42	Calculus (or AP Calculus)	5
CME 100/ENGR 154	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CME 102/ENGR 155A	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	
CME 106/ENGR 155C	Introduction to Probability and Statistics for Engineers (or STATS 110, STATS 116, CS 109)	4-5
or STATS 110	Statistical Methods in Engineering and the Physical Sciences	
or STATS 116	Theory of Probability	
or CS 109	Introduction to Probability for Computer Scientists	

Science

19 units minimum		
PHYSICS 41	Mechanics (or AP Physics)	4
PHYSICS 43	Electricity and Magnetism (or AP Physics)	4
PHYSICS 45	Light and Heat	4
CHEM 31X	Chemical Principles Accelerated (or CHEM 31A +B, AP Chemistry)	4-5

or ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology

Science elective ² 3-5

Technology in Society (one course required)

3 units minimum ³ 3-5

Engineering Fundamentals (three courses required)

11 units minimum

ENGR 30 Engineering Thermodynamics 3

ENGR 70A Programming Methodology 5

Fundamentals Elective ⁴ 3-5

Engineering Depth

30 units minimum

AA 100 Introduction to Aeronautics and Astronautics 3

AA 190 Directed Research and Writing in Aero/Astro 3-5

ME 70 Introductory Fluids Engineering 4

ENGR 14 Intro to Solid Mechanics 4

ME 131A Heat Transfer 3

ENGR 15 Dynamics 4

ME 161 Dynamic Systems, Vibrations and Control 3-4

or PHYSICS 110 Advanced Mechanics

CEE 101A Mechanics of Materials 4

or ME 80 Mechanics of Materials

Aero/Astro Depth

18 units minimum

Engineering Electives (two courses required) ⁵ 6-10

See Course List AA-1 below for a list of options

Depth Area I (two courses required) ⁶ 6-10

See Course List AA-2 below for a list of options

Depth Area II (two courses required) ⁶ 6-10

See Course List AA-2 below for a list of options

Units

Total Units 103-126

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

- ¹ It is recommended that the CME series (100, 102, 104) be taken rather than the MATH series (51, 52, 53). If students take the MATH series, it is recommended to take MATH 51M Introduction to MATLAB for Multivariable Mathematics, offered Autumn Quarter.
- ² Courses that satisfy the Science elective are listed in Figure 3-2 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.
- ³ Courses that satisfy the Technology in Society Requirement are listed in Figure 3-3 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.
- ⁴ Courses that satisfy the Engineering Fundamentals elective are listed in Figure 3-4 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>. ENGR 70B or X (same as CS 106B or X) is not allowed to fulfill the third fundamentals requirement.
- ⁵ Courses that satisfy the Engineering Electives are listed in Figure AA-1 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>, as well as Course List AA-1 below.
- ⁶ Courses that satisfy the Depth Area choices are listed in Figure AA-2 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>, as well as Course List AA-2 below.

Units

AA-1. Engineering Electives: Two Courses Required		
AA 250	Nanomaterials for Aerospace	3

ENGR 240	Introduction to Micro and Nano Electromechanical Systems	3
ME 210	Introduction to Mechatronics	4
ME 220	Introduction to Sensors	3-4
ME 227	Vehicle Dynamics and Control	3
ME 250	Internal Combustion Engines	3-5
ME 257	Turbine and Internal Combustion Engines	3
ME 260	Fuel Cell Science and Technology	3
ME 324	Precision Engineering	4
ME 331A	Advanced Dynamics & Computation	3
ME 331B	Advanced Dynamics, Simulation & Control	3
ME 345	Fatigue Design and Analysis	3
ME 348	Experimental Stress Analysis	3
ME 351A	Fluid Mechanics	3
ME 351B	Fluid Mechanics	3
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	3
CS 107	Computer Organization and Systems	3-5
CS 110	Principles of Computer Systems	3-5
CS 140	Operating Systems and Systems Programming	3-4
CS 161	Design and Analysis of Algorithms	3-5
EE 102A	Signal Processing and Linear Systems I	4
EE 102B	Signal Processing and Linear Systems II	4
EE 101A	Circuits I	4
EE 101B	Circuits II	4
ENERGY 121	Fundamentals of Multiphase Flow	3
ENERGY 191	Optimization of Energy Systems	3-4
ENERGY 226	Thermal Recovery Methods	3
MATSCI 155	Nanomaterials Synthesis	4
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
MATSCI 197	Rate Processes in Materials	3-4
MATSCI 198	Mechanical Properties of Materials	3-4
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4

* It is recommended that students review prerequisites for all courses.

Units

AA-2. Depth Area: Four Courses Required, Two From Each of Two Areas

Dynamics and Controls		
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
AA 203	Introduction to Optimal Control Theory	3
AA 222	Introduction to Multidisciplinary Design Optimization	3-4
AA 242A	Classical Dynamics	3
AA 271A	Dynamics and Control of Spacecraft and Aircraft	3
Systems Design		
AA 236A	Spacecraft Design	3-5
AA 236B	Spacecraft Design Laboratory	3-5
AA 241A	Introduction to Aircraft Design, Synthesis, and Analysis	3
AA 241B	Introduction to Aircraft Design, Synthesis, and Analysis	3
AA 284B	Propulsion System Design Laboratory	3
Fluids and CFD		
AA 200	Applied Aerodynamics	3

AA 201A	Fundamentals of Acoustics	3
AA 210A	Fundamentals of Compressible Flow	3
AA 214A/CME 206/ME 300C	Introduction to Numerical Methods for Engineering	3
AA 283	Aircraft and Rocket Propulsion	3
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems Structures	5
AA 240A	Analysis of Structures	3
AA 240B	Analysis of Structures	3
AA 256	Mechanics of Composites	3
AA 280	Smart Structures	3
ME 335A	Finite Element Analysis	3

* It is recommended that students review prerequisites for all courses.

Architectural Design (AD)

Completion of the undergraduate program in Architectural Design leads to the conferral of the Bachelor of Science in Engineering. The subplan "Architectural Design" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Architectural Design

The mission of the undergraduate program in Architectural Design is to develop students' ability to integrate engineering and architecture in ways that blend innovative architectural design with cutting-edge engineering technologies. Courses in the program combine hands-on architectural design studios with a wide variety of other courses. Students can choose from a broad mix of elective courses concerning energy conservation, sustainability, building systems, and structures, as well as design foundation and fine arts courses. In addition to preparing students for advanced studies in architecture and construction management, the program's math and science requirements prepare students well for graduate work in other fields such as civil and environmental engineering, law, and business.

Requirements

Units

Mathematics and Science (36 units minimum) ¹

Mathematics		
MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4
Or the following sequence:		
MATH 41	Calculus	
MATH 42	Calculus	
CME 100	Vector Calculus for Engineers (Recommended)	5
One course in Statistics (required)		3-5
Science		
PHYSICS 41	Mechanics	4
Recommended:		
EARTHSYS 101	Energy and the Environment	
EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes	

GES 1A	Introduction to Geology: The Physical Science of the Earth (or GES 1B or 1C)	
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	
CEE 70	Environmental Science and Technology	
CEE 101D	Computations in Civil and Environmental Engineering	
PHYSICS 23 or PHYSICS 43	Electricity and Optics Electricity and Magnetism	

Or from School of Engineering approved list

Technology in Society		
One course required, see Basic Requirement 4		3-5

Engineering Fundamentals		
Three courses minimum, see Basic Requirement 3		9-15

ENGR 14	Intro to Solid Mechanics	4
ENGR 60	Engineering Economy ²	3
or CEE 146A	Engineering Economy	

AD Depth Core ³		
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CEE 31	Accessing Architecture Through Drawing	4
or CEE 31Q	Accessing Architecture Through Drawing	
CEE 100	Managing Sustainable Building Projects	4
CEE 120A	Building Information Modeling Workshop	2-4
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	4
CEE 137B	Advanced Architecture Studio	5
ARTHIST 3	Introduction to World Architecture	5

Depth Options		
See Note 3 for course options		12

Depth Electives		
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Elective units must be such that courses in ENGR Fundamentals, Core, Depth Options, and Depth Electives total at least 60 units. One of the following must be taken:

CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting	3
or CEE 32A	Psychology of Architecture	
or CEE 32B	Design Theory	
or CEE 32D	Construction: The Writing of Architecture	
or CEE 32F	Light, Color, and Space	
or CEE 32G	Architecture Since 1900	
or CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting	
or CEE 139	Design Portfolio Methods	

Total Units		80-92
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For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

¹ School of Engineering approved list of math and science courses available in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.
² CEE 146A, offered Autumn quarter, may be used in place of ENGR 60 for the second ENGR Fundamental.

³ Engineering depth options: Choose at least 12 units from the following courses: CEE 101A, CEE 101B, CEE 101C, CEE 156, CEE 172, CEE 172A, CEE 176A, CEE 180, CEE 181, CEE 182, CEE 183, CEE 226, CEE 241, OR CEE 242. Students should investigate any prerequisites for the listed courses and carefully plan course sequences with the AD director.

- Electives:
- CEE 32A, CEE 32B, CEE 32D, CEE 32F, CEE 32G, CEE 32Q, CEE 101B, CEE 101C, CEE 120A, CEE 120B, CEE 120C, CEE 122A, CEE 122B, CEE 124, CEE 131A, CEE 132, CEE 134B, CEE 135A, CEE 139, CEE 154, CEE 172A, CEE 176A, CEE 180, CEE 181, CEE 182, CEE 183
 - ENGR 50, ENGR 103, ENGR 131
 - ME 10AX, ME 101, ME 110, ME 115A/B/C, ME 120, ME 203
 - ARTSTUDI 13BX, ARTSTUDI 140, ARTSTUDI 145, ARTSTUDI 151, ARTSTUDI 160, ARTSTUDI 170, ARTSTUDI 171, ARTSTUDI 181
 - ARTHIST 107A, ARTHIST 142, ARTHIST 143A, ARTHIST 188A
 - FILMPROD 114
 - TAPS 137
 - URBANST 110, URBANST 113, URBANST 163, URBANST 171

Atmosphere/Energy (A/E)

Completion of the undergraduate program in Atmosphere/Energy leads to the conferral of the Bachelor of Science in Engineering. The subplan "Atmosphere/Energy" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Atmosphere/Energy

Atmosphere and energy are strongly linked: fossil-fuel energy use contributes to air pollution, global warming, and weather modification; and changes in the atmosphere feed back to renewable energy resources, including wind, solar, hydroelectric, and wave resources. The mission of the undergraduate program in Atmosphere/Energy (A/E) is to provide students with the fundamental background necessary to understand large- and local-scale climate, air pollution, and energy problems and solve them through clean, renewable, and efficient energy systems. To accomplish this goal, students learn in detail the causes and proposed solutions to the problems, and learn to evaluate whether the proposed solutions are truly beneficial. A/E students take courses in renewable energy resources, indoor and outdoor air pollution, energy efficient buildings, climate change, renewable energy and clean-vehicle technologies, weather and storm systems, energy technologies in developing countries, electric grids, and air quality management. The curriculum is flexible. Depending upon their area of interest, students may take in-depth courses in energy or atmosphere and focus either on science, technology, or policy. The major is designed to provide students with excellent preparation for careers in industry, government, and research; and for study in graduate school.

Requirements

	Units
Mathematics and Science (45 units minimum):	
Mathematics	23
23 units minimum, including at least one course from each group:	
Group A	
MATH 53	Ordinary Differential Equations with Linear Algebra
CME 102	Ordinary Differential Equations for Engineers
Group B	
CME 106	Introduction to Probability and Statistics for Engineers
STATS 60	Introduction to Statistical Methods: Precalculus
STATS 110	Statistical Methods in Engineering and the Physical Sciences
Science	20
20 units minimum, including all of the following:	

PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
or PHYSICS 45	Light and Heat	
Select one of the following:		4
CHEM 31B	Chemical Principles II	
or CHEM 31X	Chemical Principles Accelerated	
or ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology	
CEE 70	Environmental Science and Technology ¹	
Technology in Society (1 course)		
MSE 197	Ethics, Technology, and Public Policy (WIM)	5
Engineering Fundamentals		
Three courses minimum, including the following:		
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use	3
Plus one of the following courses, plus one elective (see Basic Requirement 3):		6-9
ENGR 10	Introduction to Engineering Analysis	
ENGR 30	Engineering Thermodynamics	
ENGR 60	Engineering Economy	
ENGR 70A	Programming Methodology	
Engineering Depth		
Required: ²		
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions (cannot also fulfill science requirement)	3
CEE 173A	Energy Resources	4-5
At least 34 units from the following with at least four courses from each group:		34
Group A: Atmosphere		
AA 100	Introduction to Aeronautics and Astronautics	
BIO 147		
CEE 63	Weather and Storms	
CEE 101B	Mechanics of Fluids	
or ME 70	Introductory Fluids Engineering	
CEE 164	Introduction to Physical Oceanography	
or EESS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	
CEE 172	Air Quality Management	
CEE 172A	Indoor Air Quality (given alt years)	
CEE 172S	Green House Gas Mitigation	
CEE 178	Introduction to Human Exposure Analysis	
EARTHSYS 37N	Climate Change: Science & Society	
or	The Global Warming Paradox	
EARTHSYS 41N		
EARTHSYS 57Q	Climate Change from the Past to the Future	
EARTHSYS 111	Biology and Global Change	
or BIO 164	Biosphere-Atmosphere Interactions	
EARTHSYS 142	Remote Sensing of Land	
or	Fundamentals of Geographic Information Science (GIS)	
EARTHSYS 144		

EARTHSYS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation (alt years)	
EARTHSYS 184	Climate and Agriculture (alt. years)	
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	
MSE 92Q	International Environmental Policy	
Group B: Energy		
AA 116Q	Electric Automobiles and Aircraft	
or EE 152	Green Electronics	
CEE 109	Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision (alternate years)	
or CEE 136	Green Architecture	
CEE 142A	Negotiating Sustainable Development	
or CEE 156	Building Systems	
CEE 176A	Energy Efficient Buildings	
CEE 176B	Electric Power: Renewables and Efficiency	
CEE 176F	Energy Systems Field Trips: China Energy Systems ((given alt years))	
CEE 177S	Design for a Sustainable World	
CHEMENG 35N	Renewable Energy for a Sustainable World	
EARTHSYS 101	Energy and the Environment	
EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes	
ECON 17N	Energy, the Environment, and the Economy	
EE 151	Sustainable Energy Systems	
ENERGY 104	Transition to sustainable energy systems	
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
ME 185	Electric Vehicle Design	
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms	

Total Units **102-106**

- Can count as a science requirement or Engineering Fundamental, but not both.
- To fulfill the Writing in the Major (WIM) requirement take Technology in Society course MS&E 193W or MS&E 197. Alternative WIM Courses: CEE 100, EARTHSYS 200, HUMBIO 4B, or the combination of 2 units of CEE 199 with 1 unit of E199W.

Honors Program

The A/E honors program offers eligible students the opportunity to engage in guided original research, or project design, over the course of an academic year. Interested students must:

- submit a 1-2 page letter applying to the honors program in A/E. The letter must describe the problem to be investigated. Students must obtain signatures from the current primary adviser and the proposed honors adviser, if different, and submit the letter to the student services office in the Department of Civil and Environmental Engineering (CEE). The application must include an unofficial Stanford transcript. Applications must be received in the fourth quarter prior to graduation. It is recommended that a prospective student meet with the proposed honors adviser well in advance of submitting an application.
- maintain a GPA of at least 3.5.
- complete an honors thesis or project over a period of three quarters. The typical length of the written report is 15-20 pages. The deadline for

submission of the report is decided by the honors adviser, but should be no later than the end of the third week in May.

- present their thesis or project be read and evaluated by the honors adviser and one other reader. It is the student's responsibility to obtain both the adviser and the reader. At least one of the two must be a member of the Academic Council in the School of Engineering.
- present the completed work in an appropriate forum such as in the same session as honors theses are presented in the department of the adviser. All honors programs require some public presentation of the thesis or project.
- take up to 10 units of CEE 199H Undergraduate Honors Thesis toward the thesis (optional). Students must take ENGR 202S Writing: Special Projects or its equivalent. Units for ENGR 202S are beyond those required for the A/E major.
- submit two copies of the signed thesis to the CEE student services office no later than two weeks before the end of the graduation quarter.

For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Bioengineering (BioE)

Completion of the undergraduate program in Bioengineering leads to the conferral of the Bachelor of Science in Engineering. The subplan "Bioengineering" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Bioengineering

The Stanford Bioengineering (BioE) major enables students to combine engineering and the life sciences in ways that advance scientific discovery, healthcare and medicine, manufacturing, environmental quality, culture, education, and policy. Students who major in BioE earn a fundamental engineering degree for which the raw materials, underlying basic sciences, fundamental toolkit, and future frontiers are all defined by the unique properties of living systems.

Students will complete engineering fundamentals courses, including an introduction to BioE and computer programming. A series of core BioE classes beginning in the second year leads to a student-selected depth area and a senior capstone design project. The department also organizes a summer Research Experience for Undergraduates (REU) program (<http://bioengineering.stanford.edu/education/REU.html>). BioE graduates are well prepared to pursue careers and lead projects in research, medicine, business, law, and policy.

Requirements

Mathematics ¹

28 units minimum required, see Basic Requirement 1)

MATH 41	Calculus	10
& MATH 42	and Calculus (or AP Calculus)	

Select one of the following:

CME 100	Vector Calculus for Engineers (Recommended)	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	

Select one of the following:

CME 102	Ordinary Differential Equations for Engineers (Recommended)	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	

Select one of the following:

CME 104	Linear Algebra and Partial Differential Equations for Engineers (Recommended)	5
or MATH 52	Integral Calculus of Several Variables	

CME 106	Introduction to Probability and Statistics for Engineers (Recommended)	3-5
or STATS 110	Statistical Methods in Engineering and the Physical Sciences	
or STATS 141	Biostatistics	

Science ²

28 units minimum:

CHEM 31X	Chemical Principles Accelerated	5-10
or CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	
CHEM 33	Structure and Reactivity	5
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
BIO 42	Cell Biology and Animal Physiology	5
PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4

Technology in Society

One course required; see Basic Requirement 4

BIOE 131	Ethics in Bioengineering ^(WIM)	3
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Engineering Fundamentals

ENGR 70A	Programming Methodology (same as CS 106A)	5
ENGR 80	Introduction to Bioengineering	4

Fundamentals Elective; see UGHB Fig. 3-4 for approved course list; may not use ENGR 70B or ENGR 70X 3-5

Bioengineering Core

BIOE 41	Physical Biology of Macromolecules	4
BIOE 42	Physical Biology of Cells	4
BIOE 44	Fundamentals for Engineering Biology Lab	4
BIOE 51	Anatomy for Bioengineers	4
BIOE 101	Systems Biology	4
BIOE 103	Systems Physiology and Design	4
BIOE 123	Optics and Devices Lab	4
BIOE 141A	Senior Capstone Design I	4
BIOE 141B	Senior Capstone Design II	4

Bioengineering Depth Electives

Four courses, minimum 12 units: 12

BIOE 115	Computational Modeling of Microbial Communities	
BIOE 201C	Diagnostic Devices Lab	
BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing	
BIOE 212	Introduction to Biomedical Informatics Research Methodology	
BIOE 214	Representations and Algorithms for Computational Molecular Biology	
BIOE 220	Introduction to Imaging and Image-based Human Anatomy	
BIOE 221	Physics and Engineering of Radionuclide Imaging	
BIOE 222	Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects	
BIOE 223	Physics and Engineering of X-Ray Computed Tomography	
BIOE 224	Probes and Applications for Multi-modality Molecular Imaging of Living Subjects	
BIOE 227	Functional MRI Methods	
BIOE 231	Protein Engineering	
BIOE 244	Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems	
BIOE 260	Tissue Engineering	

BIOE 281	Biomechanics of Movement
BIOE 287	Introduction to Physiology and Biomechanics of Hearing
BIOE 291	Principles and Practice of Optogenetics for Optical Control of Biological Tissues

Total Units119-128 **(BME)**

- It is strongly recommended that CME 100 Vector Calculus for Engineers, CME 102 Ordinary Differential Equations for Engineers, and CME 104 Linear Algebra and Partial Differential Equations for Engineers be taken rather than MATH 51 Linear Algebra and Differential Calculus of Several Variables, MATH 52 Integral Calculus of Several Variables, and MATH 53 Ordinary Differential Equations with Linear Algebra. CME 106 Introduction to Probability and Statistics for Engineers utilizes MATLAB, a powerful technical computing program, and should be taken rather than STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 141 Biostatistics. If you are taking the MATH 50 series, it is strongly recommended to take MATH 51M Introduction to MATLAB or CME 192 Introduction to MATLAB.
- Science must include both Chemistry (CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II; or CHEM 31X Chemical Principles Accelerated or ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology) and calculus-based Physics, with two quarters of course work in each, in addition to two courses of BIO core. CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II are considered one course even though given over two quarters. Premeds should take Chemistry, not ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>). Students pursuing a premed program need to take additional courses; see the UGHB, BioE Premed 4-Year Plan.

Honors Program

The School of Engineering offers a program leading to a Bachelor of Science in Engineering: Bioengineering with Honors (ENGR-BSH, BIOE). This program provides the opportunity for qualified BioE majors to conduct independent research at an advanced level with a faculty research adviser and documented in an honors thesis.

In order to receive departmental honors, students admitted to the program must:

- Declare the honors program in Axxess (ENGR-BSH, Subplan: Bioengineering).
- Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
- Complete at least two quarters of research with a minimum of nine units of BIOE 191 Bioengineering Problems and Experimental Investigation or BIOE 191X Out-of-Department Advanced Research Laboratory in Bioengineering for a letter grade; up to three units may be used towards the bioengineering depth elective requirements.
- Submit a completed thesis draft to the honors adviser and second reader by the first week of Spring Quarter. Further revisions and final endorsement are to be finished by the second Monday in May, when two signed bound copies plus one PC-compatible CD-ROM are to be submitted to the student services officer.
- Attend the Bioengineering Honors Symposium at the end of Spring Quarter and give a poster or oral presentation, or present in another approved suitable forum.

For more information and application instructions, see the department's undergraduate site (<http://bioengineering.stanford.edu/education/bio-honors-instructions-v.2.pdf>).

Biomechanical Engineering (BME)

Completion of the undergraduate program in Biomechanical Engineering leads to the conferral of the Bachelor of Science in Engineering. The subplan "Biomechanical Engineering" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Biomechanical Engineering

The mission of the undergraduate program in Biomechanical Engineering is to help students address health science challenges by applying engineering mechanics and design to the fields of biology and medicine. The program is interdisciplinary in nature, integrating engineering course work with biology and clinical medicine. Research and teaching in this discipline focus primarily on neuromuscular, musculoskeletal, cardiovascular, and cell and tissue biomechanics. This major prepares students for graduate studies in bioengineering, medicine or related areas.

Requirements

		Units
Mathematics		21
21 units minimum; see Basic Requirement 1		
Science (22 units Minimum) ¹		
CHEM 31X	Chemical Principles Accelerated (or CHEM 31A +B)	5
CHEM 33	Structure and Reactivity	5
PHYSICS 41	Mechanics	4
BIO 44X	Core Molecular Biology Laboratory	5
Biology or Human Biology A/B core courses		10
Technology in Society		
One course required, see Basic Requirement 4		3-5
Engineering Topics (Engineering Science and Design)		
Engineering Fundamentals (minimum three courses; see Basic Requirement 3):		
ENGR 14	Intro to Solid Mechanics	4
ENGR 25B	Biotechnology	3
or ENGR 80	Introduction to Bioengineering	
Fundamentals Elective		3-5
Engineering Depth		
ENGR 15	Dynamics	4
ENGR 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 80	Mechanics of Materials	4
ME 389	Biomechanical Research Symposium ²	1
Options to complete the ME depth sequence (3 courses, minimum 9 units):		9
ENGR 105	Feedback Control Design	
ME 101	Visual Thinking	
ME 112	Mechanical Systems Design ³	
ME 113	Mechanical Engineering Design	
ME 131A	Heat Transfer ³	

ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery
ME 140	Advanced Thermal Systems ³
ME 161	Dynamic Systems, Vibrations and Control
ME 203	Design and Manufacturing
ME 210	Introduction to Mechatronics
ME 220	Introduction to Sensors
Options to complete the BME depth sequence (3 courses, minimum 9 units) and WIM: ³	
BIOE 260	Tissue Engineering
ME 239	Mechanics of the Cell
ME 266	Introduction to Physiology and Biomechanics of Hearing
ME 280	Skeletal Development and Evolution
ME 281	Biomechanics of Movement
ME 283	Tissue Mechanics and Mechanobiology
ME 287	Mechanics of Biological Tissues
ME 294L	Medical Device Design Lab
ME 328	Medical Robotics (with permission of instructor)

Total Units

97-101

- Science must include both Chemistry and Physics with one year of course work (3 courses) in at least one, two courses of HUMBIO core or BIO core, and CHEM 31A and B or X, *or* ENGR 31. CHEM 31A and B are considered one course even though given over two quarters.
- If ME 389 is not offered, other options include BIOE 393, ME 571, or course by petition.
- There are two options for fulfilling the WIM requirement. The first option is to complete one of ME112, ME131A, or ME140 (ME 131A must be taken for 5 units to fulfill WIM). The second option is to perform engineering research over the summer or during the academic year and enroll in 3 units of ENGR 199W "Writing of Original Research for Engineers," (preferably during the time you are performing research or the following quarter) to write a technical report on your research. This second option requires an agreement with your faculty research supervisor.

Honors Program

The School of Engineering offers a program leading to a Bachelor of Science in Engineering: Biomechanical Engineering with Honors. This program provides an opportunity for qualified BME majors to conduct independent study and research related to biomechanical engineering at an advanced level with a faculty mentor.

Honors Criteria:

- GPA of 3.5 or higher in the major
- Arrangement with an ME faculty member (or a faculty member from another department who is approved by the BME Undergraduate Program Director) who agrees to serve as the honors adviser, plus a second faculty member who reads and approves the thesis. The honors adviser must be a member of the Academic Council in the School of Engineering.
- Applications are subject to the review and final approval by the BME Undergraduate Program Director. Applicants and thesis advisers receive written notification when a decision has been made. Submit application documents to the student services office, Building 530, room 125.
- An application consists of
 - One page written statement describing the research topic
 - Unofficial Stanford transcript

- Signature of thesis adviser and thesis reader agreeing to serve on the committee
- Deadline: No later than the second week of the Autumn Quarter of the senior year
- In order to graduate with honors:
 - Declare ENGR-BSH (Honors) program in Axess
 - Maintain 3.5 GPA
 - Submit a completed thesis draft to the adviser and reader by April 1
 - Present the thesis synopsis at the Mechanical Engineering Poster Session held in April
- Further revisions and a final endorsement by the adviser and reader are to be completed by May 15 when two bound copies are to be submitted to the Mechanical Engineering student services office.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Biomedical Computation (BMC)

Completion of the undergraduate program in Biomedical Computation leads to the conferral of the Bachelor of Science in Engineering. The subplan "Biomedical Computation" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Biomedical Computation

As biology and medical science enter the 21st century, the importance of computational methods continues to increase dramatically. These methods span the analysis of biomedical data, the construction of computational models for biological systems, and the design of computer systems that help biologists and physicians create and administer treatments to patients. The Biomedical Computation major prepares students to work at the cutting edge of this interface between computer science, biology, and medicine. Students begin their journey by gaining a solid fundamental understanding of the underlying biological and computational disciplines. They learn techniques in informatics and simulation and their countless applications in understanding and analyzing biology at all levels, from individual molecules in cells to entire organs, organisms, and populations. Students then focus their efforts on a depth area of their choice, and participate in a substantial research project with a Stanford faculty member. Upon graduation, students are prepared to enter a wide range of cutting-edge fields in both academia and industry.

Requirements

Units

Mathematics

21 unit minimum, see Basic Requirement 1

MATH 41	Calculus	5
MATH 42	Calculus	5
STATS 116	Theory of Probability ¹	3-5
CS 103	Mathematical Foundations of Computing	3-5

Science

17 units minimum, see Basic Requirement 2

PHYSICS 41	Mechanics	4
CHEM 31X	Chemical Principles Accelerated	5
CHEM 33	Structure and Reactivity	5
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
or HUMBIO 2A	Genetics, Evolution, and Ecology	
BIO 42	Cell Biology and Animal Physiology	5
or HUMBIO 3A	Cell and Developmental Biology	

BIO 43	Plant Biology, Evolution, and Ecology	5
or HUMBIO 4A	The Human Organism	

Engineering Fundamentals

CS 106B	Programming Abstractions	3-5
or CS 106X	Programming Abstractions (Accelerated)	

For the second required course, see concentrations

Technology in Society

One course required, see Basic Requirement 4		3-5
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Engineering

CS 107	Computer Organization and Systems	3-5
CS 161	Design and Analysis of Algorithms	3-5

Select one of the following: 3

CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
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CS 273A	A Computational Tour of the Human Genome	
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CS 274	Representations and Algorithms for Computational Molecular Biology	
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CS 275	Translational Bioinformatics	
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CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
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Research: 6 units of biomedical computation research in any department^{2,3} 6

Engineering Depth Concentration (select one of the following concentrations):⁷

Cellular/Molecular Concentration

Mathematics: Select one of the following:

CME 100	Vector Calculus for Engineers	
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STATS 141	Biostatistics	
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MATH 51	Linear Algebra and Differential Calculus of Several Variables	
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One additional Engineering Fundamental⁴

Biology (four courses):

BIO 129A	Cellular Dynamics I: Cell Motility and Adhesion	
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BIO 129B	Cellular Dynamics II: Building a Cell	
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BIO 188	Biochemistry I (or CHEM 135 or CHEM 171)	
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Informatics Electives (two courses)^{5,6}

Simulation Electives (two courses)^{5,6}

Simulation, Informatics, or Cell/Mol Elective (one course)^{5,6}

Informatics Concentration

Mathematics: Select one of the following:

STATS 141	Biostatistics	
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STATS 203	Introduction to Regression Models and Analysis of Variance	
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STATS 205	Introduction to Nonparametric Statistics	
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STATS 215		
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One additional Engineering Fundamental⁴

Informatics Core (three courses):

CS 145	Introduction to Databases	
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or CS 147	Introduction to Human-Computer Interaction Design	
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CS 221	Artificial Intelligence: Principles and Techniques	
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or CS 228	Probabilistic Graphical Models: Principles and Techniques	
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or CS 229	Machine Learning	
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One additional course from the previous two lines

Informatics Electives (three courses)^{5,6}

Cellular Electives (two courses)^{5,6} 6-10

Organs Electives (two courses)^{5,6} 6-10

Organs/Organisms Concentration

Mathematics (select one of the following):

CME 100	Vector Calculus for Engineers	
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STATS 141	Biostatistics	
-----------	---------------	--

MATH 51	Linear Algebra and Differential Calculus of Several Variables	
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One additional Engineering Fundamental⁴

Biology (two courses):

BIO 112	Human Physiology	
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BIO 188	Biochemistry I	
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or BIOE 220	Introduction to Imaging and Image-based Human Anatomy	
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Two additional Organs Electives^{5,6}

Simulation Electives (two courses)^{5,6}

Informatics Electives (two courses)^{5,6}

Simulation, Informatics, or Organs Elective (one course)^{5,6}

Simulation Concentration

Mathematics:

CME 100	Vector Calculus for Engineers	
---------	-------------------------------	--

or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
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Engineering Fundamentals:

ENGR 30	Engineering Thermodynamics	
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Simulation Core:

CME 102	Ordinary Differential Equations for Engineers	5
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or MATH 53	Ordinary Differential Equations with Linear Algebra	
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ENGR 80	Introduction to Bioengineering	4
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BIOE 101	Systems Biology	4
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BIOE 103	Systems Physiology and Design	4
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Simulation Electives (two courses)^{5,6}

Cellular Elective (one course)^{5,6}

Organs Elective (one course)^{5,6}

Simulation, Cellular, or Organs Elective (two courses)^{5,6}

Total Units **89-105**

- CS 109 Introduction to Probability for Computer Scientists, MSE 120 Probabilistic Analysis, MSE 220 Probabilistic Analysis, EE 178 Probabilistic Systems Analysis, and CME 106 Introduction to Probability and Statistics for Engineers are acceptable substitutes for STATS 116 Theory of Probability.
- Research projects require pre-approval of BMC Coordinators
- Research units taken as CS 191W Writing Intensive Senior Project or in conjunction with ENGR 199W Writing of Original Research for Engineers fulfill the Writing in the Major (WIM) requirement. CS 272 Introduction to Biomedical Informatics Research Methodology, which does not have to be taken in conjunction with research, also fulfills the WIM requirement.
- One 3-5 unit course required; CS 106A Programming Methodology may not be used. See Fundamentals list in Handbook for Undergraduate Engineering Programs.
- The list of electives is continually updated to include all applicable courses. For the current list of electives, see <http://bmc.stanford.edu>.
- A course may only be counted towards one elective or core requirement; it may not be double-counted.

- ⁷ A total of 40 Engineering units must be taken. The core classes only provide 27 Engineering units, so the remaining units must be taken from within the electives.

Honors Program

The Biomedical Computation program offers an honors option for qualified students, resulting in a B.S. with Honors degree in Engineering (ENGR-BSH, Biomedical Computation). An honors project is meant to be a substantial research project during the later part of a student's undergraduate career, culminating in a final written and oral presentation describing the student's project and its significance. There is no limit to the number of majors who can graduate with honors; any BMC major who is interested and meets the qualifications is considered.

- Students apply by submitting a 1-2 page proposal describing the problem the student has chosen to investigate, its significance, and the student's research plan. This plan must be endorsed by the student's research and academic advisers, one of whom must be a member of the Academic Council. In making its decision, the department evaluates the overall scope and significance of the student's proposed work.
- Students must maintain a 3.5 GPA.
- Students must complete three quarters of research. All three quarters must be on the same project with the same adviser. A Summer Quarter counts as one quarter of research.
 - Ideally, funding should not be obtained through summer research college sources, but rather through the UAR's Student Grants Program (<http://exploreddegrees.stanford.edu/schoolofengineering/%20http://studentgrants.stanford.edu>). In no case can the same work be double-paid by two sources.
- Students must complete a substantial write-up of the research in the format of a publishable research paper. This research paper is expected to be approximately 15-20 pages and must be approved by the student's research adviser and by a second reader.
- As the culmination of the honors project, each student presents the results in a public forum. This can either be in the honors presentation venue of the home department of the student's adviser, or in a suitable alternate venue.

For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Chemical Engineering (CHE)

Completion of the undergraduate program in Chemical Engineering leads to the conferral of the Bachelor of Science in Chemical Engineering.

Mission of the Undergraduate Program in Chemical Engineering

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government, or for graduate study.

Requirements*

Units

Mathematics¹

MATH 41	Calculus	5
MATH 42	Calculus	5
Select one of the following:		5-10
CME 100	Vector Calculus for Engineers	
MATH 51 & MATH 52	Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables	
Select one of the following:		5
CME 102 or MATH 53	Ordinary Differential Equations for Engineers or Ordinary Differential Equations with Linear Algebra	
Select one of the following:		4-5
CME 104 or CME 106	Linear Algebra and Partial Differential Equations for Engineers or Introduction to Probability and Statistics for Engineers	

Science¹

CHEM 31X	Chemical Principles Accelerated	5
CHEM 33	Structure and Reactivity	5
CHEM 35	Synthetic and Physical Organic Chemistry	5
CHEM 36	Organic Chemistry Laboratory I	3
PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
CHEM 131	Organic Polyfunctional Compounds	3

Technology in Society

One course required, see Basic Requirement 4 3-5

Engineering Fundamentals

Three courses minimum; see Basic Requirement 3		
ENGR/ CHEMENG 20	Introduction to Chemical Engineering	3
Fundamentals Elective from another School of Engineering department		3-5
See the UGHB for a list of courses.		
Select one of the following:		3
ENGR 25B	Biotechnology (same as CHEMENG 25B)	
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use (same as CHEMENG 25E)	

Chemical Engineering Depth

Minimum 68 Engineering Science and Design units; see Basic Requirement 5

CHEMENG 10	The Chemical Engineering Profession	1
CHEMENG 100	Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110	Equilibrium Thermodynamics	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 130	Separation Processes	3
CHEMENG 150	Biochemical Engineering	3
CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 180	Chemical Engineering Plant Design	4
CHEMENG 181	Biochemistry I	3
CHEMENG 185A	Chemical Engineering Laboratory A (WIM)	4
CHEMENG 185B	Chemical Engineering Laboratory B	4
CHEM 171	Physical Chemistry I	3
CHEM 173	Physical Chemistry II	3

CHEM 175	Physical Chemistry III	3
Select four of the following: ^{2,3}		12
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	
CHEMENG 142	Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations	
CHEMENG 160	Polymer Science and Engineering	
CHEMENG 162	Polymers for Clean Energy and Water	
CHEMENG 174	Environmental Microbiology I	
CHEMENG 183	Biochemistry II	
CHEMENG 196	Creating New Ventures in Engineering and Science-based Industries	

Total Units **125-135**

* For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

- Unit count is higher if program includes one of more of the following: MATH 51 and MATH 52 in lieu of CME 100; or CHEM 31A and CHEM 31B in lieu of CHEM 31X.
- Any two acceptable except combining 160 and 162 or 174 and 183.
- The student may petition to substitute one other science and engineering 3 unit lecture course. See UGHB (<http://ughb.stanford.edu>) for additional details.

Civil Engineering (CE)

Completion of the undergraduate program in Civil Engineering leads to the conferral of the Bachelor of Science in Civil Engineering.

Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodologies necessary for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate studies in engineering.

Requirements

	Units
Mathematics and Science	45
45 units minimum; see Basic Requirements 1 and 2 ¹	
Technology in Society	
One course; see Basic Requirement 4 ²	3-5
Engineering Fundamentals	
Three courses minimum, see Basic Requirement 3	
ENGR 14 Intro to Solid Mechanics	4
ENGR 90/CEE 70 Environmental Science and Technology	3
Fundamentals Elective	3-5

Engineering Depth

Minimum of 68 Engineering Fundamentals plus Engineering Depth; see Basic Requirement 5

CEE 100	Managing Sustainable Building Projects ³	4
CEE 101A	Mechanics of Materials	4
CEE 101B	Mechanics of Fluids	4
CEE 101C	Geotechnical Engineering	4
CEE 146A	Engineering Economy	3
Specialty courses in either:		35-42
Environmental and Water Studies (see below)		
Structures and Construction (see below)		
Other School of Engineering Electives		3-0
Total Units		115-123

- Mathematics must include CME 100 Vector Calculus for Engineers/ CME 102 Ordinary Differential Equations for Engineers (or Math 51 Linear Algebra and Differential Calculus of Several Variables/ MATH 53 Ordinary Differential Equations with Linear Algebra) and a Statistics course. Science must include Physics 41 Mechanics; either ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology, CHEM31A Chemical Principles I or CHEM 31X Chemical Principles; two additional quarters in either chemistry or physics and GES 1A Introduction to Geology: The Physical Science of the Earth (or GES 1B or 1C); for students in the Environmental and Water Studies track, the additional chemistry or physics must include CHEM 33; for students in the Structures and Construction track, it must include PHYSICS 43 or 45.
- Chosen TiS class must specifically include an ethics component, such as ENGR 130 Science, Technology, and Contemporary Society, ENGR 131 Ethical Issues in Engineering, and MS&E 197 Ethics and Public Policy.
- CEE 100 meets the Writing in the Major (WIM) requirement

Environmental and Water Studies Focus

	Units	
ENGR 30	Engineering Thermodynamics ¹	3
CEE 101D	Computations in Civil and Environmental Engineering ²	3
CEE 160	Mechanics of Fluids Laboratory	2
CEE 161A	Rivers, Streams, and Canals	3-4
CEE 166A	Watersheds and Wetlands	3
CEE 166B	Floods and Droughts, Dams and Aqueducts	3
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 179A	Water Chemistry Laboratory	3
CEE 179C	Environmental Engineering Design	5
(or CEE 169) Capstone design experience course		
Remaining specialty units from:		
CEE 63	Weather and Storms ²	3
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions ²	3
CEE 109	Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision	2
CEE 129	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	3
CEE 155	Introduction to Sensing Networks for CEE	4

CEE 164	Introduction to Physical Oceanography	4
CEE 166D	Water Resources and Water Hazards Field Trips	2
CEE 172A	Indoor Air Quality	2-3
CEE 173A	Energy Resources	4-5
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 178	Introduction to Human Exposure Analysis	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4

Structures and Construction Focus

		Units
CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 156	Building Systems	4
CEE 181	Design of Steel Structures	4
CEE 180	Structural Analysis	4
CEE 182	Design of Reinforced Concrete Structures	4
CEE 183	Integrated Civil Engineering Design Project	4
Select one of the following:		4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E	Introduction to Materials Science, Energy Emphasis	
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	
Remaining specialty units from:		
ENGR 15	Dynamics	4
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5
CEE 101D	Computations in Civil and Environmental Engineering	3
CEE 112A	Industry Applications of Virtual Design & Construction	2-4
CEE 112B	Industry Applications of Virtual Design & Construction	2-4
CEE 122A	Computer Integrated Architecture/Engineering/Construction	2
CEE 122B	Computer Integrated A/E/C	2
CEE 129	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	3
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 142A	Negotiating Sustainable Development	3
CEE 151	Negotiation	3
CEE 155	Introduction to Sensing Networks for CEE	4
CEE 160	Mechanics of Fluids Laboratory	2
CEE 161A	Rivers, Streams, and Canals	3-4
CEE 171	Environmental Planning Methods	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 195	Fundamentals of Structural Geology	3
CEE 196	Engineering Geology and Global Change	3

CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4
CEE 203	Probabilistic Models in Civil Engineering	3-4
One of the following can also count as remaining specialty units.		
CEE 120A	Building Information Modeling Workshop	2-4
or CEE 120B		
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	
CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting	
CEE 134B	Intermediate Arch Studio	

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Computer Science (CS)

Completion of the undergraduate program in Computer Science leads to the conferral of the Bachelor of Science in Computer Science.

Mission of the Undergraduate Program in Computer Science

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer sciences, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, and the corporate sector, and for graduate study.

Requirements

Mathematics (26 units minimum)—

CS 103	Mathematical Foundations of Computing ¹	5
CS 109	Introduction to Probability for Computer Scientists ²	5
MATH 41	Calculus	10
& MATH 42	and Calculus ³	
Plus two electives ⁴		

Science (11 units minimum)—

PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
Science elective ⁵		3

Technology in Society (3-5 units)—

One course; see Basic Requirement 4

Engineering Fundamentals (13 units minimum; see Basic Requirement 3)—

CS 106B	Programming Abstractions	5
or CS 106X	Programming Abstractions (Accelerated)	
ENGR 40	Introductory Electronics ⁴	5
or ENGR 40A or 40M*		
Fundamentals Elective (may not be 70A, B, or X)		3-5

*Students who take ENGR 40A or 40M for fewer than 5 units are required to take 1-2 additional units of ENGR Fundamentals (13 units minimum), or 1-2 additional units of Depth (27 units minimum for track and elective courses).

Writing in the Major—

Select one of the following:

CS 181W	Computers, Ethics, and Public Policy
CS 191W	Writing Intensive Senior Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294W	Writing Intensive Research Project in Computer Science

Computer Science Core (15 units)—

CS 107	Computer Organization and Systems	5
CS 110	Principles of Computer Systems	5
CS 161	Design and Analysis of Algorithms	5

Computer Science Depth B.S.

Choose one of the following ten CS degree tracks (a track must consist of at least 25 units and 7 classes):

Artificial Intelligence Track

	Units
CS 221 Artificial Intelligence: Principles and Techniques	4
Select two of the following:	6-8
CS 223A Introduction to Robotics	
CS 224M Multi-Agent Systems	
CS 224N Natural Language Processing	
CS 228 Probabilistic Graphical Models: Principles and Techniques	
CS 229 Machine Learning	
CS 131 Computer Vision: Foundations and Applications or CS 231A Computer Vision: From 3D Reconstruction to Recognition	
One additional course from the list above or the following:	3-4
CS 124 From Languages to Information	
CS 205A Mathematical Methods for Robotics, Vision, and Graphics	
CS 222 Rational Agency and Intelligent Interaction	
CS 224S Spoken Language Processing	
CS 224U Natural Language Understanding	
CS 224W Social and Information Networks	
CS 225A Experimental Robotics	
CS 225B Robot Programming Laboratory	
CS 227B General Game Playing	
CS 231A Computer Vision: From 3D Reconstruction to Recognition	
CS 231B The Cutting Edge of Computer Vision	
CS 231M Mobile Computer Vision	
CS 262 Computational Genomics	
CS 276 Information Retrieval and Web Search	
CS 277 Experimental Haptics	

CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells
CS 329	Topics in Artificial Intelligence (with adviser consent)
CS 331A	Advanced Reading in Computer Vision
CS 374	Algorithms in Biology
CS 379	Interdisciplinary Topics (with adviser consent)
EE 263	Introduction to Linear Dynamical Systems
EE 376A	Information Theory
ENGR 205	Introduction to Control Design Techniques
ENGR 209A	Analysis and Control of Nonlinear Systems
MSE 251	Stochastic Control
MSE 351	Dynamic Programming and Stochastic Control
STATS 315A	Modern Applied Statistics: Learning
STATS 315B	Modern Applied Statistics: Data Mining

Track Electives (at least three additional courses from the above lists, the general CS electives list, or the following):⁵ 9-13

CS 275	Translational Bioinformatics
CS 334A or EE 364A	Convex Optimization I
EE 364B	Convex Optimization II
ECON 286	Game Theory and Economic Applications
MSE 252	Decision Analysis I: Foundations of Decision Analysis
MSE 352	Decision Analysis II: Professional Decision Analysis
MSE 355	Influence Diagrams and Probabilistic Networks
PHIL 152	Computability and Logic
PSYCH 202	Cognitive Neuroscience
PSYCH 204A	Human Neuroimaging Methods
PSYCH 204B	Computational Neuroimaging: Analysis Methods
STATS 200	Introduction to Statistical Inference
STATS 202	Data Mining and Analysis
STATS 205	Introduction to Nonparametric Statistics

Biocomputation Track—

Units

The Mathematics, Science, and Engineering Fundamentals requirements are non-standard for this track. See Handbook for Undergraduate Engineering Programs for details.

Select one of the following:	3-4
CS 121	(Not given this year)
CS 221	Artificial Intelligence: Principles and Techniques
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
Select one of the following:	
CS 173 or CS 273A	A Computational Tour of the Human Genome
CS 262	Computational Genomics
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 274	Representations and Algorithms for Computational Molecular Biology
CS 275	Translational Bioinformatics

CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
One additional course from the lists above or the following:		3-4
CS 124	From Languages to Information	
CS 145	Introduction to Databases	
CS 147	Introduction to Human-Computer Interaction Design	
CS 148	Introduction to Computer Graphics and Imaging	
CS 248	Interactive Computer Graphics	
One course from either the general CS electives list, BIOE 101, or the list of Biomedical Computation (BMC) Informatics electives (see http://bmc.stanford.edu and select Informatics from the elective options) ⁵		3-4
One course from the BMC Informatics elective list		3-4
One course from either the BMC Informatics, Cellular/Molecular, or Organs/Organisms electives lists		3-5
One course from either the BMC Cellular/Molecular or Organs/Organisms electives lists		3-5

Computer Engineering Track—

	Units
EE 108 & EE 180	Digital System Design and Digital Systems Architecture
Select two of the following:	
EE 101A	Circuits I
EE 101B	Circuits II
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
Satisfy the requirements of one of the following concentrations:	
1) Digital Systems Concentration	
CS 140	Operating Systems and Systems Programming
or CS 143	Compilers
EE 109	Digital Systems Design Lab
EE 271	Introduction to VLSI Systems
Select two of the following if not counted above (6-8 units):	
CS 140	Operating Systems and Systems Programming
or CS 143	Compilers
CS 144	Introduction to Computer Networking
CS 149	Parallel Computing
CS 240E	
CS 244	Advanced Topics in Networking
EE 273	Digital Systems Engineering
EE 282	Computer Systems Architecture
2) Robotics and Mechatronics Concentration	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CS 223A	Introduction to Robotics
ME 210	Introduction to Mechatronics
ENGR 105	Feedback Control Design
Select one of the following (3-4 units):	
CS 225A	Experimental Robotics
CS 225B	Robot Programming Laboratory
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
CS 235	(Not given this year)
CS 277	Experimental Haptics

ENGR 205	Introduction to Control Design Techniques
ENGR 207A	Linear Control Systems I
ENGR 207B	Linear Control Systems II
3) Networking Concentration	
CS 140	Operating Systems and Systems Programming
& CS 144	and Introduction to Computer Networking
Select three of the following (9-11 units):	
CS 240	Advanced Topics in Operating Systems
CS 240E	
CS 244	Advanced Topics in Networking
CS 244B	Distributed Systems
CS 244E	Networked Wireless Systems
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective
CS 249B	Large-scale Software Development
EE 179	Analog and Digital Communication Systems

Graphics Track—

	Units
CS 148 & CS 248	Introduction to Computer Graphics and Imaging and Interactive Computer Graphics
Select one of the following: ⁶	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CME 104	Linear Algebra and Partial Differential Equations for Engineers
CME 108	Introduction to Scientific Computing
MATH 52	Integral Calculus of Several Variables
MATH 113	Linear Algebra and Matrix Theory
Select two of the following:	
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion
CS 178	Digital Photography
CS 205B	Mathematical Methods for Fluids, Solids, and Interfaces
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
or CS 131	Computer Vision: Foundations and Applications
CS 268	Geometric Algorithms
CS 348A	
CS 348B	Computer Graphics: Image Synthesis Techniques
CS 448	Topics in Computer Graphics
CS 478	(Not given this year)
Track Electives: at least two additional courses from the lists above, the 6-8 general CS electives list, or the following: ⁵	
ARTSTUDI 160	Design I : Fundamental Visual Language
ARTSTUDI 170	Introduction to Photography
ARTSTUDI 179	Digital Art I
CS 48N	(Not given this year)
CME 302	Numerical Linear Algebra
CME 306	Numerical Solution of Partial Differential Equations
EE 262	Two-Dimensional Imaging
EE 264	Digital Signal Processing
EE 278	Introduction to Statistical Signal Processing

EE 368	Digital Image Processing
ME 101	Visual Thinking
PSYCH 30	Introduction to Perception
PSYCH 221	Applied Vision and Image Systems

Human-Computer Interaction Track—

	Units
CS 147	Introduction to Human-Computer Interaction Design 4
Select one of the following:	4
CS 247	Human-Computer Interaction Design Studio
CS 377	Topics in Human-Computer Interaction
CS 448B	Data Visualization
CS 210A	Software Project Experience with Corporate Partners
Select one of the following:	3-6
PSYCH 30	Introduction to Perception
PSYCH 45	Introduction to Learning and Memory
PSYCH 50	Introduction to Cognitive Neuroscience
PSYCH 70	Introduction to Social Psychology
PSYCH 75	Introduction to Cultural Psychology
PSYCH 131	Language and Thought
PSYCH 154	Judgment and Decision-Making
PSYCH 252	Statistical Methods for Behavioral and Social Sciences
ME 101	Visual Thinking
Or any MS&E 18*	
Select one of the following:	3-4
CS 108	Object-Oriented Systems Design
CS 124	From Languages to Information
CS 140	Operating Systems and Systems Programming
CS 142	Web Applications
CS 221	Artificial Intelligence: Principles and Techniques
CS 229	Machine Learning
CS 229A	(Not given this year)
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective
Select one of the following:	3-4
CS 148	Introduction to Computer Graphics and Imaging
CS 376	Human-Computer Interaction Research
CS 378	(Not given this year)
Track Electives: at least two additional courses from the lists above, the 6-9 general CS electives list, or the following: ⁵	
ARTSTUDI 160	Design I : Fundamental Visual Language
COMM 169	Computers and Interfaces
CS 476A	Music, Computing, and Design I: Software Paradigms for Computer Music
ME 115A	Introduction to Human Values in Design
ME 115B	Product Design Methods
SYMSYS 245	Cognition in Interaction Design

Information Track—

	Units
CS 124	From Languages to Information 4
CS 145	Introduction to Databases 4

Two courses, from different areas:	6-9
1) Information-based AI applications	
CS 224N	Natural Language Processing
CS 224S	Spoken Language Processing
CS 229	Machine Learning
CS 229A	(Not given this year)
2) Database and Information Systems	
CS 140	Operating Systems and Systems Programming
CS 142	Web Applications
CS 245	Database Systems Principles
CS 246	Mining Massive Data Sets
CS 341	Project in Mining Massive Data Sets
CS 345	(Offered occasionally)
CS 346	Database System Implementation
CS 347	Parallel and Distributed Data Management
3) Information Systems in Biology	
CS 262	Computational Genomics
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 274	Representations and Algorithms for Computational Molecular Biology
4) Information Systems on the Web	
CS 224W	Social and Information Networks
CS 276	Information Retrieval and Web Search
CS 364B	(Not given this year)
At least three additional courses from the above areas or the general CS electives list. ⁵	

Systems Track—

	Units
CS 140	Operating Systems and Systems Programming 4
Select one of the following:	3-4
CS 143	Compilers
EE 180	Digital Systems Architecture
Two additional courses from the list above or the following:	6-8
CS 144	Introduction to Computer Networking
CS 145	Introduction to Databases
CS 149	Parallel Computing
CS 155	Computer and Network Security
CS 240	Advanced Topics in Operating Systems
CS 242	Programming Languages
CS 243	Program Analysis and Optimizations
CS 244	Advanced Topics in Networking
CS 245	Database Systems Principles
EE 271	Introduction to VLSI Systems
EE 282	Computer Systems Architecture
Track Electives: at least three additional courses selected from the list above, the general CS electives list, or the following: ⁵	9-12
CS 240E	
CS 244C	Readings and Projects in Distributed Systems
CS 244E	Networked Wireless Systems
CS 315A	Parallel Computer Architecture and Programming
or CS 316	Advanced Multi-Core Systems
CS 341	Project in Mining Massive Data Sets
CS 343	(Not given this year)
CS 344	Topics in Computer Networks

CS 344E	Advanced Wireless Networks
CS 345	(Offered occasionally)
CS 346	Database System Implementation
CS 347	Parallel and Distributed Data Management
CS 349	Topics in Programming Systems (with permission of undergraduate advisor)
CS 448	Topics in Computer Graphics
EE 382C	Interconnection Networks
EE 384A	Internet Routing Protocols and Standards
EE 384B	Multimedia Communication over the Internet
EE 384C	Wireless Local and Wide Area Networks
EE 384S	Performance Engineering of Computer Systems & Networks
EE 384X	Packet Switch Architectures

Theory Track—

	Units
CS 154	Introduction to Automata and Complexity Theory 4
Select one of the following:	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion
CS 167	(Not given this year)
CS 168	The Modern Algorithmic Toolbox
CS 255	Introduction to Cryptography
CS 258	(Not given this year)
CS 261	Optimization and Algorithmic Paradigms
CS 264	Beyond Worst-Case Analysis
CS 265	Randomized Algorithms and Probabilistic Analysis
CS 268	Geometric Algorithms
CS 361A	Advanced Algorithms
CS 361B	Advanced Algorithms
Two additional courses from the list above or the following:	6-8
CS 143	Compilers
CS 155	Computer and Network Security
CS 157	Logic and Automated Reasoning
or PHIL 151	Metalogic
CS 166	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 242	Programming Languages
CS 254	Computational Complexity
CS 259	((With adviser consent); Not given this year)
CS 262	Computational Genomics
CS 266	Parameterized Algorithms and Complexity
CS 267	Graph Algorithms
CS 354	(Not given this year)
CS 355	(Not given this year)
CS 357	(Not given this year)
CS 358	Topics in Programming Language Theory
CS 359	Topics in the Theory of Computation (with adviser consent)
CS 364A	Algorithmic Game Theory
CS 364B	(Not given this year)
CS 366	(Not given this year)
CS 367	(Not given this year)

CS 369	Topics in Analysis of Algorithms (with adviser consent)
CS 374	Algorithms in Biology
MSE 310	Linear Programming
Track Electives: at least three additional courses from the list above, the general CS electives list, or the following: ⁵	9-12
CME 302	Numerical Linear Algebra
CME 305	Discrete Mathematics and Algorithms
PHIL 152	Computability and Logic

Unspecialized Track—

	Units
CS 154	Introduction to Automata and Complexity Theory 4
Select one of the following:	4
CS 140	Operating Systems and Systems Programming
CS 143	Compilers
One additional course from the list above or the following:	3-4
CS 144	Introduction to Computer Networking
CS 155	Computer and Network Security
CS 242	Programming Languages
CS 244	Advanced Topics in Networking
EE 180	Digital Systems Architecture
Select one of the following:	3-4
CS 121	(Not given this year)
CS 221	Artificial Intelligence: Principles and Techniques
CS 223A	Introduction to Robotics
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
Select one of the following:	3-4
CS 145	Introduction to Databases
CS 147	Introduction to Human-Computer Interaction Design
CS 148	Introduction to Computer Graphics and Imaging
CS 248	Interactive Computer Graphics
CS 262	Computational Genomics
At least two courses from the general CS electives list ⁵	

Individually Designed Track

Students may propose an individually designed track. Proposals should include a minimum of seven courses, at least four of which must be CS courses numbered 100 or above. See Handbook for Undergraduate Engineering Programs for further information.

Senior Capstone Project (3 units minimum)

CS 191	Senior Project ⁷
CS 191W	Writing Intensive Senior Project ⁷
CS 194	Software Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294W	Writing Intensive Research Project in Computer Science

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

- MATH 19, MATH 20, and MATH 21 may be taken instead of MATH 41 and MATH 42 as long as at least 26 MATH units are taken. AP Calculus must be approved by the School of Engineering.
- The math electives list consists of: MATH 51, MATH 104, MATH 108, MATH 109, MATH 110, MATH 113; CS 157, CS 205A; PHIL 151; CME 100, CME 102, CME 104. Completion of MATH 52 and MATH 53 counts as one math elective. Restrictions: CS 157 and PHIL 151 may not be used in combination to satisfy the math electives requirement. Students who have taken both MATH 51 and MATH 52 may not count CME 100 as an elective. Courses counted as math electives cannot also count as CS electives, and vice versa.
- The science elective may be any course of 3 or more units from the School of Engineering Science list plus PSYCH 30; AP Chemistry may be used to meet this requirement. Either of the PHYSICS sequences 61/63 or 21/23 may be substituted for 41/43 as long as at least 11 science units are taken. AP Physics must be approved by the School of Engineering.
- Students who take ENGR 40A (3 units) are required to take two additional units of ENGR Fundamentals (13 units minimum), or 2 additional units of Depth (27 units minimum for track and elective courses).
- General CS Electives: CS 108, CS 121 or CS 221, CS 124, CS 131, CS 140, CS 142, CS 143 CS 144, CS 145, CS 147, CS 148, CS 149, CS 154, CS 155, CS 157 or PHIL 151, CS 164, CS 166, CS 167, CS 168, CS 190, CS 205A, CS 205B, CS 210A, CS 222, CS 223A, CS 224M, CS 224N, CS 224S, CS 224U, CS 224W, CS 225A, CS 225B, CS 227B, CS 228, CS 228T, CS 229, CS 229A, CS 229T, CS 231A, CS 231B, CS 231M, CS 232, CS 235, CS 240, CS 240H, CS 241, CS 242, CS 243, CS 244, CS 244B, CS 245, CS 246, CS 247, CS 248, CS 249A, CS 249B, CS 254, CS 255, CS 258, CS 261, CS 262, CS 263, CS 264, CS 265, CS 266, CS 267, CS 270, CS 272, CS 173 or CS 273A, CS 274, CS 276, CS 277, CS 279, CS 295, CS 348B; CME 108; EE 180, EE 282, EE 364A.
- CS 205A Mathematical Methods for Robotics, Vision, and Graphics is recommended in this list for the Graphics track. Students taking CME 104 Linear Algebra and Partial Differential Equations for Engineers are also required to take its prerequisite, CME 102 Ordinary Differential Equations for Engineers.
- Independent study projects (CS 191 Senior Projector CS 191W Writing Intensive Senior Project) require faculty sponsorship and must be approved by the adviser, faculty sponsor, and the CS senior project adviser (P. Young). A signed approval form, along with a brief description of the proposed project, should be filed the quarter before work on the project is begun. Further details can be found in the *Handbook for Undergraduate Engineering Programs*.

Electrical Engineering (EE)

Completion of the undergraduate program in Electrical Engineering leads to the conferral of the Bachelor of Science in Electrical Engineering.

Mission of the Undergraduate Program in Electrical Engineering

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart a basic understanding of electrical engineering built on a foundation of physical science, mathematics, computing, and technology, and to provide majors in the department with knowledge of electrical engineering principles along with the required supporting knowledge of mathematics, science, computing, and engineering fundamentals. The program develops students' skills in performing and designing experimental projects and communicating their findings to the scientific community effectively. Students in the major are required to

select one sub-discipline for specialization. Choices include: electronic circuits, devices and photonics; signal processing, communication and controls; hardware and software systems; bio-electronics and bio-imaging; music; and energy and environment. The program prepares students for careers in government agencies, the corporate sector, or for future study in graduate or professional schools.

Requirements

Mathematics

MATH 41	Calculus	5
MATH 42	Calculus	5
Select one 2-course sequence:		10

CME 100 & CME 102	Vector Calculus for Engineers and Ordinary Differential Equations for Engineers (Same as ENGR 154)
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MATH 52 & MATH 53	Integral Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra
-------------------	--

EE Math. One additional 100-level course. Select one of the following: 3

EE 102B	Signal Processing and Linear Systems II (if not used in Depth)
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EE 103	Introduction to Matrix Methods
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EE 142	Engineering Electromagnetics
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CME 104/ ENGR 155B	Linear Algebra and Partial Differential Equations for Engineers
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MATH 113	Linear Algebra and Matrix Theory
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CS 103	Mathematical Foundations of Computing
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Statistics/Probability. Select one of the following: ¹ 3-4

EE 178	Probabilistic Systems Analysis (Preferred)
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CS 109	Introduction to Probability for Computer Scientists
--------	---

Science

Select one of the following sequences: 8

PHYSICS 41 & PHYSICS 43	Mechanics and Electricity and Magnetism ²
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PHYSICS 61 & PHYSICS 63	Mechanics and Special Relativity and Electricity, Magnetism, and Waves
-------------------------	--

Science elective. One additional 4-5 unit course from approved list in Undergraduate Handbook, Figure 3-2. ³ 4-5

Technology in Society

One course, see Basic Requirement 4 in the School of Engineering section 3-5

Engineering Fundamentals ⁴

Select one of the following:

CS 106B/ENGR 70B	Programming Abstractions	5
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or CS 106X/ ENGR 70X	Programming Abstractions (Accelerated)
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At least two additional courses, at least one of which is not in EE or CS (CS 106A is not allowed). Choose from table in Undergraduate Handbook, Figure 3-4. One from ENGR 40, ENGR 40M or ENGR 40P recommended. 8-10

Writing in the Major (WIM)

Select one of the following: 3-4

EE 109	Digital Systems Design Lab (WIM/Design)
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EE 133	Analog Communications Design Laboratory (WIM/Design)
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EE 134	Introduction to Photonics (WIM/Design)
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EE 152	Green Electronics (WIM/Design)	
EE 153	Power Electronics (WIM/Design)	
EE 168	Introduction to Digital Image Processing (WIM/Design)	
EE 191W	Special Studies and Reports in Electrical Engineering (WIM; Department approval required) ⁵	
CS 194W	Software Project (WIM/Design)	

Core Electrical Engineering Courses

EE 100	The Electrical Engineering Profession ⁶	1
EE 101A	Circuits I	4
EE 102A	Signal Processing and Linear Systems I	4
EE 108	Digital System Design	4
Physics in Electrical Engineering. Students must complete one of the following courses:		3-5
EE 41/ENGR 40P	Physics of Electrical Engineering ⁷	
EE 65	Modern Physics for Engineers (Preferred)	
EE 142	Engineering Electromagnetics ⁸	

Depth Courses 14

Select four courses from one of the following Depth areas. Courses must include one required course, one Design course, and 2 additional courses.

Design Course 3-4

Select one of the following:

EE 109	Digital Systems Design Lab (WIM/Design)	
EE 133	Analog Communications Design Laboratory (WIM/Design)	
EE 134	Introduction to Photonics (WIM/Design)	
EE 152	Green Electronics (WIM/Design)	
EE 153	Power Electronics (WIM/Design)	
EE 168	Introduction to Digital Image Processing (WIM/Design)	
EE 262	Two-Dimensional Imaging (Design)	
EE 265	Digital Signal Processing Laboratory (Design)	
CS 194W	Software Project (WIM/Design)	

Additional Depth Electives 12

May include up to two additional Engineering Fundamentals, any CS 193 course and any letter graded EE or EE Related courses (minus any previously noted restrictions). Freshman and Sophomore seminars, EE191 and CS 106A do not count toward the 60 units.

- 1 CME 106 or STATS 116 can also fulfill the Statistics/Probability requirement, but these are not preferred.
- 2 The EE introductory class ENGR 40 or ENGR 40M may be taken concurrently with PHYSICS 43.
- 3 A minimum of 12 science units must be taken. A minimum of 40 math and science units combined must be taken.
- 4 EE Engineering Topics: Fundamentals and Depth courses must total 60 units minimum.
- 5 EE 191W may satisfy WIM only if it is a follow-up to an REU, independent study project or as part of an honors thesis project where a faculty agrees to provide supervision of writing a technical paper and with suitable support from the Writing Center.
- 6 For upper division students, a 200-level seminar in their depth area will be accepted, on petition.
- 7 EE 41/ENGR 40P can meet this requirement only if it is not used to fulfill the Engineering Fundamentals requirement.

- ⁸ EE 142 cannot be used for both Physics in Electrical Engineering and as a depth elective.

Depth Areas

		Units
Bio-electronics and Bio-imaging		
EE 101B or EE 102B	Circuits II (Required) Signal Processing and Linear Systems II	4
EE 122B	Introduction to Biomedical Electronics	3
EE 124	Introduction to Neuroelectrical Engineering	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/Design)	4
EE 169	Introduction to Bioimaging	3
EE 202	Electrical Engineering in Biology and Medicine	3
EE 225	Biochips and Medical Imaging	3
Circuits and Devices		
EE 101B	Circuits II (Required)	4
EE 114	Fundamentals of Analog Integrated Circuit Design	3
EE 116	Semiconductor Device Physics	3
EE 122A	Analog Circuits Laboratory	3
EE 133	Analog Communications Design Laboratory (WIM/Design)	4
EE 152	Green Electronics	4
EE 153	Power Electronics (WIM/Design)	3-4
EE 212	Integrated Circuit Fabrication Processes	3
EE 214B	Advanced Analog Integrated Circuit Design	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 271	Introduction to VLSI Systems	3
Computer Hardware		
CS 107	Computer Organization and Systems (Prerequisite for EE 180)	3-5
EE 180	Digital Systems Architecture (Required)	3-4
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 152	Green Electronics (WIM/Design)	4
EE 271	Introduction to VLSI Systems	3
EE 273	Digital Systems Engineering	3
EE 282	Computer Systems Architecture	3
Computer Software		
CS 107	Computer Organization and Systems (Prerequisite for EE 180)	3-5
EE 180	Digital Systems Architecture (Required)	3-4
CS 108	Object-Oriented Systems Design	3-4
CS 110	Principles of Computer Systems	3-5
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144 or EE 284	Introduction to Computer Networking Introduction to Computer Networks	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
EE 152	Green Electronics (WIM/Design)	4
CS 194W	Software Project (WIM/Design)	3
Energy and Environment		
EE 101B or EE 180	Circuits II (Required) Digital Systems Architecture	4
EE 116	Semiconductor Device Physics	3
EE 134	Introduction to Photonics (WIM/Design)	4

EE 151	Sustainable Energy Systems	3
EE 152	Green Electronics (WIM/Design)	4
EE 153	Power Electronics (WIM/Design)	3-4
EE 168	Introduction to Digital Image Processing (WIM/Design)	3-4
EE 263	Introduction to Linear Dynamical Systems	3
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
EE 293B	Fundamentals of Energy Processes	3
CEE 155	Introduction to Sensing Networks for CEE	4
CEE 173A	Energy Resources	4-5
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ME 185	Electric Vehicle Design	3
Music		
EE 102B or MUSIC 320A	Signal Processing and Linear Systems II (Required) Introduction to Audio Signal Processing Part I: Spectrum Analysis	4
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 122A	Analog Circuits Laboratory	3
EE 264 or EE 265	Digital Signal Processing Digital Signal Processing Laboratory	3-4
MUSIC 256A	Music, Computing, and Design I: Software Paradigms for Computer Music	1-4
MUSIC 256B	Music, Computing, Design II: Mobile Music	1-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4
MUSIC 420A	Signal Processing Models in Musical Acoustics	3-4
MUSIC 421A	Audio Applications of the Fast Fourier Transform	3-4
MUSIC 422	Perceptual Audio Coding	3
MUSIC 424	Signal Processing Techniques for Digital Audio Effects	3-4
Photonics, Solid State and Electromagnetics		
EE 101B	Circuits II (Required)	4
EE 116	Semiconductor Device Physics	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 136	Introduction to Nanophotonics and Nanostructures	3
EE 142	Engineering Electromagnetics	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 228	Basic Physics for Solid State Electronics	3
EE 236A	Modern Optics	3
EE 236B	Guided Waves	3
EE 242	Electromagnetic Waves	3
EE 247	Introduction to Optical Fiber Communications	3
Signal Processing, Communications and Controls		
EE 102B	Signal Processing and Linear Systems II (Required)	4
EE 124	Introduction to Neuroelectrical Engineering	3
EE 133	Analog Communications Design Laboratory (WIM/Design)	3-4
EE 168	Introduction to Digital Image Processing (WIM/Design)	3-4

EE 169	Introduction to Bioimaging	3
EE 179	Analog and Digital Communication Systems	3
EE 184		
EE 261	The Fourier Transform and Its Applications	3
EE 262	Two-Dimensional Imaging (Design)	3
EE 263	Introduction to Linear Dynamical Systems	3
EE 264 or EE 265	Digital Signal Processing Digital Signal Processing Laboratory	3
EE 278	Introduction to Statistical Signal Processing	3
EE 279	Introduction to Digital Communication	3
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Engineering Physics (EPHYS)

Completion of the undergraduate program in Engineering Physics leads to the conferral of the Bachelor of Science in Engineering. The subplan "Engineering Physics" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Engineering Physics

The mission of the undergraduate program in Engineering Physics is to provide students with a strong foundation in physics and mathematics, together with engineering and problem solving skills. All majors take high-level math and physics courses as well as engineering courses. This background prepares them to tackle complex problems in multidisciplinary areas that are at the forefront of 21st-century technology such as solid state devices, quantum optics and photonics, materials science, nanotechnology, electromechanical systems, energy systems, biophysics, computational science, and any other engineering field that requires a solid background in physics. Because the program emphasizes science, mathematics, and engineering, students are well prepared to pursue graduate work in engineering, physics, or applied physics.

Requirements

	Units	
Mathematics		
Select one of the following sequences:	10	
MATH 51 & MATH 52	Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables	
CME 100 & CME 104	Vector Calculus for Engineers and Linear Algebra and Partial Differential Equations for Engineers	
MATH 53 or CME 102	Ordinary Differential Equations with Linear Algebra Ordinary Differential Equations for Engineers	5
MATH 131P	Partial Differential Equations I	3
Science		
PHYSICS 41	Mechanics (or PHYSICS 61)	4
PHYSICS 42	Classical Mechanics Laboratory (or PHYSICS 62) ¹	1
PHYSICS 43	Electricity and Magnetism (or PHYSICS 63)	4
PHYSICS 67	Introduction to Laboratory Physics ²	2
PHYSICS 45	Light and Heat (or PHYSICS 65)	4
PHYSICS 46	Light and Heat Laboratory (or PHYSICS 67)	1
PHYSICS 70	Foundations of Modern Physics (if taking the 40 series)	4
Technology in Society		

One course required, see Basic Requirement 4 3-5

Engineering Fundamentals

Three courses minimum (CS 106A or X recommended)³ 9-14

Engineering Physics Depth (core)

Advanced Mathematics:

One advanced math elective such as 3-5

EE 261	The Fourier Transform and Its Applications
PHYSICS 112	Mathematical Methods of Physics
CS 109	Introduction to Probability for Computer Scientists
CME 106	Introduction to Probability and Statistics for Engineers

Also qualified are EE 263, any Math or Statistics course numbered 100 or above, and any CME course numbered 200 or above, except CME 206.

Advanced Mechanics:⁴ 3-4

AA 242A Classical Dynamics (or ME 333 or PHYSICS 110) 3

Intermediate Electricity and Magnetism 6-8

Select one of the following sequences:

PHYSICS 120 Intermediate Electricity and Magnetism I
& PHYSICS 121 and Intermediate Electricity and Magnetism II

EE 142 Engineering Electromagnetics
& EE 242 and Electromagnetic Waves

Numerical Methods

Select one of the following: 3-4

APPPHYS 215 Numerical Methods for Physicists and Engineers

CME 108 Introduction to Scientific Computing

CME 206/ME 300C Introduction to Numerical Methods for Engineering

PHYSICS 113 Computational Physics

Electronics Lab

Select one of the following: 3-5

ENGR 40 Introductory Electronics (ENGR 40A is not allowed)

EE 101B Circuits II

EE 122A Analog Circuits Laboratory

PHYSICS 105 Intermediate Physics Laboratory I: Analog Electronics

APPPHYS 207 Laboratory Electronics

Writing Lab (WIM)

Select one of the following: 4-5

ENGR 199W Writing of Original Research for Engineers (for students pursuing an independent research project)

BIOE 131 Ethics in Bioengineering (for Biophysics specialty only)

CS 181W Computers, Ethics, and Public Policy (for Computational Science specialty only)

EE 134 Introduction to Photonics (for Photonics specialty only)

EE 152 Green Electronics (for Renewable Energy specialty only)

ME 112 Mechanical Systems Design (for Electromechanical System Design specialty only)

ME 131A Heat Transfer
& ME 140 and Advanced Thermal Systems (for Energy Systems specialty only)

MATSCI 161 Nanocharacterization Laboratory (Okay for Materials Science, Renewable Energy and Solid State Physics specialties)

MATSCI 164 Electronic and Photonic Materials and Devices Laboratory (Okay for Materials Science, Renewable Energy and Solid State Physics specialties)

PHYSICS 107 Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis (for Photonics specialty)

Quantum Mechanics

Select one of the following sequences: 6-8

EE 222 Applied Quantum Mechanics I
& EE 223 and Applied Quantum Mechanics II

PHYSICS 130 Quantum Mechanics
& PHYSICS 131 and Quantum Mechanics II

Thermodynamics and Statistical Mechanics

PHYSICS 170 Thermodynamics, Kinetic Theory, and Statistical
& PHYSICS 171 Mechanics I 3-8

and Thermodynamics, Kinetic Theory, and Statistical Mechanics II

or ME 346A Introduction to Statistical Mechanics

Design Course

Select one of the following: 3-4

CS 108 Object-Oriented Systems Design

EE 133 Analog Communications Design Laboratory

ME 203 Design and Manufacturing

ME 210 Introduction to Mechatronics

PHYSICS 108 Advanced Physics Laboratory: Project

Specialty Tracks

Select three courses from one specialty area: 9-12

Solid State Physics:

APPPHYS 272 Solid State Physics

or PHYSICS 172 Solid State Physics

APPPHYS 273 Solid State Physics II

EE 116 Semiconductor Device Physics

EE 216 Principles and Models of Semiconductor Devices

MATSCI 199 Electronic and Optical Properties of Solids

Photonics:

EE 216 Principles and Models of Semiconductor Devices

EE 234 Photonics Laboratory

EE 243 Semiconductor Optoelectronic Devices

MATSCI 199 Electronic and Optical Properties of Solids

Materials Science:

Any MATSCI courses numbered 151 to 199 (except 159Q) or PHYSICS 172

Electromechanical System Design:

ME 80 Mechanics of Materials

ME 112 Mechanical Systems Design

ME 210 Introduction to Mechatronics

or EE 118 Introduction to Mechatronics

Energy Systems:

ME 131A Heat Transfer

ME 131B Fluid Mechanics: Compressible Flow and Turbomachinery

ME 140 Advanced Thermal Systems

Renewable Energy:

CEE 176B Electric Power: Renewables and Efficiency

EE 152 Green Electronics

EE 153 Power Electronics

EE 237	Solar Energy Conversion	
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
EE 293B	Fundamentals of Energy Processes	
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
MATSCI 302	Solar Cells	
MATSCI 316	Nanoscale Science, Engineering, and Technology	
ME 260	Fuel Cell Science and Technology	
Biophysics:		
BIO 132	Advanced Imaging Lab in Biophysics	
BIOE 41	Physical Biology of Macromolecules	
BIOE 42	Physical Biology of Cells	
BIOE 44	Fundamentals for Engineering Biology Lab	
BIOE 101	Systems Biology	
BIOE 103	Systems Physiology and Design	
BIOE 123	Optics and Devices Lab	
CS 262	Computational Genomics	
EE 169	Introduction to Bioimaging	
or EE 369A	Medical Imaging Systems I	
Computational Science:		
CME 212	Advanced Programming for Scientists and Engineers	
CME 215A	Advanced Computational Fluid Dynamics	
CME 215B	Advanced Computational Fluid Dynamics	
Any CME course with course number greater than 300 and less than 390		
CS 103	Mathematical Foundations of Computing	
CS 154	Introduction to Automata and Complexity Theory	
CS 161	Design and Analysis of Algorithms	
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	
CS 205B	Mathematical Methods for Fluids, Solids, and Interfaces	
CS 221	Artificial Intelligence: Principles and Techniques	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	3-4
STATS 202	Data Mining and Analysis	
STATS 213	Introduction to Graphical Models	

Total Units **99-127**

- 1 PHYSICS 42 Classical Mechanics Laboratory or PHYSICS 62 Classical Mechanics Laboratory, Mechanics Lab (1 unit), required in 2011-12 and beyond
- 2 PHYSICS 67 Introduction to Laboratory Physics (2 units), recommended in place of PHYSICS 44 Electricity and Magnetism Lab
- 3 The Engineering Fundamental courses are to be selected from the Basic Requirements 3 list. Fundamentals courses acceptable for the core program may also be used to satisfy the fundamentals requirement as long as 45 unduplicated units of Engineering are taken.
- 4 ENGR 15 Dynamics, allowed for students who matriculated in 2011/2012 or earlier; however, AA 242A Classical Dynamics, ME 333 Mechanics or PHYSICS 110 Advanced Mechanics recommended instead of, or in addition to, ENGR 15 Dynamics.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Honors Program

The School of Engineering offers a program leading to a Bachelor of Science in Engineering: Engineering Physics with Honors.

Honors Criteria

1. Minimum overall GPA of 3.5.
2. Independent research conducted at an advanced level with a faculty research adviser and documented in an honors thesis. The honors candidate must identify a faculty member who will serve as his or her honors research adviser and a second reader who will be asked to read the thesis and give feedback before endorsing the thesis. One of the two must be a member of the Academic Council and in the School of Engineering.

Application: The deadline to apply is October 15 in Autumn Quarter of the senior year. The application documents should be submitted to the student services officer. Applications are reviewed by a subcommittee of the faculty advisers for Engineering Physics majors. Applicants and thesis advisers receive written notification when the application is approved. An application consists of three items:

1. One-page description of the research topic
2. Application form (http://www.stanford.edu/group/ughb/2011-12/2012-13/EPhysHonorsReq_App_2012.doc) signed by the honors thesis adviser
3. Unofficial Stanford transcript

Requirements and Timeline for Honors in Engineering Physics:

1. Declare the honors program in Axess (ENGR-BSH, Subplan: Engineering Physics)
2. Obtain application form from the student services officer.
3. Apply to honors program by October 15 in the autumn quarter of the senior year.
4. Maintain an overall GPA of at least 3.5.
5. Optional: Under direction of the thesis adviser, students may enroll for research units in ENGR 199(W) or in departmental courses such as ME 191(H).
6. Submit a completed thesis draft to the research adviser and second reader by April 15.
7. Present the thesis work in an oral presentation or poster session in an appropriate forum (e.g., an event that showcases undergraduate research and is organized by the department of the adviser, the school of the adviser, or the university).
8. Incorporate feedback, which the adviser and second reader should provide by April 30, and obtain final endorsement signatures from the thesis adviser and second reader by May 15.
9. Submit two signed, single-sided copies to the student services officer by May 15.

Environmental Systems Engineering (EnvSE)

Completion of the undergraduate program in Environmental Systems Engineering leads to the conferral of the Bachelor of Science in Environmental Systems Engineering.

Environmental Engineering (ENV)

The program in Environmental Engineering has been discontinued. Students currently enrolled in this program should consult the previous year's Stanford Bulletin (<http://exploreddegrees.stanford.edu/archive/2012-13/schoolofengineering/civilandenvironmentalengineering/#bachelorofsciencetext-enviengi>) for program requirements (click on Environmental Engineering in the right hand menu). Any current Environmental Engineering major wishing ABET accreditation must graduate by June 2015.

Mission of the Undergraduate Program in Environmental Systems Engineering

The mission of the undergraduate program in Environmental Systems Engineering is to prepare students for incorporating environmentally sustainable design, strategies and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Courses in the program are multidisciplinary in nature, combining math/science/engineering fundamentals, and tools and skills considered essential for an engineer, along with a choice of one of three focus areas for more in-depth study: coastal environments, freshwater environments, or urban environments. This major offers the opportunity for a more focused curriculum than the Environmental and Water Studies concentration in the Civil Engineering degree program. The program of study, which includes a capstone experience, aims to equip engineering students to take on the complex challenges of the 21st Century involving natural and built environments, in consulting and industry as well as in graduate school.

Requirements

Mathematics and Science	
See Basic Requirement 1 and 2 ¹	36
Technology in Society (TiS)	
One 3-5 unit course required, see Basic Requirement 4	3-5
Engineering Fundamentals	
Three courses minimum (see Basic Requirement 3), including:	
ENGR 70A Programming Methodology (or ENGR 70X)	5
(req'd) plus one of the following courses:	
ENGR 90 Environmental Science and Technology (req'd for Freshwater and Coastal focus areas)	
or	
ENGR 60 Engineering Economy (req'd for Urban focus area)	3
(or CEE 146A)	
plus one Engineering Fundamentals Elective	3-5
Fundamentals Tools/Skills ²	10
in Visual, Oral/Written Communication, and Modeling/Analysis	
Specialty Courses, in either	36
Coastal Environments (see Below)	
or Freshwater Environments (see Below)	
or Urban Environments (see Below)	
Total Units	96-100

- Math must include CME 100 Vector Calculus for Engineers (or MATH 51 Linear Algebra and Differential Calculus of Several Variables), and either a Probability/Statistics course or CME 102 Ordinary Differential Equations for Engineers (or MATH 53 Ordinary Differential Equations with Linear Algebra). Science must include PHYSICS 41 Mechanics; and either ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology, CHEM 31B Chemical Principles II or CHEM 31X Chemical Principles Accelerated (or PHYSICS 43 Electricity and Magnetism, for Urban track only).
- Fundamental Tools/Skills must include: (a) CEE 1 Introduction to Environmental Systems Engineering (offered AY 2015-16); (b) *at least one* Visual Communication class from CEE 31 Accessing Architecture Through Drawing / CEE 31Q Accessing Architecture Through Drawing, CEE 133F Principles of Freehand Drawing, ME 110 Design Sketching, ARTSTUDI 160 Design I : Fundamental Visual Language, or OSPPARIS 44 EAP: Analytical Drawing and Graphic Art; (c) *at least one* Oral/Written Communication class from ENGR 103 Public Speaking (or ORALCOMM 122 "The TED Commandments": The Art and Heart of Effective Public Speaking), ENGR 202W Technical Writing, CEE 151 Negotiation, EARTHSYS 195 Natural Hazards and Risk Communication or ENVRES 200 Sustaining Action: Research, Analysis and Writing for the Public; and (d) *at least one* Modeling/Analysis class from CEE 155 Introduction to Sensing Networks for CEE, CEE 120A Building Information Modeling Workshop (or CEE 120B Building Information Modeling Workshop), CEE 226 Life Cycle Assessment for Complex Systems, EARTHSYS 144 Fundamentals of Geographic Information Science (GIS), ENERGY 160 Modeling Uncertainty in the Earth Sciences, CEE 101D Computations in Civil and Environmental Engineering (if not counted as Math), or CEE 211 Introduction to Programming for Scientists and Engineers (or EARTHSYS 211 Fundamentals of Modeling).

Urban Environments Focus Area (36 units)

Required		
CEE 100	Managing Sustainable Building Projects	4
CEE 101B	Mechanics of Fluids	4
CEE 176A	Energy Efficient Buildings	3-4
Electives		
Building Systems		
CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	4
CEE 156	Building Systems	4
Energy Systems		
CEE 173A	Energy Resources	3-5
CEE 176B	Electric Power: Renewables and Efficiency	3-4
ENERGY 171	Energy Infrastructure, Technology and Economics	3
or		
ENERGY 191	Optimization of Energy Systems	3-4
Water Systems		
CEE 166A	Watersheds and Wetlands	3
CEE 166B	Floods and Droughts, Dams and Aqueducts	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
Urban Planning		
CEE 171	Environmental Planning Methods	3
CEE 177L	Smart Cities & Communities	2-3
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	5

or		
URBANST 164	Sustainable Cities	4-5
or		
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
Capstone		
CEE 112A	Industry Applications of Virtual Design & Construction	2-4
-and-		
CEE 112B	Industry Applications of Virtual Design & Construction	2-4
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 221A	Planning Tools and Methods in the Power Sector	3-4
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	2-3

Freshwater Environments Focus Area (36 units)

Required		
CEE 101B	Mechanics of Fluids	4
CEE 177	Aquatic Chemistry and Biology	4
CEE 166A	Watersheds and Wetlands	3
or		
CEE 174A	Providing Safe Water for the Developing and Developed World	3
(if not counted as a req'd course)		
Electives		
CEE 160	Mechanics of Fluids Laboratory	2
CEE 161A	Rivers, Streams, and Canals	3-4
CEE 165C	Water Resources Management	3
CEE 166A	Watersheds and Wetlands	3
(if not counted as req'd course)		
CEE 166B	Floods and Droughts, Dams and Aqueducts	3
CEE 166D	Water Resources and Water Hazards Field Trips	2
CEE 171	Environmental Planning Methods	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 179A	Water Chemistry Laboratory	3
CEE 265A	Sustainable Water Resources Development	3
EARTHSYS 140	The Energy-Water Nexus	3
EARTHSYS 156	Soil and Water Chemistry	1-4
Capstone		
CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

Coastal Environments Focus Area (36 units)

Required		
CEE 101B	Mechanics of Fluids	4
CEE 164	Introduction to Physical Oceanography	4
CEE 175A	California Coast: Science, Policy, and Law	3-4

Electives		
CEE 160	Mechanics of Fluids Laboratory	2
CEE 166A	Watersheds and Wetlands	3
CEE 171	Environmental Planning Methods	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 272	Coastal Contaminants	3-4
BIO 30	Ecology for Everyone	4
EARTHSYS 8	The Oceans: An Introduction to the Marine Environment	3
or		
GES 8	Oceanography: An Introduction to the Marine Environment	3
EARTHSYS 141	Remote Sensing of the Oceans	3-4
EARTHSYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
EARTHSYS 151	Biological Oceanography	3-4
to be taken concurrently with		
EARTHSYS 152	Marine Chemistry	3-4
EARTHSYS 156M	Marine Resource Economics and Conservation	5
Capstone (1 class req'd)		
CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Individually Designed Majors in Engineering (IDMENS)

Completion of the undergraduate program in Individually Designed Majors in Engineering (IDMEN) leads to the conferral of the Bachelor of Science in an Individually Designed Major: (approved title). The approved title of the IDMEN also appears on the transcript.

Mission of the Undergraduate Program in Individually Designed Majors in Engineering

The mission of the undergraduate program in Individually Designed Majors in Engineering (IDMEN) is to provide students with an understanding of engineering principles and the analytical and problem solving, design, and communication skills necessary to be successful in the field. The B.S. for IDMENS is intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the pre-approved School of Engineering majors. Core courses in the curriculum include engineering fundamentals, mathematics, technology in society, and the sciences. Students then take additional courses pertinent to their IDMEN major. The program prepares students for careers in government and the corporate sector, and for graduate study.

B.S. in Individually Designed Majors in Engineering

The B.S. degree for IDMENs is intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the pre-approved School of Engineering majors. IDMEN curricula are designed by students with the assistance of two faculty advisers of their choice and are submitted to the Undergraduate Council's Subcommittee on Individually Designed Majors. The degree conferred is "Bachelor of Science in Individually Designed Major in Engineering: (approved title)."

Students must submit written proposals to the IDMEN subcommittee detailing their course of study. Programs must meet the following requirements: mathematics (21 unit minimum, see Basic Requirement 1 below), science (17 units minimum, see Basic Requirement 2 below), Technology in Society (one approved course, see Basic Requirement 4 below), at least three Engineering Fundamentals courses, see Basic Requirement 4 for a list of courses, and a minimum of 31 units of engineering depth courses, and sufficient relevant additional course work to bring the total number of units to at least 90 and at most 107. Students may take additional courses pertinent to their IDMEN major, but the IDMEN proposal itself may not exceed 107 units. Students are responsible for completing the prerequisites for all courses included in their majors.

Each proposal should begin with a statement describing the proposed major. In the statement, the student should make clear the motivation for and goal of the major, and indicate how it relates to her or his projected career plans. The statement should specify how the courses to be taken relate to and move the student toward realizing the major's goal. A proposed title for the major should be included. The title approved by the IDMEN Subcommittee is listed on the student's official University transcript and on the diploma in this form: "Individually Designed Major in Subplan", where "Subplan" is the title approved by the IDMEN Subcommittee.

The proposal statement should be followed by a completed Program Sheet listing all the courses comprising the student's IDMEN curriculum, organized by the five categories printed on the sheet (mathematics, science, technology in society, engineering fundamentals, and engineering depth). Normally, the courses selected should comprise a well-coordinated sequence or sequences that provide mastery of important principles and techniques in a well-defined field. In some circumstances, especially if the proposal indicates that the goal of the major is to prepare the student for graduate work outside of engineering, a more general engineering program may be appropriate. A four-year study plan, showing courses to be taken each quarter, should also be included in the student's IDMEN proposal.

The proposal must be signed by two faculty members who certify that they endorse the major as described in the proposal and that they agree to serve as the student's permanent advisers. One of the faculty members, who must be from the School of Engineering, acts as the student's primary adviser. The proposal must be accompanied by a statement from that person giving an appraisal of the academic value and viability of the proposed major.

Students proposing IDMENs must have at least four quarters of undergraduate work remaining at Stanford after the quarter in which their proposals are first submitted. Any changes in a previously approved major must be endorsed by the advisers and re-approved by the IDMEN subcommittee. A request by a student to make changes in her or his approved curriculum must be made sufficiently far in advance so that, should the request be denied, adequate time remains to complete the original, approved curriculum. Proposals are reviewed and acted upon once a quarter. Forms may be obtained from the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>. Completed proposals should be submitted to Darlene Lazar in the Office of Student Affairs, Huang Engineering Center, Suite 135. An IDMEN cannot be a student's secondary major.

Management Science and Engineering (MS&E)

Completion of the undergraduate program in Management Science and Engineering leads to the conferral of the Bachelor of Science in Management Science and Engineering.

Requirements

		Units
Mathematics and Science		
All required; see SoE Basic Requirements 1 and 2 ¹		
CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CME 103	Introduction to Matrix Methods	5
MSE 120	Probabilistic Analysis	5
MSE 121	Introduction to Stochastic Modeling	4
MSE 125	Introduction to Applied Statistics	4
Select one of the following sequences:		8
CHEM 31B & CHEM 33	Chemical Principles II and Structure and Reactivity	
CHEM 31X & CHEM 33	Chemical Principles Accelerated and Structure and Reactivity	
PHYSICS 21 & PHYSICS 22 & PHYSICS 23 & PHYSICS 24	Mechanics and Heat and Mechanics and Heat Laboratory and Electricity and Optics and Electricity and Optics Laboratory	
PHYSICS 41 & PHYSICS 43	Mechanics and Electricity and Magnetism	
Electives from SoE approved list or AP/IB credit ¹		13
Technology in Society		
Select one of the following; see SoE Basic Requirement 4		3
COMM 120W	Digital Media in Society	
COMM 169	Computers and Interfaces	
CS 181	Computers, Ethics, and Public Policy	
ENGR 130	Science, Technology, and Contemporary Society	
ENGR 131	Ethical Issues in Engineering	
MSE 181	Issues in Technology and Work for a Postindustrial Economy	
MSE 193	Technology and National Security (WIM)	
MSE 197	Ethics, Technology, and Public Policy (WIM)	
Engineering Fundamentals ²		
Three courses; see SoE Basic Requirement 3		
CS 106A	Programming Methodology ³	5
Select one of the following:		3
ENGR 25B or ENGR 25E	Biotechnology Energy: Chemical Transformations for Production, Storage, and Use	
ENGR 40 or ENGR 40A or ENGR 40M or ENGR 40P	Introductory Electronics Introductory Electronics An Intro to Making: What is EE Physics of Electrical Engineering	
ENGR 80	Introduction to Bioengineering	

Select one of the following (or ENGR 25, ENGR 40, or ENGR 80 if not used above): 3

ENGR 10	Introduction to Engineering Analysis
ENGR 14	Intro to Solid Mechanics
ENGR 15	Dynamics
ENGR 20	Introduction to Chemical Engineering
ENGR 30	Engineering Thermodynamics
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis
or ENGR 50E	Introduction to Materials Science, Energy Emphasis
or ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis
ENGR 60	Engineering Economy
ENGR 90	Environmental Science and Technology

Engineering Depth²

Core Courses (all six required) 25

CS 103	Mathematical Foundations of Computing ⁴
or CS 106B	Programming Abstractions
or CS 106X	Programming Abstractions (Accelerated)
ECON 50	Economic Analysis I
MSE 108	Senior Project
MSE 111	Introduction to Optimization ⁴
MSE 140	Accounting for Managers and Entrepreneurs
or MSE 140X	Financial Accounting Concepts and Analysis
MSE 180	Organizations: Theory and Management

Area Courses (see below) 27

Choose four or five courses (minimum 15 units) from a primary area and two courses (minimum 6 units) from each of the other two areas.

Depth Areas

Finance and Decision Area

Units
6-15

Students choosing F&D as their primary area must take at least two of ECON 51, MS&E 145, and MS&E 152

Introductory (appropriate for freshmen and sophomores)	
MSE 145	Introductory Financial Analysis
MSE 152	Introduction to Decision Analysis (WIM)
Intermediate (appropriate for juniors and seniors)	
MSE 146	Corporate Financial Management
MSE 245G	Finance for Non-MBAs
MSE 252	Decision Analysis I: Foundations of Decision Analysis
Advanced (intended primarily for graduate students)	
MSE 245A	Investment Science
MSE 250A	Engineering Risk Analysis
MSE 250B	Project Course in Engineering Risk Analysis
MSE 245B	Advanced Investment Science

Operations and Analytics Area

6-15

Students choosing O&A as their primary area may also include CS 161, CS 229, and STATS 202 in their selections⁴

Introductory (no prerequisites)	
MSE 107	Interactive Management Science Methods
MSE 223	Simulation
MSE 226	"Small" Data
MSE 251	Stochastic Control

Applications

MSE 130	Information Networks and Services
MSE 233	Networked Markets
MSE 260	Introduction to Operations Management
MSE 262	Supply Chain Management
MSE 263	Healthcare Operations Management
MSE 264	Sustainable Product Development and Manufacturing
MSE 268	Operations Strategy

Organizations, Technology, and Policy Area 6-15

Students choosing OT&P as their primary area must take at least two of ENGR 145, MS&E 175, MS&E 181, MS&E 185, PSYCH 70, and SOC 114 (but not both PSYCH 70 and SOC 114)⁴

Introductory (no prerequisites)

ENGR 131	Ethical Issues in Engineering ⁴
MSE 178	The Spirit of Entrepreneurship
MSE 189	Social Networks - Theory, Methods, and Applications
MSE 190	Methods and Models for Policy and Strategy Analysis
MSE 193	Technology and National Security (WIM) ⁴
MSE 197	Ethics, Technology, and Public Policy (WIM) ⁴
Advanced (has prerequisites and/or appropriate for juniors and seniors)	
ENGR 145	Technology Entrepreneurship
MSE 175	Innovation, Creativity, and Change
MSE 177	Engineering Innovation
MSE 181	Issues in Technology and Work for a Postindustrial Economy ⁴
MSE 185	Global Work
MSE 243	Energy and Environmental Policy Analysis
MSE 292	Health Policy Modeling
MSE 294	Climate Policy Analysis
MSE 295	Energy Policy Analysis

¹ Math and Science must total a minimum of 44 units. Electives must come from the School of Engineering approved list, or, PSYCH 50 Introduction to Cognitive Neuroscience, or PSYCH 70 Introduction to Social Psychology, and many not repeat material from any other requirement. AP/IB credit for Chemistry, Mathematics, and Physics may be used.

² Engineering fundamentals plus engineering depth must total a minimum of 60 units.

³ Students may petition to place out of CS 106A Programming Methodology.

⁴ Courses used to satisfy the Math, Science, Technology in Society, or Engineering Fundamental requirement may not also be used to satisfy an engineering depth requirement.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Materials Science and Engineering (MATSCI)

Completion of the undergraduate program in Materials Science and Engineering leads to the conferral of the Bachelor of Science in Materials Science and Engineering.

Mission of the Undergraduate Program in Materials Science and Engineering

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminal degree program which leads to an M.S. in Materials Science and Engineering. Coterminal degree programs are encouraged both for undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines.

Requirements

Mathematics

20 units minimum; see Basic Requirement 1¹

Select one of the following: 5

MATH 51 Linear Algebra and Differential Calculus of Several Variables

CME 100/
ENGR 154 Vector Calculus for Engineers

Select one of the following: 5

MATH 52 Integral Calculus of Several Variables

CME 104/
ENGR 155B Linear Algebra and Partial Differential Equations for Engineers

Select one of the following: 5

MATH 53 Ordinary Differential Equations with Linear Algebra

CME 102/
ENGR 155A Ordinary Differential Equations for Engineers

One additional course 5

Science

20 units minimum; see Basic Requirement 2² 20

Must include a full year of physics or chemistry, with one quarter of study in the other subject.

Technology in Society

One course; see Basic Requirement 3³ 3-5

Engineering Fundamentals

Three courses minimum; see Basic Requirement 4⁴

Select one of the following: 4

ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis⁴

ENGR 50E Introduction to Materials Science, Energy Emphasis⁴

ENGR 50M Introduction to Materials Science, Biomaterials Emphasis⁴

Units

At least two additional courses 6-9

Materials Science and Engineering Depth

Materials Science Fundamentals:

MATSCI 153 Nanostructure and Characterization 4

MATSCI 154 Thermodynamic Evaluation of Green Energy Technologies⁵ 4

MATSCI 155 Nanomaterials Synthesis 4

MATSCI 157 Quantum Mechanics of Nanoscale Materials 4

Two of the following courses: 8

MATSCI 151 Microstructure and Mechanical Properties

MATSCI 152 Electronic Materials Engineering

MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

MATSCI 190 Organic and Biological Materials

MATSCI 192 Materials Chemistry

MATSCI 193 Atomic Arrangements in Solids

MATSCI 194 Thermodynamics and Phase Equilibria

MATSCI 195 Waves and Diffraction in Solids

MATSCI 196 Defects in Crystalline Solids

MATSCI 197 Rate Processes in Materials

MATSCI 198 Mechanical Properties of Materials

MATSCI 199 Electronic and Optical Properties of Solids

Engineering Depth 16

One of the following courses:

MATSCI 161 Nanocharacterization Laboratory (WIM)

MATSCI 164 Electronic and Photonic Materials and Devices Laboratory (WIM)

Three of the following courses:

MATSCI 160 Nanomaterials Laboratory

MATSCI 162 X-Ray Diffraction Laboratory

MATSCI 163 Mechanical Behavior Laboratory

MATSCI 165 Nanoscale Materials Physics Computation Laboratory

Focus Area Options⁶ 10

¹ Basic Requirement 1 (20 units minimum): see a list of approved Math Courses (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses).

² Basic Requirement 2 (20 units minimum): see a list of approved Science Courses (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses).

³ Basic Requirement 3 (one course minimum): see a list of approved Technology in Society Courses (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses).

⁴ Basic Requirement 4 (3 courses minimum): see a list of approved Engineering Fundamentals (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses) Courses. If both ENGR 50 (p. 155) Introduction to Materials Science, Nanotechnology Emphasis, ENGR 50E (p. 155) Introduction to Materials Science - Energy Emphasis, and/or ENGR 50M (p. 155) Introduction to Materials Science, Biomaterials Emphasis are taken, one may be used for the Materials Science Fundamentals requirement.

⁵ ENGR 30 (p. 155) Engineering Thermodynamics may be substituted for MATSCI 154 (p. 155) Thermodynamic Evaluation of Green Energy Technologies as long as the total MATSCI program units total 50 or more.

⁶ Focus Area Options: 10 units from one of the following Focus Area Options below.

Focus Area Options

Bioengineering (10 units minimum)

BIOE 220	Introduction to Imaging and Image-based Human Anatomy
BIOE 281	Biomechanics of Movement
BIOE 284B	Cardiovascular Bioengineering
BIOE 333	Interfacial Phenomena and Bionanotechnology
BIOE 381	Orthopaedic Bioengineering
MATSCI 190	Organic and Biological Materials
MATSCI 380	Nano-Biotechnology
MATSCI 381	Biomaterials in Regenerative Medicine
MATSCI 382	Biochips and Medical Imaging

Chemical Engineering (10 units minimum)

CHEM 171	Physical Chemistry I
CHEMENG 130	Separation Processes
CHEMENG 140	Micro and Nanoscale Fabrication Engineering
CHEMENG 150	Biochemical Engineering
CHEMENG 160	Polymer Science and Engineering

Chemistry (10 units minimum)

CHEM 151	Inorganic Chemistry I
CHEM 153	Inorganic Chemistry II
CHEM 171	Physical Chemistry I
CHEM 173	Physical Chemistry II
CHEM 175	Physical Chemistry III
CHEM 181	Biochemistry I
CHEM 183	Biochemistry II
CHEM 185	Biochemistry III

Electronics & Photonics (10 units minimum)

EE 101A	Circuits I
EE 101B	Circuits II
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
EE 116	Semiconductor Device Physics
EE 134	Introduction to Photonics
EE 136	Introduction to Nanophotonics and Nanostructures
EE 142	Engineering Electromagnetics (Formerly EE 141)
MATSCI 343	Organic Semiconductors for Electronics and Photonics

Energy Technology (10 units minimum)

EE 293B	Fundamentals of Energy Processes
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
MATSCI 302	Solar Cells
MATSCI 303	Principles, Materials and Devices of Batteries
ME 260	Fuel Cell Science and Technology

Materials Characterization Techniques (10 units minimum)

MATSCI 320	Nanocharacterization of Materials
MATSCI 321	Transmission Electron Microscopy
MATSCI 322	Transmission Electron Microscopy Laboratory
MATSCI 323	Thin Film and Interface Microanalysis
MATSCI 326	X-Ray Science and Techniques

Mechanical Behavior & Design (10 units minimum)

AA 240A	Analysis of Structures
AA 240B	Analysis of Structures
AA 256	Mechanics of Composites
MATSCI 198	Mechanical Properties of Materials
MATSCI 358	Fracture and Fatigue of Materials and Thin Film Structures
ME 80	Mechanics of Materials
or CEE 101A	Mechanics of Materials
ME 203	Design and Manufacturing
ME 294	Medical Device Design

Nanoscience (10 units minimum)

BIOE 333	Interfacial Phenomena and Bionanotechnology
EE 136	Introduction to Nanophotonics and Nanostructures
ENGR 240	Introduction to Micro and Nano Electromechanical Systems
MATSCI 316	Nanoscale Science, Engineering, and Technology
MATSCI 320	Nanocharacterization of Materials
MATSCI 346	Nanophotonics
MATSCI 347	Introduction to Magnetism and Magnetic Nanostructures
MATSCI 380	Nano-Biotechnology

Physics (10 units minimum)

PHYSICS 70	Foundations of Modern Physics
PHYSICS 110	Advanced Mechanics
PHYSICS 120	Intermediate Electricity and Magnetism I
PHYSICS 121	Intermediate Electricity and Magnetism II
PHYSICS 130	Quantum Mechanics
PHYSICS 131	Quantum Mechanics II
PHYSICS 134	Advanced Topics in Quantum Mechanics
PHYSICS 170	Thermodynamics, Kinetic Theory, and Statistical Mechanics I
PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics II
PHYSICS 172	Solid State Physics

Self-Defined Option (10 units minimum)

Petition for a self-defined cohesive program.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

Mechanical Engineering (ME)

Completion of the undergraduate program in Mechanical Engineering leads to the conferral of the Bachelor of Science in Mechanical Engineering.

Mission of the Undergraduate Program in Mechanical Engineering

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of intellectual and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide array of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro-mechanics, and design. The program prepares students for entry-level work

as mechanical engineers and for graduate studies in either an engineering discipline or another field where a broad engineering background is useful.

Requirements

Mathematics

24 units minimum; see Basic Requirement 1 ¹		
CME 102/ENGR 155A	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	
Select one of the following:		3-5
CME 106/ENGR 155C	Introduction to Probability and Statistics for Engineers	
STATS 110	Statistical Methods in Engineering and the Physical Sciences	
STATS 116	Theory of Probability	
Plus additional courses to total min. 24		16

Science

20 units minimum; see Basic Requirement 2 ¹		
CHEM 31X	Chemical Principles Accelerated	5
or ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology	
Plus additional required courses ¹		15

Technology in Society

One course from approved SoE list; see Basic Requirement 4		3-5
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Engineering Fundamentals

Three courses minimum; see Basic Requirement 3 ²		
ENGR 40	Introductory Electronics	5
ENGR 70A	Programming Methodology (same as CS 106A)	5
Fundamentals Elective ²		3-5

Engineering Depth

Minimum of 68 Engineering Science and Design ABET units; see Basic Requirement 5		
ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ENGR 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking	4
ME 103D	Engineering Drawing and Design ³	1
ME 112	Mechanical Systems Design ⁴	4
ME 113	Mechanical Engineering Design	4
ME 131A	Heat Transfer	3-5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems ⁴	5
ME 161	Dynamic Systems, Vibrations and Control	4
ME 203	Design and Manufacturing ³	4

- ¹ Math and science must total 45 units.
 - Math: 24 units required and must include a course in differential equations (CME 102 Ordinary Differential Equations for Engineers or MATH 53 Ordinary Differential Equations with Linear Algebra; one of these required) and calculus-based Statistics (CME 106 Introduction to Probability and Statistics for Engineers or STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 116 is required).
 - Science: 20 units minimum and requires courses in calculus-based Physics and Chemistry, with at least a full year (3 courses) in one or the other. CHEM 31A Chemical Principles I/CHEM 31B Chemical Principles II are considered one course because they cover the same material as CHEM 31X Chemical Principles Accelerated but at a slower pace. CHEM 31X Chemical Principles Accelerated or ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology are recommended.
- ² ME Fundamental elective may not be a course counted for other requirements. Students may opt to use ENGR 14 Intro to Solid Mechanics, ENGR 15 Dynamics, or ENGR 30 Engineering Thermodynamics from the required depth courses as the third fundamental class. However, total units for Engineering Topics (Fundamentals + Depth) must be a minimum of 68 units; additional options courses may be required to meet unit requirements. ENGR 70A (CS 106A) must be taken for 5 units.
- ³ Courses ME 103D and ME 203 must be taken concurrently .
- ⁴ ME 112, ME 131A and ME 140 together fulfill the WIM requirement.

Options to complete the ME depth sequence: see the list of options in the ME major section of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Product Design (PD)

Completion of the undergraduate program in Product Design leads to the conferral of the Bachelor of Science in Engineering. The subplan "Product Design" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Product Design

The mission of the undergraduate program in Product Design is to graduate designers who can synthesize technology, human factors, and business factors in the service of human need. The program teaches a design process that encourages creativity, craftsmanship, aesthetics, and personal expression, and emphasizes brainstorming and need finding. The course work provides students with the skills necessary to carry projects from initial concept to completion of working prototypes. Students studying product design follow the basic mechanical engineering curriculum and are expected to meet the University requirements for a Bachelor of Science degree. The program prepares students for careers in industry and for graduate study.

Conferral of the undergraduate program in Product Design leads to the conferral of the Bachelor of Science in Engineering. The subplan "Product Design" appears on the transcript and on the diploma.

Requirements

	Units
Mathematics and Science	43
	minimum
Mathematics	20
20 units minimum	
Recommended: one course in Statistics	
Science	23
	units
	minimum

23 units minimum: 8 units of social science (inc PSYCH 1) and 15 units must be from School of Engineering approved list ¹

PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 45	Light and Heat	4
PSYCH 1	Introduction to Psychology	5
PSYCH elective from courses numbered 30-200 ¹		3-5

Technology in Society

Choose one from SoE Approved TiS Courses list at <ughb.stanford.edu>.

Engineering Fundamentals

11 units minimum

ENGR 40	Introductory Electronics	3-5
or ENGR 40A	Introductory Electronics	
or ENGR 40M	An Intro to Making: What is EE	
ENGR 70A	Programming Methodology	5
Fundamentals Elective ²		3-4

Product Design Engineering Depth

55 units minimum

Three Art Studio courses numbered 100 or higher		12
ENGR 14	Intro to Solid Mechanics ³	4
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking ³	4
ME 103D	Engineering Drawing and Design ⁴	1
ME 110	Design Sketching	2
ME 112	Mechanical Systems Design ⁵	4
ME 115A	Introduction to Human Values in Design	3
ME 115B	Product Design Methods	3
ME 115C	Design and Business Factors ⁶	3
ME 203	Design and Manufacturing ⁴	4
ME 216A	Advanced Product Design: Needfinding	4
ME 216B	Advanced Product Design: Implementation 1	4
ME 216C	Advanced Product Design: Implementation 2	4

¹ School of Engineering approved science list available at <http://ughb.stanford.edu>. If the Psychology elective was taken prior to the requirement being increased to 3 units minimum in 2012-13, student will be short 1 unit in Science/Behavioral Science; this is approved without petition.

² Select one of the following: ENGR 10, ENGR 15, ENGR 20, ENGR 25B or ENGR 25E, ENGR 30, ENGR 50 or ENGR 50E or ENGR 50M, ENGR 60, ENGR 62, ENGR 90. Note that CS 106B or CS 106X are not allowed to fulfill elective.

³ If ENGR 14 and/or ME 110 were taken prior to the courses being offered for 4 units, depth total may be reduced by 1-2 units with no petition required.

⁴ ME 103D and ME 203 should be taken concurrently.

⁵ ME 112 meets the Writing in the Major (WIM) requirement for Product Design.

⁶ ME 115C is the only course that can be waived if student takes a quarter overseas. Students should plan their overseas quarter to take place in Sophomore year, or Spring Quarter of the junior year only. Total depth units are reduced by 3; this is approved without petition.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Mission

The Joint Major provides a unique opportunity to gain mastery in two disciplines: Computer Science and a selected humanities field. Unlike the double major or dual major, the Joint Major emphasizes integration of the two fields through a cohesive, transdisciplinary course of study and integrated capstone experience. The Joint Major not only blends the intellectual traditions of two Stanford departments-it does so in a way that reduces the total unit requirement for each major.

Computer Science Major Requirements in the Joint Major Program

(See the respective humanities department Joint Major Program section of this bulletin for details on humanities major requirements.)

The CS requirements for the Joint Major follow the CS requirements for the CS-BS degree with the following exceptions:

- Two of the depth electives are waived. The waived depth electives are listed below for each CS track.
- The Senior Project is fulfilled with a joint capstone project. The student enrolls in CS191 or 191W (3 units) during the senior year. Depending on the X department, enrollment in an additional Humanities capstone course may also be required. But, at a minimum, 3 units of CS191 or 191W must be completed.
- There is no double-counting of units between majors. If a course is required for both the CS and Humanities majors, the student will work with one of the departments to identify an additional course - one which will benefit the academic plan - to apply to that major's total units requirement.
- For CS, WIM can be satisfied with CS181W or CS191W.

Depth Electives for CS Tracks for students completing a Joint Major:

Artificial Intelligence Track:

One Track Elective (rather than three).

Biocomputation Track:

One course from the BMC Informatics elective list (see <http://bmc.stanford.edu> and select Informatics from the elective options), plus one course from either the general CS electives list, BIOE 101, or the list of BMC Informatics electives.

Computer Engineering Track:

- EE 108A and 108B
 - One of the following: EE 101A, 101B, 102A, 102B
 - Satisfy the requirements of one of the following concentrations:
1. Digital Systems Concentration: CS 140 or 143; EE 109, 271; plus one of CS 140 or 143 (if not counted above), 144, 149, 240E, 244; EE 273, 282
 2. Robotics and Mechatronics Concentration: CS 205A, 223A; ME 210; ENGR 105
 3. Networking Concentration: CS 140, 144; plus two of the following, CS 240, 240E, 244, 244B, 244E, 249A, 249B, EE 179, EE 276

Graphics Track:

No Track Electives required (rather than two)

HCI Track:

No Track Electives required (rather than two)

Information Track:

One Track Elective (rather than three)

Systems Track:

One Track Elective (rather than three)

Theory Track:

One Track Elective (rather than three)

Unspecialized Track:

No Track Electives required (rather than two)

Individually Designed Track:

Proposals should include a minimum of five (rather than seven) courses, at least four of which must be CS courses numbered 100 or above.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentervicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in the School of Engineering

An undergraduate minor in some Engineering programs may be pursued by interested students; see the Handbook for Undergraduate Engineering Programs, or consult with a department's undergraduate program representative or the Office of Student Affairs, Huang Engineering Center, Suite 135.

General requirements and policies for a minor in the School of Engineering are:

1. A set of courses totaling not less than 20 and not more than 36 units, with a minimum of six courses of at least 3 units each. These courses must be taken for a letter grade except where letter grades are not offered, and a minimum GPA of 2.0 within the minor course list must be maintained (departments may require a higher GPA if they choose).
2. The set of courses should be sufficiently coherent as to present a body of knowledge within a discipline or subdiscipline.
3. Prerequisite mathematics, statistics, or science courses, such as those normally used to satisfy the school's requirements for a department major, may not be used to satisfy the requirements of the minor; conversely, engineering courses that serve as prerequisites for subsequent courses must be included in the unit total of the minor program.
4. Courses used for the major and/or minor core must not be duplicated within any other of the student's degree programs; that is, students may not overlap (double-count) courses for completing major and minor requirements except in the case of prerequisite courses as noted in #3.

Departmentally based minor programs are structured at the discretion of the sponsoring department, subject only to requirements 1, 2, 3, and 4 above. Interdisciplinary minor programs may be submitted to the Undergraduate Council for approval and sponsorship. A general Engineering minor is not offered.

Aeronautics and Astronautics (AA) Minor

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements for the minor are described in detail below. Courses cannot be double-counted within a major and a minor, or within multiple minors; if necessary, the Aero/Astro adviser can help select substitute courses to fulfill the AA minor core.

The following core courses fulfill the minor requirements:

		Units
AA 100	Introduction to Aeronautics and Astronautics	3
ENGR 14	Intro to Solid Mechanics *	4
ENGR 15	Dynamics *	4
ENGR 30	Engineering Thermodynamics *	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer ¹	3-5
Two courses from one of the upper-division elective areas below (min. 6 units)		
Plus one course from a second area below (min. 3 units)		9-11
Aerospace Systems Synthesis/Design		
AA 236A	Spacecraft Design	
& AA 236B	and Spacecraft Design Laboratory	

AA 241A Introduction to Aircraft Design, Synthesis, and
& AA 241B Analysis
and Introduction to Aircraft Design, Synthesis, and
Analysis

AA 284B Propulsion System Design Laboratory

Dynamics and Controls

AA 242A Classical Dynamics

AA 203 Introduction to Optimal Control Theory

AA 222 Introduction to Multidisciplinary Design
Optimization

AA 271A Dynamics and Control of Spacecraft and Aircraft

ENGR 105 Feedback Control Design

ENGR 205 Introduction to Control Design Techniques

Fluids

AA 200 Applied Aerodynamics

AA 201A Fundamentals of Acoustics

AA 210A Fundamentals of Compressible Flow

AA 214A Introduction to Numerical Methods for Engineering

or CME 206 Introduction to Numerical Methods for Engineering

AA 283 Aircraft and Rocket Propulsion

ME 131B Fluid Mechanics: Compressible Flow and
Turbomachinery

ME 140 Advanced Thermal Systems

Structures

AA 240A Analysis of Structures

AA 240B Analysis of Structures

AA 256 Mechanics of Composites

AA 280 Smart Structures

ME 335A Finite Element Analysis

* ENGR 14 Intro to Solid Mechanics, ENGR 15 Dynamics, or ENGR 30 Engineering Thermodynamics are waived as minor requirements if already taken as part of the major.

¹ AA minors take ME 131 for 3 units

Chemical Engineering (CHE) Minor

The following core courses fulfill the minor requirements:

	Units
ENGR/ CHEMENG 20 Introduction to Chemical Engineering	3
CHEMENG 100 Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110 Equilibrium Thermodynamics	3
CHEMENG 120A Fluid Mechanics	4
CHEMENG 120B Energy and Mass Transport	4
CHEMENG 170 Kinetics and Reactor Design	3
CHEMENG 185A Chemical Engineering Laboratory A	4
CHEM 171 Physical Chemistry I	3
CHEMENG 180 Chemical Engineering Plant Design	4
Select one of the following:	3
CHEMENG 140 Micro and Nanoscale Fabrication Engineering	
CHEMENG 142 Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations	
CHEMENG 160 Polymer Science and Engineering	

CHEMENG
162 Polymers for Clean Energy and Water

CHEMENG
174 Environmental Microbiology I

CHEMENG
181 Biochemistry I

Total Units

34

Civil Engineering (CE) Minor

The civil engineering minor is intended to give students a focused introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Architectural Design, Construction Engineering and Management, and Structural and Geotechnical Engineering. Students interested in Environmental and Water Studies should refer to the Environmental Systems Engineering minor.

The minimum prerequisite for a civil engineering minor is MATH 42 Calculus (or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. The minimum prerequisite for a Civil Engineering minor focusing on architectural design is MATH 41 Calculus (or MATH 19 Calculus) and a course in Statistics. Students should recognize that a minor in civil engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, and the field itself is so broad, no single set of course requirements will be appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information, including example minor programs, are provided on the CEE web site (http://cee.stanford.edu/prospective/undergrad/minor_overview.html) and in Chapter 6 of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

General guidelines are:

1. A civil engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
2. The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are given on the CEE webpage.

Professor Anne Kiremidjian (kiremidjian@stanford.edu) is the CEE undergraduate minor adviser in Structural Engineering and Construction Engineering and Management. John Barton (jhbarton@stanford.edu), Program Director for Architectural Design, is the undergraduate minor adviser in Architectural Design. Students must consult the appropriate adviser when developing their minor program, and obtain approval of the finalized study list from them.

Computer Science (CS) Minor

The following core courses fulfill the minor requirements. Prerequisites include the standard mathematics sequence through MATH 51.

Introductory Programming (AP Credit may be used to fulfill this requirement):

CS 106B or CS 106X	Programming Abstractions Programming Abstractions (Accelerated)	5
Core:		
CS 103	Mathematical Foundations of Computing	5
CS 107	Computer Organization and Systems	5

CS 109	Introduction to Probability for Computer Scientists	5
Electives (choose two courses from different areas):		
Artificial Intelligence—		
CS 124	From Languages to Information	4
CS 221	Artificial Intelligence: Principles and Techniques	4
CS 229	Machine Learning	3-4
Human-Computer Interaction—		
CS 147	Introduction to Human-Computer Interaction Design	4
Software—		
CS 108	Object-Oriented Systems Design	4
CS 110	Principles of Computer Systems	5
Systems—		
CS 140	Operating Systems and Systems Programming	4
CS 143	Compilers	4
CS 144	Introduction to Computer Networking	4
CS 145	Introduction to Databases	4
CS 148	Introduction to Computer Graphics and Imaging	4
Theory—		
CS 154	Introduction to Automata and Complexity Theory	4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	5

Note: for students with no programming background and who begin with CS 106A, the minor consists of seven courses.

Electrical Engineering (EE) Minor

The options for completing a minor in EE are outlined below. Students must complete a minimum of 23-25 units, as follows:

Select one of the following courses:	Units
EE 65 Modern Physics for Engineers	5
ENGR 40 Introductory Electronics	
ENGR 40M An Intro to Making: What is EE	
ENGR 40P/EE Physics of Electrical Engineering	
41	
Select one of the following options:	8
Option I:	
EE 101A Circuits I	
EE 101B Circuits II	
Option II:	
EE 102A Signal Processing and Linear Systems I	
EE 102B Signal Processing and Linear Systems II	
Option III:	
EE 108 Digital System Design	
EE 180 Digital Systems Architecture	

In addition, four letter-graded EE or Related courses at the 100-level or higher must be taken (12 units minimum). CS 107 is required as a prerequisite for EE 180, but can count as one of the four classes.

Environmental Systems Engineering (EnvSE) Minor

The Environmental Systems Engineering minor is intended to give students a focused introduction to one or more areas of Environmental Systems Engineering. Departmental expertise and undergraduate course offerings are available in the areas of environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The minimum prerequisite for an Environmental Systems Engineering minor

is MATH 42 Calculus (or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. Students should recognize that a minor in Environmental Systems Engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining an environmental systems engineering minor, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information on preparing a minor program is available in the Undergraduate Engineering Handbook (<http://ughb.stanford.edu>).

General guidelines are—

- An Environmental Systems Engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
- The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are available on the CEE web site (http://cee.stanford.edu/prospective/undergrad/minor_overview.html).

Professor Lynn Hildemann (hildemann@stanford.edu) is the CEE undergraduate minor adviser in Environmental Systems Engineering. Students must consult with Professor Hildemann in developing their minor program, and obtain approval of the finalized study list from her.

Management Science and Engineering (MS&E) Minor

The following courses are required to fulfill the minor requirements:

	Units
Select one of the following courses:	5
Background requirements (two courses)	
CME 100 Vector Calculus for Engineers	5
or MATH 51 Linear Algebra and Differential Calculus of Several Variables	
CS 106A Programming Methodology	5
Minor requirements (seven courses, letter-graded)	
MSE 111 Introduction to Optimization	4
MSE 120 Probabilistic Analysis	5
MSE 121 Introduction to Stochastic Modeling	4
MSE 125 Introduction to Applied Statistics	4
MSE 180 Organizations: Theory and Management	4
Electives (select any two 100- or 200-level MS&E courses)	6
Recommended courses	
In addition to the required background and minor courses, it is recommended that students also take the following courses.	
ECON 50 Economic Analysis I	5
MSE 140 Accounting for Managers and Entrepreneurs (may be used as one of the required electives above)	2-4
or MSE 140X Financial Accounting Concepts and Analysis	

Materials Science and Engineering (MATSCI) Minor

A minor in Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain an understanding of the fundamental processes that govern materials behavior.

The following courses fulfill the minor requirements:

	Units
Engineering Fundamentals	

Select one of the following:	4
ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E Introduction to Materials Science, Energy Emphasis	
ENGR 50M Introduction to Materials Science, Biomaterials Emphasis	
Materials Science Fundamentals and Engineering Depth	
Select six of the following:	24
MATSCI 151 Microstructure and Mechanical Properties	
MATSCI 152 Electronic Materials Engineering	
MATSCI 153 Nanostructure and Characterization	
MATSCI 154 Thermodynamic Evaluation of Green Energy Technologies	
MATSCI 155 Nanomaterials Synthesis	
MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
MATSCI 157 Quantum Mechanics of Nanoscale Materials	
MATSCI 160 Nanomaterials Laboratory	
MATSCI 161 Nanocharacterization Laboratory	
MATSCI 162 X-Ray Diffraction Laboratory	
MATSCI 163 Mechanical Behavior Laboratory	
MATSCI 164 Electronic and Photonic Materials and Devices Laboratory	
MATSCI 165 Nanoscale Materials Physics Computation Laboratory	
MATSCI 190 Organic and Biological Materials	
MATSCI 192 Materials Chemistry	
MATSCI 193 Atomic Arrangements in Solids	
MATSCI 194 Thermodynamics and Phase Equilibria	
MATSCI 195 Waves and Diffraction in Solids	
MATSCI 196 Defects in Crystalline Solids	
MATSCI 197 Rate Processes in Materials	
MATSCI 198 Mechanical Properties of Materials	
MATSCI 199 Electronic and Optical Properties of Solids	
Total Units	28

Mechanical Engineering (ME) Minor

The following courses fulfill the minor requirements:

General Minor *

ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ENGR 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 101	Visual Thinking	4
Plus two of the following:		8-9
ME 80	Mechanics of Materials	
ME 131A	Heat Transfer	
ME 161	Dynamic Systems, Vibrations and Control	
ME 203	Design and Manufacturing	

Thermosciences Minor **

ENGR 14	Intro to Solid Mechanics	4
ENGR 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4

ME 131A	Heat Transfer	5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems	5

Mechanical Design Minor ***

ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking	4
ME 112	Mechanical Systems Design	4
ME 203	Design and Manufacturing	4

Plus one of the following: 3-4

ME 113 Mechanical Engineering Design

ME 210 Introduction to Mechatronics

ME 220 Introduction to Sensors

Total Units **79-81**

* This minor aims to expose students to the breadth of ME in terms of topics and analytic and design activities. Prerequisites: MATH 41 Calculus, MATH 42 Calculus, and PHYSICS 41 Mechanics.

** Prerequisites: MATH 41 Calculus, MATH 42 Calculus, MATH 51 Linear Algebra and Differential Calculus of Several Variables (or CME 100 Vector Calculus for Engineers) and PHYSICS 41 Mechanics.

*** This minor aims to expose students to design activities supported by analysis. Prerequisites: MATH 41 Calculus, PHYSICS 42 Classical Mechanics Laboratory, and PHYSICS 41 Mechanics.

Master of Science in the School of Engineering

The M.S. degree is conferred on graduate students in engineering according to the University regulations stated in the "Graduate Degrees (p. 43)" section of this bulletin, and is described in the various department listings. A minimum of 45 units is usually required in M.S. programs in the School of Engineering. The presentation of a thesis is not a school requirement. Further information is found in departmental listings.

Master of Science in Engineering

The M.S. in Engineering is available to students who wish to follow an interdisciplinary program of study that does not conform to a normal graduate program in a department. There are three school requirements for the M.S. degree in Engineering:

Units

1. The student's program must be a coherent one with a well-defined objective and must be approved by a department within the school which has experience with graduate-level teaching and advising in the program area.
2. The student's program must include at least 21 units of courses within the School of Engineering with catalog numbers of 200 or above in which the student receives letter grades.
3. The program must include a total of at least 45 units.

Each student's program is administered by the particular department in which it is lodged and must meet the standard of quality of that department. Transfer into this program is possible from any graduate program by application through the appropriate department; the department then recommends approval to the Office of Student Affairs in the School of Engineering. The application should be submitted before completing 18 units of the proposed program; it should include a statement describing the objectives of the program, the coherence of the proposed course work, and why this course of study cannot conform to existing graduate programs.

Normally, it would include the approval of at least one faculty member willing to serve as adviser. (A co-advising team may be appropriate for interdisciplinary programs.) The actual transfer is accomplished through the Graduate Authorization Petition process.

Engineer in the School of Engineering

The degree of Engineer is intended for students who want additional graduate training beyond that offered in an M.S. program. The program of study must satisfy the student's department and must include at least 90 units beyond the B.S. degree. The presentation of a thesis is required. The University regulations for the Engineer degree are stated in the "Graduate Degrees (p. 43)" section of this bulletin, and further information is available in the individual departmental sections of this bulletin.

Doctor of Philosophy in the School of Engineering

Programs leading to the Ph.D. degree are offered in each of the departments of the school. University regulations for the Ph.D. are given in the "Graduate Degrees (p. 43)" section of this bulletin. Further information is found in departmental listings.

Honors Cooperative Program

Industrial firms, government laboratories, and other organizations may participate in the Honors Cooperative Program (HCP), a program that permits qualified engineers, scientists, and technology professionals admitted to Stanford graduate degree programs to register for Stanford courses and obtain the degree on a part-time basis. In many areas of concentration, the master's degree can be obtained entirely online.

Through this program, many graduate courses offered by the School of Engineering on campus are made available through the Stanford Center for Professional Development (SCPD). SCPD delivers more than 250 courses a year online. For HCP employees who are not part of a graduate degree program at Stanford, courses and certificates are also available through a non-degree option (NDO) and a non-credit professional education program. Non-credit short courses may be customized to meet a company's needs. For a full description of educational services provided by SCPD, see <http://scpd.stanford.edu>; call (650) 725-3000; fax (650) 725-2868; or email scpd-registration@stanford.edu.

Dean: Persis Drell

Senior Associate Deans: Laura L. Breyfogle (External Relations), Scott Calvert (Administration), Bernd Girod (Online Learning & Professional Development), Thomas Kenny (Student Affairs), Jennifer Widom (Faculty and Academic Affairs)

Associate Dean: Noé P. Lozano (Diversity Programs)

Assistant Dean: Sally Gressens (Graduate Student Affairs)

Faculty Teaching General Engineering Courses

Professors: Chris Edwards, Mark Horowitz, Chaitan Khosla, Sanjay Lall, Parviz Moin, Eric Roberts, Stephen M. Rock, Sheri Sheppard, Robert Sinclair, James Swartz, Hai Wang

Associate Professors: Drew Endy, Sarah Heilshorn, Thomas Jaramillo, Jan Liphardt, Nick Melosh, Allison Okamura, Amin Saberi, Thomas Jaramillo, Xiaolin Zheng

Assistant Professors: Chuck Easley, Werner Ihme, Sindy Tang,

Professors (Teaching): Thomas H. Byers, Robert McGinn, Mehran Sahami

Senior Lecturers: Vadim Khayms

Lecturers: Abbas Emami-Naeini, Jeff Epstein, David Evans, Rebeca Hwang, David Jaffe, Thomas Kosnik, Cynthia Bailey Lee, Hung Le, Adam Leeper, Paul Mitiguy, Keith Schwarz, Marty Stepp, Jeremy Utley, Matt Vassar

Emeritus Faculty: George M. Homsy

Other Teaching: William Behrman, Jesse Benck, Steve Blank, Robyn Dunbar, Larry Lagerstrom, Mark McClure, Mary McDevitt, Michael T. Padilla, Bernard Roth

Overseas Studies Courses in Engineering

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 40B	Introductory Electronics	5
OSPBER 50M	Introductory Science of Materials	4
OSPFLOR 50M	Introductory Science of Materials	4
OSPKYOTO 40K	Introductory Electronics	5
OSPPARIS 40P	Introductory Electronics	5
OSPPARIS 50M	Introductory Science of Materials	4

Aeronautics and Astronautics

Courses offered by the Department of Aeronautics and Astronautics are listed under the subject code AA on the (<https://explorecourses.stanford.edu/search?filter-term=Autumn=on&filter-catalognumber-AA=on&filter-term=Summer=on&page=0&q=AA&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on&catalog=71>) *Stanford Bulletin's* ExploreCourses web site.

The Department of Aeronautics and Astronautics prepares students for professional positions in industry, government, and academia by offering a comprehensive program of graduate teaching and research. In this broad program, students have the opportunity to learn and integrate multiple engineering disciplines. The program emphasizes structural, aerodynamic, guidance and control, and propulsion problems of aircraft and spacecraft. Courses in the teaching program lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy. Undergraduates and doctoral students in other departments may also elect a minor in Aeronautics and Astronautics.

Requirements for all degrees include courses on basic topics in Aeronautics and Astronautics, as well as in mathematics, and related fields in engineering and the sciences.

The current research and teaching activities cover a number of advanced fields, with emphasis on:

- Aeroelasticity and Flow Simulation
- Aircraft Design, Performance, and Control
- Applied Aerodynamics
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Computational Mechanics and Dynamical Systems
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Materials and Structures
- Direct and Large-Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hybrid Propulsion
- Hypersonic and Supersonic Flow
- Micro and Nano Systems and Materials
- Multidisciplinary Design Optimization
- Navigation Systems (especially GPS)
- Optimal Control, Estimation, System Identification
- Sensors for Harsh Environments
- Space Debris Characterization
- Space Environment Effects on Spacecraft
- Space Plasmas
- Spacecraft Design and Satellite Engineering
- Turbulent Flow and Combustion

Mission of the Undergraduate Program in Aeronautics and Astronautics

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, space exploration, air and space-based telecommunication industries, teaching, research, military service, and many related technology-intensive fields.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work which provides a solid grounding in the basic disciplines, including fluid mechanics, dynamics and control, propulsion, structural mechanics, and applied or computational mathematics, and course work or supervised research which provides depth and breadth in the student's area of specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Aeronautics and Astronautics and related fields.

Graduate Programs in Aeronautics and Astronautics Admission

To be eligible to apply for admission to the department, a student must have a bachelor's degree in engineering, physical science, mathematics, or an acceptable equivalent. Students who have not yet received a master's degree in a closely allied discipline will be admitted to the master's program; eligibility for the Ph.D. program is considered after the master's year (see "Doctor of Philosophy"). Applications for admission with financial aid (fellowships or assistantships) or without financial aid must be received and completed by December 2 for the next Autumn Quarter.

Information about admission to the Honors Cooperative Program is included in the "School of Engineering" section of this bulletin. The department may consider HCP applications for Winter or Spring quarters as well as for Autumn Quarter; prospective applicants should contact the department's student services office.

Further information and application forms for all graduate degree programs may be obtained from Graduate Admissions, the Registrar's Office, <http://gradadmissions.stanford.edu>.

Waivers and Transfer Credits

Waivers of the Basic Courses required for the M.S. degree in Aeronautics and Astronautics can only be granted by the instructor of that course. Students who believe that they have had a substantially equivalent course at another institution should consult with the course instructor to determine if they are eligible for a waiver, and with their adviser to judge the effect on their overall program plans. To request a waiver, students should fill out a Petition for Waiver form (reverse side of the department's program proposal) and have it approved by the instructor and their adviser. One additional technical elective must be added for each Basic Course that is waived.

A similar procedure should be followed for transfer credits. The number of transfer credits allowed for each degree (Engineer and Ph.D.) is delineated in the "Graduate Degrees" section of this bulletin; transfer credit is not accepted for the M.S. degree. Transfer credit is allowed only for courses taken as a graduate student, after receiving a bachelor's degree, in which equivalence to Stanford courses is established and for which a grade of 'B' or better has been awarded. Transfer credits, if approved, reduce the total number of Stanford units required for a degree.

Fellowships and Assistantships

Fellowships and course or research assistantships are available to qualified graduate students. Fellowships sponsored by Gift Funds, Stanford University, and Industrial Affiliates of Stanford University in Aeronautics and Astronautics provide grants to several first-year students for the nine-month academic year to cover tuition and living expenses. Stanford Graduate Fellowships, sponsored by the University, provide grants for three full years of study and research; each year, the department is invited to nominate several outstanding doctoral or predoctoral students for these prestigious awards. Students who have excelled in their master's-level course work at Stanford are eligible for course assistantships in the department; those who have demonstrated research capability are eligible for research assistantships from individual faculty members. Students may also hold assistantships in other departments if the work is related to their academic progress; the criteria for selecting course or research assistants are determined by each hiring department. A standard, 20 hours/week course or research assistantship provides a semi-monthly salary and an 8-10 unit

tuition grant per quarter. Research assistants may be given the opportunity of additional summer employment. They may use their work as the basis for a dissertation or Engineer's thesis.

Aeronautics and Astronautics Facilities

The work of the department is centered in the William F. Durand Building for Space Engineering and Science. This 120,000 square foot building houses advanced research and teaching facilities and concentrates in one complex the Department of Aeronautics and Astronautics. The Durand Building also houses faculty and staff offices and several conference rooms.

Through the department's close relations with nearby NASA-Ames Research Center, students and faculty have access to one of the best and most extensive collections of experimental aeronautical research facilities in the world, as well as the latest generation of supercomputers.

General Information

Further information about the facilities and programs of the department is available at <http://aa.stanford.edu>, or from the department's student services office.

The department has a student branch of the American Institute of Aeronautics and Astronautics, which sponsors programs and speakers covering aerospace topics and social events. It also conducts visits to nearby research, government, and industrial facilities, and sponsors a Young Astronauts Program in the local schools.

Bachelor of Science in Engineering (Aeronautics and Astronautics)

Although primarily a graduate-level department, the program offers an undergraduate major in Aeronautics and Astronautics (AA) leading to the B.S. degree in Engineering and an undergraduate minor in Aeronautics and Astronautics. For further information, see the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

Undergraduates interested in aerospace are encouraged to combine either a minor or a coterminal M.S. in Aeronautics and Astronautics with a major in a related discipline (such as Mechanical or Electrical Engineering). Students considering these options are encouraged to contact the department's student services office.

Aeronautics and Astronautics (AA)

Mission of the Undergraduate Program in Aeronautics and Astronautics

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of

materials, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, space exploration, air and space-based telecommunication industries, teaching, research, military service, and many related technology-intensive fields.

Completion of the undergraduate program in Aeronautics and Astronautics leads to the conferral of the Bachelor of Science in Engineering. The subplan "Aeronautics and Astronautics" appears on the transcript and on the diploma.

Requirements

		Units
Mathematics		
24 units minimum ¹		
MATH 41	Calculus (or AP Calculus)	5
MATH 42	Calculus (or AP Calculus)	5
CME 100/ENGR 154	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CME 102/ENGR 155A	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	
CME 106/ENGR 155C	Introduction to Probability and Statistics for Engineers (or STATS 110, STATS 116, CS 109)	4-5
or STATS 110	Statistical Methods in Engineering and the Physical Sciences	
or STATS 116	Theory of Probability	
or CS 109	Introduction to Probability for Computer Scientists	
Science		
19 units minimum		
PHYSICS 41	Mechanics (or AP Physics)	4
PHYSICS 43	Electricity and Magnetism (or AP Physics)	4
PHYSICS 45	Light and Heat	4
CHEM 31X	Chemical Principles Accelerated (or CHEM 31A +B, AP Chemistry)	4-5
or ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology	
Science elective ²		3-5
Technology in Society (one course required)		
3 units minimum ³		3-5
Engineering Fundamentals (three courses required)		
11 units minimum		
ENGR 30	Engineering Thermodynamics	3
ENGR 70A	Programming Methodology	5
Fundamentals Elective ⁴		3-5
Engineering Depth		
30 units minimum		
AA 100	Introduction to Aeronautics and Astronautics	3
AA 190	Directed Research and Writing in Aero/Astro	3-5
ME 70	Introductory Fluids Engineering	4
ENGR 14	Intro to Solid Mechanics	4
ME 131A	Heat Transfer	3
ENGR 15	Dynamics	4
ME 161	Dynamic Systems, Vibrations and Control	3-4
or PHYSICS 110	Advanced Mechanics	
CEE 101A	Mechanics of Materials	4
or ME 80	Mechanics of Materials	

Aero/Astro Depth	
18 units minimum	
Engineering Electives (two courses required) ⁵	6-10
See Course List AA-1 below for a list of options	
Depth Area I (two courses required) ⁶	6-10
See Course List AA-2 below for a list of options	
Depth Area II (two courses required) ⁶	6-10
See Course List AA-2 below for a list of options	
Total Units	103-126

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

- It is recommended that the CME series (100, 102, 104) be taken rather than the MATH series (51, 52, 53). If students take the MATH series, it is recommended to take MATH 51M Introduction to MATLAB for Multivariable Mathematics, offered Autumn Quarter.
- Courses that satisfy the Science elective are listed in Figure 3-2 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.
- Courses that satisfy the Technology in Society Requirement are listed in Figure 3-3 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.
- Courses that satisfy the Engineering Fundamentals elective are listed in Figure 3-4 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>. ENGR 70B or X (same as CS 106B or X) is not allowed to fulfill the third fundamentals requirement.
- Courses that satisfy the Engineering Electives are listed in Figure AA-1 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>, as well as Course List AA-1 below.
- Courses that satisfy the Depth Area choices are listed in Figure AA-2 in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>, as well as Course List AA-2 below.

		Units
AA-1. Engineering Electives: Two Courses Required		
AA 250	Nanomaterials for Aerospace	3
ENGR 240	Introduction to Micro and Nano Electromechanical Systems	3
ME 210	Introduction to Mechatronics	4
ME 220	Introduction to Sensors	3-4
ME 227	Vehicle Dynamics and Control	3
ME 250	Internal Combustion Engines	3-5
ME 257	Turbine and Internal Combustion Engines	3
ME 260	Fuel Cell Science and Technology	3
ME 324	Precision Engineering	4
ME 331A	Advanced Dynamics & Computation	3
ME 331B	Advanced Dynamics, Simulation & Control	3
ME 345	Fatigue Design and Analysis	3
ME 348	Experimental Stress Analysis	3
ME 351A	Fluid Mechanics	3
ME 351B	Fluid Mechanics	3
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	3
CS 107	Computer Organization and Systems	3-5
CS 110	Principles of Computer Systems	3-5
CS 140	Operating Systems and Systems Programming	3-4
CS 161	Design and Analysis of Algorithms	3-5
EE 102A	Signal Processing and Linear Systems I	4
EE 102B	Signal Processing and Linear Systems II	4
EE 101A	Circuits I	4

EE 101B	Circuits II	4
ENERGY 121	Fundamentals of Multiphase Flow	3
ENERGY 191	Optimization of Energy Systems	3-4
ENERGY 226	Thermal Recovery Methods	3
MATSCI 155	Nanomaterials Synthesis	4
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
MATSCI 197	Rate Processes in Materials	3-4
MATSCI 198	Mechanical Properties of Materials	3-4
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4

* It is recommended that students review prerequisites for all courses.

Units

AA-2. Depth Area: Four Courses Required, Two From Each of Two Areas

		Units
Dynamics and Controls		
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
AA 203	Introduction to Optimal Control Theory	3
AA 222	Introduction to Multidisciplinary Design Optimization	3-4
AA 242A	Classical Dynamics	3
AA 271A	Dynamics and Control of Spacecraft and Aircraft	3
Systems Design		
AA 236A	Spacecraft Design	3-5
AA 236B	Spacecraft Design Laboratory	3-5
AA 241A	Introduction to Aircraft Design, Synthesis, and Analysis	3
AA 241B	Introduction to Aircraft Design, Synthesis, and Analysis	3
AA 284B	Propulsion System Design Laboratory	3
Fluids and CFD		
AA 200	Applied Aerodynamics	3
AA 201A	Fundamentals of Acoustics	3
AA 210A	Fundamentals of Compressible Flow	3
AA 214A/CME 206/ME 300C	Introduction to Numerical Methods for Engineering	3
AA 283	Aircraft and Rocket Propulsion	3
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems	5
Structures		
AA 240A	Analysis of Structures	3
AA 240B	Analysis of Structures	3
AA 256	Mechanics of Composites	3
AA 280	Smart Structures	3
ME 335A	Finite Element Analysis	3

* It is recommended that students review prerequisites for all courses.

Aeronautics and Astronautics (AA) Minor

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements

for the minor are described in detail below. Courses cannot be double-counted within a major and a minor, or within multiple minors; if necessary, the Aero/Astro adviser can help select substitute courses to fulfill the AA minor core.

The following core courses fulfill the minor requirements:

		Units
AA 100	Introduction to Aeronautics and Astronautics	3
ENGR 14	Intro to Solid Mechanics *	4
ENGR 15	Dynamics *	4
ENGR 30	Engineering Thermodynamics *	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer	3
Two courses from one of the upper-division elective areas below (min. 6 units)		
Plus one course from a second area below (min. 3 units)		9-14
Aerospace Systems Synthesis/Design		
AA 236A	Spacecraft Design	
AA 236B	Spacecraft Design Laboratory	
AA 241A	Introduction to Aircraft Design, Synthesis, and Analysis	
AA 241B	Introduction to Aircraft Design, Synthesis, and Analysis	
AA 284B	Propulsion System Design Laboratory	
Dynamics and Controls		
ENGR 105	Feedback Control Design	
ENGR 205	Introduction to Control Design Techniques	
AA 203	Introduction to Optimal Control Theory	
AA 222	Introduction to Multidisciplinary Design Optimization	
AA 242A	Classical Dynamics	
AA 271A	Dynamics and Control of Spacecraft and Aircraft	
Fluids		
AA 200	Applied Aerodynamics	
AA 201A	Fundamentals of Acoustics	
AA 210A	Fundamentals of Compressible Flow	
AA 214A	Introduction to Numerical Methods for Engineering	
AA 283	Aircraft and Rocket Propulsion	
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	
ME 140	Advanced Thermal Systems	
Structures		
AA 240A	Analysis of Structures	
AA 240B	Analysis of Structures	
AA 256	Mechanics of Composites	
AA 280	Smart Structures	
ME 335A	Finite Element Analysis	
Total Units		30-35

* ENGR 14 Intro to Solid Mechanics, ENGR 15 Dynamics, or ENGR 30 Engineering Thermodynamics are waived as minor requirements if already taken as part of the major.

Coterminal Degrees Program in Aeronautics and Astronautics

This special program allows Stanford undergraduates an opportunity to work simultaneously toward a B.S. in another field and an M.S. in Aeronautics and Astronautics. General requirements for this program and admissions procedures are described in the "School of Engineering" section of this bulletin. Admission is granted or denied through the departmental faculty Admissions and Awards Committee. A coterminal student must meet the course and scholarship requirements detailed for the M.S. below.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

Master of Science in Aeronautics and Astronautics

The University's basic requirements for the master's degree are outlined in the "Graduate Degrees" section of this bulletin. Students with an aeronautical engineering background should be able to qualify for the master's degree in three quarters of work at Stanford. Students with a bachelor's degree in Physical Science, Mathematics, or other areas of Engineering may find it necessary to take certain prerequisite courses, which would lengthen the time required to obtain the master's degree. The following are departmental requirements.

Grade Point Averages

A minimum grade point average (GPA) of 2.75 is required to fulfill the department's M.S. degree requirements; a minimum GPA of 3.5 is required for eligibility to attempt the Ph.D. qualifying examination. It is incumbent upon both M.S. and potential Ph.D. candidates to request letter grades in all courses except those that do not offer a letter grade option and those that fall into the categories of colloquia and seminars (for example, ENGR 298 Seminar in Fluid Mechanics). Insufficient grade points on which to base the GPA may delay expected degree conferral or result in refusal of permission to take the qualifying examinations.

Course Requirements

The Master of Science (M.S.) program is a terminal degree program. It is based on the completion of lecture courses focused on a theme within the discipline of Aeronautics and Astronautics engineering. No thesis is required. No research is required.

The Master's degree program requires 45 quarter units of course work, which must be taken at Stanford. The course work is divided into four categories

- Basic Courses
- Mathematics Courses
- Technical Electives
- Other Electives

Basic Courses

M.S. candidates must select eight courses as follows:

Units

(I) Five courses in the basic areas of Aeronautics and Astronautics (one in each area):

Fluids		
AA 200	Applied Aerodynamics	3
AA 210A	Fundamentals of Compressible Flow	3
Structures		

AA 240A	Analysis of Structures	3
Guidance and Control		
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
Propulsion		
AA 283	Aircraft and Rocket Propulsion	3
Experimentation/Design Requirements (see courses under Related Courses tab above)		
(II) Three courses (one each from three of the four areas below)		
Fluids		
AA 200	Applied Aerodynamics	3
AA 210A	Fundamentals of Compressible Flow	3
AA 244A	Introduction to Plasma Physics and Engineering	3
Structures		
AA 240B	Analysis of Structures	3
AA 242B	Mechanical Vibrations	3
AA 256	Mechanics of Composites	3
AA 280	Smart Structures	3
Guidance and Control		
AA 242A	Classical Dynamics	3
AA 242B	Mechanical Vibrations	3
AA 251	Introduction to the Space Environment	3
AA 271A	Dynamics and Control of Spacecraft and Aircraft	3
AA 272C	Global Positioning Systems	3
AA 279A	Space Mechanics	3
One course selected from AA courses numbered 200 and above, excluding seminars and independent research		

Candidates who believe they have satisfied a basic course requirement in previous study may request a waiver of one or more courses (see "Waivers and Transfer Credits" in the "Graduate Programs in Aeronautics and Astronautics" section of this bulletin).

Mathematics Courses

M.S. candidates are expected to exhibit competence in applied mathematics. Students meet this requirement by taking a minimum of 6 units of either advanced mathematics offered by the Mathematics Department or technical electives that strongly emphasize applied mathematics. Common choices include:

- AA 214A Introduction to Numerical Methods for Engineering
- AA 214B Numerical Methods for Compressible Flows
- AA 214C Numerical Computation of Viscous Flow
- AA 215A Advanced Computational Fluid Dynamics
- AA 215B Advanced Computational Fluid Dynamics
- AA 218 Introduction to Symmetry Analysis
- AA 222 Introduction to Multidisciplinary Design Optimization

See the list of mathematics courses under Related Courses tab above for additional suggestions. All courses in the Mathematics Department numbered 200 or above are also included as suggestions.

Technical Electives

Students, in consultation with their advisers, select at least four courses (totaling at least 12 units) from among the graduate-level courses offered by departments of the School of Engineering and related science departments. Normally, one course (3 units) may be directed research.

Other Electives

It is recommended that all candidates enroll in a humanities or social sciences course to complete the 45-unit requirement. Practicing courses in, for example, art, music, and physical education do not qualify in this category. Language courses may qualify.

Master of Science in Engineering (AA)

Students whose career objectives require a more interdepartmental or narrowly focused program than is possible in the M.S. program in Aeronautics and Astronautics (AA) may pursue a program for an M.S. degree in Engineering (45 units). This program is described in the "Graduate Programs in the School of Engineering" section of this bulletin.

Sponsorship by the Department of Aeronautics and Astronautics in this more general program requires that the student file a proposal before completing 18 units of the proposed graduate program. The proposal must be accompanied by a statement explaining the objectives of the program and how the program is coherent, contains depth, and fulfills a well-defined career objective. The proposed program must include at least 12 units of graduate-level work in the department and meet rigorous standards of technical breadth and depth comparable to the regular AA Master of Science program. The grade and unit requirements are the same as for the M.S. degree in Aeronautics and Astronautics.

Engineer in Aeronautics and Astronautics

The degree of Engineer represents an additional year (or more) of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone. It is expected that full-time students will be able to complete the degree within two years of study after the master's degree.

The University's basic requirements for the degree of Engineer are outlined in the "Graduate Degrees" section of this bulletin. The following are department requirements.

The candidate's prior study program should have fulfilled the department's requirements for the master's degree or a substantial equivalent. Beyond the master's degree, a total of 45 units of work is required, including a thesis and a minimum of 30 units of courses chosen as follows:

1. 24 units of approved technical electives, of which 9 are in mathematics or applied mathematics. See the list of mathematics courses under Related Courses tab above. All courses in the Mathematics Department numbered 200 or above are included. The remaining 15 units are chosen in consultation with the adviser, and represent a coherent field of study related to the thesis topic. Suggested fields include: (a) acoustics, (b) aerospace structures, (c) aerospace systems synthesis and design, (d) analytical and experimental methods in solid and fluid mechanics, (e) computational fluid dynamics, and (f) guidance and control.
2. 6 units of free electives.
3. The remaining 15 units may be thesis, research, technical courses, or free electives.

Candidates for the degree of Engineer are expected to have a minimum grade point average (GPA) of 3.0 for work in courses beyond those required for the master's degree. All courses except seminars and directed research should be taken for a letter grade.

Doctor of Philosophy in Aeronautics and Astronautics

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 43)" section of this bulletin. Department requirements are stated below.

Qualifications for candidacy for the doctoral degree are contingent on:

1. Having fulfilled department requirements for the master's degree or its substantial equivalent.
2. Maintaining a high scholastic record for graduate course work.
3. Completing 3 units of a directed research problem (AA 290 Problems in Aero/Astro).
4. In the first year of doctoral study, passing an oral Ph.D. qualifying examination given by the department during Autumn and Spring quarters.

Detailed information about the deadlines, nature, and scope of the Ph.D. qualifying examination can be obtained from the department. Research on the doctoral dissertation may not be formally started before passing this examination.

Course Requirements

Each individual Ph.D. program in Aeronautics and Astronautics, designed by the student in consultation with the adviser, should represent a strong and cohesive program reflecting the student's major field of interest. A total of 90 units of work is required beyond the master's degree, including a minimum of 36 units of approved formal course work (excluding research, directed study, and seminars). The courses should consist primarily of graduate courses in engineering and related sciences. The remainder of the 90 units may be in the form of either Ph.D. dissertation units or free electives. For students who elect a minor in another department, a maximum of 12 units from the minor program may be included in the 36 units of formal course work; the remaining minor units may be considered free electives and are included in the 90 unit total required for the AA Ph.D. degree.

Ph.D. students in Aeronautics and Astronautics must take 12 units of mathematics courses, with at least 6 of these units from courses with numbers over 200. The AA department and other engineering departments offer many courses that have sufficient mathematical content that they may be used to satisfy the mathematics requirement. See the list of mathematics courses under Related Courses tab above for suggestions. Others may be acceptable if approved by the adviser and the AA Student Services Office. University requirements for continuous registration apply to doctoral students for the duration of the degree.

Candidacy

Ph.D. students must complete the candidacy process and be admitted to candidacy by their second year of doctoral study. There are two requirements for admission to Ph.D. candidacy in Aeronautics and Astronautics: students must first pass the departmental qualifying exam and must then submit an application for candidacy. Detailed deadlines for the qualifying exam may be obtained from the AA Student Services Office. The candidacy form lists the courses the student will take to fulfill the requirements for the degree. The form must include the 90 non-MS units required for the Ph.D.; it should be signed by the adviser and submitted to the AA Student Services Office for the candidacy chairman's signature. AA has a department-specific candidacy form, which may be obtained in the AA Student Services Office. Candidacy is valid for five years; this term is not affected by leaves of absence.

Dissertation Reading Committee

Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. qualifying exam. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

A dissertation reading committee consists of the principal dissertation adviser and at least two other readers. If the principal adviser is emeritus, there should be a non-emeritus co-adviser. Reading committees in Aeronautics and Astronautics often include faculty from another department. It is expected that at least two members of the AA faculty be on each reading committee. If the principal research adviser is not within the AA department, then the student's AA academic adviser should be one of those members. The initial committee, and any subsequent changes, must be approved by the department Chair.

Although all readers are usually members of the Stanford Academic Council, the department Chair may approve one non-Academic Council reader if the person brings unusual and necessary expertise to the dissertation research. Generally, this non-Academic Council reader will be a fourth reader, in addition to three Academic Council members.

University Oral and Dissertation

The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four faculty examiners, plus a chairman). The examiners usually include the three members on the student's Ph.D. reading committee. The chairman must not be in the same department as the student or the adviser. Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. Forms for the University oral scheduling and a one-page dissertation abstract should be submitted to the AA Student Services Office at least three weeks prior to the date of the oral for departmental review and approval. Students must be enrolled during the quarter when they take their University oral. If the oral takes place during the vacation time between quarters, the student must be enrolled in the prior quarter.

Ph.D. Minor in Aeronautics and Astronautics

A student who wishes to obtain a Ph.D. minor in Aeronautics and Astronautics should consult the department office for designation of a minor adviser. A minor in Aeronautics and Astronautics may be obtained by completing 20 units of graduate-level courses in the Department of Aeronautics and Astronautics, following a program (and performance) approved by the department's candidacy chair.

The student's Ph.D. reading committee and University oral committee must each include at least one faculty member from Aeronautics and Astronautics.

Emeriti: (Professors) Arthur E. Bryson, Robert H. Cannon, Richard Christensen*, Daniel B. DeBra*, Robert W. MacCormack, Bradford W. Parkinson*, J. David Powell, George S. Springer, Charles R. Steele, Stephen W. Tsai*, Walter G. Vincenti

Chair: Charbel Farhat

Professors: Brian J. Cantwell, Fu-Kuo Chang, Per Enge, Charbel Farhat, Sanjiva Lele, Stephen Rock

Research Professors: Antony Jameson, Ilan Kroo

Associate Professors: Juan Alonso, Sanjay Lall

Assistant Professors: Sigrid Close, Simone D'Amico, Mykel Kochenderfer, Marco Pavone, Debbie Senesky

Courtesy Professors: J. Christian Gerdes, Ronald K. Hanson, Lambertus Hesselink

Consulting Professors: G. Scott Hubbard

Consulting Assistant Professor: Andrew Barrows, Andrew Kalman, Steven Murray, Frank Van Diggelen

* Recalled to active duty.

Experimentation/Design Requirements Courses

The following courses satisfy the master's Experimentation/Design Requirements.

		Units
AA 236A	Spacecraft Design	3-5
AA 241X	Design, Construction, and Testing of Autonomous Aircraft	3
AA 284B	Propulsion System Design Laboratory	3
CS 225A	Experimental Robotics	3
CS 402L	Beyond Bits and Atoms - Lab	1-3
EE 133	Analog Communications Design Laboratory	3-4
EE 233	Analog Communications Design Laboratory	3-4
EE 234	Photonics Laboratory	3
EE 265	Digital Signal Processing Laboratory	3-4
EE 345	Optical Fiber Communication Laboratory	3
EE 410	Integrated Circuit Fabrication Laboratory	3-4
EE 412	Advanced Nanofabrication Laboratory	3
ENGR 206	Control System Design	3-4
ENGR 207A	Linear Control Systems I	3
ENGR 341	Micro/Nano Systems Design and Fabrication	3-5
MATSCI 160	Nanomaterials Laboratory	4
MATSCI 161	Nanocharacterization Laboratory	3-4
MATSCI 162	X-Ray Diffraction Laboratory	3-4
MATSCI 163	Mechanical Behavior Laboratory	3-4
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory	3-4
MATSCI 171	Nanocharacterization Laboratory	3-4
MATSCI 172	X-Ray Diffraction Laboratory	3-4
MATSCI 173	Mechanical Behavior Laboratory	3-4
MATSCI 322	Transmission Electron Microscopy Laboratory	3
ME 210	Introduction to Mechatronics	4
ME 218A	Smart Product Design Fundamentals	4-5
ME 218B	Smart Product Design Applications	4-5
ME 218C	Smart Product Design Practice	4-5
ME 218D	Smart Product Design: Projects	3-4
ME 220	Introduction to Sensors	3-4
ME 310A	Product-Based Engineering Design, Innovation, and Development	4
ME 310B	Product-Based Engineering Design, Innovation, and Development	4

ME 310C	Project-Based Engineering Design, Innovation, and Development	4
ME 324	Precision Engineering	4
ME 348	Experimental Stress Analysis	3
ME 354	Experimental Methods in Fluid Mechanics	4
ME 367	Optical Diagnostics and Spectroscopy Laboratory	4
ME 385	Tissue Engineering Lab	1-2

Mathematics Courses

Each Aero/Astro degree has a mathematics requirement, for which courses on the following list are pre-approved. (Other advanced courses may also be acceptable.) Students should consult with their advisers in selecting the most appropriate classes for their field. M.S. candidates select 2 courses; they may also use the mathematics courses listed as common choices in the master's degree course requirements. Engineers select 3 courses; Ph.D. candidates select 4 courses, with at least 6 units from courses numbered above 200.

		Units
AA 214A	Introduction to Numerical Methods for Engineering	3
AA 214B	Numerical Methods for Compressible Flows	3
AA 214C	Numerical Computation of Viscous Flow	3
AA 215A	Advanced Computational Fluid Dynamics	3
AA 215B	Advanced Computational Fluid Dynamics	3
AA 218	Introduction to Symmetry Analysis	3
AA 222	Introduction to Multidisciplinary Design Optimization	3-4
CEE 281	Mechanics and Finite Elements	3
CME 306	Numerical Solution of Partial Differential Equations	3
CME 326	Numerical Methods for Initial Boundary Value Problems	3
EE 261	The Fourier Transform and Its Applications	3
EE 263	Introduction to Linear Dynamical Systems	3
EE 264	Digital Signal Processing	3-4
EE 364A	Convex Optimization I	3
EE 364B	Convex Optimization II	3
ENGR 207B	Linear Control Systems II	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 120	Groups and Rings	3
MATH 132	Partial Differential Equations II	3
ME 300A	Linear Algebra with Application to Engineering Computations	3
ME 300B	Partial Differential Equations in Engineering	3
ME 300C	Introduction to Numerical Methods for Engineering	3
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	3
ME 408	Spectral Methods in Computational Physics	3
ME 469	Computational Methods in Fluid Mechanics	3
ME 469B	Computational Methods in Fluid Mechanics	3
MSE 201	Dynamic Systems	3-4
MSE 211	Linear and Nonlinear Optimization	3-4
MSE 311	Optimization	3
MSE 312	Advanced Methods in Numerical Optimization	3
PHYSICS 211	Continuum Mechanics	3

STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5
STATS 217	Introduction to Stochastic Processes	2-3

Bioengineering

Mail Code: 94305-4245

Student Services Phone: Graduate students: (650) 498-2408;
Undergraduates: (650) 724-5314

Web Site: <http://bioengineering.stanford.edu>

Courses offered by the Department of Bioengineering are listed under the subject code BIOE on the *Stanford Bulletin's* ExploreCourses web site.

Bioengineering is jointly supported by the School of Engineering and the School of Medicine. The facilities and personnel of the Department of Bioengineering are housed in the Shriram Center, James H. Clark Center, the William F. Durand Building for Space Engineering and Science, the William M. Keck Science Building, the Jerry Yang and Akiko Yamazaki Environment and Energy Building, and the Richard M. Lucas Center for Magnetic Resonance Spectroscopy and Imaging. The departmental headquarters is in the Shriram Center for Bioengineering and Chemical Engineering.

Courses in the teaching program lead to the degrees of Bachelor of Science in Engineering (Bioengineering), Master of Science and Doctor of Philosophy. The department collaborates in research and teaching programs with faculty members in Chemical Engineering, Mechanical Engineering, Electrical Engineering, and departments in the School of Medicine. Quantitative biology is the core science base of the department. The research and educational thrusts are in biomedical computation, biomedical imaging, biomedical devices, regenerative medicine, and cell/molecular engineering. The clinical dimension of the department includes cardiovascular medicine, neuroscience, orthopedics, cancer care, neurology, and environment.

Mission of the Undergraduate Program in Bioengineering

The Stanford Bioengineering (BioE) major enables students to combine engineering and the life sciences in ways that advance scientific discovery, healthcare and medicine, manufacturing, environmental quality, culture, education, and policy. Students who major in BioE earn a fundamental engineering degree for which the raw materials, underlying basic sciences, fundamental toolkit, and future frontiers are all defined by the unique properties of living systems.

The department offers an undergraduate major in Bioengineering (BioE) leading to the B.S. degree in Engineering. An undergraduate major in Biomechanical Engineering and an undergraduate major in Biomedical Computation, both of which lead to the B.S. degree in Engineering, are available through the School of Engineering. For further information, see the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work with specialization in an area of the field, including biomedical computation, regenerative medicine and tissue engineering, molecular and cell bioengineering, biomedical imaging, and biomedical devices.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course

work and guided research, the program prepares students to make original contributions in Bioengineering and related fields.

Graduate Programs in Bioengineering

The University's requirements for the M.S. and Ph.D. degrees are outlined in the "Graduate Degrees (p. 43)" section of this bulletin.

Admission

Students are expected to enter with a series of core competencies in mathematics, biology, chemistry, physics, computing, and engineering. Students entering the program are assessed by the examination of their undergraduate transcripts and research experiences. Specifically, the department requires that students have completed mathematics through multivariable calculus and differential equations, completed a series of undergraduate biology courses and completed physics, chemistry, and computer sciences courses required of all undergraduate majors in engineering.

Qualified applicants are encouraged to apply for predoctoral national competitive fellowships, especially those from the National Science Foundation. Applicants to the Ph.D. program should consult with their financial aid officers for information and applications.

The deadline for receiving applications is December 2, 2014.

Further information and application forms for all graduate degree programs may be obtained from Graduate Admissions, the Registrar's Office, <http://gradadmissions.stanford.edu>.

Bachelor of Science in Engineering (Bioengineering)

The department offers an undergraduate major in Bioengineering (BioE) leading to the B.S. degree in Engineering. For additional information, see the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

Bioengineering (BioE)

Completion of the undergraduate program in Bioengineering leads to the conferral of the Bachelor of Science in Engineering. The subplan "Bioengineering" appears on the transcript and on the diploma.

Mission of the Undergraduate Program in Bioengineering

The Stanford Bioengineering (BioE) major enables students to combine engineering and the life sciences in ways that advance scientific discovery, healthcare and medicine, manufacturing, environmental quality, culture, education, and policy. Students who major in BioE earn a fundamental engineering degree for which the raw materials, underlying basic sciences, fundamental toolkit, and future frontiers are all defined by the unique properties of living systems.

Students will complete engineering fundamentals courses, including an introduction to BioE and computer programming. A series of core BioE classes beginning in the second year leads to a student-selected depth area and a senior capstone design project. The department also organizes a summer Research Experience for Undergraduates (REU) program (<http://bioengineering.stanford.edu/education/REU.html>). BioE graduates are well prepared to pursue careers and lead projects in research, medicine, business, law, and policy.

Requirements

Mathematics¹

28 units minimum required, see Basic Requirement 1)

MATH 41 Calculus 10
& MATH 42 and Calculus (or AP Calculus)

Select one of the following:

CME 100 Vector Calculus for Engineers (Recommended) 5
or MATH 51 Linear Algebra and Differential Calculus of Several Variables

Select one of the following:

CME 102 Ordinary Differential Equations for Engineers (Recommended) 5

or MATH 53 Ordinary Differential Equations with Linear Algebra

Select one of the following:

CME 104 Linear Algebra and Partial Differential Equations for Engineers (Recommended) 5

or MATH 52 Integral Calculus of Several Variables

CME 106 Introduction to Probability and Statistics for Engineers (Recommended) 3-5

or STATS 110 Statistical Methods in Engineering and the Physical Sciences

or STATS 141 Biostatistics

Science²

28 units minimum:

CHEM 31X Chemical Principles Accelerated 5-10

or CHEM 31A Chemical Principles I
& CHEM 31B and Chemical Principles II

CHEM 33 Structure and Reactivity 5

BIO 41 Genetics, Biochemistry, and Molecular Biology 5

BIO 42 Cell Biology and Animal Physiology 5

PHYSICS 41 Mechanics 4

PHYSICS 43 Electricity and Magnetism 4

Technology in Society

One course required; see Basic Requirement 4

BIOE 131 Ethics in Bioengineering^(WIM) 3

Engineering Fundamentals

ENGR 70A Programming Methodology (same as CS 106A) 5

ENGR 80 Introduction to Bioengineering 4

Fundamentals Elective; see UGHB Fig. 3-4 for approved course list; may not use ENGR 70B or ENGR 70X 3-5

Bioengineering Core

BIOE 41 Physical Biology of Macromolecules 4

BIOE 42 Physical Biology of Cells 4

BIOE 44 Fundamentals for Engineering Biology Lab 4

BIOE 51 Anatomy for Bioengineers 4

BIOE 101 Systems Biology 4

BIOE 103 Systems Physiology and Design 4

BIOE 123 Optics and Devices Lab 4

BIOE 141A Senior Capstone Design I 4

BIOE 141B Senior Capstone Design II 4

Bioengineering Depth Electives

Four courses, minimum 12 units: 12

BIOE 115 Computational Modeling of Microbial Communities

BIOE 201C Diagnostic Devices Lab

Units

BIOE 211 Biophysics of Multi-cellular Systems and Amorphous Computing

BIOE 212 Introduction to Biomedical Informatics Research Methodology

BIOE 214 Representations and Algorithms for Computational Molecular Biology

BIOE 220 Introduction to Imaging and Image-based Human Anatomy

BIOE 221 Physics and Engineering of Radionuclide Imaging

BIOE 222 Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects

BIOE 223 Physics and Engineering of X-Ray Computed Tomography

BIOE 224 Probes and Applications for Multi-modality Molecular Imaging of Living Subjects

BIOE 227 Functional MRI Methods

BIOE 231 Protein Engineering

BIOE 244 Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems

BIOE 260 Tissue Engineering

BIOE 281 Biomechanics of Movement

BIOE 287 Introduction to Physiology and Biomechanics of Hearing

BIOE 291 Principles and Practice of Optogenetics for Optical Control of Biological Tissues

Total Units

119-128

¹ It is strongly recommended that CME 100 Vector Calculus for Engineers, CME 102 Ordinary Differential Equations for Engineers, and CME 104 Linear Algebra and Partial Differential Equations for Engineers) be taken rather than MATH 51 Linear Algebra and Differential Calculus of Several Variables, MATH 52 Integral Calculus of Several Variables, and MATH 53 Ordinary Differential Equations with Linear Algebra. CME 106 Introduction to Probability and Statistics for Engineers utilizes MATLAB, a powerful technical computing program, and should be taken rather than STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 141 Biostatistics. If you are taking the MATH 50 series, it is strongly recommended to take MATH 51M Introduction to MATLAB or CME 192 Introduction to MATLAB.

² Science must include both Chemistry (CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II; or CHEM 31X Chemical Principles Accelerated or ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology) and calculus-based Physics, with two quarters of course work in each, in addition to two courses of BIO core. CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II are considered one course even though given over two quarters. Premeds should take Chemistry, not ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>). Students pursuing a premed program need to take additional courses; see the UGHB, BioE Premed 4-Year Plan.

Honors Program

The School of Engineering offers a program leading to a Bachelor of Science in Engineering: Bioengineering with Honors (ENGR-BSH, BIOE). This program provides the opportunity for qualified BioE majors to conduct independent research at an advanced level with a faculty research adviser and documented in an honors thesis.

In order to receive departmental honors, students admitted to the program must:

1. Declare the honors program in Axxess (ENGR-BSH, Subplan: Bioengineering).
2. Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
3. Complete at least two quarters of research with a minimum of nine units of BIOE 191 Bioengineering Problems and Experimental Investigation or BIOE 191X Out-of-Department Advanced Research Laboratory in Bioengineering for a letter grade; up to three units may be used towards the bioengineering depth elective requirements.
4. Submit a completed thesis draft to the honors adviser and second reader by the first week of Spring Quarter. Further revisions and final endorsement are to be finished by the second Monday in May, when two signed bound copies plus one PC-compatible CD-ROM are to be submitted to the student services officer.
5. Attend the Bioengineering Honors Symposium at the end of Spring Quarter and give a poster or oral presentation, or present in another approved suitable forum.

For more information and application instructions, see the department's undergraduate site (<http://bioengineering.stanford.edu/education/bioe-honors-instructions-v.2.pdf>).

Coterminal B.S./M.S. Program in Bioengineering

This option is available to outstanding Stanford undergraduates who wish to work simultaneously toward a B.S. in another field and an M.S. in Bioengineering. The degrees may be granted simultaneously or at the conclusion of different quarters, though the bachelor's degree cannot be awarded after the master's degree has been granted. The University minimum requirements for the coterminal bachelor's/master's program are 180 units for the bachelor's degree plus 45 unduplicated units for the master's degree. Students may apply for the coterminal B.S. and M.S. program after 120 undergraduate units have been completed, and they must be accepted into our program one quarter before receiving the B.S. degree. Students should apply directly to the Bioengineering Student Service Office by November 3, 2014. Students interested in the coterminal degree must take the Graduate Record Examination (GRE) (<http://www.gre.org>). Prospective applicants should see the department's web site for application form, instructions, and supporting documents (<http://bioengineering.stanford.edu/education/coterminal.html>).

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

The application must provide evidence of potential for strong academic performance as a graduate student. The application is evaluated and acted upon by the graduate admissions committee of the department. Students are expected to enter with a series of core competencies in mathematics, biology, chemistry, physics, computing, and engineering. Typically, a GPA of at least 3.5 in engineering, science, and math is expected.

Master of Science in Bioengineering

The Master of Science in Bioengineering requires 45 units of course work. The curriculum consists of core bioengineering courses, technical electives, seminars and unrestricted electives. Core courses focus on quantitative biology and biological systems analysis. Approved technical electives are chosen by the student in consultation with his/her graduate adviser, and can be selected from graduate course offerings in mathematics, statistics,

engineering, physical sciences, life sciences, and medicine. Seminars highlight emerging research in bioengineering and provide training in research ethics. Unrestricted electives can be freely chosen by the student in association with his/her adviser.

Requirements

The department's requirements for the M.S. in Bioengineering are:

1. Core Bioengineering courses (10-11 units)

The following courses are required:

		Units
BIOE 300A	Molecular and Cellular Bioengineering	3
BIOE 300B	Physiology and Tissue Engineering	3
Select two of the following:		4-5
BIOE 301A	Molecular and Cellular Engineering Lab	
BIOE 301B	Clinical Needs and Technology	
BIOE 301C	Diagnostic Devices Lab	
Total Units		10-11

These courses, together with the approved technical electives, should form a cohesive course of study that provides depth and breadth.

2. Approved Technical Electives (26 units)

These units must be selected from graduate courses in mathematics, statistics, engineering, physical science, life science, and medicine. They should be chosen in concert with the bioengineering courses to provide a cohesive degree program in a bioengineering focus area. Students are required to take at least one course in some area of device or instrumentation. Up to 9 units of directed study and research may be used as approved electives.

3. Seminars (4 units)

The seminar units should be fulfilled through:

		Units
BIOE 393	Bioengineering Departmental Research Colloquium (Students enroll each quarter for 1 unit)	3
MED 255	The Responsible Conduct of Research	1
Total Units		4

Other relevant seminar units may also be used with the approval of the faculty adviser. One of the seminar units must be MED 255 The Responsible Conduct of Research.

4. Unrestricted Electives (6 units).

Students are assigned an initial faculty adviser to assist them in designing a plan of study that creates a cohesive degree program with a concentration in a particular bioengineering focus area. These focus areas include, but are not limited to: Biomedical Computation, Regenerative Medicine/Tissue Engineering, Molecular and Cell Bioengineering, Biomedical Imaging, and Biomedical Devices.

To ensure that an appropriate program is pursued by all M.S. candidates, students who first matriculate at Stanford at the graduate level must:

1. submit an adviser-approved Program Proposal for a Master's Degree form to the student services office during the first month of the first quarter of enrollment
2. obtain approval from the M.S. adviser and the Chair of Graduate Studies for any subsequent program change or changes.

It is expected that the requirements for the M.S. in Bioengineering can be completed within approximately one year. There is no thesis requirement for the M.S.

Due to the interdisciplinary nature of Bioengineering, a number of courses are offered directly through the Bioengineering Department but many are available through other departments. See respective ExploreCourses for course descriptions.

Doctor of Philosophy in Bioengineering

A student studying for the Ph.D. degree must complete a master's degree (45 units) comparable to that of the Stanford M.S. degree in Bioengineering. Up to 45 units of master's degree residency units may be counted towards the degree. The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements. Students admitted to the Ph.D. program with an M.S. degree must complete at least 90 units of work at Stanford. The maximum number of transfer units is 45.

On the basis of the research interests expressed in their application, students are assigned an initial faculty adviser who assists them in choosing courses and identifying research opportunities. The department does not require formal lab rotations, but students are encouraged to explore research activities in two or three labs during their first academic year.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of bioengineering fundamentals and a potential for research by passing a qualifying oral examination.

Typically, the exam is taken shortly after the student earns a master's degree. The student is expected to have a nominal graduate Stanford GPA of 3.25 to be eligible for the exam. Once the student's faculty sponsor has agreed that the exam is to take place, the student must submit an application folder containing items including a curriculum vitae, research project abstract, and preliminary dissertation proposal to the student services office. Information about the exam may be obtained from the student services office.

In addition to the course requirements of the M.S. degree, doctoral candidates must complete a minimum of 15 additional units of approved formal course work (excluding research, directed study, and seminars).

Dissertation Reading Committee

Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. qualifying exams. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

A dissertation reading committee consists of the principal dissertation adviser and at least two other readers. Reading committees in Bioengineering may include faculty from another department. It is expected that at least one member of the Bioengineering faculty be on each reading committee. The initial committee, and any subsequent changes, must be officially approved by the department Chair.

University Oral and Dissertation

The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University

oral committee (four selected faculty members, plus a chair from another department). Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. Forms for the University oral scheduling and a one-page dissertation abstract should be submitted to the department student services office at least three weeks prior to the date of the oral for departmental review and approval.

Ph.D. Minor in Bioengineering

Doctoral students pursuing a Ph.D. degree in a major other than Bioengineering may apply for the Ph.D. minor in Bioengineering. A minor is not a requirement for any degree, but is available when agreed upon by the student and the major and minor department.

Application forms, including the University's general requirements, can be found at <http://registrar.stanford.edu/shared/forms.htm>.

A student desiring a Ph.D. minor in Bioengineering must have a minor program advisor who is a regular Bioengineering faculty member. This advisor must be a member of the student's reading committee for the doctoral dissertation, and the entire reading committee must meet at least one year prior to the date of the student's dissertation defense.

The Ph.D. minor program must include at least 20 units of course work in Stanford Bioengineering or Bioengineering cognate courses at or above the 200 level. Of these 20 units, no more than 10 can be in cognate courses. All courses listed to fulfill the 20-unit requirement must be taken for a letter grade and the GPA must be at least 3.25. Courses used for a minor may not be used to also meet the requirements for a master's degree.

M.D./Ph.D. Dual Degree Program

Students interested in a career oriented towards bioengineering and medicine can pursue the combined M.D./Ph.D. degree program. Stanford has two ways to do an M.D./Ph.D. U.S. citizens and permanent residents can apply to the Medical Scientist Training Program and can be accepted with funding from both M.D. and Ph.D. programs for stipend and tuition. They can then select a bioengineering laboratory for their Ph.D. Students not admitted to the Medical Scientist Training Program must apply to be admitted separately to the M.D. program and the Ph.D. program of their choice.

The Ph.D. is administered by the Department of Bioengineering. To be formally admitted as a Ph.D. degree candidate in this combined degree program, the student must apply through normal departmental channels and must have earned or have plans to earn an M.S. in bioengineering or other engineering discipline at Stanford or another university. The M.S. requires 45 units of course work which consists of core bioengineering courses, technical electives, seminars, and 6 unrestricted units. Students must also pass the Department of Bioengineering Ph.D. qualifying examination.

For students fulfilling the full M.D. requirements who earned their master's level engineering degree at Stanford, the Department of Bioengineering waives the normal departmental requirement of 15 units applied towards the Ph.D. degree beyond the master's degree level through formal course work. Consistent with the University Ph.D. requirements, the department accepts 15 units comprised of courses, research, or seminars approved by the student's academic adviser and the department chair. Students not completing their M.S. engineering degree at Stanford are required to take 15 units of formal course work in engineering-related areas as determined by their academic adviser.

Joint Degree Programs in Bioengineering and the School of Law

The School of Law and the Department of Bioengineering offer joint programs leading to either a J.D. degree combined with an M.S. degree in Bioengineering or to a J.D. degree combined with a Ph.D. in Bioengineering.

The J.D./M.S. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves intensively for careers in areas relating to both law and bioengineering. Students interested in either joint degree program must apply and gain entrance separately to the School of Law and the Department of Bioengineering and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Bioengineering Department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Bioengineering. Faculty advisers from each academic unit will participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Bioengineering program regardless of whether enrollment at that time is in the Law School or in the Department of Bioengineering. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.S. or Ph.D. degrees as specified in the *Stanford Bulletin* or elsewhere.

The Law School shall approve courses from the Bioengineering Department that may count toward the J.D. degree, and the Bioengineering Department shall approve courses from the Law School that may count toward the M.S. or Ph.D. degree in Bioengineering. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The lists may differ depending on whether the student is pursuing an M.S. or a Ph.D. in Bioengineering.

In the case of a J.D./M.S. program, no more than 45 units of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 units of approved courses may be counted toward both degrees. In either case, no more than 36 units of courses that originate outside the Law School may count toward the law degree. To the extent that courses under this joint degree program originate outside of the Law School but count toward the law degree, the law school credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of law school credits that may be counted toward the M.S. or Ph.D. in Bioengineering is the greater of: (i) 15 units; or (ii) the maximum number of units from courses outside of the department that M.S. or Ph.D. candidates in Bioengineering are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program. Tuition and financial aid arrangements will normally be through the school in which the student is then enrolled.

Chair: Norbert J. Pelc

Professors: Russ B. Altman, Annelise E. Barron, Kwabena Boahen, Dennis R. Carter, Karl Deisseroth, Scott L. Delp, Norbert J. Pelc, Stephen R. Quake, Matthew Scott, James R. Swartz, Paul Yock

Associate Professors: Jennifer R. Cochran, Markus Willard Covert, Andrew Endy, Jan T. Liphardt, Christina D. Smolke

Assistant Professors: Zev David Bryant, David B. Camarillo, Kerwyn C. Huang, Jin Hyung Lee, Michael Lin, Manu Prakash, Stanley Qi (effective October 2014), Ingmar Riedel-Kruse, Bo Wang (effective May 2015), Fan Yang

Courtesy Professors: Bruce Daniel, Daniel S. Fisher, Sanjiv Sam Gambhir, Garry Gold, Stuart B. Goodman, Thomas Krummel, Craig Levin, Michael T. Longaker, David Magnus, Lloyd B. Minor, Paul J. Wang, Joseph Woo

Courtesy Associate Professors: Rebecca Fahrig, Jeffrey A. Feinstein, Garry E. Gold, Brian Hargreaves, Sarah Heilshorn, Ellen Kuhl, Kim Butts Pauly, Marc E. Levenston, Sakti Srivastava

Courtesy Assistant Professors: James Wall

Consulting Faculty: Todd Brinton, Stephen Fodor, Uday Kumar, John Linehan, Gordon Saul, Charles Taylor

Graduate Related Courses

		Units
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 217	Translational Bioinformatics	4
CHEMENG 450	Advances in Biotechnology	3
EE 369A	Medical Imaging Systems I	3
EE 369B	Medical Imaging Systems II	3
ME 280	Skeletal Development and Evolution	3
ME 287	Mechanics of Biological Tissues	3
ME 381	Orthopaedic Bioengineering	3
RAD 226	In Vivo Magnetic Resonance Spectroscopy and Imaging	3

Chemical Engineering

Courses offered by the Department of Chemical Engineering are listed under the subject code CHEMENG on the *Stanford Bulletin's* ExploreCourses web site.

Research investigations are currently being carried out in the following fields: applied statistical mechanics, biocatalysis, bioengineering, biophysics, colloid science, computational materials science, electronic materials, hydrodynamic stability, kinetics and catalysis, Newtonian and non-Newtonian fluid mechanics, polymer science, renewable energy, rheo-optics of polymeric systems, and surface and interface science. Additional information may be found at <http://cheme.stanford.edu>.

The Department of Chemical Engineering offers opportunities for both undergraduates and graduate students to pursue course work and research in energy sciences and technology, which include the chemical, physical, mathematical, and engineering sciences. Courses include 25E, 35N, 140/240, 142/242, 162/262, 432, 444 with some 400 level courses being offered only in alternate years.

In addition, both undergraduates and graduate students can pursue work in interdisciplinary biosciences, which include the chemical, biological, physical, mathematical, and engineering sciences. Courses include 25B, 150, 174/274, 181/281, 183/283, 185B, 355, 420, 450, 454 with some advanced graduate courses offered only in alternate years. Students are encouraged to review course offerings in all departments of the School of Engineering and to seek academic advising with individual chemical

engineering faculty. Students wishing assistance should talk with student services staff in the department.

Further information about the department also may be found at <http://cheme.stanford.edu>. Undergraduates considering majoring in Chemical Engineering are encouraged to talk with faculty and to meet with student services' staff in room 129. Students interested in pursuing advanced work in chemical engineering, including coterminal degrees, should contact the student services manager. Admission to an advanced degree program for an active Stanford graduate student is by approval of a Graduate Authorization Petition. All other interested applicants should go to <http://studentaffairs.stanford.edu/gradadmissions> for general and departmental information about the requirements and processes for applying for admission to a graduate degree program.

Mission of the Undergraduate Program in Chemical Engineering

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government or for advanced study.

Learning Outcomes (Undergraduate)

Learning outcomes are used in evaluating students and the undergraduate program. The department expects undergraduate majors in the program to be able to demonstrate the following:

1. an ability to apply knowledge of mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. an ability to function on multidisciplinary teams.
5. an ability to identify, formulate, and solve engineering problems.
6. an understanding of professional and ethical responsibility.
7. an ability to communicate effectively.
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. a recognition of the need for, and an ability to engage in life-long learning.
10. a knowledge of contemporary issues.
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
12. the background for admission to engineering or other professional graduate programs.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through advanced lecture course work in the fundamentals of the field, including microhydrodynamics, molecular thermodynamics, kinetics, spectroscopy, applied mathematics, and biochemical engineering, in addition to the student's area of specialization. All students must master the fundamental chemical, physical, and biological concepts that govern molecular behavior.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Chemical Engineering and related fields.

Graduate Programs in Chemical Engineering

The University's requirements, including residency requirements, for the M.S., Engineer, and Ph.D. degrees are summarized in the "Graduate Degrees" section of this bulletin.

Current research and teaching activities cover a number of advanced topics in chemical engineering, including applied statistical mechanics, biocatalysis, biochemical engineering, bioengineering, biophysics, computational materials science, colloid science, dynamics of complex fluids, energy conversion, functional genomics, hydrodynamic stability, kinetics and catalysis, microrheology, molecular assemblies, nanoscience and technology, Newtonian and non-Newtonian fluid mechanics, polymer physics, protein biotechnology, renewable fuels, semiconductor processing, soft materials science, solar utilization, surface and interface science, and transport mechanics.

Fellowships and Assistantships

Qualified predoctoral applicants are encouraged to apply for nationally competitive fellowships, for example, those from the National Science Foundation. Applicants to the Ph.D. program should consult with their financial aid officers for application information and advice. In the absence of other awards, incoming Ph.D. students normally are awarded departmental fellowships. Matriculated Ph.D. students are supported primarily by fellowship awards and assistantship research or teaching appointments. All students are encouraged to apply for external, competitive fellowships and may obtain information about various awarding agencies from faculty advisers and student services. Assistantships are paid positions for graduate students that, in addition to a salary, provide the benefit of a tuition allocation. Individual faculty members appoint students to research assistantships; the department chair appoints doctoral students to teaching assistantships. Contact departmental student services for additional information.

Bachelor of Science in Chemical Engineering

The Chemical Engineering B.S. program requires basic courses in biology, chemistry, engineering, mathematics, and physics. The depth sequence of courses required for the major in chemical engineering provides training in applied chemical kinetics, biochemical engineering, electronic materials, engineering thermodynamics, plant design, polymers, process analysis and control, separation processes, and transport phenomena. Undergraduates who are considering and/or wish to major in chemical engineering should talk with departmental student services as early as during freshman orientation if feasible and consult the curriculum outlined in the "Undergraduate Program in Chemical Engineering" section of this bulletin. Courses taken to fulfill the requirements for the major (courses in

mathematics; science; technology and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if this option is offered.

Representative sequences of courses leading to a B.S. in Chemical Engineering, in both flow chart and 4-year, quarter-by-quarter formats, can be found in the *Handbook for Undergraduate Engineering Programs*, available at <http://ughb.stanford.edu>. These are explanatory examples, with each sequence starting at a different level and demonstrating how a student, based on his or her pre-college preparation, can complete the major in four years. These typical course schedules are available as well from departmental student services and chemical engineering faculty advisers for undergraduates. It is recommended that students discuss their prospective programs with the chemical engineering faculty advisers, particularly if they are transferring from another major such as Biology, Chemistry, Physics, or another Engineering major. With advance planning, students can usually arrange to attend one of the overseas campuses.

Students interested in a minor in Chemical Engineering should consult the requirements for a "Minor in Chemical Engineering" section of this bulletin.

Chemical Engineering (CHE)

Completion of the undergraduate program in Chemical Engineering leads to the conferral of the Bachelor of Science in Chemical Engineering.

Mission of the Undergraduate Program in Chemical Engineering

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government, or for graduate study.

Requirements*

	Units
Mathematics ¹	
MATH 41	Calculus 5
MATH 42	Calculus 5
Select one of the following:	5-10
CME 100	Vector Calculus for Engineers
MATH 51 & MATH 52	Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables
Select one of the following:	5
CME 102	Ordinary Differential Equations for Engineers
or MATH 53	Ordinary Differential Equations with Linear Algebra
Select one of the following:	4-5
CME 104	Linear Algebra and Partial Differential Equations for Engineers
or CME 106	Introduction to Probability and Statistics for Engineers
Science ¹	
CHEM 31X	Chemical Principles Accelerated 5
CHEM 33	Structure and Reactivity 5

CHEM 35	Synthetic and Physical Organic Chemistry	5
CHEM 36	Organic Chemistry Laboratory I	3
PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
CHEM 131	Organic Polyfunctional Compounds	3
Technology in Society		
One course required, see Basic Requirement 4		3-5
Engineering Fundamentals		
Three courses minimum; see Basic Requirement 3		
ENGR/	Introduction to Chemical Engineering	3
CHEMENG 20		
Fundamentals Elective from another School of Engineering department 3-5		
See the UGHB for a list of courses.		
Select one of the following:		3
ENGR 25B	Biotechnology (same as CHEMENG 25B)	
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use (same as CHEMENG 25E)	
Chemical Engineering Depth		
Minimum 68 Engineering Science and Design units; see Basic Requirement 5		
CHEMENG 10	The Chemical Engineering Profession	1
CHEMENG 100	Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110	Equilibrium Thermodynamics	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 130	Separation Processes	3
CHEMENG 150	Biochemical Engineering	3
CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 180	Chemical Engineering Plant Design	4
CHEMENG 181	Biochemistry I	3
CHEMENG 185A	Chemical Engineering Laboratory A (WIM)	4
CHEMENG 185B	Chemical Engineering Laboratory B	4
CHEM 171	Physical Chemistry I	3
CHEM 173	Physical Chemistry II	3
CHEM 175	Physical Chemistry III	3
Select four of the following: ^{2,3}		12
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	
CHEMENG 142	Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations	
CHEMENG 160	Polymer Science and Engineering	
CHEMENG 162	Polymers for Clean Energy and Water	
CHEMENG 174	Environmental Microbiology I	
CHEMENG 183	Biochemistry II	
CHEMENG 196	Creating New Ventures in Engineering and Science-based Industries	
Total Units		125-135

* For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

- Unit count is higher if program includes one of more of the following: MATH 51 and MATH 52 in lieu of CME 100; or CHEM 31A and CHEM 31B in lieu of CHEM 31X.
- Any two acceptable except combining 160 and 162 or 174 and 183.
- The student may petition to substitute one other science and engineering 3 unit lecture course. See UGHB (<http://ughb.stanford.edu>) for additional details.

Honors Program

The Department of Chemical Engineering offers a program leading to the degree of Bachelor of Science in Chemical Engineering with Honors. Qualified undergraduate majors conduct independent study and research at an advanced level with faculty mentors, graduate students, and fellow undergraduates. This three quarter sequential program requires concurrent participation each quarter in the CHEMENG 191H Undergraduate Honors Seminar; completion of a faculty-approved thesis; and participation in the Chemical Engineering Honors Poster Session held annually during the Mason Lecture Series Spring Quarter. The last requirement may also be fulfilled through an alternative, public, oral presentation with the approval of the department chair. A research proposal/application must be submitted at least five quarters prior to graduation with work to begin at a minimum of four quarters prior to graduation.

Admission to the honors program is by application and submission of a research proposal and is subject to approvals by faculty advisers, sponsors, and the chair of the department. Declared Chemical Engineering majors with a cumulative grade point average (GPA) of 3.5 or higher are encouraged to apply. Students must submit their applications no later than the first week of March Winter Quarter of their junior year, assuming a June degree conferral the following year, e.g. the primary 2014-2015 deadline is March 4, 2015. An application includes a Stanford transcript in addition to the research proposal, approved by both the student's research thesis adviser, a faculty reader, and, if required, a chemical engineering faculty sponsor. The research adviser or the reader or, alternatively, a faculty sponsor, must be a faculty member in the Department of Chemical Engineering. Students must start their research no later than Spring Quarter their junior year and are encouraged to consider incorporating research opportunities such as those sponsored by Undergraduate Academic Life into their honors research proposal; see http://ual.stanford.edu/OO/research_opps/Grants http://ual.stanford.edu/OO/research_opps/Grants). See departmental student services staff in Shriram Center room 129, for more information about the application process, a proposal template, and other assistance.

In order to receive departmental honors, students admitted to the honors program must:

- Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
- Complete at least three quarters of research with a minimum of 9 units of CHEMENG 190H Undergraduate Honors Research in Chemical Engineering for a letter grade. All quarters must focus on the same topic. The same faculty adviser and faculty reader should be maintained throughout if feasible.
- Enroll in CHEMENG 191H Undergraduate Honors Seminar, concurrently with each quarter of enrollment in CHEMENG 190H Undergraduate Honors Research in Chemical Engineering.
- Participate with a poster and oral presentation of thesis work at the Chemical Engineering Honors Poster Session held during the Mason Lectures week, Spring Quarter, or, at the Undergraduate Program Committee's discretion, at a comparable public event. Submit at the same time to student services one copy of the poster in electronic format.
- Submit final drafts of a thesis simultaneously to the adviser and the reader and, if appropriate, to the Chemical Engineering faculty sponsor,

no later than April 6, 2015, or the first school day of the second week of the quarter in which the degree is to be conferred.

- Complete all work and thesis revisions and obtain indicated faculty approvals on the Certificate of Final Reading of Thesis forms by the end of the last full week of April (4/24/2015), or the first month of the graduation quarter.
- Submit to departmental student services five (5) final copies of the honors thesis, as approved by the appropriate faculty. Include in each thesis an original, completed, faculty signature sheet immediately following the title page. The 2014-15 deadline is April 30, 2015.
- Submit to student services one copy of the honors thesis in electronic format at the same time as the final copies of the thesis, or no later than April 30, 2015.

Upon faculty approval, departmental student services to submit one copy of each honors thesis to Student Affairs, School of Engineering.

Chemical Engineering (CHE) Minor

The following core courses fulfill the minor requirements:

		Units
ENGR/ CHEMENG 20	Introduction to Chemical Engineering	3
CHEMENG 100	Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110	Equilibrium Thermodynamics	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 185A	Chemical Engineering Laboratory A	4
CHEM 171	Physical Chemistry I	3
CHEMENG 180	Chemical Engineering Plant Design	4
Select one of the following:		3
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	
CHEMENG 142	Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations	
CHEMENG 160	Polymer Science and Engineering	
CHEMENG 162	Polymers for Clean Energy and Water	
CHEMENG 174	Environmental Microbiology I	
CHEMENG 181	Biochemistry I	
Total Units		34

Master of Science in Chemical Engineering

A range of M.S. programs comprising appropriate course work is available to accommodate students wishing to obtain further academic preparation before pursuing a professional chemical engineering career. This degree is lecture course based; there are no research or thesis requirements. It is a terminal M.S. degree, i.e. this degree is not a prerequisite for nor does it lead to admission to the department's Ph.D. program. For conferral of a master's degree in chemical engineering the following departmental requirements must be met.

Coterminal Bachelor's and Master's Degrees in Chemical Engineering

Stanford undergraduates with strong academic records may apply to study for a master's degree while at the same time completing their bachelor's degree(s). Interested students should discuss their educational goals with their faculty advisers and talk with departmental graduate student services about the application requirements before submitting an application. Students, who have completed at least 120 units toward an undergraduate degree and complete their applications by the seventh week of a quarter, may be admitted to the Chemical Engineering M.S. program the following quarter.

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Unit and Course Requirements for the Master's Degree

Students terminating their graduate work with the M.S. degree in Chemical Engineering must develop a graduate-level, thematic M.S. program consisting of a minimum of 45 completed units of academic work that includes:

1. Four (4) Chemical Engineering core graduate lecture courses selected from the CHEMENG 300 series
2. Three (3) units of CHEMENG 699 Colloquium
3. An additional 30 units, selected from graduate-level science or engineering lecture courses (3 units or more) in any appropriate department and, by petition to the Chair of the Department of Chemical Engineering, from upper-division undergraduate lecture courses in science and engineering

Alternatively, up to 6 units of research may be used in lieu of up to 6 units of the additional 30 lecture units, to partially satisfy the 45 unit minimum requirement. Credit toward the required minimum of 45 completed units for the M.S. degree is not given for CHEMENG 296 nor for similar courses in other departments or for the Chemical Engineering special topics courses numbered in the 500 series.

To ensure that an appropriate Chemical Engineering graduate program is pursued by each M.S. candidate, students who first matriculate at Stanford at the graduate level must do the following, during the first quarter no later than the seventh week:

1. Complete a Program Proposal for a Master's Degree form, that is approved by the M.S. adviser
2. Submit this petition to departmental student services, for review by the graduate curriculum committee, and
3. Obtain approval for any subsequent program change or changes from the M.S. adviser and the graduate committee.

Stanford undergraduates admitted to the coterminal master's program must:

1. Submit an adviser-approved Program Proposal for a Master's Degree (a graduate degree progress form), either during their second quarter of graduate standing or upon the completion of 9 units of graduate work (whichever occurs first), and
2. Document with student services their M.S. adviser's review and approval of their graduate program when they have accrued 30 units toward the M.S. degree in Chemical Engineering.

Each M.S. candidate must obtain approvals for the final M.S. program no later than the seventh week of the quarter preceding the quarter of degree conferral, in order to permit amendment of the final quarter's study list if the faculty deem this necessary. Students with questions should contact departmental graduate student services.

Minimum Grade Requirement

Any course used to satisfy the 45-unit minimum for the Master of Science degree must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

Research Experience

Students in the M.S. program wishing to obtain research experience should talk with departmental student services and work with the M.S. faculty adviser on the choice of research adviser as early as feasible and in advance of the anticipated quarter(s) of research. Once arrangements are mutually agreed upon, including the number of units, students enroll in the appropriate section of CHEMENG 600 Graduate Research in Chemical Engineering. A written report describing the results of the research undertaken must be submitted to and approved by the research adviser. Research units may not be substituted for any of the required four 300-level core lecture courses.

Engineer in Chemical Engineering

The degree of Engineer is awarded after the completion of a minimum of 90 units of graduate work beyond the B.S. degree and the satisfactory completion of all University requirements plus the following departmental requirements. Application to this program is open only to active chemical engineering M.S. or Ph.D. candidates. This degree is not a prerequisite for the Ph.D. program.

Unit and Course Requirements

A minimum of 90 total units (including research), within which 45 units consisting of 42 lecture units and 3 colloquium units are required, including:

		Units
CHEMENG 300	Applied Mathematics in the Chemical and Biological Sciences	3
CHEMENG 310	Microhydrodynamics	3
CHEMENG 320	Chemical Kinetics and Reaction Engineering	3
CHEMENG 340	Molecular Thermodynamics	3
CHEMENG 345	Fundamentals and Applications of Spectroscopy	3
CHEMENG 355	Advanced Biochemical Engineering	3
(2) 3 units of:		
CHEMENG 699	Colloquium	1

The remaining lecture courses, for total at least 45 completed units, may be chosen from graduate level science and engineering courses according to the guidelines given in the Master of Science section and with the consent of the graduate curriculum committee chair and the department chair. In fulfilling the required 45-unit requirement for lecture course units, the course work may not include chemical engineering's 500 level seminar courses or similar 1-2 unit courses in other departments.

Students seeking the Engineer degree may petition to add a M.S. program and apply for the M.S. degree once the requirements for that degree have

been fulfilled (see General Requirements in the "Graduate Degrees" section of this bulletin and Chemical Engineering's "Master of Science" section).

Minimum Grade Requirement

Any course intended to satisfy the degree requirements must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

Reading Committee Requirement

All candidates are required to have an initial meeting with their reading committees, consisting of two members of the Chemical Engineering faculty, by the end of their ninth quarter. In addition, faculty strongly encourage degree candidates to hold meetings on a more frequent basis to help focus and guide the thesis project. It is each student's responsibility to schedule these meetings and to assist in the keeping of accurate degree progress records by informing student services of meeting dates in a timely manner.

Thesis Requirement

The thesis must represent a substantial piece of research equivalent to nine months of full-time effort and must be approved by the student's reading committee.

Qualification for the Ph.D. Program by Students Ready to Receive the Degree of Engineer

After completing the requirements for the Engineer degree, a student may request to be examined on the research work completed for that degree, for the purpose of qualifying for admission to Ph.D. candidacy. If the request is granted, the student's thesis must be approved by the reading committee and available in its final form for inspection by the entire faculty at least two weeks prior to the scheduled date of said examination.

Doctor of Philosophy in Chemical Engineering

The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements and the following departmental requirements. Completion of a M.S. degree is not a prerequisite for beginning, pursuing, or completing doctoral work.

Unit and Course Requirements

A minimum of 135 completed units is required, including a minimum of 45 units, consisting of 42 lecture units and 3 colloquium units. The 45-unit component includes 42 units of lecture courses and 3 units of 699. CHEMENG 699 should be taken each quarter; its units count towards the required 135 units. The research units for CHEMENG 399 are included in the 135 total, but may not be counted toward the 45 unit requirement. The following courses are required:

CHEMENG 300 Applied Mathematics in the Chemical and Biological Sciences

CHEMENG 310	Microhydrodynamics	3
CHEMENG 320	Chemical Kinetics and Reaction Engineering	3
CHEMENG 340	Molecular Thermodynamics	3
CHEMENG 345	Fundamentals and Applications of Spectroscopy	3
CHEMENG 355	Advanced Biochemical Engineering	3
CHEMENG 399	Graduate Research Rotation in Chemical Engineering	1
CHEMENG 699	Colloquium	1

Plus two courses at the 400 course level; in 2014-15 the following are available:

CHEMENG 432	Electrochemical Energy Conversion	3
CHEMENG 450	Advances in Biotechnology	3
CHEMENG 456	Microbial Bioenergy Systems	3
CHEMENG 464	Polymer Chemistry	3
CHEMENG 466	Polymer Physics	3

These courses are to be taken at Stanford, and any petition to substitute another graduate-level course for any of these core courses must be approved by the department chair. The remaining graduate-level science and engineering lecture courses may be chosen from any department. A student may petition the department chair for approval to include an upper-division undergraduate science or engineering lecture course. All proposals for Ph.D. course work must be approved by the student's adviser and the department chair or his designee. Students working with a research advisor should enroll each quarter in the 500 series, 600, and 699 as appropriate and as study list unit limits permit. Students with questions or issues should see departmental graduate student services.

Predocctoral students may petition for a M.S. degree program to be added to their university record; see departmental student services and submit in a Graduate Authorization petition in Axxess. Once a petition is approved, the M.S. candidate must complete a Program Proposal for a Master's Degree form and submit it to student services. Students may apply in Axxess for M.S. degree conferral upon completion of the requirements for this degree. (See the "Master of Science in Chemical Engineering" section in this bulletin.) The M.S. degree must be awarded within the University's candidacy period for completion of a master's degree.

Minimum Grade Requirement

Any course intended to satisfy the Ph.D. degree requirements must be taken for a letter grade, if offered. A GPA of 3.0 or above is required at the end of the second quarter (or, potentially, a petition approved by the student's research advisor, and any required co-advisor, and the department chair). In any case, a GPA of 3.0 or above is required at the end of the third quarter in order to continue in the Ph.D. program. An overall grade point average (GPA) of 3.0 must be maintained.

Candidacy

To be advanced to Ph.D. candidacy, the student must secure a research dissertation adviser (and any required co-adviser) and complete a Ph.D. candidacy examination. First, the research adviser and any required co-adviser must be established by the end of the second quarter in the Ph.D. program. Failure to do so leads to termination of a student's study toward a Ph.D. in Chemical Engineering; however, the student may continue to work toward an M.S. degree (see the "Master of Science in Chemical Engineering (p. 208)" section of this bulletin). Failure to obtain a doctoral adviser precludes any financial aid beyond that already awarded for which the student is still eligible. Second, the Ph.D. candidacy examination before a faculty committee at the end of the fourth quarter consists of (a) a student's oral presentation of their thinking about their research proposal and current progress and (b) an examination by faculty members of the proposal specifics as well as the student's understanding

Units
3

of the fundamental chemical, physical, and biological concepts that govern the molecular behavior of the system being studied. Upon successful completion of this examination candidates must submit an Application for Candidacy for Doctoral Degree form, approved by their research adviser(s), to departmental graduate student services within two months.

Teaching Requirement

Teaching experience is considered an essential component of predoctoral training because it assists in the further development and refinement of candidates' skills in conveying what they know, think, and conclude, based on articulated assumptions and knowledge. All Ph.D. candidates, regardless of the source of their financial support, are required to assist in the teaching of a minimum of two chemical engineering courses.

Reading Committee Requirement

Reading committee meetings are intended to be discussion sessions, which help to focus and guide the dissertation project; they are not examinations. By the end of the second year, all Ph.D. candidates are required to assemble reading committees and submit Doctoral Dissertation Reading Committee forms signed by research advisers to student services. By the beginning of their third year (or by the end of their ninth quarter) candidates should have had an initial meeting with the full reading committee. The faculty strongly encourage doctoral candidates to take advantage of the benefits of ongoing, yearly, full reading committee meetings. It is the student's responsibility to schedule committee meetings, and the faculty's to respond in a timely manner to scheduling requests. Students should assist in the maintenance of degree progress records by reporting the committee meeting dates to the student services manager.

Research Poster Requirement

Experience in analyzing and presenting one's research to diverse audiences also is an essential component of predoctoral training, and faculty strongly encourage candidates to do so several times each year, starting in the second year. All candidates in their third year are required to prepare and present a research poster during the annual Mason Lecturers week in spring quarter.

Dissertation and Oral Defense Requirements

A dissertation based on a successful investigation of a fundamental problem in chemical engineering is required. A student is expected to have fulfilled all the requirements for this degree, including the completion of a dissertation approved by his or her research adviser(s) and reading committee members within approximately five calendar years after enrolling in the Ph.D. program. Upon adviser approval (s), copies of the final draft of the dissertation must be distributed to each reading committee member. No sooner than three weeks after this distribution, a student may schedule an oral examination. This examination is a dissertation defense, based on the candidate's dissertation research, and is in the form of a public seminar followed by a private examination by the faculty members on the student's oral examination committee. Satisfactory performance in the oral examination and acceptance of an approved dissertation by Graduate Degree Progress, Office of the University Registrar, leads to Ph.D. degree conferral.

Ph.D. Minor in Chemical Engineering

The University's general requirements for the Ph.D. minor are specified in the "Graduate Degrees" section of this bulletin. An application for a Ph.D. minor must be approved by both the major and minor departments.

A student desiring a Ph.D. minor in Chemical Engineering must work with a minor program adviser who has a faculty appointment in Chemical Engineering. This adviser must be included as a member of the student's reading committee for the doctoral dissertation, and the entire reading committee must meet at least once and at least one year prior to the scheduling of the student's oral examination. The department strongly prefers that regular meetings of the full reading committee start no later than the third year of graduate study or when the student is admitted to Ph.D. candidacy. In addition, the Chemical Engineering faculty member who is the minor adviser must be a member of the student's University oral examination committee.

The Ph.D. minor program must include at least 20 units of graduate-level lecture courses (numbered at the 200 level or above), but may not include any 1-2 unit lecture courses in the 20-unit minimum. The list of courses must form a coherent program and must be approved by the minor program adviser and the chair of this department. All courses for the minor must be taken for a letter grade, and a GPA of at least 3.0 must be earned for these courses.

Emeriti: (Professors) Andreas Acrivos, George M. Homsy, Robert J. Madix, Channing R. Robertson

Chair: Eric S. G. Shaqfeh

Professors: Zhenan Bao, Stacey F. Bent, Curtis W. Frank, Gerald G. Fuller, Chaitan Khosla, Jens K. Nørskov, Eric S. G. Shaqfeh, Alfred M. Spormann, James R. Swartz

Associate Professors: Thomas F. Jaramillo, Andrew J. Spakowitz

Assistant Professors: Matteo Cargnello (effective January 1, 2015), Alexander R. Dunn, Elizabeth S. Sattely, Clifford L. Wang

Courtesy Professors: Gordon E. Brown, Jennifer R. Cochran, Sarah C. Heilshorn, Daniel Herschlag, Anders R. Nilsson, Christina D. Smolke, Robert M. Waymouth

Lecturers: Lisa Y. Hwang, Ricardo B. Levy, Shari B. Libicki, Sara Loesch-Frank, John E. Moalli, Anthony Pavone, Howard B. Rosen

Consulting Professors: Jae Chun Hyun, Do Yeung Yoon

Visiting Professor: Karsten Reuter

Cognate Courses for Advanced Degrees in Chemical Engineering

In addition to core CHEMENG graduate courses in the 300 series and elective CHEMENG graduate courses in the 200 and 400 series, students pursuing advanced degrees in chemical engineering include elective courses offered by other departments. The following list is a partial list of the more frequently chosen courses and is subdivided into five focus areas.

	Units
Broadly Applicable	
APPPHYS 207	Laboratory Electronics 4
CHEM 221	Advanced Organic Chemistry 3
CHEM 271	Advanced Physical Chemistry 3
CHEM 273	Advanced Physical Chemistry 3
EE 261	The Fourier Transform and Its Applications 3
STATS 200	Introduction to Statistical Inference 3
Biochemistry and Bioengineering focus *	

BIO 217	Neuronal Biophysics	4
BIOE 331	Protein Engineering	3
BIOPHYS 228	Computational Structural Biology	3
BIOPHYS/SBIO 241	Biological Macromolecules	3-5
CBIO 241	Molecular, Cellular, and Genetic Basis of Cancer	5
MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	4
SBIO 228	Computational Structural Biology	3
SBIO 241	Biological Macromolecules	3-5

Fluid Mechanics, Applied Mathematics, and Numerical Analysis focus **

AA 218	Introduction to Symmetry Analysis	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Programming for Scientists and Engineers	3
ME 351A	Fluid Mechanics	3
ME 457	Fluid Flow in Microdevices	3

Materials Science focus ***

MATSCI 210	Organic and Biological Materials	3
MATSCI 251	Microstructure and Mechanical Properties	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
MATSCI 343	Organic Semiconductors for Electronics and Photonics	3
MATSCI 380	Nano-Biotechnology	3

Microelectronics focus ****

AA 218	Introduction to Symmetry Analysis	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Programming for Scientists and Engineers	3
ME 457	Fluid Flow in Microdevices	3

Microelectronics focus

AA 218	Introduction to Symmetry Analysis	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Programming for Scientists and Engineers	3
ME 457	Fluid Flow in Microdevices	3

* e.g., with CHEMENG 281 Biochemistry I, CHEMENG 283 Biochemistry II, CHEMENG 454 Synthetic Biology and Metabolic Engineering, CHEMENG 456 Microbial Bioenergy Systems.

** e.g., with CHEMENG 462 Complex Fluids and Non-Newtonian Flows.

*** e.g., with CHEMENG 260 Polymer Science and Engineering, CHEMENG 442 Structure and Reactivity of Solid Surfaces, CHEMENG 460, CHEMENG 461, CHEMENG 464 Polymer Chemistry, CHEMENG 466 Polymer Physics.

**** e.g., with CHEMENG 240 Micro and Nanoscale Fabrication Engineering.

Civil and Environmental Engineering

Courses offered by the Department of Civil and Environmental Engineering are listed under the subject code CEE (<https://explorecourses.stanford.edu/search/?search?view=catalog&academicYear=&q=CEE&filter-departmentcode=CEE=on&filter-coursestatus=Active=on&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&page=0>) on the *Stanford Bulletin's* ExploreCourses (<https://explorecourses.stanford.edu>) web site.

The Department of Civil and Environmental Engineering (CEE) at Stanford conducts fundamental and applied research to advance the civil and environmental engineering professions, educate future academic and industry leaders, and prepare students for careers in professional practice. Civil and environmental engineers work to sustain the natural environment while creating and maintaining the built environment. Civil and environmental engineers are essential to providing the necessities of human life, including water, air, shelter, the infrastructure, energy, and food in increasingly more efficient and renewable ways.

The department focuses on the theme of engineering for sustainability, including three core areas: built environment, environmental and water studies, and atmosphere/energy. The Sustainable Built Environment Program includes creating processes, techniques, materials, and monitoring technologies for planning, design, construction and operation of environmentally sensitive, economically efficient, performance-based buildings and infrastructure, and managing associated risks from natural and man-made hazards. The Environmental and Water Studies Program includes creating plans, policies, science-based assessment models and engineered systems to manage water in ways that protect human health, promote human welfare, and provide freshwater and coastal ecosystem services. The Atmosphere/Energy Program includes studying fundamental energy and atmospheric engineering and science, assessing energy-use effects on atmospheric processes and air quality, and analyzing and designing energy-efficient generation and use systems with minimal environmental impact.

The department oversees undergraduate programs in Civil Engineering and in Environmental Systems Engineering. The department also hosts the School of Engineering undergraduate major in Architectural Design and the undergraduate major in Atmosphere/Energy; both of these programs lead to a B.S. in Engineering.

Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodology needed for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate school in Engineering.

Mission of the Undergraduate Program in Environmental Systems Engineering

The mission of the undergraduate program in Environmental Systems Engineering is to prepare students for incorporating environmentally sustainable design, strategies and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Courses in the program are multidisciplinary in nature, combining math, science, and engineering fundamentals, and tools and skills considered essential for an engineer, along with a choice of one of three focus areas for more in-depth study: coastal environments, freshwater environments, or urban environments. This major offers the opportunity for a more focused curriculum than the Environmental and Water Studies concentration in the Civil Engineering degree program. The program of study, which includes a capstone experience, aims to equip engineering students to take on the complex challenges of the 21st century involving natural and built environments, in consulting and industry as well as in graduate school.

Learning Outcomes (Undergraduate)

Undergraduates in the Civil Engineering and the Environmental Systems Engineering programs are expected to achieve the following learning outcomes through their major. These learning outcomes are used both in evaluating students and the department's undergraduate programs. Students are expected to demonstrate the ability to:

1. apply knowledge of mathematics, science, and engineering.
2. design and conduct experiments, as well as analyze and interpret data.
3. design a system, component, or process to meet desired needs.
4. function on multidisciplinary teams.
5. identify, formulate, and solve engineering problems.
6. understand professional and ethical responsibility.
7. communicate effectively.
8. obtain the broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. recognize the need for and engage in life-long learning.
10. gain knowledge of contemporary issues.
11. apply the techniques, skills, and modern engineering tools necessary for engineering practice.
12. acquire the background for admission to engineering or other professional graduate programs.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. Students are prepared through course work with specialization within one of three broad areas including the built environment, atmosphere and energy, and environmental and water studies. All graduate students must master the analytical, quantitative, and interpretive skills necessary for successful leadership in their chosen field.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Civil and Environmental Engineering and related fields.

Graduate Programs in Civil and Environmental Engineering

The Department of Civil and Environmental Engineering (CEE), in collaboration with other departments, offers graduate degrees structured in three degree programs.

- The Atmosphere/Energy Program offers degrees with the designation of Atmosphere/Energy.
- The Sustainable Built Environment Program offers degrees with two designations:
 - Structural Engineering and Geomechanics
 - Sustainable Design and Construction
- The Environmental and Water Studies Program offers degrees with two designations:
 - Environmental Engineering and Science
 - Environmental Fluid Mechanics and Hydrology

For detailed information on these programs and degree designations, see the "Programs of Graduate Study in Civil and Environmental Engineering" section of this bulletin.

Admissions and Financial Aid

Applications require online submission of the application form and statement of purpose, followed by three letters of recommendation, results of the General Section of the Graduate Record Examination, and transcripts of all courses taken at colleges and universities. See <http://gradadmissions.stanford.edu>. Policies for each of the department's programs are available on the department website. See: <http://cee.stanford.edu>. Successful applicants are advised as to the degree and program for which they are admitted. If students wish to transfer from one CEE program to another after being accepted, an application for the intradepartmental change must be filed within the department; they will then be advised whether the change is possible. If, after enrollment at Stanford, students wish to continue toward a degree beyond the one for which they were originally admitted, a written application must be made to the Department of Civil and Environmental Engineering.

The department maintains a continuing program of merit-based financial aid for graduate students. MS and ENG applications for financial aid and assistantships should be filed by December 2, 2014; it is important that Graduate Record Examination scores be available at that time. MS and ENG applicants not requesting financial assistance have until January 13, 2015 to submit their online application. PHD applicants for financial aid and assistantships should be filed January 13, 2015. Merit-based financial aid consists of teaching assistantships and research assistantships for up to half-time work. Engineer and Ph.D. candidates may be able to use research results as a basis for their thesis or dissertation. Fellowship and scholarship awards or loans may supplement assistantships and other basic support. Continued support is generally provided for further study toward the Engineer or Ph.D. degree based on the student's performance, the availability of research funds, and requisite staffing of current research projects.

Research Centers and Facilities

Research work and instruction in the three principal areas are carried out in these facilities: Building Energy Laboratory; Environmental Engineering and Science Laboratory (EESL); Environmental Fluid Mechanics

Laboratory (EFML); Geotechnical Engineering Laboratory; Structural Engineering Laboratory.

The EESL conducts laboratory and field-based research on air quality and on water and wastewater quality and treatment and is home to the following centers: The National Science Foundation (NSF) supported Engineering Research Center for Re-inventing the Nation's Urban Water Infrastructure (ReNUWIt): a four-university consortium that seeks more sustainable solutions to urban water challenges in the arid west; and The William and Cloy Codiga Resource Recovery Center (CR2C), a new facility for pilot-scale testing of resource recovery technology, will be operational in 2015.

The EFML focuses on transport and mixing processes in the surface and sub-surface environment using computation, laboratory experimentation and a global network of field sites

The John A. Blume Earthquake Engineering Center conducts research on earthquake engineering including advanced sensing and control, innovative materials, and risk hazard assessment.

Research and advanced global teamwork education is conducted in the Project Based Learning (PBL) Laboratory. In collaboration with the Department of Computer Science, the Center for Integrated Facility Engineering (CIFE) employs advanced CAD, artificial intelligence, communications concepts, and information management to integrate participants in the facility development process and to support design and construction automation. The Global Projects Center (GPC) is a multi-school, multi-university research program aimed at improving the performance of global engineering and construction projects, with a special focus on financing and governance of sustainable civil and social infrastructure projects. The Stanford Sustainable Systems Lab (S3L) aims to advance the state of the art in the design, monitoring and management of built environment systems, with a special focus on smart grid, smart buildings and smart infrastructures.

Programs of Graduate Study in Civil and Environmental Engineering Atmosphere/Energy Program

The Atmosphere/Energy Program in Civil and Environmental Engineering combines atmospheric science with energy science and engineering. The main goals of the program are to educate students and the public, through courses, research, and public outreach, about the causes of climate, air pollution, and weather problems and methods of addressing these problems through renewable and efficient energy systems. In addition, students learn about feedback between the atmosphere and renewable energy systems and the effects of the current energy infrastructure on the atmosphere.

Major focus areas of energy research include examining the resource availability of renewable energies, such as wind, solar, and wave, and studying optimal methods of combining renewable energies together to match energy supply with instantaneous demand. This type of work is generally done through a combination of data analysis, three-dimensional atmospheric computer modeling of wind, solar, wave, and hydroelectric power resources, and transmission load flow computer modeling. Other energy research, performed through three-dimensional computer modeling, focuses on the effects, for example, of hydrogen fuel cell vehicles on air pollution and the ozone layer and the effects of ethanol and diesel vehicles on air quality and climate. Studies also examine the feedback of wind turbines to the atmosphere and the effects of climate change on wind and solar energy resources.

Atmospheric research in the program generally involves laboratory work, field measurements, or three-dimensional computer modeling of the combined atmosphere, ocean, and land surface. An example of laboratory

work includes measuring the properties of organic particulate matter that forms in the atmosphere. Examples of fieldwork include measuring exposures to secondhand smoke, allergens, and emissions from building materials.

Computer modeling is performed at a variety of spatial scales, from the globe down to the size of a building or smaller. Some examples of modeling studies include examining the effects of air pollution particles on clouds, rainfall, water supply, ultraviolet radiation, the stratospheric ozone layer, and climate, simulating the dispersion of toxic contaminants in an urban street canyon, studying the effects of aircraft exhaust and biomass burning on climate, studying the effects of carbon dioxide domes over cities on air pollution mortality, and studying the leading causes of global warming and their impacts.

Environmental and Water Studies Programs

Environmental and Water Studies include subprograms in Environmental Engineering and Science and Environmental Fluid Mechanics and Hydrology, which includes environmental planning. Course offerings permit study in a single area or interrelated study between areas. Programs are flexible to foster interaction among students and encourage the development of individual programs. The Stanford laboratories for water quality control and environmental fluid mechanics are well equipped for advanced research and instruction.

Courses from other programs and departments complement our programs' course offerings. Examples include the Institute for Computational and Mathematical Engineering (applied math, numerical methods), Environmental Earth System Science (geostatistics, soil science, hydrogeology, oceanography), Mechanical Engineering (experimental methods, fluid mechanics, heat transfer), Energy Resources Engineering (reservoir engineering, well-test analysis), Statistics (probability and statistics), and the School of Law (natural resources law, environmental law).

Environmental Engineering and Science

The Environmental Engineering and Science (EES) subprogram emphasizes the chemical and biological processes involved in water quality engineering, pollution treatment, remediation, and environmental protection.

Course offerings include: the biological, chemical, and engineering aspects of water supply; the movement and fate of pollutants in surface and ground waters, soil, and the atmosphere; hazardous substance control; molecular environmental biotechnology; and water and air pollution. Companion courses in the Environmental Fluid Mechanics and Hydrology Program (EFMH) include environmental planning and impact assessment, and environmental fluid mechanics, hydrology, and transport modeling.

Environmental Fluid Mechanics and Hydrology

The Environmental Fluid Mechanics and Hydrology (EFMH) subprogram focuses on understanding, characterizing, and modeling the physical and biochemical processes, and their interaction, controlling the movement of mass, energy, and momentum in the water environment and the atmosphere. It also considers the planning, design, and implementation of water resources projects and systems, including environmental and institutional issues.

Environmental fluid mechanics courses address: experimental methods in the field and in the laboratory; fluid transport and mixing processes; the fluid mechanics of geophysical and stratified flows; natural flows in coastal waters, estuaries, lakes, and open channels; and hydrodynamic modeling. Hydrology courses consider flow and transport in porous

media, stochastic methods in both surface and subsurface hydrology, and watershed hydrology and modeling. Water resources courses address design principles and tools for systems incorporating urban and rural water supply, irrigation, hydropower, stormwater management, flood-damage mitigation, and hydrologic ecosystem services. Planning courses emphasize environmental policy implementation and sustainable water resources development.

The research of this group is focused in the Environmental Fluid Mechanics Laboratory, which includes the P. A. McCuen Environmental Computing Center, and a wide range of field sites.

Admission to Environmental Engineering and Science and Environmental Fluid Mechanics and Hydrology are handled separately; prospective students should indicate their preference on their application.

Sustainable Built Environment Program

The Sustainable Built Environment program includes subprograms in Structural Engineering and Geomechanics, and Sustainable Design and Construction. These programs focus on educating practitioners and researchers to plan, design, build, and operate more sustainable buildings and infrastructure.

The Structural Engineering and Geomechanics (SEG) subprogram educates designers and researchers who want to progress beyond traditional life safety code-based design, to develop and disseminate performance-based structural and geotechnical engineering methods and tools that maximize the lifecycle economic value of facilities.

The Sustainable Design and Construction (SDC) subprogram provides courses in sustainable, multi-stakeholder design methods and tools that incorporate lifecycle assessment, project planning and entitlement, green architectural design, lighting, and energy analysis, power systems, transportation, water supply and wastewater treatment to educate students interested in promoting more sustainable development of buildings and infrastructure.

Admission is managed separately for these two subprograms; prospective students should indicate their preference on their application.

Structural Engineering and Geomechanics

The Structural Engineering and Geomechanics (SEG) subprogram encompasses teaching and research in structural design and analysis, structural materials, earthquake engineering and structural dynamics, advanced sensing and structural health monitoring, risk and reliability analysis, computational science and engineering, solid mechanics, computational mechanics, and geomechanics. The SEG subprogram prepares students for industrial or academic careers.

Students can balance engineering fundamentals with modern computational and experimental methods to customize programs to launch careers as consultants on large and small projects, designers, and engineering analysts.

Structural design and analysis focuses on the conceptual design of structural systems and on computational methods for predicting the static and dynamic, linear and nonlinear responses of structures.

Structural materials research and teaching focuses on the design and analysis of high-performance as well as low-environmental impact materials.

Earthquake engineering and structural dynamics addresses earthquake phenomena, ground shaking, and the behavior, analysis, and design of structures under seismic and other dynamic forces.

Reliability and risk analysis focuses on assessing damage and losses to structures and lifeline systems under earthquakes, wind and other hazards;

insights from these assessments are used to engineer more sustainable structures and more resilient communities.

Computational science and engineering emphasizes the application of modern computing methods to structural engineering and geomechanics, and encompasses numerical, structural, and geotechnical analysis.

In the area of geomechanics, students focus on the application of the principles of computational and applied mechanics to problems involving geologic materials including soil and rock, as well as on the use of computational methods for analysis and design of foundations and earth structures.

Sustainable Design and Construction

The Sustainable Design and Construction (SDC-X) subprogram prepares students for careers in planning, designing, building, and operating sustainable buildings and infrastructure to maximize their lifecycle economic value, their net contribution to environmental functions and services, and their social equity.

The SDC-X subprogram offers courses in:

- Project finance
- Lifecycle assessment
- Sustainable multidisciplinary, multi-stakeholder planning and design processes
- Green architecture
- Performance-based structural design
- Building energy systems
- Renewable power generation and smart electrical grids
- Water supply
- Wastewater treatment
- Transportation development
- Sustainable construction materials and processes

Classes on cutting-edge information technology, sensor networks embedded in intelligent buildings and infrastructure, strategy, economics, entrepreneurship and organization design for new businesses, corporate or governmental initiatives aimed at enhancing the sustainability of buildings and infrastructure round out the subprogram

This subprogram is intended for students with undergraduate degrees in architecture, engineering, science, construction management, economics or business who wish to pursue careers that enhance the sustainability of the built environment.

Employers of past SDC graduates include: architectural and engineering design firms, constructors, design-build firms and developers focused on delivering green buildings and infrastructure; energy and sustainability consultants; facility management or sustainability departments within large companies; clean-tech start ups, and clean-tech venture funds.

There are four tracks in the SDC subprogram. All four SDC tracks have a common overarching structure and core that includes courses in construction engineering and management and introduces cutting edge metrics and tools to enhance lifecycle sustainability of the sustainable built environment. Each track then offers a different set of additional courses beyond the SDC core to support a specific career direction.

SDC Construction (SDC-C)

The SDC-C track includes courses in construction engineering and management and introduces advanced modeling and visualization methods and tools known as virtual design and construction. This track prepares technically qualified students for responsible engineering and management roles in all phases of the development of major constructed facilities. It emphasizes management techniques useful in organizing, planning, and controlling the activities of diverse specialists working within the unique

project environment of the construction industry, and it covers construction engineering aspects of heavy, industrial and building construction.

SDC-C offers courses in:

- Building systems
- Construction administration
- Construction law
- Project finance
- Accounting
- Real estate development
- Structural design
- Equipment and methods
- Estimating
- International construction
- Labor relations
- Managing human resources
- Planning and control techniques
- Productivity improvement
- Project and company organizations

Additional related course work is available from other programs within the department, from other engineering departments, and from other schools in the University such as Earth Sciences and the Graduate School of Business

SDC-C allows students substantial flexibility to tailor their program of study for careers with general contractors, specialty contractors, real estate or infrastructure developers or facility owners and operators.

SDC-Energy (SDC-E)

The SDC-Energy (SDC-E) track includes courses on design and construction of buildings and infrastructure systems to produce, distribute and consume energy sustainably. SDC-E prepares students for careers in design and construction of building energy systems, renewable power generating systems, and smart power grids connected to smart buildings and infrastructure, cleantech venture capital, sustainability-focused public policy, green real estate development, and sustainability management positions.

SDC-E includes courses from our department and several other departments at Stanford on sustainable HVAC design and construction of small scale and large structures, the planning, design and construction of renewable power systems, and sensing and control technologies to link integrated smart grids with intelligent buildings, data centers and infrastructure systems.

SDC-Structures (SDC-S)

The SDC-Structures (SDC-S) track includes courses from construction engineering and management and Structural Engineering and Geomechanics (SEG) to prepare students for careers in design and construction firms that provide integrated design-build project delivery, construction management, and pre-construction services.

This track prepares students for multidisciplinary collaborative teamwork in an integrated design and construction process. The subprogram extends a student's design or construction background with core courses in each of these areas and develops the background needed to understand the concerns and expertise of the many project stakeholders. It includes a comprehensive project-based learning experience.

The SDC-S track is intended for applicants with backgrounds in engineering and science. Applicants should also have a background in the planning, design, or construction of facilities by virtue of work experience and/or their undergraduate education. Knowledge in subjects from the traditional areas of civil engineering is necessary for students to receive the degree and to satisfy prerequisite requirements for some of the required graduate courses.

Students with an undergraduate degree in Civil Engineering, and who expect to pursue careers with design or construction firms that emphasize design-build, EPC, or turnkey projects should consider SDC-S.

SDC-Water (SDC-W)

The SDC-Water (SDC-W) track combines courses from our department's subprograms in Environmental Engineering and Science and Environmental Fluid Mechanics with courses on sustainable design and construction methods and tools. The SDC-W track prepares students for careers in sustainable design, construction and operation of both centralized systems and emerging distributed systems for water supply and water and waste treatment that integrate the production of energy and a grown stream of valuable bio-engineered products recovered from the waste stream.

This track offers courses in physical and chemical treatment processes for water and wastewater treatment, environmental biotechnology for use in water resource management and bioremediation, watershed and wetland management, environmental engineering design, and sustainable water resource development. Additional related course work is available from other programs within the department, including the Environmental Engineering and Science (EES) and Environmental Fluid Mechanics and Hydrology (EFMH) programs.

This track is intended for students with a background and interest in environmental engineering and fluid mechanics who wish to pursue careers in the development of sustainable water and waste treatment facilities with large integrated design-building firms or progressive governmental agencies in this sector.

Bachelor of Science in Civil Engineering

The B.S. in Civil Engineering is an ABET accredited program, which integrates research with engineering education. The B.S. in Civil Engineering offers the opportunity to focus on structures and construction, or on environmental and water studies. No new majors are being accepted for the B.S. in Environmental Engineering. Current Environmental Engineering majors should refer to the 2013-14 Bulletin for details. Any current Environmental Engineering major wishing ABET accreditation must graduate by June 2015.

Three educational objectives structure the Civil Engineering degree program. Graduates of the program are expected within a few years of graduation to have the ability to:

1. Establish themselves as practicing professionals in civil or environmental engineering or a related field.
2. Pursue graduate study in civil or environmental engineering or other fields.
3. Work effectively as responsible professionals alone or in teams handling increasingly complex professional and societal expectations.

Students who major in Civil Engineering must complete the appropriate requirements for the B.S. degree listed. Each student has elective units, which may be used in any way the student desires, including additional studies in the department of Civil and Environmental Engineering or any other school or department in the University. Because the undergraduate engineering curriculum provides breadth of study, students who intend to enter professional practice in civil engineering should plan to obtain their professional education at the graduate level.

A number of undergraduate programs at Stanford may be of interest to students seeking to specialize in environmental studies. In addition to the Environmental and Water Studies track within the Civil Engineering major, students may consider related programs in the department such as Atmosphere/Energy and Environmental Systems Engineering, as well as programs offered in other departments and schools such as Earth Systems,

Geological and Environmental Sciences, Urban Studies, and Human Biology.

Civil Engineering (CE)

Completion of the undergraduate program in Civil Engineering leads to the conferral of the Bachelor of Science in Civil Engineering.

Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodologies necessary for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate studies in engineering.

Requirements

	Units
Mathematics and Science	45
45 units minimum; see Basic Requirements 1 and 2 ¹	
Technology in Society	
One course; see Basic Requirement 4 ²	3-5
Engineering Fundamentals	
Three courses minimum, see Basic Requirement 3	
ENGR 14 Intro to Solid Mechanics	4
ENGR 90/CEE 70 Environmental Science and Technology Fundamentals Elective	3-5
Engineering Depth	
Minimum of 68 Engineering Fundamentals plus Engineering Depth; see Basic Requirement 5	
CEE 100 Managing Sustainable Building Projects ³	4
CEE 101A Mechanics of Materials	4
CEE 101B Mechanics of Fluids	4
CEE 101C Geotechnical Engineering	4
CEE 146A Engineering Economy	3
Specialty courses in either:	35-42
Environmental and Water Studies (see below)	
Structures and Construction (see below)	
Other School of Engineering Electives	3-0
Total Units	115-123

- ¹ Mathematics must include CME 100 Vector Calculus for Engineers/ CME 102 Ordinary Differential Equations for Engineers (or Math 51 Linear Algebra and Differential Calculus of Several Variables/ MATH 53 Ordinary Differential Equations with Linear Algebra) and a Statistics course. Science must include Physics 41 Mechanics; either ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology, CHEM31A Chemical Principles I or CHEM 31X Chemical Principles; two additional quarters in either chemistry or physics and GES 1A Introduction to Geology: The Physical Science of the Earth (or GES 1B or 1C); for students in the Environmental and Water Studies track, the additional chemistry or physics must include CHEM 33; for students in the Structures and Construction track, it must include PHYSICS 43 or 45.
- ² Chosen TiS class must specifically include an ethics component, such as ENGR 130 Science, Technology, and Contemporary Society, ENGR 131 Ethical Issues in Engineering, and MS&E 197 Ethics and Public Policy.
- ³ CEE 100 meets the Writing in the Major (WIM) requirement

Environmental and Water Studies Focus

	Units
ENGR 30 Engineering Thermodynamics ¹	3
CEE 101D Computations in Civil and Environmental Engineering ²	3
CEE 160 Mechanics of Fluids Laboratory	2
CEE 161A Rivers, Streams, and Canals	3-4
CEE 166A Watersheds and Wetlands	3
CEE 166B Floods and Droughts, Dams and Aqueducts	3
CEE 171 Environmental Planning Methods	3
CEE 172 Air Quality Management	3
CEE 177 Aquatic Chemistry and Biology	4
CEE 179A Water Chemistry Laboratory	3
CEE 179C Environmental Engineering Design (or CEE 169) Capstone design experience course	5
Remaining specialty units from:	
CEE 63 Weather and Storms ²	3
CEE 64 Air Pollution and Global Warming: History, Science, and Solutions ²	3
CEE 109 Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision	2
CEE 129 Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	3
CEE 155 Introduction to Sensing Networks for CEE	4
CEE 164 Introduction to Physical Oceanography	4
CEE 166D Water Resources and Water Hazards Field Trips	2
CEE 172A Indoor Air Quality	2-3
CEE 173A Energy Resources	4-5
CEE 174A Providing Safe Water for the Developing and Developed World	3
CEE 174B Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 176A Energy Efficient Buildings	3-4
CEE 176B Electric Power: Renewables and Efficiency	3-4
CEE 178 Introduction to Human Exposure Analysis	3
CEE 199 Undergraduate Research in Civil and Environmental Engineering	1-4

Structures and Construction Focus

		Units
CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 156	Building Systems	4
CEE 181	Design of Steel Structures	4
CEE 180	Structural Analysis	4
CEE 182	Design of Reinforced Concrete Structures	4
CEE 183	Integrated Civil Engineering Design Project	4
Select one of the following:		4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E	Introduction to Materials Science, Energy Emphasis	
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	
Remaining specialty units from:		
ENGR 15	Dynamics	4
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5
CEE 101D	Computations in Civil and Environmental Engineering	3
CEE 112A	Industry Applications of Virtual Design & Construction	2-4
CEE 112B	Industry Applications of Virtual Design & Construction	2-4
CEE 122A	Computer Integrated Architecture/Engineering/Construction	2
CEE 122B	Computer Integrated A/E/C	2
CEE 129	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	3
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 142A	Negotiating Sustainable Development	3
CEE 151	Negotiation	3
CEE 155	Introduction to Sensing Networks for CEE	4
CEE 160	Mechanics of Fluids Laboratory	2
CEE 161A	Rivers, Streams, and Canals	3-4
CEE 171	Environmental Planning Methods	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 195	Fundamentals of Structural Geology	3
CEE 196	Engineering Geology and Global Change	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4
CEE 203	Probabilistic Models in Civil Engineering	3-4
One of the following can also count as remaining specialty units.		3-4
CEE 120A	Building Information Modeling Workshop	2-4
or CEE 120B		
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	
CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting	
CEE 134B	Intermediate Arch Studio	

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Bachelor of Science in Environmental Systems Engineering

For undergraduate studies focusing on Environmental Engineering, two options are available. The undergraduate Civil Engineering major (which is ABET-accredited) offers an Environmental & Water Studies track, and the new Environmental Systems Engineering major (which is not ABET-accredited) offers a choice of focusing on coastal environments, freshwater environments, or urban environments.

Environmental Systems Engineering (EnvSE)

Completion of the undergraduate program in Environmental Systems Engineering leads to the conferral of the Bachelor of Science in Environmental Systems Engineering.

Environmental Engineering (ENV)

The program in Environmental Engineering has been discontinued. Students currently enrolled in this program should consult the previous year's Stanford Bulletin (<http://exploreddegrees.stanford.edu/archive/2012-13/schoolofengineering/civilandenvironmentalengineering/#bachelorofsciencetext-enviengi>) for program requirements (click on Environmental Engineering in the right hand menu). Any current Environmental Engineering major wishing ABET accreditation must graduate by June 2015.

Mission of the Undergraduate Program in Environmental Systems Engineering

The mission of the undergraduate program in Environmental Systems Engineering is to prepare students for incorporating environmentally sustainable design, strategies and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Courses in the program are multidisciplinary in nature, combining math/science/engineering fundamentals, and tools and skills considered essential for an engineer, along with a choice of one of three focus areas for more in-depth study: coastal environments, freshwater environments, or urban environments. This major offers the opportunity for a more focused curriculum than the Environmental and Water Studies concentration in the Civil Engineering degree program. The program of study, which includes a capstone experience, aims to equip engineering students to take on the complex challenges of the 21st Century involving natural and built environments, in consulting and industry as well as in graduate school.

Requirements

Mathematics and Science

See Basic Requirement 1 and 2¹ 36

Technology in Society (TiS)

One 3-5 unit course required, see Basic Requirement 4 3-5

Engineering Fundamentals

Three courses minimum (see Basic Requirement 3), including:

ENGR 70A Programming Methodology 5

(or ENGR 70X)

(req'd) plus one of the following courses:

ENGR 90 Environmental Science and Technology

(req'd for Freshwater and Coastal focus areas)

or		
ENGR 60	Engineering Economy	3
(req'd for Urban focus area)		
(or CEE 146A)		
plus one Engineering Fundamentals Elective		3-5
Fundamentals Tools/Skills ²		10
in Visual, Oral/Written Communication, and Modeling/Analysis		
Specialty Courses, in either		36
Coastal Environments (see Below)		
or Freshwater Environments (see Below)		
or Urban Environments (see Below)		
Total Units		96-100

¹ Math must include CME 100 Vector Calculus for Engineers (or MATH 51 Linear Algebra and Differential Calculus of Several Variables), and either a Probability/Statistics course or CME 102 Ordinary Differential Equations for Engineers (or MATH 53 Ordinary Differential Equations with Linear Algebra). Science must include PHYSICS 41 Mechanics; and either ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology, CHEM 31B Chemical Principles II or CHEM 31X Chemical Principles Accelerated (or PHYSICS 43 Electricity and Magnetism, for Urban track only).

² Fundamental Tools/Skills must include: (a) CEE 1 Introduction to Environmental Systems Engineering (offered AY 2015-16); (b) *at least* one Visual Communication class from CEE 31 Accessing Architecture Through Drawing / CEE 31Q Accessing Architecture Through Drawing, CEE 133F Principles of Freehand Drawing, ME 110 Design Sketching, ARTSTUDI 160 Design I : Fundamental Visual Language, or OSPPARIS 44 EAP: Analytical Drawing and Graphic Art; (c) *at least* one Oral/Written Communication class from ENGR 103 Public Speaking (or ORALCOMM 122 "The TED Commandments": The Art and Heart of Effective Public Speaking), ENGR 202W Technical Writing, CEE 151 Negotiation, EARTHSYS 195 Natural Hazards and Risk Communication or ENVRES 200 Sustaining Action: Research, Analysis and Writing for the Public; and (d) *at least* one Modeling/Analysis class from CEE 155 Introduction to Sensing Networks for CEE, CEE 120A Building Information Modeling Workshop (or CEE 120B Building Information Modeling Workshop), CEE 226 Life Cycle Assessment for Complex Systems, EARTHSYS 144 Fundamentals of Geographic Information Science (GIS), ENERGY 160 Modeling Uncertainty in the Earth Sciences, CEE 101D Computations in Civil and Environmental Engineering (if not counted as Math), or CEE 211 Introduction to Programming for Scientists and Engineers (or EARTHSYS 211 Fundamentals of Modeling).

Urban Environments Focus Area (36 units)

Required		
CEE 100	Managing Sustainable Building Projects	4
CEE 101B	Mechanics of Fluids	4
CEE 176A	Energy Efficient Buildings	3-4
Electives		
Building Systems		
CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	4
CEE 156	Building Systems	4
Energy Systems		
CEE 173A	Energy Resources	3-5
CEE 176B	Electric Power: Renewables and Efficiency	3-4

ENERGY 171	Energy Infrastructure, Technology and Economics	3
or		
ENERGY 191	Optimization of Energy Systems	3-4
Water Systems		
CEE 166A	Watersheds and Wetlands	3
CEE 166B	Floods and Droughts, Dams and Aqueducts	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
Urban Planning		
CEE 171	Environmental Planning Methods	3
CEE 177L	Smart Cities & Communities	2-3
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	5
or		
URBANST 164	Sustainable Cities	4-5
or		
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
Capstone		
CEE 112A	Industry Applications of Virtual Design & Construction	2-4
-and-		
CEE 112B	Industry Applications of Virtual Design & Construction	2-4
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 221A	Planning Tools and Methods in the Power Sector	3-4
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	2-3

Freshwater Environments Focus Area (36 units)

Required		
CEE 101B	Mechanics of Fluids	4
CEE 177	Aquatic Chemistry and Biology	4
CEE 166A	Watersheds and Wetlands	3
or		
CEE 174A	Providing Safe Water for the Developing and Developed World	3
(if not counted as a req'd course)		
Electives		
CEE 160	Mechanics of Fluids Laboratory	2
CEE 161A	Rivers, Streams, and Canals	3-4
CEE 165C	Water Resources Management	3
CEE 166A	Watersheds and Wetlands	3
(if not counted as req'd course)		
CEE 166B	Floods and Droughts, Dams and Aqueducts	3
CEE 166D	Water Resources and Water Hazards Field Trips	2
CEE 171	Environmental Planning Methods	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 179A	Water Chemistry Laboratory	3
CEE 265A	Sustainable Water Resources Development	3
EARTHSYS 140	The Energy-Water Nexus	3

EARTHSYS 156	Soil and Water Chemistry	1-4
Capstone		
CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

Coastal Environments Focus Area (36 units)

Required

CEE 101B	Mechanics of Fluids	4
CEE 164	Introduction to Physical Oceanography	4
CEE 175A	California Coast: Science, Policy, and Law	3-4

Electives

CEE 160	Mechanics of Fluids Laboratory	2
CEE 166A	Watersheds and Wetlands	3
CEE 171	Environmental Planning Methods	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 272	Coastal Contaminants	3-4
BIO 30	Ecology for Everyone	4
EARTHSYS 8	The Oceans: An Introduction to the Marine Environment	3

or

GES 8	Oceanography: An Introduction to the Marine Environment	3
EARTHSYS 141	Remote Sensing of the Oceans	3-4
EARTHSYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
EARTHSYS 151	Biological Oceanography	3-4
to be taken concurrently with		
EARTHSYS 152	Marine Chemistry	3-4
EARTHSYS 156M	Marine Resource Economics and Conservation	5

Capstone (1 class req'd)

CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Honors Program

This program leads to a B.S. with honors for undergraduates majoring in Civil Engineering or in Environmental Systems Engineering. It is designed to encourage qualified students to undertake a more intensive study of civil and environmental engineering than is required for the normal majors through a substantial, independent research project.

The program involves an in-depth research study in an area proposed to and agreed to by a Department of Civil and Environmental Engineering faculty adviser and completion of a thesis of high quality. A written proposal

for the research to be undertaken must be submitted and approved by the faculty advisor in the fourth quarter prior to graduation. At the time of application, the student must have an overall grade point average (GPA) of at least 3.3 for course work at Stanford; this GPA must be maintained to graduation. The thesis is supervised by a CEE faculty adviser and must involve input from the School of Engineering writing program by means of ENGR 202S Writing: Special Projects or its equivalent. The written thesis must be approved by the thesis adviser. Students are encouraged to present their results in a seminar for faculty and students. Up to 10 units of CEE 199H Undergraduate Honors Thesis, may be taken to support the research and writing (not to duplicate ENGR 202S). These units are beyond the normal Civil Engineering or Environmental Systems Engineering major program requirements.

Minor in Civil Engineering or Environmental Systems Engineering

The department offers a minor in Civil Engineering and a minor in Environmental Systems Engineering. Departmental expertise and undergraduate course offerings are available in the areas of architectural design, construction engineering, construction management, structural/geotechnical engineering, environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The courses required for the minors typically have prerequisites. Minors are not ABET-accredited programs.

Civil Engineering (CE) Minor

The civil engineering minor is intended to give students a focused introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Architectural Design, Construction Engineering and Management, and Structural and Geotechnical Engineering. Students interested in Environmental and Water Studies should refer to the Environmental Systems Engineering minor.

The minimum prerequisite for a civil engineering minor is MATH 42 Calculus (or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. The minimum prerequisite for a Civil Engineering minor focusing on architectural design is MATH 41 Calculus (or MATH 19 Calculus) and a course in Statistics. Students should recognize that a minor in civil engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, and the field itself is so broad, no single set of course requirements will be appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information, including example minor programs, are provided on the CEE web site (http://cee.stanford.edu/prospective/undergrad/minor_overview.html) and in Chapter 6 of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

General guidelines are:

1. A civil engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
2. The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are given on the CEE webpage.

Professor Anne Kiremidjian (kiremidjian@stanford.edu) is the CEE undergraduate minor adviser in Structural Engineering and Construction

Engineering and Management. John Barton (jhbarton@stanford.edu), Program Director for Architectural Design, is the undergraduate minor adviser in Architectural Design. Students must consult the appropriate adviser when developing their minor program, and obtain approval of the finalized study list from them.

Environmental Systems Engineering (EnvSE) Minor

The Environmental Systems Engineering minor is intended to give students a focused introduction to one or more areas of Environmental Systems Engineering. Departmental expertise and undergraduate course offerings are available in the areas of environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The minimum prerequisite for an Environmental Systems Engineering minor is MATH 42 Calculus (or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. Students should recognize that a minor in Environmental Systems Engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining an environmental systems engineering minor, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information on preparing a minor program is available in the Undergraduate Engineering Handbook (<http://ughb.stanford.edu>).

General guidelines are—

- An Environmental Systems Engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
- The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are available on the CEE web site (http://cee.stanford.edu/prospective/undergrad/minor_overview.html).

Professor Lynn Hildemann (hildemann@stanford.edu) is the CEE undergraduate minor adviser in Environmental Systems Engineering. Students must consult with Professor Hildemann in developing their minor program, and obtain approval of the finalized study list from her.

Coterminal B.S./M.S. Program in Civil and Environmental Engineering

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminal program at Stanford must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit their application no later than the quarter prior to the expected completion of their undergraduate degree and are expected to meet the Department of Civil and Environmental Engineering application deadlines for coterminal applicants for graduate study (January 16, 2015). Applications are considered once a year during Winter Quarter. An application must display evidence of potential for strong academic performance as a graduate student.

It is recommended that students who contemplate advanced study at Stanford discuss their plans with their advisers in the junior year.

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University

application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Master of Science in Civil and Environmental Engineering

The following programs are available leading to the M.S. degree in Civil and Environmental Engineering:

- Atmosphere/Energy
- Environmental Engineering and Science
- Environmental Fluid Mechanics and Hydrology
- Geomechanics
- Structural Engineering
- Sustainable Design and Construction

Students admitted to graduate study with a B.S. in Civil Engineering, or equivalent, from an accredited curriculum can satisfy the requirements for the M.S. degree in Civil and Environmental Engineering by completing a minimum of 45 units beyond the B.S. All 45 units must be taken at Stanford. A minimum 2.75 grade point average (GPA) is required for candidates to be recommended for the M.S. degree. No thesis is required.

The program of study must be approved by the faculty of the department and should include at least 45 units of courses in engineering, mathematics, science, and related fields unless it can be shown that other work is pertinent to the student's objectives. Additional program area requirements are available on the department web site and from the department's student services office (Y2E2 room 316).

Candidates for the M.S. in Civil and Environmental Engineering who do not have a B.S. in Civil Engineering may, in addition to the above, be required to complete those undergraduate courses deemed important to their graduate programs. In such cases, more than three quarters is often required to obtain the degree.

Engineer in Civil and Environmental Engineering

A student with an M.S. in Civil Engineering may satisfy the requirements of the degree of Engineer in Civil and Environmental Engineering by completing 45 unduplicated course work and research units for a total of 90 units. Engineer candidates must submit an acceptable thesis (12-15 units) and maintain a minimum GPA of 3.0. The program of study must be approved by a faculty member in the department.

This degree is recommended for those desiring additional graduate education, especially those planning a career in professional practice. The thesis normally should be started in the first quarter of graduate study after the M.S. degree. Programs are offered in the fields of specialization mentioned for the M.S. degree. For students who will continue study toward a CEE Ph.D., the Engineer thesis topic must be significantly different from their doctoral research.

Graduate students who lack adequate background in their area of specialization (e.g. lack a prior degree in civil engineering, if required in their program) or who are not full-time students should expect to be enrolled for more than two years. Engineer degree candidates should develop individually tailored expected-progress timetables in consultation with their program advisers.

For graduate students not currently attending Stanford, admission to study for the Engineer degree in the Department of Civil and Environmental Engineering begins with the office of Graduate Admissions (<http://www.stanford.edu/home/admission/index/html>).

If you are currently pursuing a graduate degree at Stanford, and wish to apply for the Engineer degree program, submit an Application for Post-

Masters Study (available in the department office, Y2E2 Room 314). This form is typically filed during your second quarter of graduate study, preferably before January 1, so that your application may be reviewed during the normal graduate admissions cycle. You may apply at a later date if your adviser feels that it is appropriate to do so.

A minimum of 90 quarter units of full-time graduate study (or equivalent part-time graduate study) is required for the Engineer degree. For most students, the master's degree supplies 45 of these units.

If your master's degree was obtained at another school, you can apply to transfer up to 45 quarter units of residency credit by completing an Application for Transfer Credit for Graduate Work Done Elsewhere. No units need to be transferred if you hold an M.S. degree from Stanford.

Doctor of Philosophy in Civil and Environmental Engineering

The Ph.D. is offered under the general regulations of the University as set forth in the "Graduate Degrees" section of this bulletin. This degree is recommended for those who expect to engage in a professional career in research, teaching, or technical work of an advanced nature. The Ph.D. program requires a total of 135 units of graduate study, at least 90 units of which must be at Stanford. Up to 45 units of graduate study can be represented by the M.S. program described above. Students must maintain a minimum GPA of 3.0 in post-M.S. course work. All candidates for the Ph.D. degree are required to complete CEE 200 in conjunction with a one-quarter teaching assistantship/course assistantship to gain training and instructional experience. Further information on Ph.D. requirements and regulations is found in the department Graduate Handbook.

The program of study is arranged by the prospective candidate at the beginning of the second year with the advice of a faculty committee whose members are nearest in the field of interest to that of the student. The chair of the committee serves as the student's interim adviser until such time as a member of the faculty has agreed to direct the dissertation research. Insofar as possible, the program of study is adapted to the interests and needs of the student within the framework of the requirements of the department and the University.

By the end of the second year of graduate study (or by the end of the first year for students who enroll at Stanford with an M.S.), the student is expected to pass the department's General Qualifying Examination (GQE) to be admitted to candidacy for the doctoral degree. The purpose of the GQE is to ensure that the student is adequately prepared to undertake doctoral research and has a well planned research topic. The exam may take the form of (1) a written and/or oral general examination of the candidate's major field, (2) a presentation and defense of the candidate's doctoral research dissertation proposal, or (3) a combination research proposal and general examination. The GQE is administered by an advisory committee consisting of at least three Stanford faculty members, including a chair who is a faculty member in Civil and Environmental Engineering. All members are normally on the Stanford Academic Council. A petition for appointment of one advisory committee member who is not on the Academic Council may be made if the proposed person contributes an area of expertise that is not readily available from the faculty. Such petitions are subject to approval by the department chair. When the primary research adviser is not a member of the CEE Academic Council faculty, the committee must consist of four examiners, with two members from the CEE department.

Ph.D. Minor in Civil and Environmental Engineering

A Ph.D. minor is a program outside a major department. Requirements for a minor are established by the minor department. Acceptance of the minor as part of the total Ph.D. program is determined by the major department.

Application for the Ph.D. minor must be approved by both the major and the minor department, and the minor department must be represented at the University oral examination.

A student desiring a Ph.D. minor in Civil and Environmental Engineering (CEE) must have a minor program adviser who is a regular CEE faculty member in the program of the designated subfield. This adviser must be a member of the student's University oral examination committee and the reading committee for the doctoral dissertation.

The program must include at least 20 units of graduate-level course work (courses numbered 200 or above, excluding special studies and thesis) in CEE completed at Stanford University. Units taken for the minor cannot be counted as part of the 45 unduplicated units for the PhD major. The list of courses must form a coherent program and must be approved by the minor program adviser and the CEE chair. A minimum GPA of 3.0 must be achieved in these courses.

Emeriti: (Professors) Joseph B. Franzini, Gilbert M. Masters*, Perry L. McCarty*, Henry W. Parker, Martin Reinhard*, Hareesh C. Shah, Robert L. Street*, Clyde B. Tatum*, Paul M. Teicholz

Chair: Stephen G. Monismith

Associate Chair: Sarah Billington

Professors: Sarah L. Billington, Ronaldo I. Borja (on leave Aut), Craig S. Criddle, Gregory G. Deierlein (on leave Win, Spr), Martin A. Fischer, Lynn M. Hildemann, Mark Z. Jacobson, Anne S. Kiremidjian (on leave Spr), Peter K. Kitanidis (on leave Win, Spr), Jeffrey R. Koseff, Kincho H. Law, James O. Leckie, Raymond E. Levitt (on leave Aut, Win), Richard G. Luthy, Stephen G. Monismith, Leonard Ortolano (on leave Autumn), Alfred M. Spormann

Associate Professors: Jack W. Baker, Alexandria B. Boehm, Jennifer Davis, David L. Freyberg, Oliver B. Fringer, Eduardo Miranda, William A. Mitch

Assistant Professors: Michael D. Lepech, Christian Linder, Ram Rajagopal

Courtesy Professors: Peter M. Pinsky, David D. Pollard

Courtesy Associate Professor: Margot G. Gerritsen

Courtesy Assistant Professor: Karen L. Casciotti

Lecturers: Cassiana Aaronson Wright, Michael Azgour, Deborah Ballati, John H. Barton II, Terry Beaubois, Thomas Beischer, Christopher Burmester, Alex Chase, Beverly Choe Harris, Stanley F. Christensen, Peter L. Datin, Charles Debbas, Derek Fong, Jack Fuchs, Renate Fruchter, Robert R. Groves, James Hawk, Kenneth D. Hayes, Geza T. Kisch, Glenn Katz, Sunil Kishnani, Michael Lyons, David N. Kleiman, Nelson A. Koen Cohen, Erik Kolderup, John Koester, Royal J. Kopperud, John C. Kunz, Amy Larimer, Ashby Monk, Ryan J. Orr, Alexander P. Robertson, Peter Rumsey, Jon R. Wren, Ethen J. Wood

Consulting Professors: Vladimir Bazjanac, Calvin K. Kam, James E. Cloern, Angelos N. Findikakis, Gary E. Griggs, Robert F. Hickey, Thomas L. Holzer, Michael C. Kavanaugh, Martin W. McCann, Jr., William McDonough, Paul K. Meyer, Piotr D. Moncarz, Wayne R. Ott, Benedict R. Schwegler, Jr, Avram S. Tucker, Antonio L. Vives, Michael W. Walton, Jane Woodward

Consulting Associate Professors: Edward S. Gross, Gloria T. Lau, Karl Knapp, Colin Ong, Ryan J. Orr, Joel N. Swisher, Jie Wang

Shimizu Visiting Professor: Jennifer Whyte

UPS Visiting Associate Professor: Angela Lin

* Recalled to active duty.

Overseas Studies Courses in Civil and Environmental Engineering

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms	4-5

Note: OSPAUSTL 10 may count towards the ENVEN-BS and the CE-BS with Specialty in Environmental & Water Studies, however it does not count towards the CE-BS with Specialty in Structures & Construction.

Computer Science

Courses offered by the Department of Computer Science are listed under the subject code CS on the *Stanford Bulletin's* ExploreCourses (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CS&filter-catalognumber-CS=on&filter-coursestatus-Active=on>) web site.

The Department of Computer Science (CS) operates and supports computing facilities for departmental education, research, and administration needs. All CS students have access to the departmental student machine for general use (mail, news, etc.), as well as computer labs with public workstations located in the Gates Building. In addition, most students have access to systems located in their research areas.

Each research group in Computer Science has systems specific to its research needs. These systems include workstations (PCs, Macs), multi-CPU computer clusters, and local mail and file servers. Servers and workstations running Linux or various versions of Windows are commonplace. Support for course work and instruction is provided on systems available through Information Technology Services (<http://itservices.stanford.edu>) (ITS) and the School of Engineering (<http://engineering.stanford.edu>) (SoE).

Mission of the Undergraduate Program in Computer Science

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer sciences, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and

applications. The program prepares students for careers in government, law, and the corporate sector, and for graduate study.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to:

1. Apply the knowledge of mathematics, science, and engineering.
2. Design and conduct experiments, as well to analyze and interpret data.
3. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. Function on multidisciplinary teams.
5. Identify, formulate, and solve engineering problems.
6. Understand professional and ethical responsibility.
7. Communicate effectively.
8. Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. Demonstrate a working knowledge of contemporary issues.
10. Apply the techniques, skills, and modern engineering tools necessary for engineering practice.
11. Transition from engineering concepts and theory to real engineering application.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work in the foundational elements of the field and in at least one graduate specialization. Areas of specialization include artificial intelligence, biocomputation, computer and network security, human-computer interaction, information management and analytics, mobile and internet computing, real-world computing, software theory, systems, and theoretical computer science.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Computer Science and related fields.

Graduate Programs in Computer Science

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Computer Science Course Catalog Numbering System

The first digit of a CS course number indicates its general level of sophistication:

Digit	Description
001-099	Service courses for nontechnical majors
100-199	Other service courses, basic undergraduate
200-299	Advanced undergraduate/beginning graduate
300-399	Advanced graduate

400-499	Experimental
500-599	Graduate seminars

The tens digit indicates the area of Computer Science it addresses:

Digit	Description
00-09	Introductory, miscellaneous
10-19	Hardware and Software Systems
20-39	Artificial Intelligence
40-49	Software Systems
50-59	Mathematical Foundations of Computing
60-69	Analysis of Algorithms
70-79	Computational Biology and Interdisciplinary Topics
90-99	Independent Study and Practicum

Bachelor of Science in Computer Science

The department offers both a major in Computer Science and a minor in Computer Science. Further information is available in the *Handbook for Undergraduate Engineering Programs* published by the School of Engineering. The Computer Science major offers a number of tracks (programs of study) from which students can choose, allowing them to focus their program on the areas of most interest. These tracks also reflect the broad diversity of areas in computing disciplines. The department has an honors program, which is described in the following section.

In addition to Computer Science itself, Stanford offers several interdisciplinary degrees with a substantial computer science component. The Symbolic Systems major (in the School of Humanities and Sciences) offers an opportunity to explore computer science and its relation to linguistics, philosophy, and psychology. The Mathematical and Computational Sciences major (also Humanities and Sciences) allows students to explore computer science along with more mathematics, statistics, and operations research.

Computer Science (CS)

Completion of the undergraduate program in Computer Science leads to the conferral of the Bachelor of Science in Computer Science.

Mission of the Undergraduate Program in Computer Science

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer sciences, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, and the corporate sector, and for graduate study.

Requirements

Mathematics (26 units minimum)—

CS 103	Mathematical Foundations of Computing ¹	5
CS 109	Introduction to Probability for Computer Scientists ²	5

MATH 41	Calculus	10
& MATH 42	and Calculus ³	

Plus two electives⁴

Science (11 units minimum)—

PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4

Science elective⁵ 3

Technology in Society (3-5 units)—

One course; see Basic Requirement 4

Engineering Fundamentals (13 units minimum; see Basic Requirement 3)—

CS 106B	Programming Abstractions	5
or CS 106X	Programming Abstractions (Accelerated)	
ENGR 40	Introductory Electronics ⁴	5
or ENGR 40A or 40M*		
Fundamentals Elective (may not be 70A, B, or X)		3-5

*Students who take ENGR 40A or 40M for fewer than 5 units are required to take 1-2 additional units of ENGR Fundamentals (13 units minimum), or 1-2 additional units of Depth (27 units minimum for track and elective courses).

Writing in the Major—

Select one of the following:

CS 181W	Computers, Ethics, and Public Policy
CS 191W	Writing Intensive Senior Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294W	Writing Intensive Research Project in Computer Science

Computer Science Core (15 units)—

CS 107	Computer Organization and Systems	5
CS 110	Principles of Computer Systems	5
CS 161	Design and Analysis of Algorithms	5

Computer Science Depth B.S.

Choose one of the following ten CS degree tracks (a track must consist of at least 25 units and 7 classes):

Artificial Intelligence Track

		Units
CS 221	Artificial Intelligence: Principles and Techniques	4
Select two of the following:		6-8
CS 223A	Introduction to Robotics	
CS 224M	Multi-Agent Systems	
CS 224N	Natural Language Processing	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 131	Computer Vision: Foundations and Applications	

or CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
One additional course from the list above or the following:		3-4
CS 124	From Languages to Information	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	
CS 222	Rational Agency and Intelligent Interaction	
CS 224S	Spoken Language Processing	
CS 224U	Natural Language Understanding	
CS 224W	Social and Information Networks	
CS 225A	Experimental Robotics	
CS 225B	Robot Programming Laboratory	
CS 227B	General Game Playing	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
CS 231B	The Cutting Edge of Computer Vision	
CS 231M	Mobile Computer Vision	
CS 262	Computational Genomics	
CS 276	Information Retrieval and Web Search	
CS 277	Experimental Haptics	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
CS 329	Topics in Artificial Intelligence (with adviser consent)	
CS 331A	Advanced Reading in Computer Vision	
CS 374	Algorithms in Biology	
CS 379	Interdisciplinary Topics (with adviser consent)	
EE 263	Introduction to Linear Dynamical Systems	
EE 376A	Information Theory	
ENGR 205	Introduction to Control Design Techniques	
ENGR 209A	Analysis and Control of Nonlinear Systems	
MSE 251	Stochastic Control	
MSE 351	Dynamic Programming and Stochastic Control	
STATS 315A	Modern Applied Statistics: Learning	
STATS 315B	Modern Applied Statistics: Data Mining	
Track Electives (at least three additional courses from the above lists, or the general CS electives list, or the following): ⁵		9-13
CS 275	Translational Bioinformatics	
CS 334A	Convex Optimization I	
or EE 364A	Convex Optimization I	
EE 364B	Convex Optimization II	
ECON 286	Game Theory and Economic Applications	
MSE 252	Decision Analysis I: Foundations of Decision Analysis	
MSE 352	Decision Analysis II: Professional Decision Analysis	
MSE 355	Influence Diagrams and Probabilistic Networks	
PHIL 152	Computability and Logic	
PSYCH 202	Cognitive Neuroscience	
PSYCH 204A	Human Neuroimaging Methods	
PSYCH 204B	Computational Neuroimaging: Analysis Methods	
STATS 200	Introduction to Statistical Inference	
STATS 202	Data Mining and Analysis	
STATS 205	Introduction to Nonparametric Statistics	

Biocomputation Track—

The Mathematics, Science, and Engineering Fundamentals requirements are non-standard for this track. See Handbook for Undergraduate Engineering Programs for details.

Select one of the following:		3-4
CS 121	(Not given this year)	
CS 221	Artificial Intelligence: Principles and Techniques	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	

Select one of the following:		
CS 173	A Computational Tour of the Human Genome	
or CS 273A	A Computational Tour of the Human Genome	
CS 262	Computational Genomics	
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 274	Representations and Algorithms for Computational Molecular Biology	
CS 275	Translational Bioinformatics	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	

One additional course from the lists above or the following:		3-4
CS 124	From Languages to Information	
CS 145	Introduction to Databases	
CS 147	Introduction to Human-Computer Interaction Design	
CS 148	Introduction to Computer Graphics and Imaging	
CS 248	Interactive Computer Graphics	

One course from either the general CS electives list, BIOE 101, or the list of Biomedical Computation (BMC) Informatics electives (see <http://bmc.stanford.edu> and select Informatics from the elective options)⁵

One course from the BMC Informatics elective list	3-4
One course from either the BMC Informatics, Cellular/Molecular, or Organs/Organisms electives lists	3-5
One course from either the BMC Cellular/Molecular or Organs/Organisms electives lists	3-5

Computer Engineering Track—

EE 108 & EE 180	Digital System Design and Digital Systems Architecture	Units 6-8
Select two of the following:		8
EE 101A	Circuits I	
EE 101B	Circuits II	
EE 102A	Signal Processing and Linear Systems I	
EE 102B	Signal Processing and Linear Systems II	
Satisfy the requirements of one of the following concentrations:		
1) Digital Systems Concentration		
CS 140	Operating Systems and Systems Programming	
or CS 143	Compilers	
EE 109	Digital Systems Design Lab	
EE 271	Introduction to VLSI Systems	

Select two of the following if not counted above (6-8 units):

CS 140 Operating Systems and Systems Programming
or CS 143 Compilers

CS 144 Introduction to Computer Networking

CS 149 Parallel Computing

CS 240E

CS 244 Advanced Topics in Networking

EE 273 Digital Systems Engineering

EE 282 Computer Systems Architecture

2) Robotics and Mechatronics Concentration

CS 205A Mathematical Methods for Robotics, Vision, and Graphics

CS 223A Introduction to Robotics

ME 210 Introduction to Mechatronics

ENGR 105 Feedback Control Design

Select one of the following (3-4 units):

CS 225A Experimental Robotics

CS 225B Robot Programming Laboratory

CS 231A Computer Vision: From 3D Reconstruction to Recognition

CS 235 (Not given this year)

CS 277 Experimental Haptics

ENGR 205 Introduction to Control Design Techniques

ENGR 207A Linear Control Systems I

ENGR 207B Linear Control Systems II

3) Networking Concentration

CS 140 Operating Systems and Systems Programming
& CS 144 and Introduction to Computer Networking

Select three of the following (9-11 units):

CS 240 Advanced Topics in Operating Systems

CS 240E

CS 244 Advanced Topics in Networking

CS 244B Distributed Systems

CS 244E Networked Wireless Systems

CS 249A Object-Oriented Programming from a Modeling and Simulation Perspective

CS 249B Large-scale Software Development

EE 179 Analog and Digital Communication Systems

Graphics Track—

CS 148	Introduction to Computer Graphics and Imaging & CS 248	8
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Select one of the following: ⁶ 3-5

CS 205A Mathematical Methods for Robotics, Vision, and Graphics

CME 104 Linear Algebra and Partial Differential Equations for Engineers

CME 108 Introduction to Scientific Computing

MATH 52 Integral Calculus of Several Variables

MATH 113 Linear Algebra and Matrix Theory

Select two of the following: 6-8

CS 164 Computing with Physical Objects: Algorithms for Shape and Motion

CS 178 Digital Photography

CS 205B Mathematical Methods for Fluids, Solids, and Interfaces

CS 231A Computer Vision: From 3D Reconstruction to Recognition

or CS 131 Computer Vision: Foundations and Applications

CS 268 Geometric Algorithms

CS 348A

CS 348B Computer Graphics: Image Synthesis Techniques

CS 448 Topics in Computer Graphics

CS 478 (Not given this year)

Track Electives: at least two additional courses from the lists above, the 6-8 general CS electives list, or the following: ⁵

ARTSTUDI Design I : Fundamental Visual Language
160

ARTSTUDI Introduction to Photography
170

ARTSTUDI Digital Art I
179

CS 48N (Not given this year)

CME 302 Numerical Linear Algebra

CME 306 Numerical Solution of Partial Differential Equations

EE 262 Two-Dimensional Imaging

EE 264 Digital Signal Processing

EE 278 Introduction to Statistical Signal Processing

EE 368 Digital Image Processing

ME 101 Visual Thinking

PSYCH 30 Introduction to Perception

PSYCH 221 Applied Vision and Image Systems

Human-Computer Interaction Track—

CS 147	Introduction to Human-Computer Interaction Design	4
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Select one of the following: 4

CS 247 Human-Computer Interaction Design Studio

CS 377 Topics in Human-Computer Interaction

CS 448B Data Visualization

CS 210A Software Project Experience with Corporate Partners

Select one of the following: 3-6

PSYCH 30 Introduction to Perception

PSYCH 45 Introduction to Learning and Memory

PSYCH 50 Introduction to Cognitive Neuroscience

PSYCH 70 Introduction to Social Psychology

PSYCH 75 Introduction to Cultural Psychology

PSYCH 131 Language and Thought

PSYCH 154 Judgment and Decision-Making

PSYCH 252 Statistical Methods for Behavioral and Social Sciences

ME 101 Visual Thinking

Or any MS&E 18*

Select one of the following: 3-4

CS 108 Object-Oriented Systems Design

CS 124 From Languages to Information

CS 140 Operating Systems and Systems Programming

CS 142 Web Applications

CS 221 Artificial Intelligence: Principles and Techniques

CS 229 Machine Learning

CS 229A	(Not given this year)	
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	
Select one of the following:		3-4
CS 148	Introduction to Computer Graphics and Imaging	
CS 376	Human-Computer Interaction Research	
CS 378	(Not given this year)	
Track Electives: at least two additional courses from the lists above, the general CS electives list, or the following: ⁵		6-9
ARTSTUDI 160	Design I : Fundamental Visual Language	
COMM 169	Computers and Interfaces	
CS 476A	Music, Computing, and Design I: Software Paradigms for Computer Music	
ME 115A	Introduction to Human Values in Design	
ME 115B	Product Design Methods	
SYMSYS 245	Cognition in Interaction Design	

Information Track—

		Units
CS 124	From Languages to Information	4
CS 145	Introduction to Databases	4
Two courses, from different areas:		6-9
1) Information-based AI applications		
CS 224N	Natural Language Processing	
CS 224S	Spoken Language Processing	
CS 229	Machine Learning	
CS 229A	(Not given this year)	
2) Database and Information Systems		
CS 140	Operating Systems and Systems Programming	
CS 142	Web Applications	
CS 245	Database Systems Principles	
CS 246	Mining Massive Data Sets	
CS 341	Project in Mining Massive Data Sets	
CS 345	(Offered occasionally)	
CS 346	Database System Implementation	
CS 347	Parallel and Distributed Data Management	
3) Information Systems in Biology		
CS 262	Computational Genomics	
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 274	Representations and Algorithms for Computational Molecular Biology	
4) Information Systems on the Web		
CS 224W	Social and Information Networks	
CS 276	Information Retrieval and Web Search	
CS 364B	(Not given this year)	
At least three additional courses from the above areas or the general CS electives list. ⁵		

Systems Track—

		Units
CS 140	Operating Systems and Systems Programming	4
Select one of the following:		3-4
CS 143	Compilers	
EE 180	Digital Systems Architecture	

Two additional courses from the list above or the following:		6-8
CS 144	Introduction to Computer Networking	
CS 145	Introduction to Databases	
CS 149	Parallel Computing	
CS 155	Computer and Network Security	
CS 240	Advanced Topics in Operating Systems	
CS 242	Programming Languages	
CS 243	Program Analysis and Optimizations	
CS 244	Advanced Topics in Networking	
CS 245	Database Systems Principles	
EE 271	Introduction to VLSI Systems	
EE 282	Computer Systems Architecture	

Track Electives: at least three additional courses selected from the list above, the general CS electives list, or the following:⁵

CS 240E		
CS 244C	Readings and Projects in Distributed Systems	
CS 244E	Networked Wireless Systems	
CS 315A	Parallel Computer Architecture and Programming	
or CS 316	Advanced Multi-Core Systems	
CS 341	Project in Mining Massive Data Sets	
CS 343	(Not given this year)	
CS 344	Topics in Computer Networks	
CS 344E	Advanced Wireless Networks	
CS 345	(Offered occasionally)	
CS 346	Database System Implementation	
CS 347	Parallel and Distributed Data Management	
CS 349	Topics in Programming Systems (with permission of undergraduate advisor)	
CS 448	Topics in Computer Graphics	
EE 382C	Interconnection Networks	
EE 384A	Internet Routing Protocols and Standards	
EE 384B	Multimedia Communication over the Internet	
EE 384C	Wireless Local and Wide Area Networks	
EE 384S	Performance Engineering of Computer Systems & Networks	
EE 384X	Packet Switch Architectures	

Theory Track—

		Units
CS 154	Introduction to Automata and Complexity Theory	4
Select one of the following:		3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	
CS 167	(Not given this year)	
CS 168	The Modern Algorithmic Toolbox	
CS 255	Introduction to Cryptography	
CS 258	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	
CS 264	Beyond Worst-Case Analysis	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 268	Geometric Algorithms	
CS 361A	Advanced Algorithms	
CS 361B	Advanced Algorithms	
Two additional courses from the list above or the following:		6-8
CS 143	Compilers	
CS 155	Computer and Network Security	

CS 157	Logic and Automated Reasoning
or PHIL 151	Metalogic
CS 166	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 242	Programming Languages
CS 254	Computational Complexity
CS 259	((With adviser consent); Not given this year)
CS 262	Computational Genomics
CS 266	Parameterized Algorithms and Complexity
CS 267	Graph Algorithms
CS 354	(Not given this year)
CS 355	(Not given this year)
CS 357	(Not given this year)
CS 358	Topics in Programming Language Theory
CS 359	Topics in the Theory of Computation (with adviser consent)
CS 364A	Algorithmic Game Theory
CS 364B	(Not given this year)
CS 366	(Not given this year)
CS 367	(Not given this year)
CS 369	Topics in Analysis of Algorithms (with adviser consent)
CS 374	Algorithms in Biology
MSE 310	Linear Programming

Track Electives: at least three additional courses from the list above, 9-12 the general CS electives list, or the following:⁵

CME 302	Numerical Linear Algebra
CME 305	Discrete Mathematics and Algorithms
PHIL 152	Computability and Logic

Unspecialized Track—

	Units	
CS 154	Introduction to Automata and Complexity Theory	4
Select one of the following:		4
CS 140	Operating Systems and Systems Programming	
CS 143	Compilers	
One additional course from the list above or the following:		3-4
CS 144	Introduction to Computer Networking	
CS 155	Computer and Network Security	
CS 242	Programming Languages	
CS 244	Advanced Topics in Networking	
EE 180	Digital Systems Architecture	
Select one of the following:		3-4
CS 121	(Not given this year)	
CS 221	Artificial Intelligence: Principles and Techniques	
CS 223A	Introduction to Robotics	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
Select one of the following:		3-4
CS 145	Introduction to Databases	

CS 147	Introduction to Human-Computer Interaction Design
CS 148	Introduction to Computer Graphics and Imaging
CS 248	Interactive Computer Graphics
CS 262	Computational Genomics

At least two courses from the general CS electives list⁵

Individually Designed Track

Students may propose an individually designed track. Proposals should include a minimum of seven courses, at least four of which must be CS courses numbered 100 or above. See Handbook for Undergraduate Engineering Programs for further information.

Senior Capstone Project (3 units minimum)

CS 191	Senior Project ⁷
CS 191W	Writing Intensive Senior Project ⁷
CS 194	Software Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294W	Writing Intensive Research Project in Computer Science

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

- MATH 19, MATH 20, and MATH 21 may be taken instead of MATH 41 and MATH 42 as long as at least 26 MATH units are taken. AP Calculus must be approved by the School of Engineering.
- The math electives list consists of: MATH 51, MATH 104, MATH 108, MATH 109, MATH 110, MATH 113; CS 157, CS 205A; PHIL 151; CME 100, CME 102, CME 104. Completion of MATH 52 and MATH 53 counts as one math elective. Restrictions: CS 157 and PHIL 151 may not be used in combination to satisfy the math electives requirement. Students who have taken both MATH 51 and MATH 52 may not count CME 100 as an elective. Courses counted as math electives cannot also count as CS electives, and vice versa.
- The science elective may be any course of 3 or more units from the School of Engineering Science list plus PSYCH 30; AP Chemistry may be used to meet this requirement. Either of the PHYSICS sequences 61/63 or 21/23 may be substituted for 41/43 as long as at least 11 science units are taken. AP Physics must be approved by the School of Engineering.
- Students who take ENGR 40A (3 units) are required to take two additional units of ENGR Fundamentals (13 units minimum), or 2 additional units of Depth (27 units minimum for track and elective courses).
- General CS Electives: CS 108, CS 121 or CS 221, CS 124, CS 131, CS 140, CS 142, CS 143 CS 144, CS 145, CS 147, CS 148, CS 149, CS 154, CS 155, CS 157 or PHIL 151, CS 164, CS 166, CS 167, CS 168, CS 190, CS 205A, CS 205B, CS 210A, CS 222, CS 223A, CS 224M, CS 224N, CS 224S, CS 224U, CS 224W, CS 225A, CS 225B, CS 227B, CS 228, CS 228T, CS 229, CS 229A, CS 229T, CS 231A, CS 231B, CS 231M, CS 232, CS 235, CS 240, CS 240H, CS 241, CS 242, CS 243, CS 244, CS 244B, CS 245, CS 246, CS 247, CS 248, CS 249A, CS 249B, CS 254, CS 255, CS 258, CS 261, CS 262, CS 263, CS 264, CS 265, CS 266, CS 267, CS 270, CS 272, CS 173 or CS 273A, CS 274, CS 276, CS 277, CS 279, CS 295, CS 348B; CME 108; EE 180, EE 282, EE 364A.

- ⁶ CS 205A Mathematical Methods for Robotics, Vision, and Graphics is recommended in this list for the Graphics track. Students taking CME 104 Linear Algebra and Partial Differential Equations for Engineers are also required to take its prerequisite, CME 102 Ordinary Differential Equations for Engineers.
- ⁷ Independent study projects (CS 191 Senior Projector CS 191W Writing Intensive Senior Project) require faculty sponsorship and must be approved by the adviser, faculty sponsor, and the CS senior project adviser (P. Young). A signed approval form, along with a brief description of the proposed project, should be filed the quarter before work on the project is begun. Further details can be found in the *Handbook for Undergraduate Engineering Programs*.

Honors Program

The Department of Computer Science (CS) offers an honors program for undergraduates whose academic records and personal initiative indicate that they have the necessary skills to undertake high-quality research in computer science. Admission to the program is by application only. To apply for the honors program, students must be majoring in Computer Science, have a grade point average (GPA) of at least 3.6 in courses that count toward the major, and achieve senior standing (135 or more units) by the end of the academic year in which they apply. Coterminal master's students are eligible to apply as long as they have not already received their undergraduate degree. Beyond these requirements, students who apply for the honors program must find a Computer Science faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

Students who meet the eligibility requirements and wish to be considered for the honors program must submit a written application to the CS undergraduate program office by May 1 of the year preceding the honors work. The application must include a letter describing the research project, a letter of endorsement from the faculty sponsor, and a transcript of courses taken at Stanford. Each year, a faculty review committee selects the successful candidates for honors from the pool of qualified applicants.

In order to receive departmental honors, students admitted to the honors program must, in addition to satisfying the standard requirements for the undergraduate degree, do the following:

1. Complete at least 9 units of CS 191 or CS 191W under the direction of their project sponsor.
2. Attend a weekly honors seminar Winter and Spring quarters.
3. Complete an honors thesis deemed acceptable by the thesis adviser and at least one additional faculty member.
4. Present the thesis at a public colloquium sponsored by the department.
5. Maintain the 3.6 GPA required for admission to the honors program.

Guide to Choosing Introductory Courses

Students arriving at Stanford have widely differing backgrounds and goals, but most find that the ability to use computers effectively is beneficial to their education. The department offers many introductory courses to meet the needs of these students.

For students whose principal interest is an exposure to the fundamental ideas behind computer science and programming, CS 101 or CS 105 are the most appropriate courses. They are intended for students in nontechnical disciplines who expect to make some use of computers, but who do not expect to go on to more advanced courses. CS 101 and CS 105 meet the new Ways of Thinking Ways of Doing breadth requirements in Formal Reasoning and include an introduction to programming and the use of modern Internet-based technologies. Students interested in learning to use the computer should consider CS 1C, Introduction to Computing at Stanford.

Students who intend to pursue a serious course of study in computer science may enter the program at a variety of levels, depending on their background. Students with little prior experience or those who wish to take more time to study the fundamentals of programming should take CS 106A followed by CS 106B. Students in CS 106A need not have prior programming experience. Students with significant prior exposure to programming or those who want an intensive introduction to the field should take CS 106X or may start directly in CS 106B. CS 106A uses Java as its programming language; CS 106B and X use C++. No prior knowledge of these languages is assumed, and the prior programming experience required for CS 106B or X may be in any language. In all cases, students are encouraged to discuss their background with the instructors responsible for these courses.

After the introductory sequence, Computer Science majors and those who need a significant background in computer science for related majors in engineering should take CS 103, CS 107 and CS 110. CS 103 offers an introduction to the mathematical and theoretical foundations of computer science. CS 107 exposes students to a variety of programming concepts that illustrate critical strategies used in systems development; CS 110 builds on this material, focusing on the development of larger-scale software making use of systems and networking abstractions.

In summary:

For exposure:

CS 1C	Introduction to Computing at Stanford
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For nontechnical use:

CS 101 or CS 105	Introduction to Computing Principles Introduction to Computers
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For scientific use:

CS 106A	Programming Methodology
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For a technical introduction:

CS 106A	Programming Methodology
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For significant use:

CS 106A & CS 106B or CS 106X	Programming Methodology and Programming Abstractions Programming Abstractions (Accelerated)
CS 103	Mathematical Foundations of Computing
CS 107	Computer Organization and Systems
CS 110	Principles of Computer Systems

Overseas Studies Courses in Computer Science

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

Joint Major Program: Computer Science and a Humanities Major

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Mission

The Joint Major provides a unique opportunity to gain mastery in two disciplines: Computer Science and a selected humanities field. Unlike the double major or dual major, the Joint Major emphasizes integration of the two fields through a cohesive, transdisciplinary course of study and integrated capstone experience. The Joint Major not only blends the intellectual traditions of two Stanford departments—it does so in a way that reduces the total unit requirement for each major.

Computer Science Major Requirements in the Joint Major Program

(See the respective humanities department Joint Major Program section of this bulletin for details on humanities major requirements.)

The CS requirements for the Joint Major follow the CS requirements for the CS-BS degree with the following exceptions:

1. Two of the depth electives are waived. The waived depth electives are listed below for each CS track.
2. The Senior Project is fulfilled with a joint capstone project. The student enrolls in CS191 or 191W (3 units) during the senior year. Depending on the X department, enrollment in an additional Humanities capstone course may also be required. But, at a minimum, 3 units of CS191 or 191W must be completed.
3. There is no double-counting of units between majors. If a course is required for both the CS and Humanities majors, the student will work with one of the departments to identify an additional course - one which will benefit the academic plan - to apply to that major's total units requirement.
4. For CS, WIM can be satisfied with CS181W or CS191W.

Depth Electives for CS Tracks for students completing a Joint Major:

Artificial Intelligence Track:

One Track Elective (rather than three).

Biocomputation Track:

One course from the BMC Informatics elective list (see <http://bmc.stanford.edu> and select Informatics from the elective options), plus one course from either the general CS electives list, BIOE 101, or the list of BMC Informatics electives.

Computer Engineering Track:

- EE 108A and 108B
 - One of the following: EE 101A, 101B, 102A, 102B
 - Satisfy the requirements of one of the following concentrations:
1. Digital Systems Concentration: CS 140 or 143; EE 109, 271; plus one of CS 140 or 143 (if not counted above), 144, 149, 240E, 244; EE 273, 282
 2. Robotics and Mechatronics Concentration: CS 205A, 223A; ME 210; ENGR 105

3. Networking Concentration: CS 140, 144; plus two of the following, CS 240, 240E, 244, 244B, 244E, 249A, 249B, EE 179, EE 276

Graphics Track:

No Track Electives required (rather than two)

HCI Track:

No Track Electives required (rather than two)

Information Track:

One Track Elective (rather than three)

Systems Track:

One Track Elective (rather than three)

Theory Track:

One Track Elective (rather than three)

Unspecialized Track:

No Track Electives required (rather than two)

Individually Designed Track:

Proposals should include a minimum of five (rather than seven) courses, at least four of which must be CS courses numbered 100 or above.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentsservicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Computer Science (CS) Minor

The following core courses fulfill the minor requirements. Prerequisites include the standard mathematics sequence through MATH 51.

Introductory Programming (AP Credit may be used to fulfill this requirement):

Course	Requirement	Units
CS 106B	Programming Abstractions	5
or CS 106X	Programming Abstractions (Accelerated)	

Core:

Units

CS 103	Mathematical Foundations of Computing	5
CS 107	Computer Organization and Systems	5
CS 109	Introduction to Probability for Computer Scientists	5
Electives (choose two courses from different areas):		
Artificial Intelligence—		
CS 124	From Languages to Information	4
CS 221	Artificial Intelligence: Principles and Techniques	4
CS 229	Machine Learning	3-4
Human-Computer Interaction—		
CS 147	Introduction to Human-Computer Interaction Design	4
Software—		
CS 108	Object-Oriented Systems Design	4
CS 110	Principles of Computer Systems	5
Systems—		
CS 140	Operating Systems and Systems Programming	4
CS 143	Compilers	4
CS 144	Introduction to Computer Networking	4
CS 145	Introduction to Databases	4
CS 148	Introduction to Computer Graphics and Imaging	4
Theory—		
CS 154	Introduction to Automata and Complexity Theory	4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	5

Note: for students with no programming background and who begin with CS 106A, the minor consists of seven courses.

Master of Science in Computer Science

In general, the M.S. degree in Computer Science is intended as a terminal professional degree and does not lead to the Ph.D. degree. Most students planning to obtain the Ph.D. degree should apply directly for admission to the Ph.D. program. Some students, however, may wish to complete the master's program before deciding whether to pursue the Ph.D. To give such students a greater opportunity to become familiar with research, the department has instituted a program leading to a master's degree with distinction in research. This program is described in more detail below.

Admission

Applications to the M.S. program and all supporting documents must be submitted and received online by the published deadline. Information on admission requirements and deadlines is available at <http://cs.stanford.edu/admissions/>. Exceptions are made for applicants who are already students at Stanford and are applying to the coterminal program. See <http://cs/content/coterminal-program-deadline>.

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Requirements

A candidate is required to complete a program of 45 units. At least 36 of these must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. The 45 units may include no more than 10 units of courses from those listed below in Requirement 1. Thus, students needing to take more than two of the courses listed in Requirement 1 actually complete more than 45 units of course work in the program. Only well-prepared students may expect to finish the program in one year; most students complete the program in six quarters. Students hoping to complete the

program with 45 units should already have a substantial background in computer science, including course work or experience equivalent to all of Requirement 1 and some prior course work related to their specialization area.

Requirement 1: Foundations—

Students must complete the following courses, or waive out of them by providing evidence to their advisers that similar or more advanced courses have been taken, either at Stanford or another institution (total units used to satisfy foundations requirement may not exceed 10):

Logic, Automata, and Computability

CS 103	Mathematical Foundations of Computing
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Probability

Select one of the following:

CS 109	Introduction to Probability for Computer Scientists
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STATS 116	Theory of Probability
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MSE 220	Probabilistic Analysis
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CME 106	Introduction to Probability and Statistics for Engineers
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Algorithms

CS 161	Design and Analysis of Algorithms
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Computer Organization and Systems

CS 107	Computer Organization and Systems
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Principles of Computer Systems

CS 110	Principles of Computer Systems
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Requirement 2: Significant Software Implementation—

Students must complete at least one course designated as having a significant software implementation component. The list of such courses includes:

CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 210B	Software Project Experience with Corporate Partners	3-4
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 243	Program Analysis and Optimizations	3-4
CS 248	Interactive Computer Graphics	3-4
CS 341	Project in Mining Massive Data Sets	3
CS 346	Database System Implementation (no longer offered)	3-5

Requirement 3: Specialization—

Students may choose to satisfy this requirement through one of two options, Single Depth or Dual Depth, outlined following. All courses taken for this requirement must be taken for letter grades.

Option 1—Single Depth

- A program of 27 units in a single area of specialization must be completed. A maximum of 9 units of independent study (CS 393, CS 395, CS 399) may be counted toward the specialization.
- Additionally, students must complete three breadth courses from the list of approved breadth courses associated with their chosen specialization. Individual specializations explicitly have different breadth requirements; see the individual specialization sheets at <http://cs.stanford.edu/degrees/mssc/programsheets> for details.

- Breadth courses may not be waived, must be taken for at least 3 units each, and must be completed for a letter grade.

Option 2—Dual Depth

- Students select distinct primary and secondary areas.
- A program of 21 units in the primary area of specialization must be completed. A maximum of 9 units of independent study (CS 393, CS 395, CS 399) may be counted toward the primary specialization.
- Students must also complete a program of five courses satisfying the requirements for their secondary area of specialization.
- Breadth courses are not required.

Specialization Areas—

Ten approved specialization areas which may be used to satisfy Requirement 3 are listed following. Students may propose to the M.S. program committee other coherent programs that meet their goals and satisfy the basic requirements.

Courses marked with an asterisk (*) require consent of the faculty adviser. Courses marked with a double asterisk (**) may be waived by students with equivalent course work and with the approval of their adviser.

1. Artificial Intelligence—

A.

CS 221	Artificial Intelligence: Principles and Techniques **
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B. Select at least four of the following:

CS 223A	Introduction to Robotics
CS 224M	Multi-Agent Systems
CS 224N	Natural Language Processing
CS 224S	Spoken Language Processing
CS 224U	Natural Language Understanding
CS 224W	Social and Information Networks
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 231A	Computer Vision: From 3D Reconstruction to Recognition

C. Sufficient depth units from category (b) and the following:

CS 173	A Computational Tour of the Human Genome
or CS 273A	A Computational Tour of the Human Genome
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CS 222	Rational Agency and Intelligent Interaction
CS 225A	Experimental Robotics
CS 225B	Robot Programming Laboratory
CS 227B	General Game Playing
CS 229A	(Not given this year)
CS 229T	Statistical Learning Theory
CS 231B	The Cutting Edge of Computer Vision
CS 231M	Mobile Computer Vision
CS 232	Digital Image Processing
CS 238	Decision Making under Uncertainty
CS 239	Advanced Topics in Sequential Decision Making
CS 246	Mining Massive Data Sets
CS 262	Computational Genomics
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 274	Representations and Algorithms for Computational Molecular Biology
CS 275	Translational Bioinformatics

CS 276	Information Retrieval and Web Search
CS 277	Experimental Haptics
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells
CS 294A	Research Project in Artificial Intelligence *
CS 321	(Not given this year)
CS 327A	Advanced Robotic Manipulation (Not given this year)
CS 328	Topics in Computer Vision
CS 329	Topics in Artificial Intelligence
CS 331A	Advanced Reading in Computer Vision
CS 331B	3D Representation and Recognition
CS 334A	Convex Optimization I
or EE 364A	Convex Optimization I
CS 341	Project in Mining Massive Data Sets
CS 345	(Offered occasionally)
CS 362	(Not given this year)
CS 364A	Algorithmic Game Theory
CS 364B	(Not given this year)
CS 374	Algorithms in Biology (not given this year)
CS 377	Topics in Human-Computer Interaction *
CS 379	Interdisciplinary Topics *
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
EE 263	Introduction to Linear Dynamical Systems
EE 363	(not given this year)
EE 364B	Convex Optimization II
EE 376A	Information Theory
ENGR 205	Introduction to Control Design Techniques
ENGR 209A	Analysis and Control of Nonlinear Systems
MSE 251	Stochastic Control
MSE 252	Decision Analysis I: Foundations of Decision Analysis
MSE 351	Dynamic Programming and Stochastic Control
MSE 352	Decision Analysis II: Professional Decision Analysis
MSE 353	Decision Analysis III: Frontiers of Decision Analysis
PSYCH 202	Cognitive Neuroscience
STATS 202	Data Mining and Analysis
STATS 315A	Modern Applied Statistics: Learning
STATS 315B	Modern Applied Statistics: Data Mining
BIOE 332	Large-Scale Neural Modeling
APPPHYS 293	Theoretical Neuroscience

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Artificial Intelligence must take five total courses satisfying the area (a) and (b) requirements above.
- Those students who have waived out of CS 221 may take an additional course in either area (b) or (c).

Artificial Intelligence Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E	Networked Wireless Systems	3
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 255	Introduction to Cryptography	3
CS 258	(Not given this year)	3
CS 259	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266	Parameterized Algorithms and Complexity	3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

2. Biocomputation—

A. Select at least four of the following:

CS 173	A Computational Tour of the Human Genome
or CS 273A	A Computational Tour of the Human Genome
CS 262	Computational Genomics
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 272	Introduction to Biomedical Informatics Research Methodology
CS 274	Representations and Algorithms for Computational Molecular Biology
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells

B. Sufficient depth units from category (a) and the following:

CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning

CS 229A	(Not given this year)
CS 245	Database Systems Principles
CS 246	Mining Massive Data Sets
CS 261	Optimization and Algorithmic Paradigms
CS 264	Beyond Worst-Case Analysis
CS 265	Randomized Algorithms and Probabilistic Analysis
CS 268	Geometric Algorithms
CS 275	Translational Bioinformatics
CS 277	Experimental Haptics
CS 341	Project in Mining Massive Data Sets
CS 345	(Offered occasionally)
CS 346	Database System Implementation
CS 362	(Not given this year)
CS 374	Algorithms in Biology
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
APPPHYS 293	Theoretical Neuroscience
BIOC 218	
BIOE 332	Large-Scale Neural Modeling
GENE 211	Genomics
SBIO 228	Computational Structural Biology

• Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) and (b) requirements above.

• Students with a secondary area of specialization (per Option 2 above) in Biocomputation must take five total courses, three courses of which must come from area (a) and the remaining two courses may come from either area (a) or (b).

Biocomputation Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4

CS 224W	Social and Information Networks	3
CS 227B	General Game Playing	3
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E	Networked Wireless Systems	3
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 255	Introduction to Cryptography	3
CS 258	(Not given this year)	3
CS 259	(Not given this year)	
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

3. Computer and Network Security—

A.

CS 140	Operating Systems and Systems Programming **	
CS 144	Introduction to Computer Networking **	
CS 155	Computer and Network Security	
CS 244	Advanced Topics in Networking	
CS 255	Introduction to Cryptography	

B. Select at least three of the following:

CS 142	Web Applications	
CS 240	Advanced Topics in Operating Systems	
CS 241	(Not given this year; alternate years)	
CS 244B	Distributed Systems	
CS 244C	Readings and Projects in Distributed Systems	
CS 259	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 340	Topics in Computer Systems	
CS 344	Topics in Computer Networks	
CS 355	(Not given this year)	

C. Sufficient depth units from category (b) and the following:

CS 240E		
CS 244E	Networked Wireless Systems	
CS 245	Database Systems Principles	
CS 264	Beyond Worst-Case Analysis	
CS 294S	Research Project in Software Systems and Security (Not given this year) *	
CS 295	Software Engineering	
CS 341	Project in Mining Massive Data Sets	
CS 345	(Offered occasionally)	
CS 347	Parallel and Distributed Data Management	
CS 361A	Advanced Algorithms	

CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	
EE 384A	Internet Routing Protocols and Standards	
EE 384B	Multimedia Communication over the Internet (not given this year)	
EE 384C	Wireless Local and Wide Area Networks	
EE 384M	Network Science	
EE 384S	Performance Engineering of Computer Systems & Networks	
EE 384X	Packet Switch Architectures	

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Computer and Network Security must take five courses; those five courses must satisfy the area (a) requirement and additional courses from area (b) should be taken if any area (a) requirements are waived.

Computer and Network Security Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 143	Compilers	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 173	A Computational Tour of the Human Genome	3
or CS 273A	A Computational Tour of the Human Genome	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Social and Information Networks	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 229A	(Not given this year)	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 246	Mining Massive Data Sets	3-4
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 262	Computational Genomics	3

CS 268	Geometric Algorithms	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

4. Human-Computer Interaction—

A.

CS 147	Introduction to Human-Computer Interaction Design	**
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B. Select one of the following:

CS 247	Human-Computer Interaction Design Studio
CS 294H	Research Project in Human-Computer Interaction

C. Select one of the following:

CS 376	Human-Computer Interaction Research
CS 378	(Not given this year)
CS 448B	Data Visualization

D. Select one of the following:

CS 124	From Languages to Information
CS 142	Web Applications
CS 148	Introduction to Computer Graphics and Imaging

E. Select one of the following:

CS 303	(Not given this year)
COMM 206	Communication Research Methods
COMM 268	Experimental Research in Advanced User Interfaces
PSYCH 110	Research Methods and Experimental Design
PSYCH 252	Statistical Methods for Behavioral and Social Sciences
PSYCH 254	Lab in Experimental Methods
SOC 257	Causal Inference in Quantitative Educational and Social Science Research

F. Select one of the following:

ARTSTUDI 160	Design I: Fundamental Visual Language
ME 203	Design and Manufacturing
ME 216A	Advanced Product Design: Needfinding
ME 277	Graduate Design Research Techniques
ME 377	Design Thinking Studio: Experiences in Innovation and Design

Any d.school course

G. One or more courses from areas (b) through (f), or the following:

ARTSTUDI 260	Design II
CS 224N	Natural Language Processing
CS 224W	Social and Information Networks
CS 229	Machine Learning
CS 229A	(Not given this year)
CS 242	Programming Languages
CS 246	Mining Massive Data Sets
CS 248	Interactive Computer Graphics

CS 295	Software Engineering
CS 341	Project in Mining Massive Data Sets
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
CS 402	Beyond Bits and Atoms: Designing Technological Tools
CS 476A	Music, Computing, and Design I: Software Paradigms for Computer Music

- Or any d.school class listed at <http://dschool.stanford.edu>, or any HCI class listed at <http://hci.stanford.edu/courses>. Such courses must be numbered 100 or above and be taken for at least 3 units to count for this requirement.
- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) through (g) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Human-Computer Interaction must take five courses as follows:
 - one course each from areas (a), (d), (e), and (f)
 - then one course from either area (b) or (c)
- Students waiving out of the area (a) requirement should take one additional course from areas (b) through (g).

Human-Computer Interaction Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 173	A Computational Tour of the Human Genome	3
or CS 273A	A Computational Tour of the Human Genome	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 243	Program Analysis and Optimizations	3-4

CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E	Networked Wireless Systems	3
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 255	Introduction to Cryptography	3
CS 258	(Not given this year)	3
CS 259	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	3
CS 262	Computational Genomics	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266	Parameterized Algorithms and Complexity	3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

5. Information Management and Analytics

A.

CS 145	Introduction to Databases **	3-4
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B. Select at least four of the following:

CS 224N	Natural Language Processing	
CS 224W	Social and Information Networks	
CS 229	Machine Learning	
CS 245	Database Systems Principles	
CS 246	Mining Massive Data Sets	
CS 276	Information Retrieval and Web Search	
CS 345	(Offered occasionally)	
CS 346	Database System Implementation (no longer offered)	

CS 347 Parallel and Distributed Data Management

C. Sufficient depth units from category (b) and the following:

CS 144	Introduction to Computer Networking	
CS 173	A Computational Tour of the Human Genome	
or CS 273A	A Computational Tour of the Human Genome	
CS 224S	Spoken Language Processing	
CS 224U	Natural Language Understanding	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229A	(Not given this year)	
CS 229T	Statistical Learning Theory	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
CS 240	Advanced Topics in Operating Systems	
CS 242	Programming Languages	
CS 243	Program Analysis and Optimizations	

CS 244	Advanced Topics in Networking	
CS 244B	Distributed Systems	
CS 244C	Readings and Projects in Distributed Systems	
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	
CS 249B	Large-scale Software Development	
CS 255	Introduction to Cryptography	
CS 262	Computational Genomics	
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 272	Introduction to Biomedical Informatics Research Methodology	
CS 274	Representations and Algorithms for Computational Molecular Biology	
CS 275	Translational Bioinformatics	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
CS 315A	Parallel Computer Architecture and Programming	
or CS 316	Advanced Multi-Core Systems	
CS 321	(Not given this year)	
CS 341	Project in Mining Massive Data Sets	
CS 344	Topics in Computer Networks	
CS 362	(Not given this year)	
CS 364B	(Not given this year)	
CS 374	Algorithms in Biology	
CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	
STATS 315A	Modern Applied Statistics: Learning	
STATS 315B	Modern Applied Statistics: Data Mining	

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Information Management and Analytics must take five courses satisfying the area (a) and (b) requirements above. Note that if CS145 was waived in area (a), students should take an additional course from either area (b) or (c) in its place.

Information Management and Analytics Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3

CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 227B	General Game Playing	3
CS 240E		
CS 244E	Networked Wireless Systems	3
CS 258	(Not given this year)	3
CS 259	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266	Parameterized Algorithms and Complexity	3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

6. Mobile and Internet Computing—

A. Select two of the following:

CS 140	Operating Systems and Systems Programming **
CS 144	Introduction to Computer Networking
CS 244	Advanced Topics in Networking

B. Select one of the following:

CS 142	Web Applications
CS 147	Introduction to Human-Computer Interaction Design
CS 247	Human-Computer Interaction Design Studio

C. Select one of the following:

CS 155	Computer and Network Security
CS 255	Introduction to Cryptography

D.

CS 294S	Research Project in Software Systems and Security (Not given this year)
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E. Sufficient depth units from categories (a) through (d) and the following:

CS 224W	Social and Information Networks
CS 244E	Networked Wireless Systems
CS 246	Mining Massive Data Sets
CS 344	Topics in Computer Networks
CS 344E	Advanced Wireless Networks
CS 364A	Algorithmic Game Theory
CS 376	Human-Computer Interaction Research
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
EE 359	Wireless Communications
EE 384A	Internet Routing Protocols and Standards
EE 384B	Multimedia Communication over the Internet (not given this year)
EE 384C	Wireless Local and Wide Area Networks
EE 384E	Networked Wireless Systems
EE 384M	Network Science
EE 384P	(not given this year)
EE 384S	Performance Engineering of Computer Systems & Networks
COMM 268	Experimental Research in Advanced User Interfaces

PSYCH 252	Statistical Methods for Behavioral and Social Sciences
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- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) through (e) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Mobile and Internet Computing must take five courses satisfying the area (a) through (d) requirements above.

Mobile and Internet Computing Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 143	Compilers	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 173	A Computational Tour of the Human Genome	3
or CS 273A	A Computational Tour of the Human Genome	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 229A	(Not given this year)	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244B	Distributed Systems	3
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 258	(Not given this year)	3
CS 259	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	3
CS 262	Computational Genomics	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266	Parameterized Algorithms and Complexity	3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3

CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

7. Real-World Computing—

A. Select at least three of the following:

CS 148	Introduction to Computer Graphics and Imaging
CS 223A	Introduction to Robotics
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
CS 248	Interactive Computer Graphics

B. Select at least three of the following:

CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CS 205B	Mathematical Methods for Fluids, Solids, and Interfaces
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective
CS 249B	Large-scale Software Development
CS 262	Computational Genomics
CS 268	Geometric Algorithms
CS 277	Experimental Haptics
CS 348A	
CS 348B	Computer Graphics: Image Synthesis Techniques
CS 374	Algorithms in Biology
CME 302	Numerical Linear Algebra
CME 306	Numerical Solution of Partial Differential Equations
CME 326	Numerical Methods for Initial Boundary Value Problems

C. Sufficient additional units chosen from the above and from the following:

CS 173	A Computational Tour of the Human Genome
or CS 273A	A Computational Tour of the Human Genome
CS 225A	Experimental Robotics
CS 225B	Robot Programming Laboratory
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 229A	(Not given this year)
CS 231B	The Cutting Edge of Computer Vision
CS 231M	Mobile Computer Vision
CS 232	Digital Image Processing
or EE 368	Digital Image Processing
CS 247	Human-Computer Interaction Design Studio
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 272	Introduction to Biomedical Informatics Research Methodology
CS 274	Representations and Algorithms for Computational Molecular Biology

CS 294A	Research Project in Artificial Intelligence *
CS 327A	Advanced Robotic Manipulation (Not given this year)
CS 328	Topics in Computer Vision
CS 331A	Advanced Reading in Computer Vision
CS 331B	3D Representation and Recognition
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
CS 448	Topics in Computer Graphics
CS 478	(Not given this year)

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Real-World Computing must take five total courses satisfying area (a) and two of the three courses in the area (b) requirements above (i.e., three courses in area (a) and two courses in area (b)).

Real-World Computing Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Social and Information Networks	3
CS 227B	General Game Playing	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E	Networked Wireless Systems	3
CS 246	Mining Massive Data Sets	3
CS 255	Introduction to Cryptography	3
CS 258	(Not given this year)	3
CS 259	(Not given this year)	
CS 261	Optimization and Algorithmic Paradigms	3

CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266	Parameterized Algorithms and Complexity	3
CS 267	Graph Algorithms	3
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

8. Software Theory—

A.

CS 242	Programming Languages
CS 243	Program Analysis and Optimizations

B. Select at least one of the following:

CS 244	Advanced Topics in Networking
CS 245	Database Systems Principles
CS 295	Software Engineering
CS 341	Project in Mining Massive Data Sets
CS 345	(Offered occasionally)

C. Select at least one course from the following:

CS 255	Introduction to Cryptography
CS 261	Optimization and Algorithmic Paradigms
CS 264	Beyond Worst-Case Analysis
CS 265	Randomized Algorithms and Probabilistic Analysis
CS 266	Parameterized Algorithms and Complexity
CS 267	Graph Algorithms
CS 268	Geometric Algorithms
CS 355	(Not given this year)
CS 361A	Advanced Algorithms
CS 361B	Advanced Algorithms
CS 367	(Not given this year)

D. Sufficient depth units from (b), (c), or the following:

CS 259	(Not given this year)
CS 294S	Research Project in Software Systems and Security (Not given this year)
CS 346	Database System Implementation
CS 362	(Not given this year)
CS 393	Computer Laboratory
CS 395	Independent Database Project
CS 399	Independent Project

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a)-(d) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Software Theory need to take 5 total courses satisfying the area (a) through (d) requirements above:
 - two courses in area (a)
 - one course each in areas (b) through (d).

Software Theory Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4

CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 173	A Computational Tour of the Human Genome	3
or CS 273A	A Computational Tour of the Human Genome	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Social and Information Networks	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 229A	(Not given this year)	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 244B	Distributed Systems	3
CS 244E	Networked Wireless Systems	3
CS 246	Mining Massive Data Sets	3-4
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 262	Computational Genomics	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

9. Systems—

A.

CS 140	Operating Systems and Systems Programming **
CS 144	Introduction to Computer Networking **
CS 240	Advanced Topics in Operating Systems
CS 242	Programming Languages

B. Select at least three of the following:

CS 243	Program Analysis and Optimizations
CS 244	Advanced Topics in Networking
CS 245	Database Systems Principles

CS 248	Interactive Computer Graphics
CS 348B	Computer Graphics: Image Synthesis Techniques
EE 271	Introduction to VLSI Systems
EE 282	Computer Systems Architecture
C. At least two additional courses chosen from category (b) and the following:	
CS 240E	(no longer offered)
CS 240H	
CS 244B	Distributed Systems
CS 244C	Readings and Projects in Distributed Systems
CS 244E	Networked Wireless Systems
CS 246	Mining Massive Data Sets
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective
CS 249B	Large-scale Software Development
CS 255	Introduction to Cryptography
CS 259	(Not given this year)
CS 262	Computational Genomics
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 272	Introduction to Biomedical Informatics Research Methodology
CS 276	Information Retrieval and Web Search
CS 294S	Research Project in Software Systems and Security (Not given this year) *
CS 295	Software Engineering
CS 315A	Parallel Computer Architecture and Programming
or CS 316	Advanced Multi-Core Systems
CS 340	Topics in Computer Systems
CS 341	Project in Mining Massive Data Sets
CS 343	(Not given this year)
CS 344	Topics in Computer Networks
CS 344B	(Not given this year)
CS 345	(Offered occasionally)
CS 346	Database System Implementation
CS 347	Parallel and Distributed Data Management
CS 348A	
CS 349	Topics in Programming Systems
CS 374	Algorithms in Biology
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
CS 448	Topics in Computer Graphics
CS 478	(Not given this year)
EE 273	Digital Systems Engineering
EE 382C	Interconnection Networks
EE 384A	Internet Routing Protocols and Standards
EE 384B	Multimedia Communication over the Internet (not given this year)
EE 384C	Wireless Local and Wide Area Networks
EE 384M	Network Science
EE 384S	Performance Engineering of Computer Systems & Networks
EE 384X	Packet Switch Architectures

- Students with a 27-unit depth option (Option 1 above) must take 27 units subject to satisfying the area (a), (b), and (c) requirements above.

- Students with a 21-unit depth option (Option 2 above) must take that many units subject to satisfying the area (a) and (b) requirements above, and additional courses may be taken from area (c) if any courses in the area (a) requirement are waived.
- Students with a secondary area of specialization (per Option 2 above) in Systems need to take five courses; those courses must satisfy the area (a) requirement and additional courses may be taken from area (b).

Systems Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 173	A Computational Tour of the Human Genome	3
or CS 273A	A Computational Tour of the Human Genome	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Social and Information Networks	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 229A	(Not given this year)	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 258	(Not given this year)	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266	Parameterized Algorithms and Complexity	3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3

10. Theoretical Computer Science—

A.

CS 261	Optimization and Algorithmic Paradigms ***
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B. Sufficient additional units chosen from:

CS 228	Probabilistic Graphical Models: Principles and Techniques
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CS 241	(Not given this year; alternate years)
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CS 246	Mining Massive Data Sets	
CS 254	Computational Complexity	
CS 255	Introduction to Cryptography	
CS 258	(Not given this year)	
CS 259	(Not given this year)	
CS 262	Computational Genomics	
CS 264	Beyond Worst-Case Analysis	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 266	Parameterized Algorithms and Complexity	
CS 267	Graph Algorithms	
CS 268	Geometric Algorithms	
CS 334A	Convex Optimization I	
or EE 364A	Convex Optimization I	
CS 341	Project in Mining Massive Data Sets	
CS 345	(Offered occasionally)	
CS 354	(Not given this year)	
CS 355	(Not given this year)	
CS 357	(Not given this year)	
CS 358	Topics in Programming Language Theory	
CS 359	Topics in the Theory of Computation *	
CS 361A	Advanced Algorithms	
CS 361B	Advanced Algorithms	
CS 362	(Not given this year)	
CS 364A	Algorithmic Game Theory	
CS 364B	(Not given this year)	
CS 366	(Not given this year)	
CS 367	(Not given this year)	
CS 369	Topics in Analysis of Algorithms *	
CS 374	Algorithms in Biology (not given this year)	
CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	
CS 468	*	
MSE 310	Linear Programming	

- Multiple CS 359, CS 369, and/or CS 468 courses may be taken as long as they are each on different topics, denoted by different letter suffixes for the courses.
- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) and (b) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Theoretical Computer Science need to take 5 total courses satisfying the area (a) and (b) requirements above.

Theoretical Computer Science Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4

CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 173	A Computational Tour of the Human Genome	3
or CS 273A	A Computational Tour of the Human Genome	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Social and Information Networks	3
CS 227B	General Game Playing	3
CS 229	Machine Learning	3-4
CS 229A	(Not given this year)	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E	Networked Wireless Systems	3
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

* With consent of faculty adviser.

** Students with equivalent course work may waive with approval of their adviser.

*** CS 361A or CS 361B may be used as substitutes for CS 261.

Requirement 4

Additional elective units must be technical courses (numbered 100 or above) related to the degree program and approved by the adviser. All CS courses numbered above 110 (with the exception of CS 196 and 198) taken for 3 or more units are pre-approved as elective courses. Additionally, up to a maximum of 3 units of 500-level CS seminars, CS 300, EE 380, EE 385A, or other 1-2 unit seminars offered in the School of Engineering may be counted as electives. Elective courses may be taken on a satisfactory/no

credit basis provided that a minimum of 36 graded units is presented within the 45-unit program.

Master of Science with Distinction in Research

A student who wishes to pursue the M.S. in CS with distinction in research must first identify a faculty adviser who agrees to supervise and support the research work. The research adviser must be a member of the Academic Council and must hold an appointment in Computer Science. The student and principal adviser must also identify another faculty member, who need not be in the Department of Computer Science, to serve as a secondary adviser and reader for the research report. In addition, the student must complete the following requirements beyond those for the regular M.S. in CS degree:

1. **Research Experience**—The program must include significant research experience at the level of a half-time commitment over the course of three academic quarters. In any given quarter, the half-time research commitment may be satisfied by a 50 percent appointment to a departmentally supported research assistantship, 6 units of independent study (CS 393, CS 395, or CS 399), or a prorated combination of the two (such as a 25 percent research assistantship supplemented by 3 units of independent study). This research must be carried out under the direction of the primary or secondary adviser.
2. **Supervised Writing and Research**—In addition to the research experience outlined in the previous requirement, students must enroll in at least 3 units of independent research (CS 393, CS 395, or CS 399) under the direction of their primary or secondary adviser. These units should be closely related to the research described in the first requirement, but focused more directly on the preparation of the research report described in the next section. The writing and research units described in parts (1) and (2) may be counted toward the 45 units required for the degree.
3. All independent study units (CS 393, CS 395, CS 399) must be taken for letter grades and a GPA of 3.0 (B) or better must be maintained.
4. **Research Report**—Students must complete a significant report describing their research and its conclusions. The research report represents work that is publishable in a journal or at a high-quality conference, although it is presumably longer and more expansive in scope than a typical conference paper. A copy of the research report must be submitted to the student services office in the department three weeks before the beginning of the examination period in the student's final quarter. Both the primary and secondary adviser must approve the research report before the distinction-in-research designation can be conferred.

Joint M.S. and MBA Degree

The joint MS in Computer Science/MBA degree links two of Stanford University's world-class programs. This joint degree offers students an opportunity to develop advanced technical and managerial skills for a broader perspective on both existing technologies and new technology ventures.

Admission to the joint MSCS/MBA program requires that students apply and be accepted independently to both the Computer Science Department in the School of Engineering and the Graduate School of Business. Students may apply concurrently, or elect to begin their course of study in CS and apply to the GSB during their first year.

Additional information on the MS in Computer Science/MBA Joint Degree Program and its requirements is available on the web at: <http://cs.stanford.edu/education/masters>

Joint M.S. and Law Degree

Law students interested in pursuing an M.S. in Computer Science must apply for admission to the Computer Science Department either (i) concurrently with applying to the Law School; or (ii) after being admitted to the Law School, but no later than the earlier of: (a) the end of the second year of Law School; or (b) the Computer Science Department's admission deadline for the year following that second year of Law School.

In addition to being admitted separately to the Law School and the Computer Science Department, students must secure permission from both academic units to pursue degrees in those units as part of a joint degree program.

J.D./M.S. students may elect to begin their course of study in either the Law School or the Computer Science Department. Faculty advisors from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full-time in the Law School for the first year of law studies. Otherwise, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. degree as specified by the Law School and the M.S. degree as specified in this Bulletin.

The Law School approves courses from the Department of Computer Science that may count toward the J.D. degree, and the Computer Science Department approves courses from the Law School that may count toward the M.S. degree in Computer Science. In either case, approval may consist of a list applicable to all joint-degree students or may be tailored to each individual student program. No more than 45 units of approved courses may be counted toward both degrees. No more than 36 units of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may be counted toward the M.S. in Computer Science is the greater of: (i) 12 units; or (ii) the maximum number of units from courses outside of the department that M.S. candidates in Computer Science are permitted to count toward the M.S. in the case of a particular student's individual program. Tuition and financial aid arrangements are normally through the school in which the student is then enrolled.

Teaching and Research Assistantships in Computer Science

Graduate student assistantships are available. Half-time assistants receive a tuition scholarship for 8, 9, or 10 units per quarter during the academic year, and in addition receive a monthly stipend.

Duties for half-time assistants during the academic year involve approximately 20 hours of work per week. Course assistants (CAs) help an instructor teach a course by conducting discussion sections, consulting with students, and grading examinations. Research assistants (RAs) help faculty and senior staff members with research in computer science. Most course and research assistantships are held by Ph.D. students. If there is an insufficient number of Ph.D. students to staff teaching and research assistantships, then these positions are open to master's students. However, master's students should not plan on being appointed to an assistantship.

Students with fellowships may have the opportunity to supplement their stipends by serving as graduate student assistants.

Doctor of Philosophy in Computer Science

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 43)" section of this bulletin. Department requirements are stated below.

Requirements

Applications to the Ph.D. program and all supporting documents must be submitted and received online by the published deadline. Please see <http://www-cs.stanford.edu/admissions> for admissions requirements and the application deadline. Changes or updates to the admission process are posted in September.

The following are general department requirements. Contact the Computer Science Ph.D. administrator for details.

1. A student should plan and complete a coherent program of study covering the basic areas of computer science and related disciplines. The student's adviser has primary responsibility for the adequacy of the program, which is subject to review by the Student Services Office.
2. The first year of the Ph.D. program is spent working with 1-3 different professors on a rotating basis. The intent is to allow the first-year Ph.D. student to work with a variety of professors before aligning with a permanent program adviser. Students who don't need the full year to find a professor to align with will have the option of aligning within the first or second quarter.
3. The CS 300 Departmental Lecture Series seminar gives faculty the opportunity to explain their research to first year CS Ph.D. students. First year CS Ph.D. students are required to attend 2/3 of the classes to receive credit.
4. A student must complete 135 course units for graduation. Computer Science Ph.D. students take 8-10 units per quarter. Credit for coursework done elsewhere (up to the maximum of 45 course units) may be applied to graduation requirements. Students must also take at least three units of coursework from four different faculty members. There are NO courses specifically required by the CS Ph.D. program except for the 1-unit CS 300 Departmental Lecture Series and CS 499 Advanced Reading and Research or its equivalent.
5. Each student, to remain in the Ph.D. program, must satisfy the breadth requirement covering introductory-level graduate material in major areas of computer science. A student must fulfill two breadth-area requirements in each of three general areas by the end of the second year in the program. If students have fulfilled the six breadth-area requirements, and taken courses from at least four different faculty members, they are eligible to apply for candidacy prior to the second year in the program. An up-to-date list of courses that satisfy the breadth requirements can be found at <http://cs.stanford.edu/education/phd>. The student must completely satisfy the breadth requirement by the end of the second year in the program and must pass a qualifying exam in the general area of their expected dissertation by the end of the third year in the program.
6. University policy requires that all doctoral students declare candidacy by the end of the sixth quarter in residence, excluding summers. However, after aligning with a permanent adviser, passing six breadth requirements, and taking classes with four different faculty, a student is eligible to file for candidacy prior to the sixth quarter. The candidacy form serves as a "contract" between the department and the student. The department acknowledges that the student is a *bona fide* candidate for the Ph.D. and agrees that the program submitted by the student is sufficient to warrant granting the Ph.D. upon completion. The student may petition the department for modification of his or her program. Candidacy expires five years from the date of submission of the candidacy form, rounded to the end of the quarter. In special

cases, the department may extend a student's candidacy, but is under no obligation to do so.

7. Each student is required to pass a qualifying exam in their area by the end of their third year in the program. A student may only take the qualifying exam twice. If the student fails the qualifying exam a second time, the Ph.D. Program Committee is convened to discuss the student's lack of a reasonable academic progress. Failing the exam a second time is cause for dismissal from the Computer Science Ph.D. program and the committee will meet to discuss the final outcome for the student.
8. As part of the training for the Ph.D., the student is also required to complete at least four units (a unit is ten hours per week for one quarter) as a course assistant or instructor for courses in Computer Science numbered 100 or above.
9. The Reading Committee form and Oral Thesis Proposal must be submitted within one year of passing the qualifying exam.
10. The most important requirement is the dissertation. After passing the required qualifying examination, each student must secure the agreement of a member of the department faculty to act as the dissertation adviser. The dissertation adviser is often the student's program adviser.
11. The student must pass a University oral examination in the form of a defense of the dissertation. This is typically held after all or a substantial portion of the dissertation research has been completed.
12. The student is expected to demonstrate the ability to present scholarly material orally in the dissertation defense.
13. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a second member from within the department, and a third member chosen from within or outside of the University. The department requires at least two committee members to be affiliated with the Computer Science department. The principal adviser and at least one of the other committee members must be Academic Council members.

Guidelines for Reasonable Progress

By the end of the first academic year, a student should be aligned with a permanent research advisor.

By Spring Quarter of the second year, a student should complete all six breadth area requirements, two breadth area requirements in each of three areas, and file for candidacy.

By Spring Quarter of the third year, a student should pass a Qualifying Examination (<http://cs.stanford.edu/content/qualifying-exams>) in the area of his or her intended dissertation.

Within one year of passing the Qualifying Examination, a student should submit a signed Reading Committee Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/doc_diss_rdg_ctte.pdf) and Thesis Proposal.

The teaching requirement may be satisfied at any time. The research requirement is routinely satisfied by participation in research throughout the student's career.

Ph.D. Minor in Computer Science

For a minor in Computer Science, a candidate must complete 20 non-duplicate units of Computer Science coursework numbered 200 or above, except for the 100-level courses listed on the Ph.D. Minor Worksheet found at <http://cs.stanford.edu/content/phd-minor>. At least three of the courses must be master's core courses to provide breadth and one course numbered 300 or above to provide depth. One of the courses taken must include a significant programming project to demonstrate programming efficiency.

Courses must be taken for a letter grade and passed with a grade of 'B' or better. Applications for a minor in Computer Science are submitted at the same time as admission to candidacy.

Emeriti (Professors) Tom Binford, Edward Feigenbaum (<http://ksl-web.stanford.edu/people/eaf>), Richard Fikes (<http://www.stanford.edu/~fikes>), Donald E. Knuth (<http://www-cs-faculty.stanford.edu/~knuth>)*, Jean-Claude Latombe (<http://robotics.stanford.edu/~latombe>)*, Marc Levoy (<http://graphics.stanford.edu/~levoy>)*, Zohar Manna, Edward J. McCluskey (http://crc.stanford.edu/users/ejm/McCluskey_Edward.html), Teresa Meng (<http://dualist.stanford.edu/~thm>)*, William F. Miller, Nils J. Nilsson (<http://robotics.stanford.edu/~nilsson>), Serge Plotkin*, Vaughan Pratt (<http://boole.stanford.edu/pratt.html>)*, Jeffrey D. Ullman (<http://infolab.stanford.edu/~ullman>), Gio Wiederhold (<http://infolab.stanford.edu/people/gio.html>)*, Terry Winograd (<http://hci.stanford.edu/winograd>)*

Chair: Alex Aiken (<http://theory.stanford.edu/~aiken>)

Associate Chair for Education: Mehran Sahami (<http://robotics.stanford.edu/users/sahami/bio.html>)

Professors: Alex Aiken (<http://theory.stanford.edu/~aiken>), Dan Boneh (<http://crypto.stanford.edu/~dabo>), David Cheriton (<http://www.stanford.edu/~cheriton>), David Dill (<http://verify.stanford.edu/dill>), Ronald P. Fedkiw (<http://physbam.stanford.edu/~fedkiw>), Hector Garcia-Molina (<http://infolab.stanford.edu/people/hector.html>), Leonidas J. Guibas (<http://geometry.stanford.edu/member/guibas>), Patrick Hanrahan (<http://www-graphics.stanford.edu/~hanrahan>), John Hennessy, Mark A. Horowitz (<http://www-vlsi.stanford.edu/~horowitz>), Dan Jurafsky (<http://web.stanford.edu/~jurafsky>), Oussama Khatib (<http://robotics.stanford.edu/~ok>), Monica Lam (<http://suif.stanford.edu/~lam>), James Landay, Nick McKeown (<http://tiny-tera.stanford.edu/~nickm>), Christopher Manning (<http://nlp.stanford.edu/~manning>), John Mitchell (<http://theory.stanford.edu/people/jcm/home.html>), Kunle Olukotun (<http://ogun.stanford.edu/~kunle>), John Ousterhout (<http://www.stanford.edu/~ouster/cgi-bin/home.php>), Balaji Prabhakar (<http://www.stanford.edu/~balaji>), Mendel Rosenblum (<http://web.stanford.edu/~mendel>), Yoav Shoham (<http://robotics.stanford.edu/~shoham>), Jennifer Widom (<http://infolab.stanford.edu/~widom>)

Associate Professors: Serafim Batzoglou (<http://ai.stanford.edu/~serafim>), Gill Bejerano (<http://bejerano.stanford.edu>), Ron Dror (<http://cs.stanford.edu/people/rondror>), Dawson Engler (<http://www.stanford.edu/~engler>), Ronald P. Fedkiw (<http://physbam.stanford.edu/~fedkiw>), Michael Genesereth (<http://logic.stanford.edu/people/genesereth/genesereth.html>), Christoforos Kozyrakis (<http://csl.stanford.edu/~christos>), Philip Levis (<http://csl.stanford.edu/~pal>), Fei-Fei Li (<http://vision.stanford.edu>), David Mazieres (<http://www.scs.stanford.edu/~dm>), Subhasish Mitra (<http://www.stanford.edu/~subh>), Andrew Ng (<http://www.cs.stanford.edu/people/ang>), Tim Roughgarden (<http://theory.stanford.edu/~tim>)

Assistant Professors: Michael Bernstein (<http://people.csail.mit.edu/msbernst>), Stefano Ermon, Sachin Katti (<http://www.stanford.edu/~skatti>), Anshul Kundaje (<https://sites.google.com/site/anshulkundaje>), Jure Leskovec (<http://cs.stanford.edu/people/jure>), Percy Liang, Christopher Re (<http://cs.stanford.edu/people/chrisre>), Silvio Savarese (<http://cvgl.stanford.edu/silvio>), Greg Valiant (<http://theory.stanford.edu/~valiant>), Ryan Williams (<http://web.stanford.edu/~rrwill>), Virginia Williams (<http://theory.stanford.edu/~virgi>), Keith Winstein (<http://web.mit.edu/keithw>)

Professors (Research): William J. Dally (http://cva.stanford.edu/billd_webpage_new.html), John K. Salisbury (<http://robotics.stanford.edu/~jks>), Sebastian Thrun (<http://robots.stanford.edu>)

Professor (Teaching): Eric S. Roberts (<http://www-cs-faculty.stanford.edu/~eroberts>), Mehran Sahami (<http://robotics.stanford.edu/users/sahami/bio.html>)

Associate Professor (Teaching): Stephen Cooper (<http://www.stanford.edu/~coopers>),

Courtesy Professors: Russ Altman (http://bmir.stanford.edu/people/view.php/russ_b_altman), Stephen Boyd (<http://www.stanford.edu/~boyd>), Martin Fischer (<http://www.stanford.edu/~fischer>), Bernd Girod (<http://www.stanford.edu/~bgirod>), Michael Levitt, Roy Pea, Fouad A. Tobagi, Benjamin van Roy

Courtesy Associate Professors: Atul Butte (http://med.stanford.edu/profiles/Atul_Butte), Ashish Goel (<http://www.stanford.edu/~ashishg>), Dan Jurafsky (<http://www.stanford.edu/~jurafsky>), Allison Okamura, Vijay Pande

Courtesy Assistant Professors: Paulo Blikstein (<http://www.blikstein.com/paulo>), Noah Goodman (<http://stanford.edu/~ngoodman>), Ramesh Johari, Mykel Kochenderfer, Lester Mackey, Stephen Montgomery (<http://montgomerylab.stanford.edu>), Ge Wang (<https://ccrma.stanford.edu/~ge>)

Lecturers: Gerald Cain, Cynthia Lee, Nicholas J. Parlante (<http://www-cs-faculty.stanford.edu/~nick>), Keith Schwarz, Marty Stepp (<http://www.martystepp.com>), Patrick Young (<http://www.stanford.edu/~psyong>), Julie Zelenski (<http://www-cs-faculty.stanford.edu/~zelenski>)

Consulting Professors: Pei Cao (<http://crypto.stanford.edu/~cao>), Stuart Card, Tom Dean, Kurt Konolige, Prabhakar Raghavan (<http://theory.stanford.edu/people/pragh>)

Consulting Assistant Professor: Martin Casado (<http://yuba.stanford.edu/~casado>), Bill MacCartney

Visiting Professors: Roland Angst, Ian Benson, Adrian Butscher, Vassos Hadzilacos, Norbert Pohlmann, Joerg Rothe, Gil Segev, Michael Stark, Jan Vitek

Secondary Appointment in CS: Anshul Kundaje

* Recalled to active duty.

Electrical Engineering

Courses offered by the Department of Electrical Engineering are listed under the subject code EE on the *Stanford Bulletin's* ExploreCourses web site.

Mission of the Undergraduate Program in Electrical Engineering

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart a basic understanding of electrical engineering built on a foundation of physical science, mathematics, computing, and technology, and to provide majors in the department with knowledge of electrical engineering principles along with the required supporting knowledge of mathematics, science, computing, and engineering fundamentals. The program develops students' skills in performing and designing experimental projects and communicating their findings to the scientific community effectively. Students in the major are required to select one sub-discipline for specialization. Choices include bio-electronics and bio-imaging; circuits and devices; computer hardware; computer software; music; signal processing, communication and controls; and photonics, solid state and electromagnetics; and energy and environment. The program prepares students for careers in government agencies, the corporate sector, or for future study in graduate or professional schools.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. The educational objectives of the program are:

1. Technical knowledge—provide a knowledge of electrical engineering principles along with the required supporting knowledge of computing, engineering fundamentals, mathematics, and science. The program must include depth in at least one specialty area, currently including bio-electronics and bio-imaging; circuits and devices; computer hardware; computer software; music; signal processing, communication and controls; and photonics, solid state and electromagnetics; and energy and environment.
2. Laboratory and design skills—develop the basic skills needed to perform and design experimental projects. Develop the ability to formulate problems and projects and to plan a process for solution, taking advantage of diverse technical knowledge and skills.
3. Communications skills—develop the ability to organize and present information and to write and speak effective English.
4. Preparation for further study—provide sufficient breadth and depth for successful subsequent graduate study, postgraduate study, or lifelong learning programs.
5. Preparation for the profession—provide an appreciation for the broad spectrum of issues arising in professional practice, including economics, ethics, leadership, professional organizations, safety, service, and teamwork.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work providing specialization in one area of Electrical Engineering and breadth in several other areas. Areas of specialization include bio-electrical engineering; hardware; software; control and system engineering; communication systems; dynamic systems and optimization; circuits; devices, sensors and technology; fields, waves and radioscience; image systems; lasers, optoelectronics and quantum electronics; network systems; signal processing; solid state materials and devices.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Electrical Engineering and related fields.

Graduate Programs in Electrical Engineering

University regulations governing the M.S. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

The profession of electrical engineering demands a strong foundation in physical science and mathematics, a broad knowledge of engineering techniques, and an understanding of the relationship between technology and society. Curricula at Stanford are planned to offer the breadth of education and depth of training necessary for leadership in the profession. To engage in this profession with competence, four years of undergraduate study and at least one year of postgraduate study are recommended. For those who plan to work in highly technical development or fundamental research, additional graduate study is desirable.

The degree of Master of Science is offered under the general regulations of the University. The master's program, requiring a minimum of 45 units of

graduate study, should be considered by those with the ability and desire to make a life work of professional practice or continued graduate study.

The degree of Doctor of Philosophy is offered under the general regulations of the University. The doctoral program, requiring a minimum of 135 units of graduate study, should be considered by those with the ability and desire to make a life work of research or teaching.

Application for Admission

Applications for graduate admission in Electrical Engineering (EE) should be completed electronically at <http://gradadmissions.stanford.edu>. For information concerning Electrical Engineering graduate admissions, see <http://ee.stanford.edu/admissions>. The application deadline for full-time admission for Autumn Quarter 2015-16 is December 9, 2014.

Electrical Engineering Course Catalog Numbering System

Electrical Engineering courses are typically numbered according to the year in which the courses are normally taken.

Number	Year
010-099	first or second year undergraduate
100-199	second through fourth year undergraduate
200-299	mezzanine courses for advanced undergraduate or first-year graduate
300-399	second through fourth year graduate
400-499	specialized courses for advanced graduate
600-799	special summer courses

The Department of Electrical Engineering (EE) offers courses in the following areas:

- Biomedical Devices and Bioimaging
- Communication Systems: wireless, optical, wireline
- Control, Learning, and Optimization
- Electronic and Magnetic Devices
- Energy: solar cells, smart grid, load control
- Environmental and Remote Sensing: sensor nets, radar systems, space
- Fields and Waves
- Graphics, HCI, Computer Vision, Photography
- Information Theory and Coding: Image and data compression, denoising
- Integrated Circuit Design: MEMs, sensors, analog, RF
- Network Systems and Science: Next gen internet, wireless networks
- Nano and Quantum Science
- Nanofabrication Science and Technology
- Photonic Devices
- Systems Software: OS, compilers, languages
- Systems Hardware: architecture, VLSI, embedded systems

Areas of Research in Electrical Engineering

Candidates for advanced degrees participate in the research activities of the department as paid research assistants or as students of individual faculty members. At any one time, certain areas of research have more openings

than others. At present, faculty members and students are actively engaged in research in the following areas:

Hardware/Software Systems

- Data Science
- Distributed Systems
- Energy-Efficient Hardware Systems
- Integrated Circuits and Power Electronics
- Programming Environments
- Security
- Software Defined Networking
- Mobile Networking

Information Systems and Science

- Bio-Medical Imaging
- Communications Systems
- Control & Optimization
- Data Science
- Information Theory and Applications
- Societal Networks
- Signal Processing and Multimedia

Physical Science and Technology

- Biomedical Devices and Systems
- Electronic Devices
- Energy Harvesting and Conversion
- Integrated Circuits and Power Electronics
- Nanotechnology and NEMS/MEMS
- Nanophotonics and Quantum Technologies
- Optics

For additional information, see the Department of Electrical Engineering's Research page at <https://ee.stanford.edu/research/the-big-picture>.

Undergraduate Programs in Electrical Engineering

To major in Electrical Engineering (EE), undergraduates should follow the depth sequence in the "Undergraduate Degree in Electrical Engineering" section of this bulletin. Students must have a program planning sheet approved by their adviser and the department before the end of the quarter following the quarter in which they declare the EE major. A final version of the completed and signed program sheet is due to the department no later than one month prior to the quarter of senior year. Program sheets are available at <http://ughb.stanford.edu>. Majors must receive at least a 2.0 grade point average (GPA) in courses taken for the EE depth requirement; all classes must be taken for a letter grade.

Students interested in a minor should consult the "Minor in Electrical Engineering" section of this bulletin.

A Stanford undergraduate may work simultaneously toward the B.S. and M.S. degrees. University requirements for the coterminal M.A. or M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Electrical Engineering (EE)

Completion of the undergraduate program in Electrical Engineering leads to the conferral of the Bachelor of Science in Electrical Engineering.

Mission of the Undergraduate Program in Electrical Engineering

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart a basic understanding of electrical engineering built on a foundation of physical science, mathematics, computing, and technology, and to provide majors in the department with knowledge of electrical engineering principles along with the required supporting knowledge of mathematics, science, computing, and engineering fundamentals. The program develops students' skills in performing and designing experimental projects and communicating their findings to the scientific community effectively. Students in the major are required to select one sub-discipline for specialization. Choices include: electronic circuits, devices and photonics; signal processing, communication and controls; hardware and software systems; bio-electronics and bio-imaging; music; and energy and environment. The program prepares students for careers in government agencies, the corporate sector, or for future study in graduate or professional schools.

Requirements

Mathematics

MATH 41	Calculus	5
MATH 42	Calculus	5
Select one 2-course sequence:		10

CME 100 & CME 102	Vector Calculus for Engineers and Ordinary Differential Equations for Engineers (Same as ENGR 154)	
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MATH 52 & MATH 53	Integral Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra	
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EE Math. One additional 100-level course. Select one of the following: 3

EE 102B	Signal Processing and Linear Systems II (if not used in Depth)	
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EE 103	Introduction to Matrix Methods	
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EE 142	Engineering Electromagnetics	
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CME 104/ ENGR 155B	Linear Algebra and Partial Differential Equations for Engineers	
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MATH 113	Linear Algebra and Matrix Theory	
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CS 103	Mathematical Foundations of Computing	
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Statistics/Probability. Select one of the following: ¹ 3-4

EE 178	Probabilistic Systems Analysis (Preferred)	
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CS 109	Introduction to Probability for Computer Scientists	
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Science

Select one of the following sequences: 8

PHYSICS 41 & PHYSICS 43	Mechanics and Electricity and Magnetism ²	
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PHYSICS 61 & PHYSICS 63	Mechanics and Special Relativity and Electricity, Magnetism, and Waves	
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Science elective. One additional 4-5 unit course from approved list in Undergraduate Handbook, Figure 3-2. ³ 4-5

Technology in Society

One course, see Basic Requirement 4 in the School of Engineering section 3-5

Engineering Fundamentals⁴

Select one of the following:

CS 106B/ENGR 70B	Programming Abstractions	5
or CS 106X/ENGR 70X	Programming Abstractions (Accelerated)	

At least two additional courses, at least one of which is not in EE or CS (CS 106A is not allowed). Choose from table in Undergraduate Handbook, Figure 3-4. One from ENGR 40, ENGR 40M or ENGR 40P recommended.

Writing in the Major (WIM)

Select one of the following: 3-4

EE 109	Digital Systems Design Lab (WIM/Design)	
EE 133	Analog Communications Design Laboratory (WIM/Design)	
EE 134	Introduction to Photonics (WIM/Design)	
EE 152	Green Electronics (WIM/Design)	
EE 153	Power Electronics (WIM/Design)	
EE 168	Introduction to Digital Image Processing (WIM/Design)	
EE 191W	Special Studies and Reports in Electrical Engineering (WIM; Department approval required) ⁵	
CS 194W	Software Project (WIM/Design)	

Core Electrical Engineering Courses

EE 100	The Electrical Engineering Profession ⁶	1
EE 101A	Circuits I	4
EE 102A	Signal Processing and Linear Systems I	4
EE 108	Digital System Design	4
Physics in Electrical Engineering. Students must complete one of the following courses:		3-5
EE 41/ENGR 40P	Physics of Electrical Engineering ⁷	
EE 65	Modern Physics for Engineers (Preferred)	
EE 142	Engineering Electromagnetics ⁸	

Depth Courses 14

Select four courses from one of the following Depth areas. Courses must include one required course, one Design course, and 2 additional courses.

Design Course 3-4

Select one of the following:

EE 109	Digital Systems Design Lab (WIM/Design)	
EE 133	Analog Communications Design Laboratory (WIM/Design)	
EE 134	Introduction to Photonics (WIM/Design)	
EE 152	Green Electronics (WIM/Design)	
EE 153	Power Electronics (WIM/Design)	
EE 168	Introduction to Digital Image Processing (WIM/Design)	
EE 262	Two-Dimensional Imaging (Design)	
EE 265	Digital Signal Processing Laboratory (Design)	
CS 194W	Software Project (WIM/Design)	

Additional Depth Electives 12

May include up to two additional Engineering Fundamentals, any CS 193 course and any letter graded EE or EE Related courses (minus any previously noted restrictions). Freshman and Sophomore seminars, EE191 and CS 106A do not count toward the 60 units.

- 1 CME 106 or STATS 116 can also fulfill the Statistics/Probability requirement, but these are not preferred.
- 2 The EE introductory class ENGR 40 or ENGR 40M may be taken concurrently with PHYSICS 43.
- 3 A minimum of 12 science units must be taken. A minimum of 40 math and science units combined must be taken.
- 4 EE Engineering Topics: Fundamentals and Depth courses must total 60 units minimum.
- 5 EE 191W may satisfy WIM only if it is a follow-up to an REU, independent study project or as part of an honors thesis project where a faculty agrees to provide supervision of writing a technical paper and with suitable support from the Writing Center.
- 6 For upper division students, a 200-level seminar in their depth area will be accepted, on petition.
- 7 EE 41/ENGR 40P can meet this requirement only if it is not used to fulfill the Engineering Fundamentals requirement.
- 8 EE 142 cannot be used for both Physics in Electrical Engineering and as a depth elective.

Depth Areas

		Units
Bio-electronics and Bio-imaging		
EE 101B	Circuits II (Required)	4
or EE 102B	Signal Processing and Linear Systems II	
EE 122B	Introduction to Biomedical Electronics	3
EE 124	Introduction to Neuroelectrical Engineering	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/Design)	4
EE 169	Introduction to Bioimaging	3
EE 202	Electrical Engineering in Biology and Medicine	3
EE 225	Biochips and Medical Imaging	3
Circuits and Devices		
EE 101B	Circuits II (Required)	4
EE 114	Fundamentals of Analog Integrated Circuit Design	3
EE 116	Semiconductor Device Physics	3
EE 122A	Analog Circuits Laboratory	3
EE 133	Analog Communications Design Laboratory (WIM/Design)	4
EE 152	Green Electronics	4
EE 153	Power Electronics (WIM/Design)	3-4
EE 212	Integrated Circuit Fabrication Processes	3
EE 214B	Advanced Analog Integrated Circuit Design	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 271	Introduction to VLSI Systems	3
Computer Hardware		
CS 107	Computer Organization and Systems (Prerequisite for EE 180)	3-5
EE 180	Digital Systems Architecture (Required)	3-4
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 152	Green Electronics (WIM/Design)	4
EE 271	Introduction to VLSI Systems	3
EE 273	Digital Systems Engineering	3
EE 282	Computer Systems Architecture	3
Computer Software		
CS 107	Computer Organization and Systems (Prerequisite for EE 180)	3-5
EE 180	Digital Systems Architecture (Required)	3-4

CS 108	Object-Oriented Systems Design	3-4
CS 110	Principles of Computer Systems	3-5
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
EE 152	Green Electronics (WIM/Design)	4
CS 194W	Software Project (WIM/Design)	3
Energy and Environment		
EE 101B	Circuits II (Required)	4
or EE 180	Digital Systems Architecture	
EE 116	Semiconductor Device Physics	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 151	Sustainable Energy Systems	3
EE 152	Green Electronics (WIM/Design)	4
EE 153	Power Electronics (WIM/Design)	3-4
EE 168	Introduction to Digital Image Processing (WIM/Design)	3-4
EE 263	Introduction to Linear Dynamical Systems	3
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
EE 293B	Fundamentals of Energy Processes	3
CEE 155	Introduction to Sensing Networks for CEE	4
CEE 173A	Energy Resources	4-5
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ME 185	Electric Vehicle Design	3
Music		
EE 102B	Signal Processing and Linear Systems II (Required)	4
or MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 122A	Analog Circuits Laboratory	3
EE 264	Digital Signal Processing	3-4
or EE 265	Digital Signal Processing Laboratory	
MUSIC 256A	Music, Computing, and Design I: Software Paradigms for Computer Music	1-4
MUSIC 256B	Music, Computing, Design II: Mobile Music	1-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4
MUSIC 420A	Signal Processing Models in Musical Acoustics	3-4
MUSIC 421A	Audio Applications of the Fast Fourier Transform	3-4
MUSIC 422	Perceptual Audio Coding	3
MUSIC 424	Signal Processing Techniques for Digital Audio Effects	3-4
Photonics, Solid State and Electromagnetics		
EE 101B	Circuits II (Required)	4
EE 116	Semiconductor Device Physics	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 136	Introduction to Nanophotonics and Nanostructures	3
EE 142	Engineering Electromagnetics	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 228	Basic Physics for Solid State Electronics	3
EE 236A	Modern Optics	3
EE 236B	Guided Waves	3
EE 242	Electromagnetic Waves	3
EE 247	Introduction to Optical Fiber Communications	3
Signal Processing, Communications and Controls		
EE 102B	Signal Processing and Linear Systems II (Required)	4
EE 124	Introduction to Neuroelectrical Engineering	3
EE 133	Analog Communications Design Laboratory (WIM/Design)	3-4
EE 168	Introduction to Digital Image Processing (WIM/Design)	3-4
EE 169	Introduction to Bioimaging	3
EE 179	Analog and Digital Communication Systems	3
EE 184		
EE 261	The Fourier Transform and Its Applications	3
EE 262	Two-Dimensional Imaging (Design)	3
EE 263	Introduction to Linear Dynamical Systems	3
EE 264	Digital Signal Processing	3
or EE 265	Digital Signal Processing Laboratory	
EE 278	Introduction to Statistical Signal Processing	3
EE 279	Introduction to Digital Communication	3
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Honors Program

The Department of Electrical Engineering offers a program leading to a Bachelor of Science in Electrical Engineering with Honors. This program offers a unique opportunity for qualified undergraduate majors to conduct independent study and research at an advanced level with a faculty mentor, graduate students, and fellow undergraduates.

Admission to the honors program is by application. Declared EE majors with a grade point average (GPA) of at least 3.5 in Electrical Engineering are eligible to submit an application. Applications must be submitted by Autumn quarter of the senior year, be signed by the thesis adviser and second reader (one must be a member of the EE Faculty), and include an honors proposal. Students need to declare honors on Axess.

In order to receive departmental honors, students admitted to the honors program must:

1. Maintain a grade point average (GPA) of at least 3.5 in EE courses.
2. Complete at least 10 units of EE 191 or EE 191W for a letter grade with their thesis adviser. EE191 units do not count toward the required 60 units, with the exception of EE 191W if used to satisfy WIM.
3. Submit one final copy of the honors thesis approved by the adviser and second reader to the EE Degree Progress Officer by May 15.
4. Attend poster and oral presentation held at the end of spring quarter or present in another suitable forum approved by the faculty adviser.

Electrical Engineering (EE) Minor

The options for completing a minor in EE are outlined below. Students must complete a minimum of 23-25 units, as follows:

Select one of the following courses: Units
5

EE 65	Modern Physics for Engineers	
ENGR 40	Introductory Electronics	
ENGR 40M	An Intro to Making: What is EE	
ENGR 40P/EE 41	Physics of Electrical Engineering	
Select one of the following options:		8
Option I:		
EE 101A	Circuits I	
EE 101B	Circuits II	
Option II:		
EE 102A	Signal Processing and Linear Systems I	
EE 102B	Signal Processing and Linear Systems II	
Option III:		
EE 108	Digital System Design	
EE 180	Digital Systems Architecture	
In addition, four letter-graded EE or Related courses at the 100-level or higher must be taken (12 units minimum). CS 107 is required as a prerequisite for EE 180, but can count as one of the four classes.		12

Master of Science in Electrical Engineering

Students with undergraduate degrees in physics, mathematics, or related sciences, as well as in various branches of engineering, are invited to apply for admission. They should typically be able to complete the master's degree in five quarters; note that many courses are not taught during the summer. Capable students without formal undergraduate preparation in electrical engineering may also be admitted for graduate study. Such students may have graduated in any field and may hold either the B.S. or B.A. degree. Graduate study in electrical engineering demands that students be adequately prepared in areas such as circuits, digital systems, fields, lab work, mathematics, and physics.

It is the student's responsibility, in consultation with an adviser, to determine whether the prerequisites for advanced courses have been met. Prerequisite courses ordinarily taken by undergraduates may be included as part of the graduate program of study. However, if the number of these is large, the proposed program may contain more than the minimum 45 units, and the time required to meet the degree requirements may be increased.

The master's degree program may provide advanced preparation for professional practice or for teaching at the junior college level. The faculty does not prescribe specific courses to be taken. Each student, with the help of a program adviser, prepares an individual program and submits it to the department for approval. The Program Proposal must be submitted to the Degree Progress Office before the end of the first quarter of graduate study (second quarter for Honors Cooperative Program students); a final revised version is due early in the final quarter of study, prior to degree conferral. Detailed requirements and instructions are available at <http://ee.stanford.edu/gradhandbook>. All requirements for a master's degree must be completed within three years after the student's first term of enrollment in the master's program (five years for Honors Cooperative Program students).

Joint Electrical Engineering and Law Degree (J.D./M.S.)

The Department of Electrical Engineering and the School of Law offer a joint degree program leading to an M.S. degree in EE combined with a J.D. degree. The J.D./M.S. program is designed for students who wish to prepare themselves for careers that involve both Law and Electrical Engineering.

Students interested in this joint degree program must apply to and gain admission separately from the Department of Electrical Engineering and

the School of Law, and as an additional step, secure consent from both academic units to pursue both degrees simultaneously. Interest in the program should be noted on a student's application to each academic unit. A student currently enrolled in either the Department of Electrical Engineering or the School of Law may apply for admission to the other academic unit and for joint degree status after commencing study in that unit.

Joint degree students may elect to begin their study in either the Department of Electrical Engineering or the School of Law. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. In the first year of the joint degree program, students must be enrolled full-time in the School of Law. Students must satisfy the requirements for both the J.D. and the M.S. degrees as specified in the *Stanford Bulletin*.

The Electrical Engineering Department approves courses from the Law School that may count toward the M.S. degree in Electrical Engineering, and the Law School approves courses from the Department of Electrical Engineering that may count toward the J.D. degree. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program.

No more than 45 quarter hours of approved courses may be counted toward both degrees. No more than 36 quarter hours of courses that originate outside the School of Law may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the School of Law but count toward the Law degree, the School of Law credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis but not below zero.

The maximum number of School of Law units that may be counted toward the M.S. degree in Electrical Engineering is the greater of:

1. 12 units

or

2. the maximum number of units from courses outside of the department that M.S. candidates in Electrical Engineering are permitted to count toward the M.S. degree under general departmental guidelines, or as set forth in the case of a particular student's individual program.

Tuition and financial aid arrangements are typically administered through the school in which the student is enrolled.

Joint Electrical Engineering and Masters in Business Administration Degree (M.S./M.B.A.)

The Department of Electrical Engineering and the Graduate School of Business offer a joint degree program leading to an M.S. degree in EE combined with an M.B.A. degree. The joint program offers students an opportunity to develop advanced technical and managerial skills in preparation for careers in existing and new technology ventures.

Admission to the joint M.S./M.B.A. program requires that students apply and be accepted independently to both the Electrical Engineering Department at the School of Engineering and the Graduate School of Business. Students may apply concurrently, or elect to begin their course of study in EE and apply to the GSB during their first year.

The Honors Cooperative Program

Many of the department's graduate students are supported by the Honors Cooperative Program (HCP), which makes it possible for academically qualified engineers and scientists in nearby companies to be part-time master's students in Electrical Engineering while continuing nearly full-

time professional employment. Prospective HCP students follow the same admission process and must meet the same admission requirements as full-time master's students. For more information regarding the Honors Cooperative Program, see the "School of Engineering" section of this bulletin.

Doctor of Philosophy in Electrical Engineering

The University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

Admission to a graduate program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement, satisfactory performance on a qualifying examination, and sponsorship by two faculty members. Enrollment in EE 391, Special Studies, is recommended as a means for getting acquainted with a faculty member who might be willing to serve as the dissertation advisor.

Students admitted to the Ph.D. program must sign up to take the department qualifying examination, given once a year in winter quarter. Students are allowed two attempts to pass the examination. Students are encouraged to take the exam in their first year of study. The first attempt must be made no later than the second year of study. Students who have never taken the qualifying examination by the end of the second year of study will be dismissed from the Ph.D. program for failure to progress. Such students may be allowed to complete a master's degree in Electrical Engineering instead. Students who do not pass the qualifying examination after two attempts will be dismissed from the Ph.D. program for failure to progress. Such students may be allowed to complete a master's degree in Electrical Engineering instead.

Upon completion of the qualifying examination and after securing agreement by two faculty members to serve as dissertation adviser and second reader, the student files an Application for Candidacy for Doctoral Degree. The dissertation adviser must be a member of the Academic Council. One of the two faculty members must have either a full, joint or courtesy appointment in the Electrical Engineering department. Students are required to advance to candidacy prior to the end of their second year in the graduate program. Students who do not advance to candidacy by the end of their second year will be dismissed from the Ph.D. program for failure to progress.

The Ph.D. in Electrical Engineering is a specialized degree, and is built on a broad base of physics, mathematics, and engineering skills. The course program is expected to reflect competency in Electrical Engineering and specialized study in other areas relevant to the student's research focus. 90 units must be completed at Stanford beyond the 45 units for a master's degree (completed either at Stanford or at another institution and transferred in via the Application for Graduate Residency Credit form), for a total of 135 units. Students must complete 21 units of letter-graded lecture courses in related advanced physics, mathematics, engineering, or computer science courses, depending on the area of research. 12 of these 21 units must be EE/EE Related courses at the 200 level or higher. The remaining 69 units should be research with the dissertation advisor (EE 400, or the corresponding course number if the dissertation advisor's primary appointment is in another department).

Only after receiving department approval of the Application for Candidacy does the student become a candidate for the Ph.D. degree.

For the most recent information, see <http://ee.stanford.edu/gradhandbook>.

Financial Assistance

The department awards a limited number of fellowships, teaching and course assistantships, and research assistantships to incoming graduate

students. Applying for financial assistance is part of the admission application.

Ph.D. Minor in Electrical Engineering

For a minor in Electrical Engineering, students must fulfill the M.S. degree depth requirement, complete at least 20 units of lecture course work at the 200-level or higher in Electrical Engineering (of which 15 units must be letter-graded), and have the Application for Ph.D. Minor approved by the EE department and the major department. A grade point average of at least 3.35 on these courses is required.

Emeriti: (Professors) Clayton W. Bates, Richard Bube, John Cioffi*, Donald C. Cox, Von R. Eshleman, Michael J. Flynn*, Joseph W. Goodman, Robert M. Gray, Stephen E. Harris, Martin E. Hellman, Umran S. Inan*, Thomas Kailath*, Gordon S. Kino, Marc Levoy, Albert Macovski*, Laurence A. Manning, Edward J. McCluskey, Malcolm M. McWhorter, James D. Meindl, Teresa Meng, Richard H. Pantell, R. Fabian W. Pease, Leonard Tyler*, Robert L. White, Bernard Widrow, Bruce A. Wooley, Yoshihisa Yamamoto*; *(Associate Professor)* Bruce B. Lusignan; *(Professors, Research)* Donald L. Carpenter*, Aldo da Rosa, Antony Fraser-Smith*, C. Robert Helms, Ingolf Lindau*, David Luckham, Arogyaswami J. Paulraj, Calvin F. Quate (* *Recalled to active duty*)

Chair: Abbas El Gamal

Associate Chairs: Robert W. Dutton (*Undergraduate Education*), Olav Solgaard (*Graduate Education*), Howard Zebker (*Admissions*)

Academic Affairs Committee Chair: Joseph M. Kahn

Professors: Nicholas Bambos, Dan Boneh, Stephen P. Boyd, Robert W. Dutton, Abbas El Gamal, Shanhui Fan, Hector Garcia-Molina, Bernd Girod, Andrea G. Goldsmith, Patrick Hanrahan, James S. Harris, John L. Hennessy, Lambertus Hesselink, Mark A. Horowitz, Roger T. Howe, Joseph M. Kahn, Gregory T. A. Kovacs, Sanjay Lall, Thomas H. Lee, Nick McKeown, David A. B. Miller, Dwight G. Nishimura, Oyekunle Olukotun, Brad G. Osgood, John M. Pauly, James D. Plummer, Balaji Prabhakar, Mendel Rosenblum, Krishna Saraswat, Krishna V. Shenoy, Olav Solgaard, Fouad A. Tobagi, David Tse, Benjamin Van Roy, Jelena Vuckovic, Shan X. Wang, Jennifer Widom, H. S. Philip Wong, S. Simon Wong, Howard Zebker

Associate Professors: Dawson Engler, John T. Gill III, Christoforos E. Kozyrakis, Philip Levis, Subhasish Mitra, Andrea Montanari, Boris Murmann, Eric Pop, Tsachy Weissman

Assistant Professors: Amin Arbabian, John Duchi, Audrey Ellerbee, Jonathan Fan, Sachin Katti, Ayfer Ozgur Aydin, Ada Poon, Juan Rivas-Davila, Gordon Wetzstein

Professors (Research): William J. Dally, James F. Gibbons, Leonid Kazovsky, Butrus Khuri-Yakub, Yoshio Nishi, Piero Pianetta

Courtesy Professors: Stacey Bent, Kim Butts-Pauly, Emmanuel Candes, EJ Chichilnisky, Amir Dembo, David L. Dill, Per Enge, Ron Fedkiw, Gary Glover, Peter Glynn, Monica S. Lam, Craig Levin, David G. Luenberger, Michael McConnell, John C. Mitchell, Sandy Napel, Richard Olshen, John Ousterhout, Norbert Pelc, Julius Smith, Brian Wandell, Lei Xing, Yinyu Ye

Courtesy Associate Professors: Kwabena Boahen, Brian Hargreaves, Ramesh Johari, Andrew Ng, Amin Saberi, Daniel Spielman, Barbara van Schewick

Courtesy Assistant Professors: Mohsen Bayati, Sigrid Close, Adam de la Zerda, Surya Ganguli, Jin Hyung Lee, David Liang, Marco Pavone, Ram Rajagopal, Debbie Senesky

Lecturers: Dennis Allison, Sakshi Arora, Andrea Di Blas, Abbas Emami-Naeini, Andrew Freeman, Peter Griffin, My Le, Roger Melen, Scott Murray, David Obershaw, Dan O'Neill, Marcel Pelgrom, Jason Stinson

Consulting Professors: Ahmad Bahai, Richard Dasher, Leslie Field, Michael Garner, Fred M. Gibbons, Dimitry Gorinevsky, Bob S. Hu, Theodore Kamins, David Leeson, Fernando Mujica, Madihally Narasimha, Guru Parulkar, Stephen Ryu, Ronald Schafer, Ashok Srivastava, John Wenstrand

Consulting Associate Professors: Jatinder Singh, Jun Ye

Consulting Assistant Professor: Aneesh Nainani

Visiting Professors: Nicola Femia, Jinliang He, Anping Jiang, Igor Markov, Naresh Shanbhag

Visiting Associate Professors: Joao Cordeiro de Oliveira Barros, Hoon Kim, Olga Munoz Medina, Aslan Tchamkerten, Shengli Zhang

Visiting Assistant Professors: Meili Guo, Haricharan Lakshman, Panagiotis Patrinos, Gerson Rodriguez de los Santos Lopez, Xiumin Shi

Institute for Computational and Mathematical Engineering

Courses offered by the Institute for Computational and Mathematical Engineering are listed under the subject code CME on the (<http://explorecourses.stanford.edu/search?jsessionid=14DE1634FEFCBE32542A001C07860506?view=catalog&catalog=&page=0&q=CME&filter-catalognumber=CME=on&filter-coursestatus-Active=on>) *Stanford Bulletin's* ExploreCourses web site.

ICME is a degree granting (M.S./Ph.D.) interdisciplinary institute at the intersection of mathematics, computing, engineering and applied sciences. ICME was founded in 2004, building upon the Scientific Computing and Computational Mathematics Program (est. 1989).

At ICME, we design state-of-the-art mathematical and computational models, methods, and algorithms for engineering and science applications. The program collaborates closely with engineers and scientists in academia and industry to develop improved computational approaches and advance disciplinary fields. In particular, it leverages Stanford's strength in engineering applications in the physical, biological, mathematical, and information sciences, and has established connections with nearly 20 departments across five schools at Stanford.

The program identifies research areas that would benefit from a multidisciplinary approach in which computational mathematics plays a role. This multidisciplinary intellectual environment is a core strength of ICME, with interaction among students and faculty with diverse backgrounds and expertise. Students and faculty are active in many research areas: financial mathematics, fluid dynamics, protein folding, data science including machine learning and recommender systems, ocean dynamics, climate modeling, reservoir engineering, aerodynamics and space applications, computer graphics, and many more.

The program trains students and scholars from across Stanford in mathematical modeling, scientific computing, and advanced computational algorithms at the undergraduate and graduate levels. Courses typically provide strong theoretical foundations for the solution of real world problems and numerical computations to facilitate application of mathematical techniques and theories. Training offered includes matrix computations, computational probability and combinatorial optimization, optimization, stochastics, numerical solution of partial differential

equations, parallel computer algorithms, and new computing paradigms (CUDA, MapReduce), amongst others.

ICME offers service courses for undergraduates and graduate students to fulfill departmental requirements, core courses for master's and doctoral students in Computational and Mathematical Engineering, and specialized electives in various application areas.

The ICME master's program offers both specialized and general tracks. Currently, the program is offering specialized tracks in Computational Geoscience (<https://pangea.stanford.edu/programs/compgeo>), Data Science, Imaging Sciences, and Mathematical and Computational Finance. The program is planning to implement a Computational Medicine track in the near future.

Graduate Programs in Computational and Mathematical Engineering

University regulations governing the M.S. and Ph.D. degrees are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through coursework in mathematical modeling, scientific computing, advanced computational algorithms, and a set of courses from a specific area of application or field. The latter includes computational geoscience, computational medicine, data sciences, imaging sciences, mathematical and computational finance and other interdisciplinary areas that combine advanced mathematics with the classical physical sciences or with challenging interdisciplinary problems emerging within disciplines such as business, biology, medicine, and information.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Computational and Mathematical Engineering and related fields.

Master of Science in Computational and Mathematical Engineering

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees" (p. 43) section of this bulletin. The following are specific departmental requirements.

The M.S. degree in Computational and Mathematical Engineering is intended as a terminal professional degree and does not lead to the Ph.D. program. Students interested in the doctoral program should apply directly to the Ph.D. program. Master's students who have maintained a minimum grade point average (GPA) of 3.5 are eligible to take the Ph.D. qualifying exam; those who pass this examination and secure a research adviser may continue into the Ph.D. program upon acceptance by the institute.

The master's program consists of 45 units of course work taken at Stanford. No thesis is required; however, students may become involved in research projects during the master's program, particularly to explore an interest in continuing to the doctoral program. Although there is no specific background requirement, significant exposure to mathematics and engineering course work is necessary for successful completion of the program.

A student may follow the conventional master's program as described directly below, or any of the specialized tracks outlined below. Additional

information on the Computational Geoscience track is available on the department's web site (<https://pangea.stanford.edu/programs/compgeo>).

Applications to the M.S. program and all required supporting documents must be received by January 6, 2015. See <http://icme.stanford.edu/prospective/admissions/index.php.html> for up-to-date information including departmental deadlines. See also Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>).

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Requirements

A candidate is required to complete a program of 45 units of courses numbered 200 or above. Courses below 200 level require special approval from the program office. At least 36 of these must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. Master's students interested in continuing to the doctoral program must maintain a 3.5 or better grade point average in the program.

Requirement 1: Foundational

Students must demonstrate foundational knowledge in the field by completing four of the six core courses:

		Units
CME 303	Partial Differential Equations of Applied Mathematics	3
CME 306	Numerical Solution of Partial Differential Equations	3
CME 302	Numerical Linear Algebra	3
CME 304 or CME 364A	Numerical Optimization Convex Optimization I	3
CME 305	Discrete Mathematics and Algorithms	3
CME 308	Stochastic Methods in Engineering	3

Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

Requirement 2: Breadth Electives

18 units of general electives to demonstrate breadth of knowledge in technical area. The elective course list represents automatically accepted electives within the program. However, electives are not limited to the list below, and the list is expanded on a continuing basis. The elective part of the ICME program is meant to be broad and inclusive of relevant courses of comparable rigor to ICME courses. Courses outside this list can be accepted as electives subject to approval by the student's ICME adviser.

		Units
Aeronautics and Astronautics		
AA 214B	Numerical Methods for Compressible Flows	3
AA 214C	Numerical Computation of Viscous Flow	3
AA 218	Introduction to Symmetry Analysis	3
Computational and Mathematical Engineering		
CME 211	Introduction to Programming for Scientists and Engineers	3
CME 212	Advanced Programming for Scientists and Engineers	3
CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3

CME 215A/215B	Advanced Computational Fluid Dynamics	3
CME 263	Introduction to Linear Dynamical Systems	3
CME 342	Parallel Methods in Numerical Analysis	3
CME 364A	Convex Optimization I	3
Computer Science		
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 255	Introduction to Cryptography	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 268	Geometric Algorithms	3
CS 340	Topics in Computer Systems	3-4
CS 348A		3-4
CS 364A	Algorithmic Game Theory	3
Electrical Engineering		
EE 223	Applied Quantum Mechanics II	3
EE 256	Numerical Electromagnetics	3
EE 376A	Information Theory	3
Management Science and Engineering		
MSE 220	Probabilistic Analysis	3-4
MSE 221	Stochastic Modeling	3
MSE 223	Simulation	3
MSE 238	Leading Trends in Information Technology	3
MSE 251	Stochastic Control	3
MSE 310	Linear Programming	3
MSE 316	Discrete Mathematics and Algorithms	3
MSE 321	Stochastic Systems	3
MSE 322	Stochastic Calculus and Control	3
Mathematics		
MATH 136	Stochastic Processes	3
MATH 171	Fundamental Concepts of Analysis	3
MATH 221A	Mathematical Methods of Imaging	3
MATH 221B	Mathematical Methods of Imaging	3
MATH 227	Partial Differential Equations and Diffusion Processes	3
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
Mechanical Engineering		
ME 335A/335B/335C	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 408	Spectral Methods in Computational Physics	3
ME 412	Engineering Functional Analysis and Finite Elements	3
ME 469	Computational Methods in Fluid Mechanics	3
ME 484	Computational Methods in Cardiovascular Bioengineering	3
Statistics		
STATS 208	Introduction to the Bootstrap	3
STATS 217	Introduction to Stochastic Processes	3
STATS 219	Stochastic Processes	3

STATS 237	Theory of Investment Portfolios and Derivative Securities	3
STATS 250	Mathematical Finance	3
STATS 305	Introduction to Statistical Modeling	3
STATS 310A/310B/310C	Theory of Probability	2-4
STATS 324	Multivariate Analysis	3
STATS 362	Topic: Monte Carlo	2-3
Other		
CEE 281	Mechanics and Finite Elements	3
CEE 362G	Stochastic Inverse Modeling and Data Assimilation Methods	3-4
ENGR 209A	Analysis and Control of Nonlinear Systems	3

Requirement 3: Specialized Electives

9 units of focused graduate application electives, approved by the ICME graduate adviser, in the areas of engineering, mathematics, physical, biological, information, and other quantitative sciences. These courses should be foundational depth courses relevant to the student's professional development and research interests.

Requirement 4: Programming

3 units of programming course work demonstrating programming proficiency. All graduate students in the program are required to complete programming course for letter grade at the level of CME 212 Advanced Programming for Scientists and Engineers or higher.

Requirement 5: Seminar

3 units of ICME graduate seminars or other approved seminars. Additional seminar units may not be counted towards the 45-unit requirement.

Prerequisites:

Note: Fundamental courses in mathematics and computing may be needed as prerequisites for other courses in the program. Check the prerequisites of each required course. Preparatory courses include such subjects as: calculus, linear algebra and differential calculus of several variables, integral calculus of several variables, ODEs with linear algebra, linear algebra and matrix theory, vector calculus for engineers, linear algebra and PDEs for engineers, introduction to scientific computing, linear algebra with application to engineering computations, PDEs in engineering, Computer Programming in C++ for Earth Scientists and Engineers, Introduction to Large-Scale Computing in Engineering, numerical linear algebra, programming methodology, programming abstractions, machine learning, introduction to optimization, theory of probability, and data mining and analysis.

Computational Geoscience Track

The Computational Geoscience (CompGeo) track is designed for students interested in the skills and knowledge required to develop efficient and robust numerical solutions to Earth Science problems using high-performance computing. The CompGeo curriculum is based on four fundamental areas: modern programming methods for Science and Engineering, applied mathematics with an emphasis on numerical methods, algorithms and architectures for high-performance computing and computationally oriented Earth Sciences courses. Earth Sciences/ computational project courses give practice in applying methodologies and concepts. CompGeo students are required to complete general and focused application electives (Requirements 2 and 3) from the approved list of courses from the Computational Geosciences program as well as completing EARTHSYS 310 seminar as part of Requirement 5. See <http://pangea.stanford.edu/programs/compgeo/>. All other requirements remain the same as set forth above.

Note: Students interested in pursuing the ICME M.S. in the Computational Geoscience (CompGeo) track are encouraged to contact the Computational Geoscience Program Director before applying. This track is not declared on AxBess, and it does not appear on the transcript or diploma.

Students are required to take 45 units of course work, and research credits to earn an M.S. in Computational and Mathematical Engineering with the Computational Geoscience track. The course work follows the requirements of the ICME M.S. degree as above with additional restrictions placed on the general and focused electives.

Requirement 1: Fundamentals

Identical to the general ICME master's program.

Requirement 2: Breadth Electives in Geosciences

The M.S. CompGeo track requires 18 units of course work in the Geosciences. Courses are currently offered but are not limited to the following specific areas of the School of Earth Sciences:

1. Reservoir Simulation
2. Geophysical Imaging
3. Tectonophysics/Geomechanics
4. Climate/Atmosphere/Ocean
5. Ecology/Geobiology.

The Earth Science courses, offered in EESS, ERE, GES, and Geophysics is selected based on the area of the student's interest and their research/thesis work, along with the advice and consent of the student's adviser. Students are encouraged to choose a range of courses in order to guarantee breadth of knowledge in Earth Sciences. A maximum of one non-computationally-oriented course can be counted towards the master's degree requirements. Following is a list of recommended courses (grouped by area) that can be taken to fulfill the Geosciences course requirement.

		Units
Environmental/Climate/Hydrogeology		
EESS 215	Earth System Dynamics	2
EESS 220	Physical Hydrogeology	4
EESS 221	Contaminant Hydrogeology and Reactive Transport	4
EESS 244	Marine Ecosystem Modeling	3
EESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
GES 224	Modeling Transport and Transformations in the Environment	2-3
GES 264	Mathematical Modeling in Biogeochemistry	3
CEE 262A	Hydrodynamics	3-4
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 262C	Modeling Environmental Flows	3
CEE 263A	Air Pollution Modeling	3-4
CEE 263B	Numerical Weather Prediction	3-4
CEE 361	Turbulence Modeling for Environmental Fluid Mechanics	2-4
Geophysical Imaging		
EE 256	Numerical Electromagnetics	3
GEOPHYS 204	Spectral Finite Element Method (SPECFEM) Seismograms	3
GEOPHYS 210	Basic Earth Imaging	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3
GEOPHYS 240	Borehole Seismic Modeling and Imaging	3

GEOPHYS 280	3-D Seismic Imaging	2-3
GEOPHYS 287	Earthquake Seismology	3-5
General Computational/Mathematical Geoscineces		
CEE 362G	Stochastic Inverse Modeling and Data Assimilation Methods	3-4
CHEM 275	Advanced Physical Chemistry	3
CME 372	Applied Fourier Analysis and Elements of Modern Signal Processing	3
CME 321A	Mathematical Methods of Imaging	3
CME 321B	Mathematical Methods of Imaging	3
EESS 211	Fundamentals of Modeling	3-5
EESS 214	Introduction to geostatistics and modeling of spatial uncertainty	3-4
ENERGY 242	Topics in Advanced Geostatistics	3-4
ENERGY 256	Electronic Structure Theory and Applications to Chemical Kinetics	3
ENERGY 260	Modeling Uncertainty in the Earth Sciences	3
ENERGY 284	Optimization and Inverse Modeling	3
ENERGY 291	Optimization of Energy Systems	3-4
GEOPHYS 257	Introduction to Computational Earth Sciences	2-4
GEOPHYS 258	Applied Optimization Laboratory (Geophys 258)	3-4
GEOPHYS 281	Geophysical Inverse Problems	3
GES 240	Geostatistics	2-3
STATS 253	Analysis of Spatial and Temporal Data	3
ME 335A	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 361	Turbulence	3
ME 469B	Computational Methods in Fluid Mechanics	3
MSE 211	Linear and Nonlinear Optimization	3-4
Reservoir Simulation/Fluid Flow		
CME 358	Finite Element Method for Fluid Mechanics	3
ENERGY 223	Reservoir Simulation	3-4
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 281	Applied Mathematics in Reservoir Engineering	3
ENERGY 290	Numerical Modeling of Fluid Flow in Heterogeneous Porous Media	3
GEOPHYS 200	Fluids and Flow in the Earth: Computational Methods	3
GES 255	Basin and Petroleum System Modeling	3
Subsurface/Reservoir Characterization		
ENERGY 241	Seismic Reservoir Characterization	3-4
GEOPHYS 202	Reservoir Geomechanics	3
GEOPHYS 260	Rock Physics for Reservoir Characterization	3
Structural/Tectonophysics/Geomechanics		
CEE 292	Computational Micromechanics	3
CEE 294	Computational Poromechanics	3
CEE 362	Numerical Modeling of Subsurface Processes	3-4
GEOPHYS 220	Ice, Water, Fire	3-5
GEOPHYS 251	Structural Geology and Rock Mechanics	4
GEOPHYS 288A	Crustal Deformation	3-5
GEOPHYS 288B	Crustal Deformation	3-5
GEOPHYS 290	Tectonophysics & Global Tectonics	3

Requirement 3: Integrative courses in Computational Geoscience (9 units)

9 units of focused research in computational geoscience. Students are required to either complete a Research Project or an Internship as described below.

		Units
Internship and/or Research Project, enrolling in a course such as:		1-4
EARTHSCI 400	Directed Research	
EARTHSCI 401	Curricular Practical Training	

Research Project

Students who plan to apply to the Ph.D. program need to take 9 units of research. Students will work with the CompGeo program director to find an appropriate advisor and research topic and then enroll in EARTHSCI 400: Directed Research (or a similar SES research course). The successful outcome of a Research Project can be:

1. an oral presentation at an international meeting requiring an extended abstract
2. a publication submission in a peer reviewed journal.
3. a written report

Internship

As an alternative to the Research Project students have the option of an internship which is recommended for those students interested in a terminal degree. The individual student is responsible for securing and organizing the internship and is required to obtain a faculty advisor and submit a written report on the internship project. Credit for the internship will be obtained through EARTHSCI 401: Curricular Practical Training (1 unit) and in this case only 8 units of research are required.

Requirement 4: Programming

3 units of programming course work demonstrating programming proficiency. All graduate students in the program are required to complete programming course for letter grade at the level of CME 212 Advanced Programming for Scientists and Engineers or higher.

		Units
CME 212	Advanced Programming for Scientists and Engineers	3
CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3
CME 342	Parallel Methods in Numerical Analysis	3
GEOPHYS 257	Introduction to Computational Earth Sciences	2-4

Requirement 5: Seminar

3 units of ICME graduate seminars or other approved seminars. Additional seminar units may not be counted towards the 45-unit requirement. One of the required seminars for CompGeo must be EARTHSCI 310 Computational Geosciences Seminar (1 unit).

Data Science Track

The Data Science track develops strong mathematical, statistical, and computational and programming skills through the general master's core and programming requirements. In addition, it provides a fundamental data science education through general and focused electives requirement from courses in data sciences and related areas. The course work follows the

requirements of the general master's degree in the core course requirement. The general and focused elective requirements (requirements 2 and 3 below) are limited to predefined courses from the data sciences and related courses group. Programming requirement (requirement 4) is extended to 6 units and includes course work in advanced scientific programming and high performance computing. The final requirement is a practical component (requirement 5) for 6 units to be completed through capstone project, data science clinic, or other courses that have strong hands-on or practical component such as statistical consulting.

Requirement 1: Foundational (12 units)

Students must demonstrate foundational knowledge in the field by completing the following core courses. Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

The following courses are required:

CME 302	Numerical Linear Algebra	3
CME 304	Numerical Optimization	3
or CME 364A	Convex Optimization I	
CME 305	Discrete Mathematics and Algorithms	3
CME 308	Stochastic Methods in Engineering (or an equivalent course approved by the committee)	3
Total Units		12

Requirement 2: Data Science electives (12 units)

Data Science electives should demonstrate breadth of knowledge in the technical area. The elective course list is defined. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

Take 12 units of the following:

STATS 200	Introduction to Statistical Inference	3
STATS 203	Introduction to Regression Models and Analysis of Variance	3
or STATS 305	Introduction to Statistical Modeling	
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

Requirement 3: Specialized electives (9 units)

Choose three courses in specialized areas from the following list. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

Take three of the following:

BIOE 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOS 221	Modern Statistics for Modern Biology	3
CS 224W	Social and Information Networks	3-4
CS 229	Machine Learning	3-4
CS 246	Mining Massive Data Sets	3-4
CS 347	Parallel and Distributed Data Management	3

CS 448	Topics in Computer Graphics	3-4
ENERGY 240	Geostatistics	2-3
OIT 367	Business Intelligence from Big Data	4
PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 303	Human and Machine Hearing	3
STATS 290	Paradigms for Computing with Data	3
STATS 366	Modern Statistics for Modern Biology	3

Requirement 4: Advanced Scientific Programming and High Performance Computing Core (6 units)

To ensure that students have a strong foundation in programming students are required to take 6 units of advanced programming for letter grade, with at least 3 units in parallel computing. Approved courses for advanced scientific programming include:

		Units
Advanced Scientific Programming; take 3 units		
CME 212	Advanced Programming for Scientists and Engineers	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3
CS 107	Computer Organization and Systems	3-5
CS 249B	Large-scale Software Development	3
Parallel/HPC Computing; take 3 units		
CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 342	Parallel Methods in Numerical Analysis	3
CS 149	Parallel Computing	3-4
CS 315A	Parallel Computer Architecture and Programming	3
CS 316	Advanced Multi-Core Systems	3
CS 344C, offered in previous years, may also be counted		3

Requirement 5: Practical component (6 units)

Students are required to take 6 units of practical component that may include any combination of:

- A capstone project, supervised by a faculty member and approved by the steering committee. The capstone project should be computational in nature. Students should submit a one-page proposal, supported by the faculty member, to the steering committee (gwalther@stanford.edu) for approval at least one quarter before.
- Project labs offered by Stanford Data Lab: ENGR 250 Data Challenge Lab, and ENGR 350 Data Impact Lab.
- Other courses that have a strong hands-on and practical component, such as STATS 390 Consulting Workshop up to 3 units.

Mathematical and Computational Finance Track

The Mathematical & Computational Finance (MCF) track is an interdisciplinary program that provides education in applied and computational mathematics, statistics, and financial applications for individuals with strong mathematical skills. Upon successful completion of the MCF track in the ICME M.S. program, students will be prepared to assume positions in the financial industry as data and information scientists, quantitative strategists, risk managers, regulators, financial technologists,

or to continue on to their Ph.D. in ICME, MS&E, Mathematics, Statistics, Finance and other disciplines.

The Institute for Computational and Mathematical Engineering, in close cooperation with Mathematics, Management Science and Engineering and Statistics provide many of the basic courses.

Note: This new track in the ICME M.S. Program will supersede, beginning in the fall quarter of 2014, the interdisciplinary M.S. Program (IDP) in Financial Mathematics in the School of Humanities & Sciences.

Requirement 1: Foundational (9 units)

Students must demonstrate foundational knowledge in the field by completing the following core courses. Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

	Units
The following courses are required:	
CME 302 Numerical Linear Algebra	3
CME 304 Numerical Optimization ¹	3
or CME 364A Convex Optimization I	
CME 308 Stochastic Methods in Engineering (or an equivalent course approved by the committee) ²	3
or MATH 236 Introduction to Stochastic Differential Equations	
Total Units	9

Requirement 2: Data Science electives (9 units)

Data Science electives should demonstrate breadth of knowledge in the technical area. The elective course list is defined. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

	Units
Take 9 units of the following:	
STATS 240 Statistical Methods in Finance	3-4
STATS 241 Data-driven financial and risk econometrics	3-4
STATS 243 Financial Models and Statistical Methods in Active Risk Management	3-4
STATS 315A Modern Applied Statistics: Learning	2-3
STATS 315B Modern Applied Statistics: Data Mining	2-3

Requirement 3: Finance electives (9-12 units)

Choose three courses in specialized areas from the following list. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

	Units
Take three or four of the following:	
FINANCE 320 Debt Markets	4
FINANCE 620 Financial Markets I	3
FINANCE 621 Financial Markets II	4
FINANCE 622 Dynamic Asset Pricing Theory	4
MATH 237 Default and Systemic Risk	3
MATH 239 Computation and Simulation in Finance	3
MATH 238 Mathematical Finance	3
MSE 347 Credit Risk: Modeling and Management	3

MSE 348 Optimization of Uncertainty and Applications in Finance	3
STATS 242 Algorithmic Trading and Quantitative Strategies	3

Requirement 4: Advanced Scientific Programming and High Performance Computing Core (6-9 units)

To ensure that students have a strong foundation in programming students are required to take 6 units of advanced programming for letter grade, with at least 3 units in parallel computing. Approved courses for advanced scientific programming include:

	Units
Advanced Scientific Programming; take 3-6 units	
CME 212 Advanced Programming for Scientists and Engineers	3
CME 214 Software Design in Modern Fortran for Scientists and Engineers	3
CS 107 Computer Organization and Systems	3-5
CS 249B Large-scale Software Development	3
Parallel/HPC Computing (at least 3 units required)	
CME 213 Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 342 Parallel Methods in Numerical Analysis	3
CS 149 Parallel Computing	3-4
CS 315A Parallel Computer Architecture and Programming	3
CS 316 Advanced Multi-Core Systems	3
CS 344C, offered in previous years, may also be counted	3

Requirement 5: Practical component (6-9 units)

Students are required to take 6 units of practical component that may include any combination of:

	Units
CME 244 Project Course in Mathematical and Computational Finance	1-6
CME 245 Topics in Mathematical and Computational Finance	1
MSE 445 Projects in Wealth Management	3-4

Imaging Sciences Track

The Imaging track is designed for students interested in the skills and knowledge required to develop efficient and robust computational tools for imaging sciences. The curriculum is based on four fundamental areas:

1. mathematical models and analysis for imaging sciences and inverse problems,
2. tools and techniques from modern imaging sciences from medicine, biology, physics/chemistry, and earth science
3. algorithms in numerical methods and scientific computing
4. high performance computing skills and architecture oriented towards imaging sciences.

This program serves both as a terminal degree for students who are interested in a professional career in computational imaging sciences and also as a preparation for a higher level degree in imaging research. Students in the Imaging track are required to complete:

1. core courses (Requirement 1)
2. general and focused application electives (Requirements 2 and 3) from the approved list of courses
3. high performance computing core (Requirement 4)

4. the ICME graduate seminar or other approved seminar series (Requirement 5)

Requirement 1: Fundamentals

Identical to the general ICME master's program; see above.

Requirement 2: Imaging Sciences electives (18 units)

Imaging Sciences electives should demonstrate breadth of knowledge in the technical area. The elective course list is defined. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

Take 18 units of the following:

		Units
APPPHYS 232	Advanced Imaging Lab in Biophysics	4
BIOE 220	Introduction to Imaging and Image-based Human Anatomy	3
CEE 362G	Stochastic Inverse Modeling and Data Assimilation Methods	3-4
EE 236A	Modern Optics	3
EE 262	Two-Dimensional Imaging	3
EE 355	Imaging Radar and Applications	3
EE 368	Digital Image Processing	3
EE 369A	Medical Imaging Systems I	3
EE 369B	Medical Imaging Systems II	3
EE 369C	Medical Image Reconstruction	3
GEOPHYS 210	Basic Earth Imaging	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3
GEOPHYS 280	3-D Seismic Imaging	2-3
MATH 221A	Mathematical Methods of Imaging	3
MATH 221B	Mathematical Methods of Imaging	3
MATH 262	Applied Fourier Analysis and Elements of Modern Signal Processing	3
PSYCH 204A	Human Neuroimaging Methods	3

Requirement 3: Specialized electives (6 units)

6 units of focused graduate application electives, approved by the ICME graduate adviser, in the areas of engineering, mathematics, physical, biological, information, and other quantitative sciences. These courses should be foundational depth courses relevant to the student's professional development and research interests.

Requirement 4: Advanced Scientific Programming and High Performance Computing Core (6 units)

To ensure that students have a strong foundation in programming students are required to take 6 units of advanced programming for letter grade, with at least 3 units in parallel computing. Approved courses for advanced scientific programming include:

		Units
Advanced Scientific Programming; take 3 units		
CME 212	Advanced Programming for Scientists and Engineers	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3
CS 249B	Large-scale Software Development	3

Parallel/HPC Computing; take 3 units

CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 342	Parallel Methods in Numerical Analysis	3
CS 149	Parallel Computing	3-4
CS 315A	Parallel Computer Architecture and Programming	3
CS 316	Advanced Multi-Core Systems	3
CS 344C	offered in previous years, may also be counted	3

Requirement 5: Seminar

3 units of ICME graduate seminars or other approved seminars. Additional seminar units may not be counted towards the 45-unit requirement.

Units Doctor of Philosophy in Computational and Mathematical Engineering

Applications to the Ph.D. program and all required supporting documents must be received by December 2, 2014. See <http://icme.stanford.edu/prospective/admissions/index.php.html> for full information. Prospective graduate students should see <http://gradadmissions.stanford.edu> for information and application materials. Applicants should take the Graduate Record Examination by October of the academic year in which the application is submitted.

Admission to the Ph.D. program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement and passing the qualifying examination.

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees" (p. 43) section of this bulletin.

Requirements

- Complete a minimum of 135 units of residency at Stanford, including:
 - 45 units from the master's program; all six core courses have to be completed for letter grade.
 - 27 units of focused electives in an area planned with the student's Ph.D. adviser; 12 of these units should come from ICME specialized electives with significant computational content such as the CME 320-380 series. The focused and specialized elective component of the ICME program is meant to be broad and inclusive of relevant courses of comparable rigor to ICME courses. The elective course list following represents automatically accepted electives within the program. However, electives are not limited to the list below, and the list is expanded on a continuing basis; courses outside the list can be accepted as electives subject to approval by the student's ICME adviser. Research, directed study, and seminar units are excluded.
 - 3 units of programming elective demonstrating programming proficiency. Students are required to complete programming course at the level of CME 213 Introduction to parallel computing using MPI, openMP, and CUDA or higher for letter grade.
 - 60 units of thesis research
- Maintain a grade point average (GPA) of 3.5.
- Pass the qualifying examination administered by ICME.
- Complete an approved program of original research.
- Complete a written dissertation based on research.
- Pass the oral examination that is a defense of the dissertation research.

Specialized Elective List

See requirement 1b above.

		Units
CEE 362G	Stochastic Inverse Modeling and Data Assimilation Methods	3-4
CME 364A/364B	Convex Optimization I	3
CS 348A		3-4
EE 368	Digital Image Processing	3
MATH 205A	Real Analysis	3
MATH 215A	Complex Analysis, Geometry, and Topology	3
MATH 217A	Differential Geometry	3
MATH 221A	Mathematical Methods of Imaging	3
MATH 221B	Mathematical Methods of Imaging	3
MATH 227	Partial Differential Equations and Diffusion Processes	3
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
ME 335A/335B/335C	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 351A/351B	Fluid Mechanics	3
ME 361	Turbulence	3
ME 408	Spectral Methods in Computational Physics	3
ME 412	Engineering Functional Analysis and Finite Elements	3
ME 469	Computational Methods in Fluid Mechanics	3
MSE 319	Approximation Algorithms	3
MSE 336	Platform and Marketplace Design	3
STATS 305	Introduction to Statistical Modeling	3
STATS 306A/306B	Methods for Applied Statistics	5-6
STATS 318	Modern Markov Chains	3
STATS 366	Modern Statistics for Modern Biology	3

Note: Students who need to complete 135 units at Stanford, should necessarily complete the CME master's requirements (p. 251). All courses listed under "Requirement 3" under the "Master of Science in Computational and Mathematical Engineering (p. 251)" section can be used for fulfilling the general elective requirement.

Financial Assistance

The department awards a limited number of fellowships, course assistantships, and research assistantships to incoming graduate students. Applying for such assistance is part of submitting the application for admission to the program. Students are appointed for half-time assistantships which provide a tuition scholarship at the 8, 9, 10 unit rate during the academic year and a monthly stipend. Half-time appointments generally require 20 hours of work per week. Most course assistantships and research assistantships are awarded to students in the doctoral program in ICME. If the number of Ph.D. students is not sufficient to staff all course and research assistantship positions available, these positions may be open to master's students. However, master's students are not guaranteed financial assistance.

Ph.D. Minor in Computational and Mathematical Engineering

For a minor in Computational and Mathematical Engineering (CME), a doctoral candidate must complete 21 units of approved graduate level courses. These should include three ICME core courses and three ICME graduate electives at the 300 level or above and a programming course at the level of CME212 or higher. All courses must be taken for a letter grade and passed with a grade of 'B' or better. Elective courses cannot be cross

listed with the primary department. Minor programs should be developed in close discussion between the student and the student's primary Ph.D. adviser.

Emeriti: (Professor) Joe Keller (Mathematics, Mechanical Engineering), (Professor, Research) Arogyaswami Paulraj (Electrical Engineering)

Director: Margot Gerritsen (Energy Resources Engineering)

Professors: Biondo Biondi (Geophysics), Stephen Boyd (Electrical Engineering), Emanuel Candes (Mathematics, Statistics), Gunnar Carlsson (Mathematics), Persi Diaconis (Mathematics, Statistics), David Donoho (Statistics), Charbel Farhat (Aeronautics and Astronautics, Mechanical Engineering), Ronald Fedkiw (Computer Science), Peter Glynn (Management Science and Engineering), Ashish Goel (Management Science and Engineering), Leonidas Guibas (Computer Science), Pat Hanrahan (Computer Science, Electrical Engineering), Jerry Harris (Geophysics), Trevor Hastie (Mathematics, Statistics), Peter Kitanidis (Civil and Environmental Engineering), Tze Leung Lai (Statistics), Sanjiva Lele (Mechanical Engineering, Aeronautics and Astronautics), Parviz Moin (Mechanical Engineering), Brad Osgood (Electrical Engineering), Vijay Pande (Chemistry), George Papanicolaou (Mathematics), Peter Pinsky (Mechanical Engineering), Lenya Ryzhik (Mathematics), Eric Shaqfeh (Chemical Engineering, Mechanical Engineering), Hamdi Tchelepi (Energy Resources Engineering), Benjamin Van Roy (Management Science and Engineering, Electrical Engineering), Andras Vasy (Mathematics), Lawrence Wein (Graduate School of Business), Wing Wong (Statistics), Yinyu Ye (Management Science and Engineering), Lexing Ying (Mathematics, Institute for Computational and Mathematical Engineering)

Associate Professors: Juan Alonso (Aeronautics and Astronautics), Eric Darve (Mechanical Engineering), Ron Dror (Computer Science, Institute for Computational and Mathematical Engineering, starting in February 2014), Oliver Fringer (Civil and Environmental Engineering), Margot Gerritsen (Energy Resources Engineering), Kay Giesecke (Management Science and Engineering), Gianluca Iaccarino (Mechanical Engineering), Ramesh Johari (Management Science and Engineering), Adrian Lew (Mechanical Engineering), Amin Saberi (Management Science and Engineering)

Assistant Professors: Eric Dunham (Geophysics), Marco Pavone (Aeronautics and Astronautics), Bala Rajaratnam (Statistics, Environmental and Earth System Sciences), Andrew Spakowitz (Chemical Engineering)

Professors (Research): Antony Jameson (Aeronautics and Astronautics), Walter Murray (Management Science and Engineering), Michael A. Saunders (Management Science and Engineering)

Senior Lecturer: Vadim Khayms

Lecturers: Bill Behrman, Kapil Jain, Hung Le, Patrick LeGresley

Consulting Professors: Reza Bosagh-Zadeh, Michael Minion, Visha Sikkal

Courses of interest to students in the department may include:

		Units
CEE 262A	Hydrodynamics	3-4
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 263A	Air Pollution Modeling	3-4
CEE 263B	Numerical Weather Prediction	3-4
CEE 294	Computational Poromechanics	3
CEE 362	Numerical Modeling of Subsurface Processes	3-4
CEE 362G	Stochastic Inverse Modeling and Data Assimilation Methods	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4

CS 229	Machine Learning	3-4
CS 232	Digital Image Processing	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 268	Geometric Algorithms	3
EE 256	Numerical Electromagnetics	3
EE 368	Digital Image Processing	3
EESS 221	Contaminant Hydrogeology and Reactive Transport	4
EESS 244	Marine Ecosystem Modeling	3
EESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
ENERGY 223	Reservoir Simulation	3-4
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 241	Seismic Reservoir Characterization	3-4
ENERGY 252	Chemical Kinetics Modeling	3
ENERGY 281	Applied Mathematics in Reservoir Engineering	3
ENERGY 284	Optimization and Inverse Modeling	3
ENERGY 290	Numerical Modeling of Fluid Flow in Heterogeneous Porous Media	3
GEOPHYS 190	Near-Surface Geophysics	3
GEOPHYS 200	Fluids and Flow in the Earth: Computational Methods	3
GEOPHYS 202	Reservoir Geomechanics	3
GEOPHYS 210	Basic Earth Imaging	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3
GEOPHYS 240	Borehole Seismic Modeling and Imaging	3
GEOPHYS 257	Introduction to Computational Earth Sciences	2-4
GEOPHYS 258	Applied Optimization Laboratory (Geophys 258)	3-4
GEOPHYS 260	Rock Physics for Reservoir Characterization	3
GEOPHYS 262	Rock Physics	3
GEOPHYS 280	3-D Seismic Imaging	2-3
GEOPHYS 281	Geophysical Inverse Problems	3
GEOPHYS 287	Earthquake Seismology	3-5
GEOPHYS 288A	Crustal Deformation	3-5
GEOPHYS 288B	Crustal Deformation	3-5
GEOPHYS 290	Tectonophysics & Global Tectonics	3
GES 224	Modeling Transport and Transformations in the Environment	2-3
GES 240	Geostatistics	2-3
MATH 136	Stochastic Processes	3
MATH 205A	Real Analysis	3
MATH 215A	Complex Analysis, Geometry, and Topology	3
MATH 217A	Differential Geometry	3
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 351A	Fluid Mechanics	3
ME 351B	Fluid Mechanics	3
ME 361	Turbulence	3
ME 408	Spectral Methods in Computational Physics	3
ME 469	Computational Methods in Fluid Mechanics	3
MSE 211	Linear and Nonlinear Optimization	3-4
STATS 219	Stochastic Processes	3
STATS 250	Mathematical Finance	3

STATS 305	Introduction to Statistical Modeling	3
STATS 306A	Methods for Applied Statistics	3
STATS 306B	Methods for Applied Statistics: Unsupervised Learning	2-3
STATS 310A	Theory of Probability	2-4
STATS 310B	Theory of Probability	2-3
STATS 310C	Theory of Probability	2-4
STATS 318	Modern Markov Chains	3

Management Science and Engineering

Courses offered by the Department of Management Science and Engineering are listed under the subject code MS&E on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Management Science and Engineering leads at the interface of engineering, business, and public policy. The department's mission is, through education and research, to advance the design, management, operation, and interaction of technological, economic, and social systems. The department's engineering research strength is integrated with its educational program at the undergraduate, master's, and doctoral levels: graduates of the program are trained as engineers and future leaders in technology, policy, and industry. Research and teaching activities are complemented by an outreach program that encourages the transfer of ideas to the environment of Silicon Valley and beyond.

Management Science and Engineering (MS&E) provides programs of education and research by integrating three basic strengths:

1. depth in conceptual and analytical foundations
2. comprehensive coverage of functional areas of application
3. interaction with other Stanford departments, Silicon Valley industry, and organizations throughout the world.

The analytical and conceptual foundations include decision and risk analysis, dynamic systems, economics, optimization, organizational science, and stochastic systems. The functional areas of application include entrepreneurship, finance, information, marketing, organizational behavior, policy, production, and strategy. Close associations with other engineering departments and with industry enrich the programs by providing opportunities to apply MS&E methods to important problems and by motivating new theoretical developments from practical experience. MS&E's programs also provide a basis for contributing to other areas such as biotechnology, defense policy, environmental policy, information systems, and telecommunications.

Mission of the Undergraduate Program in Management Science and Engineering

The mission of the undergraduate program in Management Science and Engineering is to provide students with the fundamentals of engineering systems analysis so that they are able to plan, design, and implement complex economic and technical management systems. The program builds on the foundational courses for engineering including calculus, engineering fundamentals, and physics or chemistry as well as management science. Students complete core courses in accounting, computer science, economics, ethics, organizational theory, mathematical modeling,

optimization, probability, and statistics. To personalize their exploration, students select additional courses from different areas of the department, with greater emphasis in one of them. The major prepares students for a variety of career paths, including investment banking, management consulting, facilities and process management, or for graduate school in industrial engineering, operations research, business, economics, law, medicine, or public policy .

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able:

1. to apply the knowledge of mathematics, science, and engineering;
2. to design and conduct experiments;
3. to design a system or components to meet desired needs;
4. to identify, formulate, and solve engineering problems;
5. to use techniques, skills, and modern engineering tools necessary for engineering practice;
6. to function on multidisciplinary teams;
7. to communicate effectively;
8. to recognize the need for and demonstrate an ability to engage in lifelong learning;
9. to obtain the background necessary for admission to top professional graduate engineering or business programs;
10. to understand professional and ethical responsibility;
11. to obtain the broad education necessary to understand the impact of engineering solutions in a global and societal context; and
12. to obtain a knowledge of contemporary issues pertinent to the field of management science and engineering.

Graduate Programs in Management Science and Engineering

MS&E offers programs leading to the degrees of Master of Science and Doctor of Philosophy. The department also offers a coterminal B.S./M.S. degree, a dual master's degree in cooperation with each of the other departments in the School of Engineering, and joint master's degrees with the School of Law and the Public Policy Program.

For University coterminal degree program rules and University application forms, see the Registrar's coterminal degrees web site (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>).

Applicants for admission as graduate students in MS&E must submit the results of the verbal, quantitative, and analytical parts of the Graduate Record Examination. The deadline for application to the doctoral program is December 2, 2014, and the deadline for application to the master's program is January 13, 2015.

Except in unusual circumstances, admission is limited to the Autumn Quarter because courses are arranged sequentially with basic courses and prerequisites offered early in the academic year.

Assistantships and Fellowships

A limited number of fellowships and assistantships are awarded each year. Applicants admitted to the doctoral program, who have indicated on their application that they would like to be considered for financial aid, are

automatically considered for these assistantships and fellowships. New and returning master's students may apply for course assistantships each quarter, but priority is given to MS&E doctoral students.

Information about loan programs and need-based aid for U.S. citizens and permanent residents can be obtained from the Financial Aid Office.

Learning Outcomes (Graduate)

The M.S. prepares engineers for a lifelong career addressing the critical technical and managerial needs of private and public organizations. The program emphasizes developing analytic abilities, making better decisions, developing and executing strategies while also leading people who innovate. Unlike an MBA, our master's program addresses the technical as well as the behavioral challenges of running organizations and complex systems. We emphasize quantitative analytic skills and an entrepreneurial spirit.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Management Science and Engineering and related fields.

Careers in MS&E

MS&E students are candidates for careers in consulting, product and project management, financial analysis, and work in policy arenas. A significant number join or found start-ups. Many have become leaders in technology-based businesses which have an increasing need for analytically oriented people who understand both business and technology. Other graduates make careers tackling the problems faced by local, national, and international governments by developing new healthcare systems, new energy systems and a more sustainable environment. The major problems of the day demand an ability to integrate the technical, social and economic ways of thinking. This is precisely what the department educates its students to do.

Bachelor of Science in Management Science and Engineering

The program leading to the B.S. degree in Management Science and Engineering (MS&E) is outlined in the School of Engineering section of this bulletin; more information is contained in the School of Engineering's *Handbook for Undergraduate Engineering Programs*. Students are encouraged to plan their academic programs as early as possible, ideally in the freshman or sophomore year. Students should not wait until they are declaring a major to consult with the department's student services staff. This is particularly important for students who would like to study overseas or pursue another major or minor.

The undergraduate curriculum in Management Science and Engineering provides students training in the fundamentals of engineering systems analysis to prepare them to plan, design, and implement complex economic and technological management systems where a scientific or engineering background is necessary or desirable. The major prepares students for a variety of career paths, including investment banking, management consulting, facilities and process management, or for graduate school in industrial engineering, operations research, business, economics, law, medicine, or public policy .

The educational objectives of the undergraduate degree program are:

- *Principles and Skills*—provide students with a basic understanding of management science and engineering principles, including analytical problem solving and communications skills.
- *Preparation for Practice*—prepare students for practice in a field that sees rapid changes in tools, problems, and opportunities.

- *Preparation for Continued Growth*—prepare students for graduate study and self development over an entire career.
- *Preparation for Service*—develop in students the awareness, background, and skills necessary to become responsible citizens, employees, and leaders.

See also the department’s undergraduate Learning Outcomes (p.) for additional learning objectives.

The program builds on the foundational courses for engineering, including calculus, mathematical modeling, probability, statistics, engineering fundamentals, and physics or chemistry.

Students interested in a minor should see the Minor tab in this section.

MS&E also participates with the departments of Computer Science, Mathematics, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the “Mathematical and Computational Science (p. 546)” section of this bulletin.

Core

The department core, taken for all areas, includes courses in accounting, computer science, deterministic optimization, economics, organization theory, and a capstone senior project. Through the core, students in the program are exposed to the breadth of faculty interests, and are in a good position to choose an area during the junior year.

Areas

The major is designed to allow a student to explore all three areas of the department in greater depth.

1. *Finance and Decision*: focuses on the design and analysis of financial and strategic plans.
2. *Operations and Analytics*: focuses on algorithms, theory, and the design and analysis of manufacturing, production, and service systems.
3. *Organizations, Technology, and Policy*: focuses on understanding, design, and analysis of organizations and public policy, particularly technology-based issues.

Management Science and Engineering (MS&E)

Completion of the undergraduate program in Management Science and Engineering leads to the conferral of the Bachelor of Science in Management Science and Engineering.

Requirements

Mathematics and Science

All required; see SoE Basic Requirements 1 and 2 ¹		
CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CME 103	Introduction to Matrix Methods	5
MSE 120	Probabilistic Analysis	5
MSE 121	Introduction to Stochastic Modeling	4
MSE 125	Introduction to Applied Statistics	4
Select one of the following sequences:		8
CHEM 31B & CHEM 33	Chemical Principles II and Structure and Reactivity	
CHEM 31X & CHEM 33	Chemical Principles Accelerated and Structure and Reactivity	

Units

PHYSICS 21 & PHYSICS 22	Mechanics and Heat and Mechanics and Heat Laboratory and Electricity and Optics and Electricity and Optics Laboratory	
PHYSICS 23 & PHYSICS 24	Electricity and Optics Laboratory	
PHYSICS 41 & PHYSICS 43	Mechanics and Electricity and Magnetism	
Electives from SoE approved list or AP/IB credit ¹		13
Technology in Society		
Select one of the following; see SoE Basic Requirement 4		3
COMM 120W	Digital Media in Society	
COMM 169	Computers and Interfaces	
CS 181	Computers, Ethics, and Public Policy	
ENGR 130	Science, Technology, and Contemporary Society	
ENGR 131	Ethical Issues in Engineering	
MSE 181	Issues in Technology and Work for a Postindustrial Economy	
MSE 193	Technology and National Security (WIM)	
MSE 197	Ethics, Technology, and Public Policy (WIM)	
Engineering Fundamentals ²		
Three courses; see SoE Basic Requirement 3		
CS 106A	Programming Methodology ³	5
Select one of the following:		3
ENGR 25B or ENGR 25E	Biotechnology Energy: Chemical Transformations for Production, Storage, and Use	
ENGR 40 or ENGR 40A or ENGR 40M or ENGR 40P	Introductory Electronics Introductory Electronics An Intro to Making: What is EE Physics of Electrical Engineering	
ENGR 80	Introduction to Bioengineering	
Select one of the following (or ENGR 25, ENGR 40, or ENGR 80 if not used above):		3
ENGR 10	Introduction to Engineering Analysis	
ENGR 14	Intro to Solid Mechanics	
ENGR 15	Dynamics	
ENGR 20	Introduction to Chemical Engineering	
ENGR 30	Engineering Thermodynamics	
ENGR 50 or ENGR 50E or ENGR 50M	Introduction to Materials Science, Nanotechnology Emphasis Introduction to Materials Science, Energy Emphasis Introduction to Materials Science, Biomaterials Emphasis	
ENGR 60	Engineering Economy	
ENGR 90	Environmental Science and Technology	
Engineering Depth ²		
Core Courses (all six required)		25
CS 103 or CS 106B or CS 106X	Mathematical Foundations of Computing ⁴ Programming Abstractions Programming Abstractions (Accelerated)	
ECON 50	Economic Analysis I	
MSE 108	Senior Project	
MSE 111	Introduction to Optimization ⁴	
MSE 140	Accounting for Managers and Entrepreneurs	

or MSE 140X	Financial Accounting Concepts and Analysis	
MSE 180	Organizations: Theory and Management	
Area Courses (see below)		27
Choose four or five courses (minimum 15 units) from a primary area and two courses (minimum 6 units) from each of the other two areas.		

Depth Areas

	Units
Finance and Decision Area	6-15
Students choosing F&D as their primary area must take at least two of ECON 51, MS&E 145, and MS&E 152	
Introductory (appropriate for freshmen and sophomores)	
MSE 145	Introductory Financial Analysis
MSE 152	Introduction to Decision Analysis (WIM)
Intermediate (appropriate for juniors and seniors)	
MSE 146	Corporate Financial Management
MSE 245G	Finance for Non-MBAs
MSE 252	Decision Analysis I: Foundations of Decision Analysis
Advanced (intended primarily for graduate students)	
MSE 245A	Investment Science
MSE 250A	Engineering Risk Analysis
MSE 250B	Project Course in Engineering Risk Analysis
MSE 245B	Advanced Investment Science
Operations and Analytics Area	6-15
Students choosing O&A as their primary area may also include CS 161, CS 229, and STATS 202 in their selections ⁴	
Introductory (no prerequisites)	
MSE 107	Interactive Management Science
Methods	
MSE 223	Simulation
MSE 226	"Small" Data
MSE 251	Stochastic Control
Applications	
MSE 130	Information Networks and Services
MSE 233	Networked Markets
MSE 260	Introduction to Operations Management
MSE 262	Supply Chain Management
MSE 263	Healthcare Operations Management
MSE 264	Sustainable Product Development and Manufacturing
MSE 268	Operations Strategy
Organizations, Technology, and Policy Area	6-15
Students choosing OT&P as their primary area must take at least two of ENGR 145, MS&E 175, MS&E 181, MS&E 185, PSYCH 70, and SOC 114 (but not both PSYCH 70 and SOC 114) ⁴	
Introductory (no prerequisites)	
ENGR 131	Ethical Issues in Engineering ⁴
MSE 178	The Spirit of Entrepreneurship
MSE 189	Social Networks - Theory, Methods, and Applications
MSE 190	Methods and Models for Policy and Strategy Analysis
MSE 193	Technology and National Security (WIM) ⁴
MSE 197	Ethics, Technology, and Public Policy (WIM) ⁴

Advanced (has prerequisites and/or appropriate for juniors and seniors)	
ENGR 145	Technology Entrepreneurship
MSE 175	Innovation, Creativity, and Change
MSE 177	Engineering Innovation
MSE 181	Issues in Technology and Work for a Postindustrial Economy ⁴
MSE 185	Global Work
MSE 243	Energy and Environmental Policy Analysis
MSE 292	Health Policy Modeling
MSE 294	Climate Policy Analysis
MSE 295	Energy Policy Analysis

- Math and Science must total a minimum of 44 units. Electives must come from the School of Engineering approved list, or, PSYCH 50 Introduction to Cognitive Neuroscience, or PSYCH 70 Introduction to Social Psychology, and many not repeat material from any other requirement. AP/IB credit for Chemistry, Mathematics, and Physics may be used.
- Engineering fundamentals plus engineering depth must total a minimum of 60 units.
- Students may petition to place out of CS 106A Programming Methodology.
- Courses used to satisfy the Math, Science, Technology in Society, or Engineering Fundamental requirement may not also be used to satisfy an engineering depth requirement.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Management Science and Engineering (MS&E) Minor

The following courses are required to fulfill the minor requirements:

	Units
Background requirements (two courses)	
CME 100	Vector Calculus for Engineers 5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables
CS 106A	Programming Methodology 5
Minor requirements (seven courses, letter-graded)	
MSE 111	Introduction to Optimization 4
MSE 120	Probabilistic Analysis 5
MSE 121	Introduction to Stochastic Modeling 4
MSE 125	Introduction to Applied Statistics 4
MSE 180	Organizations: Theory and Management 4
Electives (select any two 100- or 200-level MS&E courses) 6	
Recommended courses	
In addition to the required background and minor courses, it is recommended that students also take the following courses.	
ECON 50	Economic Analysis I 5
MSE 140	Accounting for Managers and Entrepreneurs (may be used as one of the required electives above) 2-4
or MSE 140X	Financial Accounting Concepts and Analysis

Master of Science in Management Science and Engineering

The M.S. degree programs require a minimum of 45 units beyond the equivalent of a B.S. degree at Stanford. All programs represent substantial progress in the major field beyond the bachelor's degree.

University requirements for the master's degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The master's in Management Science and Engineering prepares engineers for a lifelong career addressing the technical and managerial needs of private and public organizations. The program emphasizes developing analytic abilities, making better decisions, and developing and executing strategies while also leading people who innovate. Unlike an M.B.A., the department's master's program addresses the technical as well as the behavioral challenges of running organizations and complex systems, emphasizing quantitative analytic skills and an entrepreneurial spirit.

MS&E students know math, engineering, as well as behavioral science. They can conduct experiments to design better systems, organizations and work processes. They understand how to analyze data to solve real world problems. They can develop mathematical and computational models to inform action. They know how to surface and examine unarticulated assumptions and root causes. These students can communicate effectively in the team environments found in so many contemporary organizations.

MS&E master's students have breadth as well as depth. All are required to develop competence in optimization and analytics, organizations and decisions, and probability. In addition every student pursues a specialty in one of six areas:

1. *Financial Analytics*: Students who concentrate in Financial Analytics are prepared for careers requiring analytical rigor and the ability to innovate around market challenges. Example career paths include financial services, risk management, investment management, financial technology and data processing, financial regulation and policy, exchanges and clearing houses, and auditing and compliance. The concentration combines the in-depth study of quantitative techniques with practical, hands-on business problem solving. Students learn to use mathematical models and quantitative tools to solve complex problems in finance practice. The concentration exploits the intellectual ties between finance, operations research, computer science, and engineering. It offers a high level of flexibility and a range of elective courses that allow students to tailor the program to their specific career goals. Required courses immerse students in quantitative methods and deepen their understanding of finance fundamentals. Projects courses feature practical, data-driven team projects and case studies, fostering group learning and interaction with peers.
2. *Operations and Analytics*: Students following the Operations and Analytics track become prepared in the fundamentals and applications that are critical to careers in a fields ranging from operations management in the service, health care, production, manufacturing, computer, telecommunications, banking, industries to modern Silicon Valley information technology and data analytics. The program emphasizes a balance between the technical rigor of methodologies with lasting value and insightful modern applications and design challenges in a variety of established and emerging industries and operations environments. It offers a portfolio of courses in probabilistic modeling, optimization, simulation, algorithms, data science, networks, markets, and corresponding applications.
3. *Technology and Engineering Management* -- Students who concentrate in Technology and Engineering Management are prepared for careers including product and project management, management consulting, and entrepreneurship. They acquire skills to manage technical organizations, foster innovation, and deal with rapidly

evolving technologies and dynamic markets. Specialized coursework is flexible, allowing students to explore and gain depth, understanding technical organizations to develop a culture of successful innovation and entrepreneurship, along with methods for decision making under uncertainty, financial analysis, and strategic planning.

4. *Decision and Risk Analysis*: Students who specialize in Decision and Risk Analysis are prepared for careers including management consulting, policy analysis, and risk management, applying engineering systems analysis to tackle complex economic and technical management problems in the private and public sectors. They acquire the skills to identify and develop opportunities in uncertain situations while recognizing and hedging the downside risks. Specialized course work includes the mathematical foundations for modeling in dynamic uncertain environments to value and manage uncertain opportunities and risks, applications to public policy, and an opportunity to work on a client project under faculty guidance.
5. *Energy and Environment*: The Energy and Environment track is designed for students interested in energy and environmental issues from the perspectives of public policy, nongovernmental organizations, or corporations. This track includes core courses; courses in economic analysis, energy resources, and energy/environmental policy analysis; and an individually designed concentration, typically emphasizing policy, strategy, or technology. Seminars provide insights into current corporate strategy, public policy, and research community developments. Energy/environmental project courses give practice in applying methodologies and concepts.
6. *Health Systems Modeling*: The Health Systems Modeling track is designed for students interested in healthcare operations and policy. The courses in this track emphasize the application of mathematical and economic analysis to problems in public health policy and the design and operation of healthcare services.

The master's degree is designed to be a terminal degree program with a professional focus. The M.S. degree can be earned in one academic year (three academic quarters) of full-time work, although most students choose to complete the program in five academic quarters, or eighteen months, and work as an intern in the Summer Quarter.

Background Requirements

Students are expected to have completed both MATH 51 Linear Algebra and Differential Calculus of Several Variables, or an equivalent multivariable differential calculus course, and CS 106A Programming Methodology, or an equivalent general programming course, before beginning graduate study. These courses do not count toward degree requirements.

Degree Requirements

Students must take a minimum of 45 course units as follows:

- Three core courses (9-12 units)
- A primary or specialized concentration (12-24 units)
- One project course or two integrated project courses (0-8 units)
- Elective courses (1-24 units; see restrictions below)

Core Courses (three courses required)

Optimization and Analytics (select one)

		Units
MSE 211	Linear and Nonlinear Optimization	3-4
MSE 226	"Small" Data	3
Relevant 200 or 300 level course in optimization or analytics if a comparable introductory course in optimization or analytics has already been completed.		3-4

Organizations and Decisions (select one)

		Units
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MSE 280	Organizational Behavior: Evidence in Action	3-4
Relevant 200 or 300 level course in organizations or decisions if a comparable introductory course in organizations or decisions has already been completed.		

Probability (select one)

		Units
MSE 220	Probabilistic Analysis	3-4
MSE 221	Stochastic Modeling	3
Relevant 200 or 300 level course in probability or stochastics if a comparable introductory course in probability or stochastics has already been completed.		

Primary Concentrations

Financial Analytics Concentration (five courses required)

Financial Theory and Modeling (select one):

MSE 245A	Investment Science	3
MSE 245B	Advanced Investment Science	3
MSE 246	Financial Risk Management	3

Quantitative Methods (two required):

Select one (whichever wasn't taken for core):

MSE 211	Linear and Nonlinear Optimization	3-4
MSE 226	"Small" Data	3

Select one:

MSE 322	Stochastic Calculus and Control	3
STATS 207	Introduction to Time Series Analysis	3
STATS 240	Statistical Methods in Finance	3-4
STATS 241	Data-driven financial and risk econometrics	3-4

Financial Applications (select two):

MATH 237	Default and Systemic Risk	3
MSE 347	Credit Risk: Modeling and Management	3
MSE 348	Optimization of Uncertainty and Applications in Finance	3
MSE 445	Projects in Wealth Management	3-4
MSE 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy	3
MSE 448	Big Financial Data and Algorithmic Trading	3

Operations and Analytics Concentration (four courses required)

		Units
Required Courses		
MSE 211	Linear and Nonlinear Optimization (whichever course wasn't taken for core)	3-4
or MSE 226	"Small" Data	
MSE 221	Stochastic Modeling (or a more advanced course in probability (i.e. MS&E 223 Simulation) if a student has taken an equivalent class in stochastic modeling)	3
MSE 251	Stochastic Control	3
MSE 260	Introduction to Operations Management	3
or MSE 261	Inventory Control and Production Systems	

or MSE 263 Healthcare Operations Management

Recommended Elective Courses:

MSE 223	Simulation	3
MSE 233	Networked Markets	3
MSE 243	Energy and Environmental Policy Analysis	3
MSE 245A	Investment Science	3
MSE 250A	Engineering Risk Analysis	3
MSE 251	Stochastic Control	3
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MSE 260	Introduction to Operations Management	3
MSE 261	Inventory Control and Production Systems	3
MSE 262	Supply Chain Management	3
MSE 263	Healthcare Operations Management	3
MSE 264	Sustainable Product Development and Manufacturing	3-4
MSE 268	Operations Strategy	3
MSE 270	Strategy in Technology-Based Companies	3-4
MSE 292	Health Policy Modeling	3
MSE 467	Strategic Operations Consulting	3

Technology and Engineering Management Concentration (five courses required)

The course used to satisfy the Organizations and Decisions Core may also be counted here.

		Units
Organizations and Strategy (select at least one):		
MSE 270	Strategy in Technology-Based Companies	3-4
MSE 274	Dynamic Entrepreneurial Strategy	3
MSE 278	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
MSE 280	Organizational Behavior: Evidence in Action	3-4
MSE 282	Transformational Leadership	3
MSE 283	Scaling up Excellence in Organizations	4
MSE 284	Designing Modern Work Organizations	3
Entrepreneurship and Innovation (select at least one):		
MSE 270	Strategy in Technology-Based Companies	3-4
MSE 271	Global Entrepreneurial Marketing	3-4
MSE 272	Startup Boards	3
MSE 273	Technology Venture Formation	3-4
MSE 276	Entrepreneurial Management and Finance	3
MSE 277	Creativity and Innovation	3-4
ENGR 245	The Lean LaunchPad: Getting Your Lean Startup Off the Ground	3-4
Finance and Decisions (select at least one):		
MSE 240	Accounting for Managers and Entrepreneurs	3-4
MSE 245A	Investment Science	3
MSE 245G	Finance for Non-MBAs	3
MSE 250A	Engineering Risk Analysis	3
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MSE 352	Decision Analysis II: Professional Decision Analysis	3-4

Specialized Concentrations (must have approval of the academic advisor)

Decision and Risk Analysis Concentration (four courses required)

	Units
Core Courses are restricted as follows:	
MSE 211 Linear and Nonlinear Optimization	3-4
MSE 221 Stochastic Modeling	3
MSE 252 Decision Analysis I: Foundations of Decision Analysis	3-4
Required Courses (select two):	
MSE 241 Economic Analysis	3-4
MSE 250A Engineering Risk Analysis	3
MSE 352 Decision Analysis II: Professional Decision Analysis	3-4
Policy Course (select one):	
MSE 243 Energy and Environmental Policy Analysis	3
MSE 292 Health Policy Modeling	3
MSE 293 Technology and National Security	3
MSE 294 Climate Policy Analysis	3
MSE 295 Energy Policy Analysis	3
Project Course (select one):	
MSE 250B Project Course in Engineering Risk Analysis	3
MSE 452 Decision Analysis Projects: Helping Real Leaders Make Real Decisions	3

Energy and Environment Concentration (six courses required)

	Units
Required Courses:	
CEE 207A Energy Resources	3-5
MSE 241 Economic Analysis	3-4
MSE 243 Energy and Environmental Policy Analysis	3
Three additional courses from energy, policy, or strategy areas below.	
Policy:	
EARTHSYS 247	
ECON 251 Natural Resource and Energy Economics	2-5
ENERGY 158 Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull	3
GSBGEN 336 Energy Markets and Policy	4
LAW 455 Energy Law	3
MSE 293 Technology and National Security	3
MSE 294 Climate Policy Analysis	3
MSE 295 Energy Policy Analysis	3
Strategy:	
ECON 203N 203 For Non-Economics Ph.D. Students	2-5
ENERGY 158 Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull	3
GSBGEN 538 Energy Policy, Markets, and Climate Change	2
MSE 270 Strategy in Technology-Based Companies	3-4
MSE 271 Global Entrepreneurial Marketing	3-4
MSE 272 Startup Boards	3
MSE 273 Technology Venture Formation	3-4
MSE 274 Dynamic Entrepreneurial Strategy	3
MSE 276 Entrepreneurial Management and Finance	3

MSE 277 Creativity and Innovation	3-4
MSE 278 Patent Law and Strategy for Innovators and Entrepreneurs	2-3
Energy:	
ENERGY 102 Renewable Energy Sources and Greener Energy Processes	3
ENERGY 104 Transition to sustainable energy systems	3
ENERGY 158 Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull	3
ME 370A Energy Systems I: Thermodynamics	3
ME 370B Energy Systems II: Modeling and Advanced Concepts	4
PHYSICS 240 Introduction to the Physics of Energy	3
PHYSICS 241 Introduction to Nuclear Energy	3
Recommended Seminars:	
ECON 341 Public Economics and Environmental Economics Seminar	1-10
ENERGY 301 The Energy Seminar	1
MSE 441 Policy and Economics Research Roundtable	1
MSE 472 Entrepreneurial Thought Leaders' Seminar	1
Recommended Elective Courses:	
ECON 250 Environmental Economics	2-5
ECON 270 Intermediate Econometrics I	2-5
ECON 278 Behavioral and Experimental Economics I	2-5
MGTECON 603 Econometric Methods I	4
MSE 201 Dynamic Systems	3-4
MSE 211 Linear and Nonlinear Optimization	3-4
MSE 244 Economic Growth and Development	3
MSE 251 Stochastic Control	3

Health Systems Modeling Concentration (four courses required)

	Units
Required Courses	
HRP 263 Advanced Decision Science Methods and Modeling in Health	3
HRP 392 Analysis of Costs, Risks, and Benefits of Health Care	4
MSE 263 Healthcare Operations Management	3
MSE 292 Health Policy Modeling	3
Recommended Elective Courses:	
HRP 241 Measuring Global Health	4
HRP 256 Economics of Health and Medical Care	5
HRP 391 Health Law: Finance and Insurance	3
MSE 256 Technology Assessment and Regulation of Medical Devices	3

Projects

Select one project course or two integrated project courses; may double-count as part of the core or concentration.

	Units
Project Courses	
MSE 250B Project Course in Engineering Risk Analysis	3
MSE 348 Optimization of Uncertainty and Applications in Finance	3
MSE 403 Integrative Modeling	3
MSE 445 Projects in Wealth Management	3-4

MSE 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy	3
MSE 448	Big Financial Data and Algorithmic Trading	3
MSE 452	Decision Analysis Projects: Helping Real Leaders Make Real Decisions	3
MSE 464	Global Project Coordination	3-4
MSE 467	Strategic Operations Consulting	3
Integrated Project Courses		
MSE 201	Dynamic Systems	3-4
MSE 211	Linear and Nonlinear Optimization	3-4
MSE 233	Networked Markets	3
MSE 243	Energy and Environmental Policy Analysis	3
MSE 245A	Investment Science	3
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MSE 256	Technology Assessment and Regulation of Medical Devices	3
MSE 260	Introduction to Operations Management	3
MSE 262	Supply Chain Management	3
MSE 264	Sustainable Product Development and Manufacturing	3-4
MSE 270	Strategy in Technology-Based Companies	3-4
MSE 271	Global Entrepreneurial Marketing	3-4
MSE 273	Technology Venture Formation	3-4
MSE 274	Dynamic Entrepreneurial Strategy	3
MSE 277	Creativity and Innovation	3-4
MSE 280	Organizational Behavior: Evidence in Action	3-4
MSE 284	Designing Modern Work Organizations	3
MSE 294	Climate Policy Analysis	3
MSE 295	Energy Policy Analysis	3
MSE 311	Optimization	3
MSE 315	Numerical Optimization	3
MSE 331	Introduction to Computational Social Science	3
MSE 337	Spectral Graph Theory and Algorithmic Applications	3
MSE 338	Advanced Topics in Information Science and Technology	3
MSE 347	Credit Risk: Modeling and Management	3
MSE 355	Influence Diagrams and Probabilistic Networks	3

Additional Requirements

1. At least 45 units must be in courses numbered 100 and above.
2. The degree program must be completed with a grade point average (GPA) of 3.0 or higher.
3. At least 27 units must be in courses numbered 200 and above in MS&E, taken for a letter grade and a minimum of two units each.
4. At least 36 letter-graded units must be in MS&E or closely related fields. Closely related fields include any department in the School of Engineering, mathematics, statistics, economics, sociology, psychology, or business.
5. All courses used to satisfy core, concentration, or project requirements must be taken for a letter grade.
6. A maximum of three units of 1-unit courses such as seminars, colloquia, workshops, in any department, including MS&E 208A, B, and C, Curricular Practical Training.
7. A maximum of 18 non-degree option (NDO) units through the Stanford Center for Professional Development (SCPD).

8. Courses in athletics, physical education, and recreation may not be applied toward the degree.

Dual Master's Degree Program

The dual degree program enables a small group of graduate students to obtain two master's degrees simultaneously. Students complete the course requirements for each department. A total of 90 units is required to complete the dual master's degree.

Admission

For the dual degree, admission to two departments is required, but is coordinated by designated members of both admissions committees who make recommendations to the committees of their respective departments. Students may apply to only one department initially. After the first quarter at Stanford, students may apply to be admitted to the second department.

Advising

Every student in the dual degree program has one adviser in each department.

Joint MS&E and Law Degrees

The School of Law and the Department of Management Science and Engineering offer joint degree programs leading to a J.D. degree and an M.S. degree in MS&E, or to a J.D. and Ph.D. in MS&E. These programs are designed for students who wish to prepare themselves for careers in areas relating to both law and to the decision making, policy making, and problem solving knowledge and skills developed in the MS&E program. Students interested in either joint degree program must apply and gain admission separately to the School of Law and the Department of Management Science and Engineering and, as an additional step, must secure consent from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or MS&E may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or MS&E. Students are assigned to a joint program committee composed of at least one faculty member from Law and one from MS&E. This committee plans the student's program jointly with the student. Students must be enrolled full time in the Law School for the first year of law studies, and it is recommended that students devote exclusively one Autumn Quarter to the MS&E M.S. program to initiate their MS&E work. After that time, enrollment may be in MS&E or Law, and students may choose courses from either program regardless of where enrolled. A candidate in the joint J.D./Ph.D. program should spend a substantial amount of full time residency in MS&E. Students must satisfy the requirements for both the J.D. and the M.S. or Ph.D. degrees as specified in this bulletin or by the School of Law. The Law School may approve courses from MS&E or courses in the student's MS&E program from outside of the Department of Management Science and Engineering that may count toward the J.D. degree, and MS&E may approve courses from the Law School that may count toward the M.S. or Ph.D. degree in MS&E. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The lists may differ depending on whether the student is pursuing an M.S. or a Ph.D. in MS&E.

In the case of a J.D./M.S. program, no more than 45 units of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 units of approved courses may be counted toward both degrees. In either case, no more than 36 units of courses that originate outside the Law School may count toward the law degree. To the extent that courses under this joint degree program originate outside the Law

School but count toward the law degree, the law credits permitted under Section 17(1) of the Law School Regulations are reduced on a unit-per-unit basis, but not below zero. The maximum number of law school credits that may be counted toward the M.S. in MS&E is the greater of: (a) 18 units in the case of the M.S., or (b) the maximum number of hours from courses outside the department that an M.S. candidate in MS&E is permitted to count toward the applicable degree under general departmental guidelines or under departmental rules that apply in the case of a particular student.

Tuition and financial aid arrangements are normally through the school in which the student is then enrolled.

Joint MS&E and Master of Public Policy Degree

MS MS&E students who wish to apply their analytical and management skills to the field of public policy can simultaneously pursue a master degree in MS&E and a master degree in Public Policy. The MPP is a two-year degree program, but MS MS&E students who pursue the joint program can earn both degrees in a minimum of two years, depending on prior preparation and elective choices, by counting up to 45 quarter units of course work toward both degrees. After admission to the Department of Management Science and Engineering, incoming or current MS students request that their application file be forwarded to the MPP program director for review.

Students in the joint program normally will spend most of their first year taking MS&E core courses. The second year is typically devoted to the MPP core, concentration, and practicum. The joint degree requires 90 quarter units. Tuition for the first year of study is paid at the Graduate Engineering rate, the remaining time at the Graduate rate.

Professional Education

The Stanford Center for Professional Development (SCPD) provides opportunities for employees of some local and remote companies to take courses at Stanford.

The Honors Cooperative Program (HCP) provides opportunities for employees of SCPD member companies to earn an M.S. degree, over a longer period, by taking one or two courses per academic quarter. Some courses are only offered on campus; HCP students may attend those courses at Stanford to meet the degree requirements. It is possible to complete this program as a remote HCP student although the remote offerings are limited. Students must apply for a degree program through the standard application process, and must meet the standard application deadlines.

The non-degree option (NDO) allows employees of some local companies to take courses for credit from their company sites before being admitted to a degree program. Students apply to take NDO courses each quarter through the Stanford Center for Professional Development. Up to 18 units taken as an NDO student may be applied toward a degree program. For additional information about the NDO application process and deadlines, see the SCPD web site (<http://scpd.stanford.edu>), or contact SCPD at (650) 725-3000.

Certificate

The department offers a certificate program within the framework of the NDO program. A certificate can be obtained by completing three MS&E core courses, plus one MS&E elective course for a total of four courses. For further information, see <http://scpd.stanford.edu/scpd/programs/certs/managementSci.htm>.

Doctor of Philosophy in Management Science and Engineering

University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

The Ph.D. degree in MS&E is intended for students primarily interested in a career of research and teaching, or high-level technical work in universities, industry, or government. The program requires three years of full-time graduate study, at least two years of which must be at Stanford. Typically, however, students take about four to five years after entering the program to complete all Ph.D. requirements. The Ph.D. is generally organized around the requirement that the students acquire a breadth across some of the eight areas of the department, and depth in one of them. These fields of study are:

- Decision analysis and risk analysis
- Economics and finance
- Information science and technology
- Organization, technology, and entrepreneurship
- Policy and strategy
- Probability and stochastic systems
- Production and operations management
- Systems modeling and optimization

Each student admitted to the Ph.D. program must satisfy a breadth requirement and pass a qualification procedure. The purpose of the qualification procedure is to assess the student's command of the field and to evaluate his or her potential to complete a high-quality dissertation in a timely manner. The student must complete specified course work in one of the eight areas of the department, or the Systems Program which is a combination of several areas. The qualification decision is based on the student's grade point average (GPA), on the one or two preliminary papers prepared by the student, and on the student's performance in an area examination. Considering this evidence, the department faculty votes on advancing the student to candidacy in the department at large. The Ph.D. requires a minimum of 135 units, at least 54 of which must be in courses of 3 units or more. At least 48 course units in courses of 3 units or more must be taken for a letter grade. Finally, the student must pass a University oral examination and complete a Ph.D. dissertation. During the course of the Ph.D. program, students who do not have a master's degree are strongly encouraged to complete one, either in MS&E or in another Stanford department.

Breadth Requirement

1. The breadth requirement is to be satisfied by a choice of four courses spanning four out of the above mentioned eight areas of the department.
2. The Ph.D. candidacy form must contain four courses that satisfy the breadth requirement.
3. Courses chosen to satisfy the breadth requirement must be taken for letter grades.
4. At least one of the four courses chosen to satisfy the breadth requirement must be at the 300 level.

Courses Satisfying the Breadth Requirement:

Choose at least one course from four different areas. Courses used to satisfy the breadth requirement may also be used to satisfy the depth requirement.

Systems Modeling and Optimization:

MSE 201	Dynamic Systems	3-4
MSE 211	Linear and Nonlinear Optimization	3-4

MSE 310	Linear Programming	3
MSE 311	Optimization	3
MSE 312	Advanced Methods in Numerical Optimization	3
MSE 314	Linear and Conic Optimization with Applications	3
MSE 315	Numerical Optimization	3
MSE 316	Discrete Mathematics and Algorithms	3
MSE 317	Algorithms for Modern Data Models	3
MSE 318	Large-Scale Numerical Optimization	3
MSE 319	Approximation Algorithms	3
Probability and Stochastic Systems:		
MSE 220	Probabilistic Analysis	3-4
MSE 221	Stochastic Modeling	3
MSE 223	Simulation	3
MSE 321	Stochastic Systems	3
MSE 322	Stochastic Calculus and Control	3
MSE 335	Queueing and Scheduling in Processing Networks	3
MSE 336	Platform and Marketplace Design	3
MSE 337	Spectral Graph Theory and Algorithmic Applications	3
MSE 338	Advanced Topics in Information Science and Technology	3
Information Science and Technology:		
MSE 233	Networked Markets	3
MSE 335	Queueing and Scheduling in Processing Networks	3
MSE 336	Platform and Marketplace Design	3
MSE 337	Spectral Graph Theory and Algorithmic Applications	3
MSE 338	Advanced Topics in Information Science and Technology	3
Economics and Finance:		
MSE 241	Economic Analysis	3-4
MSE 244	Economic Growth and Development	3
MSE 245A	Investment Science	3
MSE 245B	Advanced Investment Science	3
MSE 347	Credit Risk: Modeling and Management	3
MSE 348	Optimization of Uncertainty and Applications in Finance	3
Decision Analysis and Risk Analysis:		
MSE 250A	Engineering Risk Analysis	3
MSE 251	Stochastic Control	3
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MSE 351	Dynamic Programming and Stochastic Control	3
MSE 352	Decision Analysis II: Professional Decision Analysis	3-4
MSE 353	Decision Analysis III: Frontiers of Decision Analysis	3
MSE 355	Influence Diagrams and Probabilistics Networks	3
Production and Operations Management:		
MSE 260	Introduction to Operations Management	3
MSE 261	Inventory Control and Production Systems	3
MSE 262	Supply Chain Management	3
MSE 263	Healthcare Operations Management	3
MSE 264	Sustainable Product Development and Manufacturing	3-4
MSE 268	Operations Strategy	3
MSE 365	Advanced Models in Operations Management	3

Organization, Technology, and Entrepreneurship:		
MSE 280	Organizational Behavior: Evidence in Action	3-4
MSE 380	Doctoral Research Seminar in Organizations	3
MSE 381	Doctoral Research Seminar in Work, Technology, and Organization	2-3
MSE 383	Doctoral Seminar on Ethnographic Research	3
MSE 384	Groups and Teams	3
Policy and Strategy:		
MSE 270	Strategy in Technology-Based Companies	3-4
MSE 292	Health Policy Modeling	3
MSE 293	Technology and National Security	3
MSE 294	Climate Policy Analysis	3
MSE 295	Energy Policy Analysis	3
MSE 371	Innovation and Strategic Change	2-3
MSE 372	Entrepreneurship Doctoral Research Seminar	1-3
MSE 374	Dynamic Corporate Strategy	3
MSE 375	Research on Entrepreneurship	3
MSE 376	Strategy Doctoral Research Seminar	3
MSE 389	Seminar on Organizational Theory	5
MSE 390	Doctoral Research Seminar in Health Systems Modeling	1-3
MSE 391	Doctoral Research Seminar in Energy-Environmental Systems Modeling and Analysis	1-3

Qualification Procedure Requirements

The qualification procedure is based both on breadth across the department's disciplines and depth in an area of the student's choice. The qualification process must be completed by the end of the month of May of the student's second year of graduate study in the department. The performance of all doctoral students is reviewed every year at a department faculty meeting at the end of May or beginning of June. Ph.D. qualification decisions are made at that time and individual feedback is provided.

The Ph.D. qualification requirements comprise these elements:

- Grade Point Average:** A student must maintain a GPA of at least 3.4 in the four courses chosen to satisfy the breadth requirements, and a GPA of at least 3.4 in the set of all courses taken by the student within the department. In both cases, the GPA is computed on the basis of the nominal number of units for which each course is offered.
- Paper(s):** A student may choose between two options, either of which is to be completed before the Spring Quarter of the student's second year. The first option involves one paper supervised by a primary faculty adviser and a faculty consultant. This paper should be written in two quarters.
 - The second option involves two shorter sequential tutorials, with two different faculty advisers. Each tutorial should be completed in one quarter. In both options, the student chooses the faculty adviser(s)/consultant with the faculty members' consent.
 - A student may register for up to 3 units per tutorial and up to 6 units for a paper. These paper or tutorial units do not count towards the 54 course units required for the Ph.D., and letter grades are not given.
- Area Qualification:** In addition, during the second year, a student must pass an examination in one of the eight areas of the MS&E department or the Systems Program, a combination of several areas, which is of the student's choice. This area examination is written, oral, or both, at the discretion of the area faculty administering the exam.
- Area Course Requirement:** Students must complete the depth requirements of one of the eight fields of study of the MS&E department or the Systems Program which is a combination of several

areas. Courses used to satisfy depth requirements must be taken for a letter grade. The Ph.D. requirements for the eight areas of the MS&E department are available from the MS&E student services office.

Ph.D. Minor in Management Science and Engineering

Students pursuing a Ph.D. in another department who wish to receive a Ph.D. minor in Management Science and Engineering should consult the MS&E student services office. A minor in MS&E may be obtained by completing 20 units of approved graduate-level MS&E courses, of which at least 6 units must be at the 300-level. Courses approved for the minor must form a coherent program, and must include one course from at least three of the eleven MS&E Master of Science core options. The program must include a minimum of 16 letter-graded units, and a minimum grade point average of 3.3 must be achieved in these courses.

Emeriti: (Professors) James L. Adams, Kenneth J. Arrow, Richard W. Cottle, B. Curtis Eaves, Frederick S. Hillier, Donald L. Iglehart, David G. Luenberger, Michael M. May, William J. Perry, Henry E. Riggs, David A. Thompson

Chair: Peter W. Glynn

Professors: Nicholas Bambos, Stephen R. Barley, Margaret L. Brandeau, Kathleen M. Eisenhardt, Peter W. Glynn, Ashish Goel, Warren H. Hausman, Ronald A. Howard, Riitta Katila, M. Elisabeth Paté-Cornell, Robert I. Sutton, James L. Sweeney, Benjamin Van Roy, Yinyu Ye

Associate Professors: Samuel S. Chiu, Kay Giesecke, Pamela J. Hinds, Ramesh Johari, Amin Saberi, Ross D. Shachter, Edison T. S. Tse

Assistant Professors: Charles E. Eesley, Sharad Goel, Melissa A. Valentine

Professors (Research): Siegfried S. Hecker, Walter Murray, Michael A. Saunders, John P. Weyant

Professors (Teaching): Thomas H. Byers, Robert E. McGinn

Professor of the Practice: Tina L. Seelig

Courtesy Professors: Anat Admati, Stephen P. Boyd, Douglas K. Owens, Sylvia Plevritis, Walter Powell, Balaji Prabhakar, Tim Roughgarden

Lecturers: Daniel Barreto, Ravi Belani, Lisa Borland, David Chang, Toby Corey, Jeff Epstein, Jack Fuchs, Rebeca Hwang, Colin Kessinger, Clint Korver, Arik Lifschitz, Trevor Loy, Mary Morrison, Heidi Roizen, Rosanne Siino, Lynda Kate Smith, Andrew Wong

Consulting Professors: Peter Haas, Gerd Infanger, Thomas Kosnik, Burke Robinson, Sam L. Savage, Behnam Tabrizi

Consulting Associate Professors: Steve Blank, Michael Lyons, Audrey MacLean, Jan Pietzsch, F. Victor Stanton, Peter Woehrmann

Consulting Assistant Professors: Blake E. Johnson

Visiting Professor: Olivier de La Grandville

Director of the Industrial Affiliates Program: Yinyu Ye

Materials Science and Engineering

Courses offered by the Department of Materials Science and Engineering are listed under the subject code MATSCI on the *Stanford Bulletin's* ExploreCourses (<http://explorecourses.stanford.edu/browse>) web site.

The Department of Materials Science and Engineering is concerned with the relation between the structure and properties of materials, factors that

control the internal structure of solids, and processes for altering their structure and properties, particularly at the nanoscale.

Mission of the Undergraduate Program in Materials Science and Engineering

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminal degree program which leads to an M.S. in Materials Science and Engineering. Coterminal degree programs are encouraged both for undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines.

Graduate Programs in Materials Science Engineering

Graduate programs lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy. Graduate students can specialize in any of the areas of materials science and engineering.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course and laboratory work in solid state fundamentals and materials engineering, and further course work in a technical depth area which may include a master's Research Report. Typical depth areas include nanocharacterization, electronic and photonic materials, energy materials, nano and biomaterials.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Materials Science and Engineering and related fields.

Facilities

The department is located in the William F. Durand Building, with extensive facilities in the Jack A. McCullough Building and the Gordon and Betty Moore Materials Research Building. These buildings house offices for the chair, majority of the faculty, administrative and technical staff, graduate students as well as lecture and seminar rooms. The research facilities are equipped to conduct electrical measurements, mechanical testing of bulk and thin film materials, fracture and fatigue of advanced materials, metallography, optical, scanning, transmission electron microscopy, atomic force microscopy, UHV sputter deposition, vacuum annealing treatments, wet chemistry, and x-ray diffraction.

The McCullough/Moore Complex is also the home for the Center for Magnetic Nanotechnology (CMN (http://www.stanford.edu/group/nanomag_center)), Stanford Nanocharacterization Laboratory (SNL (<http://www.stanford.edu/group/snl>)) and Nanoscale Prototyping Laboratory (NPL

(<http://npl-web.stanford.edu>); joint facility with Mechanical Engineering in Building 530). The department maintains a microcomputer cluster for its students, which is linked to the internet.

Depending on the needs of their programs, students and faculty also conduct research in a number of other departments and independent laboratories. Chief among these are the Stanford Nanofabrication Facility (SNF (<http://snf.stanford.edu>)), Geballe Laboratory for Advanced Materials (GLAM (<http://stanford.edu/group/glam>)), and Stanford Synchrotron Radiation Laboratory (SSRL (<http://www-ssrl.slac.stanford.edu>)).

The Stanford Nanofabrication Facility (SNF) is a laboratory joining government and industrially funded research on microelectronic materials, devices, and systems. It houses a 10,000 sq. ft., class 100 clean room for Si and GaAs integrated circuit fabrication, a large number of electronic test, materials analysis, and computer facilities, and office space for faculty, staff, and students. In addition, the Center for Integrated Systems (CIS (<http://cis.stanford.edu>)) provides start-up research funds and maintains a fellow-mentor program with industry.

Bachelor of Science in Materials Science and Engineering

Mission Statement

The mission of the Materials Science and Engineering Program is to provide students with a strong foundation in materials science and engineering. The program's curriculum places special emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of materials structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering and teach them to apply this knowledge analytically to create effective and novel solutions to practical problems. The program prepares students for careers in industry or for further study in graduate school.

The undergraduate program provides training in solid state fundamentals and materials engineering. Students desiring to specialize in this field during their undergraduate period may do so by following the curriculum outlined in the Bachelor of Science in Materials Science and Engineering section of this bulletin as well as the School of Engineering Undergraduate Handbook (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Main_Page). The University's basic requirements for the bachelor's degree are discussed in the Bachelor of Science in Materials Science and Engineering section of this bulletin. Electives are available so that students with broad interests can combine materials science and engineering with work in another science or engineering department.

Students interested in the minor should see the Materials Science and Engineering Minor section of this bulletin.

Materials Science and Engineering (MATSCI)

Completion of the undergraduate program in Materials Science and Engineering leads to the conferral of the Bachelor of Science in Materials Science and Engineering.

Mission of the Undergraduate Program in Materials Science and Engineering

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminal degree program which leads to an M.S. in Materials Science and Engineering. Coterminal degree programs are encouraged both for undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines.

Requirements

	Units
Mathematics	
20 units minimum; see Basic Requirement 1 ¹	
Select one of the following:	5
MATH 51 Linear Algebra and Differential Calculus of Several Variables	
CME 100/ ENGR 154 Vector Calculus for Engineers	
Select one of the following:	5
MATH 52 Integral Calculus of Several Variables	
CME 104/ ENGR 155B Linear Algebra and Partial Differential Equations for Engineers	
Select one of the following:	5
MATH 53 Ordinary Differential Equations with Linear Algebra	
CME 102/ ENGR 155A Ordinary Differential Equations for Engineers	
One additional course	5
Science	
20 units minimum; see Basic Requirement 2 ²	20
Must include a full year of physics or chemistry, with one quarter of study in the other subject.	
Technology in Society	
One course; see Basic Requirement 3 ³	3-5
Engineering Fundamentals	
Three courses minimum; see Basic Requirement 4 ⁴	
Select one of the following:	4
ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis ⁴	
ENGR 50E Introduction to Materials Science, Energy Emphasis ⁴	
ENGR 50M Introduction to Materials Science, Biomaterials Emphasis ⁴	

At least two additional courses 6-9

Materials Science and Engineering Depth

Materials Science Fundamentals:

MATSCI 153 Nanostructure and Characterization 4

MATSCI 154 Thermodynamic Evaluation of Green Energy Technologies⁵ 4

MATSCI 155 Nanomaterials Synthesis 4

MATSCI 157 Quantum Mechanics of Nanoscale Materials 4

Two of the following courses: 8

MATSCI 151 Microstructure and Mechanical Properties

MATSCI 152 Electronic Materials Engineering

MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

MATSCI 190 Organic and Biological Materials

MATSCI 192 Materials Chemistry

MATSCI 193 Atomic Arrangements in Solids

MATSCI 194 Thermodynamics and Phase Equilibria

MATSCI 195 Waves and Diffraction in Solids

MATSCI 196 Defects in Crystalline Solids

MATSCI 197 Rate Processes in Materials

MATSCI 198 Mechanical Properties of Materials

MATSCI 199 Electronic and Optical Properties of Solids

Engineering Depth 16

One of the following courses:

MATSCI 161 Nanocharacterization Laboratory (WIM)

MATSCI 164 Electronic and Photonic Materials and Devices Laboratory (WIM)

Three of the following courses:

MATSCI 160 Nanomaterials Laboratory

MATSCI 162 X-Ray Diffraction Laboratory

MATSCI 163 Mechanical Behavior Laboratory

MATSCI 165 Nanoscale Materials Physics Computation Laboratory

Focus Area Options⁶ 10

¹ Basic Requirement 1 (20 units minimum): see a list of approved Math Courses (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses).

² Basic Requirement 2 (20 units minimum): see a list of approved Science Courses (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses).

³ Basic Requirement 3 (one course minimum): see a list of approved Technology in Society Courses (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses).

⁴ Basic Requirement 4 (3 courses minimum): see a list of approved Engineering Fundamentals (http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses) Courses. If both ENGR 50 (p. 269) Introduction to Materials Science, Nanotechnology Emphasis, ENGR 50E (p. 269) Introduction to Materials Science - Energy Emphasis, and/or ENGR 50M (p. 269) Introduction to Materials Science, Biomaterials Emphasis are taken, one may be used for the Materials Science Fundamentals requirement.

⁵ ENGR 30 (p. 269) Engineering Thermodynamics may be substituted for MATSCI 154 (p. 269) Thermodynamic Evaluation of Green Energy Technologies as long as the total MATSCI program units total 50 or more.

⁶ Focus Area Options: 10 units from one of the following Focus Area Options below.

Focus Area Options

Bioengineering (10 units minimum)

BIOE 220 Introduction to Imaging and Image-based Human Anatomy

BIOE 281 Biomechanics of Movement

BIOE 284B Cardiovascular Bioengineering

BIOE 333 Interfacial Phenomena and Bionanotechnology

BIOE 381 Orthopaedic Bioengineering

MATSCI 190 Organic and Biological Materials

MATSCI 380 Nano-Biotechnology

MATSCI 381 Biomaterials in Regenerative Medicine

MATSCI 382 Biochips and Medical Imaging

Chemical Engineering (10 units minimum)

CHEM 171 Physical Chemistry I

CHEMENG Separation Processes 130

CHEMENG Micro and Nanoscale Fabrication Engineering 140

CHEMENG Biochemical Engineering 150

CHEMENG Polymer Science and Engineering 160

Chemistry (10 units minimum)

CHEM 151 Inorganic Chemistry I

CHEM 153 Inorganic Chemistry II

CHEM 171 Physical Chemistry I

CHEM 173 Physical Chemistry II

CHEM 175 Physical Chemistry III

CHEM 181 Biochemistry I

CHEM 183 Biochemistry II

CHEM 185 Biochemistry III

Electronics & Photonics (10 units minimum)

EE 101A Circuits I

EE 101B Circuits II

EE 102A Signal Processing and Linear Systems I

EE 102B Signal Processing and Linear Systems II

EE 116 Semiconductor Device Physics

EE 134 Introduction to Photonics

EE 136 Introduction to Nanophotonics and Nanostructures

EE 142 Engineering Electromagnetics (Formerly EE 141)

MATSCI 343 Organic Semiconductors for Electronics and Photonics

Energy Technology (10 units minimum)

EE 293B Fundamentals of Energy Processes

MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

MATSCI 302 Solar Cells

MATSCI 303 Principles, Materials and Devices of Batteries

ME 260 Fuel Cell Science and Technology

Materials Characterization Techniques (10 units minimum)

MATSCI 320 Nanocharacterization of Materials

MATSCI 321 Transmission Electron Microscopy

MATSCI 322 Transmission Electron Microscopy Laboratory

MATSCI 323 Thin Film and Interface Microanalysis

MATSCI 326 X-Ray Science and Techniques

Mechanical Behavior & Design (10 units minimum)

AA 240A	Analysis of Structures
AA 240B	Analysis of Structures
AA 256	Mechanics of Composites
MATSCI 198	Mechanical Properties of Materials
MATSCI 358	Fracture and Fatigue of Materials and Thin Film Structures
ME 80	Mechanics of Materials
or CEE 101A	Mechanics of Materials
ME 203	Design and Manufacturing
ME 294	Medical Device Design
Nanoscience (10 units minimum)	
BIOE 333	Interfacial Phenomena and Bionanotechnology
EE 136	Introduction to Nanophotonics and Nanostructures
ENGR 240	Introduction to Micro and Nano Electromechanical Systems
MATSCI 316	Nanoscale Science, Engineering, and Technology
MATSCI 320	Nanocharacterization of Materials
MATSCI 346	Nanophotonics
MATSCI 347	Introduction to Magnetism and Magnetic Nanostructures
MATSCI 380	Nano-Biotechnology
Physics (10 units minimum)	
PHYSICS 70	Foundations of Modern Physics
PHYSICS 110	Advanced Mechanics
PHYSICS 120	Intermediate Electricity and Magnetism I
PHYSICS 121	Intermediate Electricity and Magnetism II
PHYSICS 130	Quantum Mechanics
PHYSICS 131	Quantum Mechanics II
PHYSICS 134	Advanced Topics in Quantum Mechanics
PHYSICS 170	Thermodynamics, Kinetic Theory, and Statistical Mechanics I
PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics II
PHYSICS 172	Solid State Physics
Self-Defined Option (10 units minimum)	
Petition for a self-defined cohesive program.	

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

Materials Science and Engineering (MATSCI) Minor

A minor in Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain an understanding of the fundamental processes that govern materials behavior.

The following courses fulfill the minor requirements:

	Units
Engineering Fundamentals	
Select one of the following:	4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis
ENGR 50E	Introduction to Materials Science, Energy Emphasis
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis
Materials Science Fundamentals and Engineering Depth	
Select six of the following:	24
MATSCI 151	Microstructure and Mechanical Properties
MATSCI 152	Electronic Materials Engineering

MATSCI 153	Nanostructure and Characterization
MATSCI 154	Thermodynamic Evaluation of Green Energy Technologies
MATSCI 155	Nanomaterials Synthesis
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
MATSCI 157	Quantum Mechanics of Nanoscale Materials
MATSCI 160	Nanomaterials Laboratory
MATSCI 161	Nanocharacterization Laboratory
MATSCI 162	X-Ray Diffraction Laboratory
MATSCI 163	Mechanical Behavior Laboratory
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory
MATSCI 165	Nanoscale Materials Physics Computation Laboratory
MATSCI 190	Organic and Biological Materials
MATSCI 192	Materials Chemistry
MATSCI 193	Atomic Arrangements in Solids
MATSCI 194	Thermodynamics and Phase Equilibria
MATSCI 195	Waves and Diffraction in Solids
MATSCI 196	Defects in Crystalline Solids
MATSCI 197	Rate Processes in Materials
MATSCI 198	Mechanical Properties of Materials
MATSCI 199	Electronic and Optical Properties of Solids

Total Units

28

Master of Science in Materials Science Engineering

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The following are specific departmental requirements.

The Department of Materials Science and Engineering requires a minimum of 45 units for a master's degree to be taken in residence at Stanford. A Master's Program Proposal (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/progpropma.pdf>) form should be filled out, signed by the student's academic adviser, and submitted to the department's student services manager by the end of the student's first quarter of study. Final revisions to the master's program proposal must be submitted no later than one academic quarter prior to the quarter of expected degree conferral. Stanford Materials Science undergraduates who are pursuing or who plan to pursue a Coterminal M.S. degree may have more flexibility in their programs and should consult with their academic advisers regarding appropriate core course and elective choices.

Degree requirements are as follows:

1. A minimum of 30 units of Materials Science and Engineering (MATSCI) course work, including core and lab courses specified below, all taken for a letter grade. Research units, one-unit seminars, MATSCI 299 Practical Training and courses in other departments (i.e., where students cannot enroll in a class with a MATSCI subject code) cannot be counted for this requirement.
2. Of these 30 units Materials Science requirements, students must include a or b.
 - a. three classes from MATSCI 201-210 core courses and three MATSCI 171, 172, 173, 174, 175 laboratory courses. One laboratory requirement may be fulfilled by taking a lab course from another engineering department.
 - b. four classes from MATSCI 201-210 core courses and two MATSCI 171, 172, 173, 174, 175 laboratory courses. One

laboratory requirement may be fulfilled by taking a lab course from another engineering department.

3. 15 units of approved course electives to result in a technically cohesive program. Of the 15 units of elective courses:
 - a. 12 of the 15 units must be taken for a letter grade (except for those submitting a M.S. thesis report).
 - b. a maximum of three units may be seminars.
 - c. if writing a master's thesis report, a minimum of 6 and a maximum of 15 units of MATSCI 200 Master's Research may be counted. Master's research units may be counted only if writing a M.S. thesis report. The final version of the thesis report must be signed off by two faculty and submitted to student services manager by last day of classes of the graduation quarter. See student services manager for details and approval.
 - d. a maximum of three units may be undergraduate units, but not courses below the 100 level offering.
 - e. a maximum of five units may be used for a foreign language course (not including any remedial English or courses in the student's native language if other than English). Students must plan to enroll in an upper level designation of a foreign language course offering.
 - f. the combination of seminar, undergraduate, and language units may not exceed six units total.
 - g. the combination of research, seminar, undergraduate, and language units may not exceed 15 units total.
 - h. activity units may not be counted toward M.S. degree.
4. A minimum grade point average (GPA) of 2.75 for degree course work.

All proposed degree programs are subject to approval by student's academic adviser, and department's student services manager, who has responsibility for assuring that each proposal is a technically cohesive program. The M.S. degree is expected to be completed within two years during the University's candidacy period for completion of a master's degree.

Master's Thesis Report

Students wishing to take this option must consult with a MATSCI faculty member initially. Out of the 45 units M.S. degree requirements, 6-15 units may be taken in Materials Science Master's research by enrolling in MATSCI 200. Students using 15 units of research toward the degree must participate in a more complex and demanding research project than those using lesser units.

The M.S. thesis report must be approved and signed off by two faculty members. In general, one is student's research adviser, if adviser is a non MATSCI faculty member, a second MATSCI faculty is required to sign off on the thesis report. Consult with student services manager about faculty criteria, and requirements. Three copies of M.S. thesis report in final format should be submitted to two faculty advisers, and the department. The report is not an official University thesis but is intended to demonstrate to the department and faculty student's ability to conduct and report a directed research.

As a general guide line, a 6-9 units of master's research is a normal load for most students. The report should reflect the number of units taken. For instance, 3-4 laboratory reports are required for a 3-unit laboratory course. Accordingly, the level expected for 9 units of research would be at least equivalent to three such courses.

Students are advised to submit their thesis draft to faculty adviser readers by the end of fifth week of the quarter in which the units are to be assigned to allow time for faculty comments and revisions. A collated final version of the thesis report should be submitted to faculty and student services manager by last day of classes of student's graduation quarter. The appropriate grade for satisfactory progress in the research project prior to submission of the final report is 'N' (continuing); the 'S' (Satisfactory) final grade is given only when the report is fully approved and signed off by both faculty members.

In cases where students decide to pursue research after the initial program submission deadline, they should submit a revised M.S. Program Proposal at least two quarters before the degree is granted. The total combined units of Materials Science research units, seminars, language courses, and undergraduate courses cannot exceed 15. If a master's thesis report is not submitted, units in MATSCI 200 Master's Research cannot be applied to the department's requirement of 45 units for the conferral of the master's degree.

Honors Cooperative Program

Some of the department's graduate students participate in the Honors Cooperative Program (HCP), which makes it possible for academically qualified engineers and scientists in industry to be part-time graduate students in Materials Science while continuing professional employment. Prospective HCP students follow the same admissions process and must meet the same admissions requirements as full-time graduate students. For information regarding the Honors Cooperative Program, see Graduate Programs in the "School of Engineering (p. 155)" section of this bulletin.

Petition Process for Transfer from M.S. to Ph.D. Degree Program

Students admitted to graduate programs are admitted specifically into either the terminal M.S. or the Ph.D. program. A student admitted to the terminal M.S. program should not assume admission to the Ph.D. program. Admission to the Ph.D. program is required for a student to be eligible to work towards the Ph.D. degree.

A student in the terminal M.S. program may petition to be admitted to the Ph.D. program by filing an M.S. to Ph.D. petition form. Petition must include a one-page statement of purpose explaining why the student wishes to transfer to the Ph.D. program, most recent unofficial transcript, and two letters of recommendation from members of the Stanford faculty, including one from the student's prospective research adviser and at least one from a Materials Science faculty member belonging to the Academic Council. The M.S. to Ph.D. petition to transfer should be submitted to the student services manager by June of the first year in the M.S. program. Students who wish to submit a petition to the Ph.D. degree, should plan to complete at least six of the MATSCI 200 series (including MATSCI 203 Atomic Arrangements in Solids, MATSCI 204 Thermodynamics and Phase Equilibria, MATSCI 207 Rate Processes in Materials) core courses during their first year of admission. A grade point average (GPA) of 3.5 or better in the core courses is requirement.

Transferring to the Ph.D. program is a competitive process and only highly qualified M.S. students may be admitted. Student's original application to the graduate program as well as the materials provided for the transfer petition are reviewed. Students must adhere to requirements for the terminal M.S. degree, and plan to confer the M.S. degree in the event that the Ph.D. petition to transfer is not approved.

Coterminal B.S./M.S. Program in Materials Science and Engineering

Stanford undergraduates who wish to continue their studies for the Master of Science degree in Materials Science and Engineering through the Coterminal program may apply for admission after they have earned 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. Applicants must submit their application no later than eight weeks before the start of the proposed admit quarter. The application must give evidence that student possesses a potential for strong academic

performance at the graduate level. Scores from the Graduate Record Examination (GRE) General Test must be reported before action can be taken on an application.

Materials science is a highly integrated and interdisciplinary subject, therefore students of any engineering or science undergraduate major are encouraged to apply.

Information and other requirements pertaining to the Coterminal program in Materials Science and Engineering may be obtained from the department's student services manager.

University requirements for the Coterminal degree are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University Coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Engineer in Materials Science Engineering

The University's basic requirements for the degree of Engineer are outlined in the "Graduate Degrees" section of this bulletin.

A student wishing to enter the Engineer program must have completed the requirements of the M.S. in Materials Science and Engineering, and must file a petition requesting admission to the program, stating the type of research to be done and the proposed supervising professor. Once approved, the Application for Candidacy must be submitted to the department's student services manager by the end of the second quarter in the Engineer program. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to degree conferral.

The 90-unit program must include 9 units of graduate courses in Materials Science with a MATSCI subject code (no research units, seminars, colloquia, and MATSCI 400 Participation in Materials Science Teaching, Participation in Teaching) beyond the requirements for the M.S. degree, and additional research or other units to meet the 90-unit University minimum requirement. A grade point average (GPA) of 3.0 must be maintained for all degree course work taken at Stanford.

The Engineer thesis must be approved and signed off by two Academic Council faculty members, one must be a MATSCI faculty member.

Doctor of Philosophy in Materials Science Engineering

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 43)" section of this bulletin.

The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements. Degree requirements for the department are as follows:

Core Courses ¹	Units
EE 222 Applied Quantum Mechanics I	30
MATSCI 202 Materials Chemistry	
MATSCI 203 Atomic Arrangements in Solids	
MATSCI 204 Thermodynamics and Phase Equilibria	
MATSCI 205 Waves and Diffraction in Solids	
MATSCI 206 Defects in Crystalline Solids	
MATSCI 207 Rate Processes in Materials	
MATSCI 208 Mechanical Properties of Materials	
MATSCI 209 Electronic and Optical Properties of Solids	
MATSCI 210 Organic and Biological Materials	

Five Elective Graduate Technical Courses ²	15
Materials Science Colloquia ³	3
MATSCI 230 Materials Science Colloquium (Autumn 2014)	
MATSCI 230 Materials Science Colloquium (Winter 2015)	
MATSCI 230 Materials Science Colloquium (Spring 2015)	
Research & Electives	87
75 Units of MATSCI 300: Ph.D. Research	
12 Units of Electives ⁴	

- At least six of these courses must be taken during the first year (including MATSCI 203 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Atomic Arrangements in Solids, MATSCI 204 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Thermodynamics and Phase Equilibria, and MATSCI 207 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Rate Processes in Materials). All core courses must be completed for a letter grade, and taken during the first two years in the program.
 - Elective technical courses must be in areas related directly to student's research interest in Materials Science and Engineering, and may not include MATSCI 230 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Materials Science Colloquium, MATSCI 299 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Practical Training, MATSCI 300 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Ph.D. Research or MATSCI 400 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Participation in Materials Science Teaching. All courses must be completed for a letter grade.
 - Materials Science & Engineering Ph.D. students are required to take MATSCI 230 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Materials Science Colloquium during each quarter of their first year. Attendance is required, roll is taken, and more than two absences results in an automatic "No Pass" grade.
 - May include other engineering courses, or MATSCI 400 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Participation in Materials Science Teaching or a maximum of 3 units MATSCI 299 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering/>) Practical Training
- Students must consult with their academic adviser on Ph.D. course selection planning. For students with a non-MATSCI research adviser, the MATSCI academic/co-adviser must also approve the list of proposed courses. Any proposed deviations from the requirements can only be considered by petition.
 - Ph.D. students are required to apply for and have conferred a MATSCI M.S. degree normally by the end of their third year of studies. A Graduate Program Authorization Petition (in Axxess) and an M.S. Program Proposal (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/progpropma.pdf>) must be submitted after taking the Ph.D. qualifying examination.
 - A departmental oral qualifying examination must be passed by the end of January of the second year. A grade point average (GPA) of 3.5 in core courses MATSCI 201-210 is required for admission to the Ph.D. qualifying examination. Students who have passed the Ph.D. qualifying examination are required to complete the Application for Candidacy to the Ph.D. degree by June of the second year after passing the qualifying examination. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to the TGR status.
 - Maintain a cumulative GPA of 3.0 in all courses taken at Stanford.

- Students must present the results of their research dissertation at the University Ph.D. oral defense examination.
- Current students subject to either this set of requirements or a prior set must obtain the approval of their adviser before filing a revised program sheet, and should as far as possible adhere to the intent of the new requirements.
- Students may refer the list of "Advanced Specialty Courses and Cognate Courses" provided below as guidelines for their selection of technical elective units. As noted above, academic adviser approval is required.
- At least 90 units must be taken in residence at Stanford. Students entering with an M.S. degree in Materials Science from another university may request to transfer up to 45 units of equivalent work toward the total of 135 Ph.D. degree requirement units.
- Students may propose a petition for exemption from a required core course if they have taken a similar course in the past. To petition, a student must consult and obtain academic and/or research adviser approval, and consent of the instructor of the proposed core course. To assess a student's level of knowledge, the instructor may provide an oral or written examination on the subject matter. The student must pass the examination in order to be exempt from core course requirement. If the petition is approved, the student is required to complete the waived number of units by taking other relevant upper level MATSCI courses.

Advanced Specialty Courses

	Units
Biomaterials	
APPPHYS 292 (Offered previous years, may be counted)	
BIOPHYS 228 Computational Structural Biology	
CHEMENG 260 Polymer Science and Engineering	
CHEMENG 310 Microhydrodynamics	
CHEMENG 355 Advanced Biochemical Engineering	
ME 284A (Offered previous years, may be counted)	
ME 284B (Offered previous years, may be counted)	
ME 381 Orthopaedic Bioengineering	
ME 385 Tissue Engineering Lab	
ME 457 Fluid Flow in Microdevices	
MATSCI 380 Nano-Biotechnology	
MATSCI 381 Biomaterials in Regenerative Medicine	
MATSCI 382 Biochips and Medical Imaging	
Electronic Materials Processing	
EE 212 Integrated Circuit Fabrication Processes	
EE 216 Principles and Models of Semiconductor Devices	
EE 311 Advanced Integrated Circuits Technology	
EE 316 Advanced VLSI Devices	
EE 410 Integrated Circuit Fabrication Laboratory	
MATSCI 312 New Methods in Thin Film Synthesis	
Materials Characterization	
APPPHYS 216 X-Ray and VUV Physics	
CHEMENG 345 Fundamentals and Applications of Spectroscopy	
EE 329 (Not offered in 2013-2014)	
MATSCI 312 New Methods in Thin Film Synthesis	
MATSCI 320 Nanocharacterization of Materials	
MATSCI 321 Transmission Electron Microscopy	

MATSCI 322	Transmission Electron Microscopy Laboratory
MATSCI 323	Thin Film and Interface Microanalysis
MatSci 325 (Not offered in 2013-2014)	
MATSCI 326	X-Ray Science and Techniques
Mechanical Behavior of Solids	
AA 252	Techniques of Failure Analysis
AA 256	Mechanics of Composites
MATSCI 251	Microstructure and Mechanical Properties
MATSCI 353	Mechanical Properties of Thin Films
MATSCI 358	Fracture and Fatigue of Materials and Thin Film Structures
ME 335A	Finite Element Analysis
ME 335B	Finite Element Analysis
ME 335C	Finite Element Analysis
ME 340	Theory and Applications of Elasticity
ME 340A (Offered previous years, may be counted)	
ME 340B (Offered previous years, may be counted)	
ME 345	Fatigue Design and Analysis
Physics of Solids and Computation	
APPPHYS 272	Solid State Physics
APPPHYS 273	Solid State Physics II
EE 222	Applied Quantum Mechanics I
EE 223	Applied Quantum Mechanics II
EE 228	Basic Physics for Solid State Electronics
EE 327	Properties of Semiconductor Materials
EE 328	Physics of Advanced Semiconductor Devices
EE 329	The Electronic Structure of Surfaces and Interfaces
EE 335 (Offered previous years, may be counted)	
MATSCI 331	Atom-based computational methods for materials
MATSCI 343	Organic Semiconductors for Electronics and Photonics
MATSCI 347	Introduction to Magnetism and Magnetic Nanostructures
ME 344A (Offered previous years, may be counted)	
ME 344B (Offered previous years, may be counted)	
Soft Materials	
CHEMENG 260	Polymer Science and Engineering
CHEMENG 310	Microhydrodynamics
CHEMENG 460 (Offered previous years, may be counted)	
MATSCI 343	Organic Semiconductors for Electronics and Photonics
ME 455	Complex Fluids and Non-Newtonian Flows

Ph.D. Minor in Materials Science and Engineering

The University's basic requirements for the Ph.D. minor are outlined in the "Graduate Degrees (p. 45)" section of this bulletin. A minor requires 20 units of graduate work of quality and depth at the 200-level or higher in the Materials Science and Engineering course offering. Courses must be taken for a letter grade. The proposed list of courses must be approved by department's advanced degree committee. Individual programs must be submitted to the student services manager at least one quarter prior to the quarter of the degree conferral. None of the units taken for the Ph.D. minor may overlap with any M.S. degree units.

Emeriti: (Professors) Clayton W. Bates Jr. (<https://engineering.stanford.edu/profile/09970823>), John C. Bravman, Richard H. Bube (<http://engineering.stanford.edu/profile/bube>), Theodore H. Geballe (<http://www.stanford.edu/dept/app-physics/cgi-bin/person/geballe-theodore-h>), Robert A. Huggins (<https://engineering.stanford.edu/profile/rhuggins>)*, William D. Nix (<http://engineering.stanford.edu/profile/nix>)*, Oleg D. Sherby (<http://engineering.stanford.edu/profile/osherby>), John C. Shyne, William A. Tiller (<https://engineering.stanford.edu/profile/07098155>), Robert L. White (http://www.stanford.edu/group/nanomag_center/faculty.htm#Executive)*, Robert S. Feigelson (<http://engineering.stanford.edu/profile/feigel>)* (*Professor, Research*)

Chair: Paul C. McIntyre (<http://engineering.stanford.edu/profile/bobsinc>)

Associate Chair: Shan Xiang Wang (<http://engineering.stanford.edu/profile/rhd>)

Professors: David M. Barnett (<http://engineering.stanford.edu/profile/barnett>), Mark L. Brongersma (<http://engineering.stanford.edu/profile/markb29>), Bruce M. Clemens (<http://engineering.stanford.edu/profile/bmc>), Reinhold H. Dauskardt (<http://engineering.stanford.edu/profile/rhd>), Persis S. Drell, Michael D. McGehee (<http://engineering.stanford.edu/profile/mmcegee>), Paul C. McIntyre (<http://engineering.stanford.edu/profile/pcm1>), Friedrich B. Prinz (<http://engineering.stanford.edu/profile/fprinz>), Robert Sinclair (<http://engineering.stanford.edu/profile/bobsinc>), Shan X. Wang (<http://engineering.stanford.edu/profile/sxwang>)

Associate Professors: Yi Cui (<http://engineering.stanford.edu/profile/yicui>), Sarah C. Heilshorn, (<http://engineering.stanford.edu/profile/sarah7>), Nicholas A. Melosh (<http://engineering.stanford.edu/profile/nmelosh>), Alberto Salleo (<http://engineering.stanford.edu/profile/asalleo>)

Assistant Professors: William Chueh (http://chuehlab.stanford.edu/Chueh_Lab/Home.html), Jennifer A. Dionne (<http://engineering.stanford.edu/profile/jdionne>), Aaron M. Lindenberg (<http://engineering.stanford.edu/profile/aaronl>), Evan J. Reed (<http://engineering.stanford.edu/profile/evanreed>)

Courtesy Professors: Zhenan Bao, Stacey F. Bent (<http://engineering.stanford.edu/profile/sbent>), Ian R. Fisher (<http://www.stanford.edu/group/fisher/>), Curtis W. Frank (<http://engineering.stanford.edu/profile/cwfrank>), Sanjiv Gambhir (http://med.stanford.edu/profiles/Sanjiv_Gambhir), Geoffrey C. Gurtner (http://med.stanford.edu/profiles/Geoffrey_Gurtner/?jsessionid=D9A8A5AC1B9BC3B2D98B3D6CE95364D8.tc-cap-08), James S. Harris (<https://engineering.stanford.edu/profile/jharris-0>), Michael T. Longaker (http://med.stanford.edu/profiles/psrl/faculty/michael_longaker), Arunava Majumdar, Yoshio Nishi (<http://engineering.stanford.edu/profile/nishiy>), James D. Plummer (<http://engineering.stanford.edu/profile/plummer>), Krishna Saraswat (<http://engineering.stanford.edu/profile/saraswat>), Jonathan Stebbins (<http://engineering.stanford.edu/profile/stohr>)

Courtesy Associate Professor: Wei Cai (<http://www.stanford.edu/~caiwei>), Andrew Spakowitz, Yunzhi Peter Yan

Lecturers: Ann Marshall, Arturas Vailionis (<http://simes.stanford.edu/investigator/arturas-vailionis>)

Consulting Professors: Turgut M. Gur (<http://www.stanford.edu/~turgut>), Michael A. Kelly, Rommel Noufi, Kristin Persson, Baylor Triplett, Robert M. White

Consulting Associate Professors: Geraud Jean-Michel Dubois (<http://researcher.watson.ibm.com/researcher/view.php?person=us-gdubois>)

Acting Assistant Professors: Paul J. Kempen

Visiting Professors: Clarence Tee

* Recalled to active duty.

Cognate Courses

		Units
AA 252	Techniques of Failure Analysis	3
AA 256	Mechanics of Composites	3
APPPHYS 216	X-Ray and VUV Physics	3
APPPHYS 270	Magnetism and Long Range Order in Solids	3
APPPHYS 272	Solid State Physics	3
APPPHYS 273	Solid State Physics II	3
APPPHYS 292	(Offered previous years, may be counted)	
BIOPHYS 228	Computational Structural Biology	3
CHEMENG 260	Polymer Science and Engineering	3
CHEMENG 310	Microhydrodynamics	3
CHEMENG 345	Fundamentals and Applications of Spectroscopy	3
CHEMENG 355	Advanced Biochemical Engineering	3
CHEMENG 460	(Offered previous years, may be counted)	
EE 212	Integrated Circuit Fabrication Processes	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 228	Basic Physics for Solid State Electronics	3
EE 311	Advanced Integrated Circuits Technology	3
EE 312	(Offered in previous years, may be counted)	
EE 316	Advanced VLSI Devices	3
EE 327	Properties of Semiconductor Materials	3
EE 328	Physics of Advanced Semiconductor Devices	3
EE 329	The Electronic Structure of Surfaces and Interfaces	3
EE 335	(Offered in previous years, may be counted)	
EE 410	Integrated Circuit Fabrication Laboratory	3-4
ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology	4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	4
ENGR 50E	Introduction to Materials Science, Energy Emphasis	4
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	4
ME 284A	(Offered in previous years, may be counted)	
ME 284B	(Offered in previous years, may be counted)	
ME 329	(Offered in previous years, may be counted)	
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	3
ME 340A	(Offered in previous years, may be counted)	
ME 340B	(Offered in previous years, may be counted)	
ME 344A	(Offered in previous years, may be counted)	
ME 344B	(Offered in previous years, may be counted)	
ME 345	Fatigue Design and Analysis	3
ME 381	Orthopaedic Bioengineering	3
ME 385	Tissue Engineering Lab	1-2
ME 455	Complex Fluids and Non-Newtonian Flows	3
ME 457	Fluid Flow in Microdevices	3
PHYSICS 230	Quantum Mechanics	3
PHYSICS 231	Quantum Mechanics	3

Mechanical Engineering

Courses offered by the Department of Mechanical Engineering are listed under the subject code ME on the *Stanford Bulletin's* ExploreCourses web site.

The programs in the Department of Mechanical Engineering (ME) emphasize a mix of applied mechanics, biomechanical engineering, computer simulations, design, and energy science and technology. Since mechanical engineering is a broad discipline, the undergraduate program can be a springboard for graduate study in business, law, medicine, political science, and other professions where understanding technology is important. Both undergraduate and graduate programs provide technical background for work in biomechanical engineering, environmental pollution control, ocean engineering, transportation, and other multidisciplinary problems that concern society. In all programs, emphasis is placed on developing systematic procedures for analysis, communication of work and ideas, practical and aesthetic aspects in design, and responsible use of technology.

Mission of the Undergraduate Program in Mechanical Engineering

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of intellectual and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide array of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro-mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or another field where a broad engineering background is useful.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an ability to apply knowledge of mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design a system, component, or process to meet desired needs.
4. an ability to function on multidisciplinary teams.
5. an ability to identify, formulate, and solve engineering problems.
6. an understanding of professional and ethical responsibility.
7. an ability to communicate effectively.
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. a recognition of the need for and an ability to engage in life-long learning.

10. a knowledge of contemporary issues.
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
12. the ability to apply advanced mathematics through multivariate calculus and differential equations.
13. the ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.

Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work providing depth in one area of specialization and breadth in complementary areas. Areas of specialization range from automatic controls, energy systems, fluid mechanics, heat transfer, and solid mechanics to biomechanical engineering, MEMS, and design.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Mechanical Engineering and related fields.

Graduate Programs in Mechanical Engineering Admission and Financial Assistance

To be eligible for admission to the department, a student must have a B.S. degree in engineering, physics, or a comparable science program. To apply for the Ph.D. degree, applicants must have already completed an M.S. degree. PhD admission is based upon not only the admissions application, but faculty sponsorship within the department, which must be arranged prior to admission. Applications for Ph.D. and HCP (Honors Co-op) programs are accepted each quarter. M.S. applications must be received by the first Tuesday in December, and admitted students must matriculate in Autumn. The department annually awards, on a competitive basis, a limited number of fellowships, teaching assistantships, and research assistantships to incoming graduate students. Research assistantships are used primarily for post-master's degree students and are awarded by individual faculty research supervisors, not by the department.

Mechanical engineering is a varied profession, ranging from primarily aesthetic aspects of design to highly technical scientific research. Disciplinary areas of interest to mechanical engineers include biomechanics, energy conversion, fluid mechanics, materials, nuclear reactor engineering, propulsion, rigid and elastic body mechanics, systems engineering, scientific computing, and thermodynamics, to name a few. No mechanical engineer is expected to have a mastery of the entire spectrum.

A master's degree program leading to the M.S. is offered in Mechanical Engineering, and a master's degree program leading to the M.S. is offered in Engineering with a choice of the following fields of study: Biomechanical Engineering, Product Design, and an individually designed major.

Post-Master's Degree Programs

The department offers two post-master's degrees: Engineer and Doctor of Philosophy. Post-master's research generally requires some evidence that a student has research potential before a faculty member agrees to supervision and a research assistantship appointment. It is most efficient to carry out

preliminary research during the M.S. degree program, if interested in a post-master's degree.

Departmental Groups

The department has five groups: Biomechanical Engineering; Design; Flow Physics and Computation; Mechanics and Computation; and Thermosciences. Each maintains its own labs, shops, and offices.

The Biomechanical Engineering (BME) Group has teaching and research activities which focus primarily on musculoskeletal biomechanics, neuromuscular biomechanics, cardiovascular biomechanics, and rehabilitation engineering. Research in other areas including hearing, ocean, plant, and vision biomechanics exists in collaboration with associated faculty in biology, engineering, and medicine. The group has strong research interactions with the Mechanics and Computation and the Design groups, and the departments of Neurology, Radiology, and Surgery in the School of Medicine.

The Design Group is devoted to the imaginative application of science, technology, and art to the conception, visualization, creation, analysis and realization of useful devices, products, and objects. Courses and research focus on topics such as kinematics, applied finite elements, microprocessors, medical devices, fatigue and fracture mechanics, dynamics and simulation, micro-electromechanical systems (MEMS), rehabilitation, optimization, high-speed devices, product design, vehicle dynamics, experimental mechanics, robotics, creativity, idea visualization, computer-aided design, manufacturing, design analysis, and engineering education.

The Flow Physics and Computational Engineering Group (FPCE) The Flow Physics and Computational Engineering Group (FPCE) blends research on flow physics and modeling with algorithm development, scientific computing, and numerical database construction. FPCE is contributing new theories, models and computational tools for accurate engineering design analysis and control of complex flows (including multi phase flows, micro-fluidics, chemical reactions, acoustics, plasmas, interactions with electromagnetic waves and other phenomena) in aerodynamics, propulsion and power systems, materials processing, electronics cooling, environmental engineering, and other areas. A significant emphasis of research is on modeling and analysis of physical phenomena in engineering systems.

The Mechanics and Computational Group covers biomechanics, continuum mechanics, dynamics, experimental and computational mechanics, finite element analysis, fluid dynamics, fracture mechanics, micromechanics, nanotechnology, and simulation based design. Qualified students can work as research project assistants, engaging in thesis research in association with the faculty director and fellow students. Projects include analysis, synthesis, and control of systems; biomechanics; flow dynamics of liquids and gases; fracture and micro-mechanics, vibrations, and nonlinear dynamics; and original theoretical, computational, and experimental investigations in the strength and deformability of elastic and inelastic elements of machines and structures.

The Thermosciences Group conducts experimental and analytical research on both fundamental and applied topics in the general area of thermal and fluid systems. Research strengths include high Reynolds number flows, microfluidics, combustion and reacting flows, multiphase flow and combustion, plasma sciences, gas physics and chemistry, laser diagnostics, microscale heat transfer, convective heat transfer, and energy systems. Research motivation comes from applications including air-breathing and space propulsion, bioanalytical systems, pollution control, electronics fabrication and cooling, stationary and mobile energy systems, biomedical systems, and materials processing. Emphasis is on fundamental experiments leading towards advances in modeling, optimization, and control of complex systems.

Facilities

The department groups maintain modern laboratories that support undergraduate and graduate instruction and graduate research work.

The Structures and Composites Laboratory, a joint activity with the Department of Aeronautics and Astronautics, studies structures made of fiber-reinforced composite materials. Equipment for fabricating structural elements includes autoclave, filament winder, and presses. X-ray, ultrasound, and an electron microscope are available for nondestructive testing. The lab also has environmental chambers, a high speed impactor, and mechanical testers. Lab projects include designing composite structures, developing novel manufacturing processes, and evaluating environmental effects on composites.

Experimental facilities are available through the interdepartmental Structures and Solid Mechanics Research Laboratory, which includes an electrohydraulic materials testing system, a vehicle crash simulator, and a shake table for earthquake engineering and related studies, together with highly sophisticated auxiliary instrumentation. Facilities to study the micromechanics of fracture areas are available in the Micromechanics/Fracture Laboratory, and include a computer-controlled materials testing system, a long distance microscope, an atomic force microscope, and other instrumentation. Additional facilities for evaluation of materials are available through the Center for Materials Research, Center for Integrated Circuits, and the Ginzton Laboratory. Laboratories for biological experimentation are accessible through the School of Medicine. Individual accommodation is available for the work of each research student.

Major experimental and computational laboratories engaged in bioengineering work are located in the Biomechanical Engineering Group. Other Biomechanical Engineering Group activities and resources are associated with the Rehabilitation Research and Development Center of the Veterans Administration Palo Alto Health Care System. This major national research center has computational and prototyping facilities. In addition, the Rehabilitation Research and Development Center houses the Electrophysiology Laboratory, Experimental Mechanics Laboratory, Human Motor Control Laboratory, Rehabilitation Device Design Laboratory, and Skeletal Biomechanics Laboratory. These facilities support graduate course work as well as Ph.D. student research activities.

Computational and experimental work is also conducted in various facilities throughout the School of Engineering and the School of Medicine, particularly the Advanced Biomaterials Testing Laboratory of the Department of Materials Science and Engineering, the Orthopaedic Research Laboratory in the Department of Functional Restoration, and the Vascular Research Laboratory in the Department of Surgery. In collaboration with the School of Medicine, facilities throughout the Stanford Medical Center and the Veterans Administration Palo Alto Health Care System conduct biological and clinical work.

The Design Group has facilities for lab work in experimental mechanics and experimental stress analysis. Additional facilities, including MTS electrohydraulic materials test systems, are available in the Solid Mechanics Research Laboratory. Design Group students also have access to Center for Integrated Systems (CIS) and Ginzton Lab microfabrication facilities.

The group also maintains the Product Realization Laboratory (PRL), a teaching facility offering students integrated experiences in market definition, product design, and prototype manufacturing. The PRL provides coaching, design manufacturing tools, and networking opportunities to students interested in product development. The ME 310 Design Project Laboratory has facilities for CAD, assembly, and testing of original designs by master's students in the engineering design program. A Smart Product Design Laboratory supports microprocessor application projects. The Center for Design Research (CDR) has an excellent facility for concurrent engineering research, development, and engineering curriculum creation and assessment. Resources include a network of high-performance workstations. For worldwide web mediated concurrent engineering by virtual, non-collocated, design development teams, see the CDR web

site at <http://cdr.stanford.edu>. In addition, CDR has several industrial robots for student projects and research. These and several NC machines are part of the CDR Manufacturing Sciences Lab. The Manufacturing Modeling Laboratory (MML) addresses various models and methods that lead to competitive manufacturing. MML links design for manufacturing (dfM) research at the Department of Mechanical Engineering with supply chain management activities at the Department of Management Science and Engineering. The Rapid Prototyping Laboratory consists of seven processing stations including cleaning, CNC milling, grit blasting, laser deposition, low temperature deposition, plasma deposition, and shot peening. Students gain experience by using ACIS and Pro Engineer on Hewlett Packard workstations for process software development. The Design Group also has a Product Design Loft in which students in the Joint Program in Design develop graduate thesis projects.

The Flow Physics and Computation Group has a 32 processor Origin 2000, 48-node and 85-node Linux cluster with high performance interconnection and an array of powerful workstations for graphics and data analysis. Several software packages are available, including all the major commercial CFD codes. FPC is strongly allied with the Center for Turbulence Research (CTR), a research consortium between Stanford and NASA, and the Center for Integrated Turbulence Simulations (CITS), which is supported by the Department of Energy (DOE) under its Accelerated Strategic Computing Initiative (ASCI). The Center for Turbulence Research has direct access to major national computing facilities located at the nearby NASA-Ames Research Center, including massively parallel super computers. The Center for Integrated Turbulence Simulations has access to DOE's vast supercomputer resources. The intellectual atmosphere of the Flow Physics and Computation Group is greatly enhanced by the interactions among CTR's and CITS's postdoctoral researchers and distinguished visiting scientists.

The Mechanics and Computation Group has a Computational Mechanics Laboratory that provides an integrated computational environment for research and research-related education in computational mechanics and scientific computing. The laboratory houses Silicon Graphics, Sun, and HP workstations and servers, including an 8-processor SGI Origin2000 and a 16-processor networked cluster of Intel-architecture workstations for parallel and distributed computing solutions of computationally intensive problems. Software is available on the laboratory machines, including commercial packages for engineering analysis, parametric geometry and meshing, and computational mathematics. The laboratory supports basic research in computational mechanics as well as the development of related applications such as simulation-based design technology.

The Thermosciences Group has four major laboratory facilities. The Heat Transfer and Turbulence Mechanics Laboratory concentrates on fundamental research aimed at understanding and improved prediction of turbulent flows and high performance energy conversion systems. The laboratory includes two general-purpose wind tunnels, a pressurized high Reynolds number tunnel, two supersonic cascade flow facilities, three specialized boundary layer wind tunnels, and several other flow facilities. Extensive diagnostic equipment is available, including multiple particle-image velocimetry and laser-Doppler anemometry systems.

The High Temperature Gas Dynamics Laboratory includes research on sensors, plasma sciences, cool and biomass combustion and gas pollutant formation, and reactive and non-reactive gas dynamics. Research facilities include diagnostic devices for combustion gases, a spray combustion facility, laboratory combustors including a coal combustion facility and supersonic combustion facilities, several advanced laser systems, a variety of plasma facilities, a pulsed detonation facility, and four shock tubes and tunnels. The Thermosciences Group and the Design Group share the Microscale Thermal and Mechanical Characterization laboratory (MTMC). MTMC is dedicated to the measurement of thermal and mechanical properties in thin-film systems, including microfabricated sensors and actuators and integrated circuits, and features a nanosecond scanning laser thermometry facility, a laser interferometer, a near-field optical microscope, and an atomic force microscope. The activities at MTMC are closely

linked to those at the Heat Transfer Teaching Laboratory (HTTL), where undergraduate and master's students use high-resolution probe stations to study thermal phenomena in integrated circuits and thermally-actuated microvalves. HTTL also provides macroscopic experiments in convection and radiative exchange.

The Energy Systems Laboratory is a teaching and research facility dedicated to the study of energy conversion systems. The lab includes three dynamometers for engine testing, a computer-controlled variable engine valve controller, a fuel-cell experimental station, a small rocket testing facility, and a small jet engine thrust stand.

The Guidance and Control Laboratory, a joint activity of the Department of Aeronautics and Astronautics and the Department of Mechanical Engineering, specializes in construction of electromechanical systems and instrumentation, particularly where high precision is a factor. Work ranges from robotics for manufacturing to feedback control of fuel injection systems for automotive emission control. The faculty and staff work in close cooperation with both the Design and Thermosciences Groups on device development projects of mutual interest.

Many computation facilities are available to department students. Three of the department's labs are equipped with super-minicomputers. Numerous smaller minicomputers and microcomputers are used in the research and teaching laboratories.

Library facilities at Stanford beyond the general library include Engineering, Mathematics, and Physics department libraries.

Bachelor of Science in Mechanical Engineering

Undergraduates seeking to major in Mechanical Engineering should see the curriculum outlined in the "Undergraduate Degree in Mechanical Engineering" section of this bulletin. The University's basic requirements for the bachelor's degree are discussed in the "Undergraduate Degrees" section of this bulletin. Courses taken for the departmental major (mathematics; science; science, technology, and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if the instructor offers the option.

A Product Design program offered by the Design Group leads to the B.S. in Engineering (Product Design). A major in Biomechanical Engineering offered by the Biomechanical Engineering Group leads to the B.S. in Engineering (Biomechanical Engineering); this may be appropriate for students preparing for medical school or graduate bioengineering studies.

Grade Requirements

To be recommended by the department for a B.S. in Mechanical Engineering, a student must achieve the minimum grade point average (GPA) set by the School of Engineering (2.0 in engineering fundamentals and mechanical engineering depth).

Students interested in the minor should see the "Minor in Mechanical Engineering" section of this bulletin.

Mechanical Engineering (ME)

Completion of the undergraduate program in Mechanical Engineering leads to the conferral of the Bachelor of Science in Mechanical Engineering.

Mission of the Undergraduate Program in Mechanical Engineering

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of intellectual and practical

experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide array of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro-mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or another field where a broad engineering background is useful.

Requirements

Mathematics

24 units minimum; see Basic Requirement 1 ¹	
CME 102/ENGR 155A	Ordinary Differential Equations for Engineers 5
or MATH 53	Ordinary Differential Equations with Linear Algebra
Select one of the following: 3-5	
CME 106/ENGR 155C	Introduction to Probability and Statistics for Engineers
STATS 110	Statistical Methods in Engineering and the Physical Sciences
STATS 116	Theory of Probability
Plus additional courses to total min. 24 16	

Science

20 units minimum; see Basic Requirement 2 ¹	
CHEM 31X	Chemical Principles Accelerated 5
or ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology
Plus additional required courses ¹ 15	

Technology in Society

One course from approved SoE list; see Basic Requirement 4 3-5	
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Engineering Fundamentals

Three courses minimum; see Basic Requirement 3 ²	
ENGR 40	Introductory Electronics 5
ENGR 70A	Programming Methodology (same as CS 106A) 5
Fundamentals Elective ² 3-5	

Engineering Depth

Minimum of 68 Engineering Science and Design ABET units; see Basic Requirement 5	
ENGR 14	Intro to Solid Mechanics 4
ENGR 15	Dynamics 4
ENGR 30	Engineering Thermodynamics 3
ME 70	Introductory Fluids Engineering 4
ME 80	Mechanics of Materials 4
ME 101	Visual Thinking 4
ME 103D	Engineering Drawing and Design ³ 1
ME 112	Mechanical Systems Design ⁴ 4
ME 113	Mechanical Engineering Design 4
ME 131A	Heat Transfer 3-5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery 4
ME 140	Advanced Thermal Systems ⁴ 5
ME 161	Dynamic Systems, Vibrations and Control 4
ME 203	Design and Manufacturing ³ 4

- Math and science must total 45 units.
 - Math: 24 units required and must include a course in differential equations (CME 102 Ordinary Differential Equations for Engineers or MATH 53 Ordinary Differential Equations with Linear Algebra; one of these required) and calculus-based Statistics (CME 106 Introduction to Probability and Statistics for Engineers or STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 116 is required).
 - Science: 20 units minimum and requires courses in calculus-based Physics and Chemistry, with at least a full year (3 courses) in one or the other. CHEM 31A Chemical Principles I/CHEM 31B Chemical Principles II are considered one course because they cover the same material as CHEM 31X Chemical Principles Accelerated but at a slower pace. CHEM 31X Chemical Principles Accelerated or ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology are recommended.
- ME Fundamental elective may not be a course counted for other requirements. Students may opt to use ENGR 14 Intro to Solid Mechanics, ENGR 15 Dynamics, or ENGR 30 Engineering Thermodynamics from the required depth courses as the third fundamental class. However, total units for Engineering Topics (Fundamentals + Depth) must be a minimum of 68 units; additional options courses may be required to meet unit requirements. ENGR 70A (CS 106A) must be taken for 5 units.
- Courses ME 103D and ME 203 must be taken concurrently.
- ME 112, ME 131A and ME 140 together fulfill the WIM requirement.

Options to complete the ME depth sequence: see the list of options in the ME major section of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

Honors Program

The Department of Mechanical Engineering offers a program leading to a B.S. in Mechanical Engineering with honors. This program offers a unique opportunity for qualified undergraduate engineering majors to conduct independent study and research at an advanced level with a faculty mentor.

Mechanical Engineering majors who have a grade point average (GPA) of 3.5 or higher in the major may apply for the honors program. Students who meet the eligibility requirement and wish to be considered for the honors program must submit a written application to the Mechanical Engineering student services office no later than the second week of Autumn Quarter in the senior year. The application to enter the program can be obtained from the ME student services office, and must contain a one-page statement describing the research topic and include an unofficial Stanford transcript. In addition, the application must be approved by a Mechanical Engineering faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

In order to receive departmental honors, students admitted to the program must:

- maintain the 3.5 GPA required for admission to the honors program.
- submit a completed thesis draft to the adviser by April 25. Further revisions and final endorsement by the adviser are to be finished by May 15, when two bound copies are to be submitted to the Mechanical Engineering student services office.
- present the thesis at the Mechanical Engineering Poster Session held in mid-April.

Mechanical Engineering (ME) Minor

The following courses fulfill the minor requirements:

Units

General Minor*

ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ENGR 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 101	Visual Thinking	4
Plus two of the following:		8-9
ME 80	Mechanics of Materials	
ME 131A	Heat Transfer	
ME 161	Dynamic Systems, Vibrations and Control	
ME 203	Design and Manufacturing	

Thermosciences Minor**

ENGR 14	Intro to Solid Mechanics	4
ENGR 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer	5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems	5

Mechanical Design Minor***

ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking	4
ME 112	Mechanical Systems Design	4
ME 203	Design and Manufacturing	4
Plus one of the following:		3-4
ME 113	Mechanical Engineering Design	
ME 210	Introduction to Mechatronics	
ME 220	Introduction to Sensors	

Total Units 79-81

* This minor aims to expose students to the breadth of ME in terms of topics and analytic and design activities. Prerequisites: MATH 41 Calculus, MATH 42 Calculus, and PHYSICS 41 Mechanics.

** Prerequisites: MATH 41 Calculus, MATH 42 Calculus, MATH 51 Linear Algebra and Differential Calculus of Several Variables (or CME 100 Vector Calculus for Engineers) and PHYSICS 41 Mechanics.

*** This minor aims to expose students to design activities supported by analysis. Prerequisites: MATH 41 Calculus, PHYSICS 42 Classical Mechanics Laboratory, and PHYSICS 41 Mechanics.

Coterminal B.S./M.S. Program in Mechanical Engineering

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminal program must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit their application no later than the quarter prior to the expected completion of their undergraduate degree. This is normally Winter Quarter (late January) prior to Spring Quarter graduation. The application must provide evidence of potential for strong academic performance as a graduate student. The Mechanical Engineering department graduate admissions committee makes decisions on each application. Typically, a GPA of at least 3.5 in engineering, science, and math is expected. Applicants must have completed two of ME 80 Mechanics of Materials, ME 112 Mechanical Systems Design, ME 131A Heat Transfer, and ME 131B Fluid Mechanics: Compressible Flow and Turbomachinery, and must take the Graduate Record Examination (GRE) before action is taken on the application.

Coterminal information, applications deadlines, and forms can be obtained from the ME Student Services Office.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Master of Science in Mechanical Engineering

The basic University requirements for the M.S. degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

The master's program consists of 45 units of course work taken at Stanford. No thesis is required, although many students become involved in research projects during the master's program, particularly to explore their interests in working towards a Ph.D. degree. Students whose undergraduate backgrounds are entirely devoid of some of the major subject disciplines of engineering (for example, applied mechanics, applied thermodynamics, fluid mechanics, ordinary differential equations) may need to take some undergraduate courses to fill obvious gaps and prepare themselves to take graduate courses in these areas. Such students may require more than three quarters to fulfill the master's degree requirements, as the makeup courses may only be used as unrestricted electives (see item 4 below) in the M.S. degree program. However, it is not the policy to require fulfillment of mechanical engineering B.S. degree requirements to obtain an M.S. degree.

Mechanical Engineering

The master's degree program requires 45 units of course work taken as a graduate student at Stanford. No thesis is required. However, students who want some research experience during the master's program may participate in research through ME 391 Engineering Problems and ME 392 Experimental Investigation of Engineering Problems.

Students are encouraged to refer to the most recent *Mechanical Engineering Graduate Student Handbook* provided by the student services office. The department's requirements for the M.S. in Mechanical Engineering are as follows:

1. *Mathematical Fundamentals*: two mathematics courses for a total of at least 6 units from the following list are required: ME 300A, 300B, 300C, 408; CME 302; EE 261, 263; ENGR 155C/CME106. Only MATH courses with catalog numbers greater than 100 and CME courses with catalog numbers greater than 200 will count towards the math requirement. However, courses must cover two different areas out of the following choices: partial differential equations, linear algebra, numerical analysis and statistics. This excludes programming classes such as CS 106; CME 211, 212, 213, 214, 292. Those classes can counted towards the Approved Electives category. Courses taken for the math requirement must be taken for a letter grade.
2. *Depth in Mechanical Engineering*: a set of graduate-level courses in Mechanical Engineering to provide depth in one area. The faculty have approved these sets as providing depth in specific areas as well as a significant component of applications of the material in the context of engineering synthesis. These sets are outlined in the *Mechanical Engineering Graduate Student Handbook*. Depth courses must be taken for a letter grade.
3. *Breadth in Mechanical Engineering*: two additional graduate level courses (outside the depth) from the depth/breadth charts listed in the *Mechanical Engineering Graduate Student Handbook*. Breadth courses must be taken for a letter grade.
4. *Sufficient Mechanical Engineering Course Work*: students must take a minimum of 24 units of course work in mechanical engineering topics. For the purposes of determining mechanical engineering topics, any course on approved lists for the mathematics, depth, and breadth requirements counts towards these units. In addition, any graduate-

level course with an ME course number is considered a mechanical engineering topic.

5. *Approved Electives* (to bring the total number of units to at least 39): electives must be approved by an adviser. Graduate engineering, mathematics, and science courses are normally approved. Approved electives must be taken for a letter grade. No more than 6 of the 39 units may come from ME 391/392 (or other independent study/research courses), and no more than 3 may come from seminars. Students planning a Ph.D. should discuss with their advisers the option of taking 391 or 392 during the master's program. ME 391/392 (and other independent study courses) may only be taken on a credit/no credit basis.
6. *Unrestricted electives* (to bring the total number of units submitted for the M.S. degree to 45): students are encouraged to take these units outside engineering, mathematics, or the sciences. Students should consult their advisers on course loads and on ways to use the unrestricted electives to make a manageable program. Unrestricted electives may be taken CR/NC.
7. Within the courses satisfying the requirements above, there must be at least one graduate-level course with a laboratory component. Courses which satisfy this requirement are:

		Units
ENGR 206	Control System Design	3-4
ENGR 341	Micro/Nano Systems Design and Fabrication	3-5
ME 203	Design and Manufacturing	4
ME 210	Introduction to Mechatronics	4
ME 220	Introduction to Sensors	3-4
ME 218A	Smart Product Design Fundamentals	4-5
ME 218B	Smart Product Design Applications	4-5
ME 218C	Smart Product Design Practice	4-5
ME 218D	Smart Product Design: Projects	3-4
ME 250	Internal Combustion Engines	3-5
ME 310A	Product-Based Engineering Design, Innovation, and Development	4
ME 310B	Product-Based Engineering Design, Innovation, and Development	4
ME 310C	Project-Based Engineering Design, Innovation, and Development	4
ME 317A	Design Methods: Product Definition	4
ME 317B	Design Methods: Quality By Design	4
ME 318	Computer-Aided Product Creation	4
ME 323	Modeling and Identification of Mechanical Systems for Control	3
ME 324	Precision Engineering	4
ME 348	Experimental Stress Analysis	3
ME 354	Experimental Methods in Fluid Mechanics	4
ME 367	Optical Diagnostics and Spectroscopy Laboratory	4
ME 382A		4
ME 382B		4
ME 385	Tissue Engineering Lab	1-2
ME 391/392	Engineering Problems	1-10
Or other independent study courses may satisfy this requirement if 3 units are taken for work involving laboratory experiments		

Candidates for the M.S. in Mechanical Engineering are expected to have the approval of the faculty; they must maintain a minimum grade point average (GPA) of 3.0 in the 45 units presented for fulfillment of degree requirements (exclusive of independent study courses). All courses used to fulfill mathematics, depth, breadth, approved electives, and lab studies must be taken for a letter grade (excluding seminars, independent study, and courses for which a letter grade is not an option for any student).

Students falling below a GPA of 2.5 at the end of 20 units may be disqualified from further registration. Students failing to meet the complete degree requirements at the end of 60 units of graduate registration are disqualified from further registration. Courses used to fulfill deficiencies arising from inadequate undergraduate preparation for mechanical engineering graduate work may not be applied to the 45 units required for completion of the MS degree.

Engineering

As described in the "School of Engineering" section of this bulletin, each department in the school may sponsor students in a more general degree, the M.S. in Engineering. Sponsorship by the Department of Mechanical Engineering (ME) requires (1) filing a petition for admission to the program by no later than the day before instruction begins, and (2) that the center of gravity of the proposed program lies in ME. No more than 18 units used for the proposed program may have been previously completed. The program must include at least 9 units of graduate-level work in the department other than ME 300A,B,C, seminars, and independent study. The petition must be accompanied by a statement explaining the program objectives and how it is coherent, contains depth, and fulfills a well-defined career objective. The grade requirements are the same as for the M.S. in Mechanical Engineering.

Master of Science in Engineering, Biomechanical Engineering

The Master of Science in Engineering: Biomechanical Engineering (MSE:BME) promotes the integration of engineering mechanics and design with the life sciences. Applicants are expected to have an additional exposure to biology and/or bioengineering in their undergraduate studies. Students planning for subsequent medical school studies are advised to contact Stanford's Premedical Advising Office in Sweet Hall.

Students wishing to pursue this program must complete the Graduate Program Authorization form and get approval from the Student Services Office. This form serves to officially add the field to the student's record. This form must be filled out electronically on Axxess.

Degree Requirements

1. Mathematical competence (minimum 6 units) in two of the following areas: partial differential equations, linear algebra, complex variables, or numerical analysis, as demonstrated by completion of two appropriate courses from the following list: ME300A,B,C; MATH106, 109, 113, 131M/P, 132; STATS110, or ENGR155C; CME108, 302. Students who have completed comparable graduate-level courses as an undergraduate, and who can demonstrate their competence to the satisfaction of the instructors of the Stanford courses, may be waived via petition from this requirement by their adviser and the Student Services Office. The approved equivalent courses should be placed in the approved electives category of the program proposal.
2. Graduate Level Engineering Courses (minimum 21 units), consisting of:
 - a. Biomechanical engineering restricted electives (9 units) to be chosen from:

		Units
ME 239	Mechanics of the Cell	3
ME 280	Skeletal Development and Evolution	3
ME 281	Biomechanics of Movement	3
ME 287	Mechanics of Biological Tissues	3
ME 337	Mechanics of Growth	3
ME 381	Orthopaedic Bioengineering	3-4
ME 382A		4
ME 385	Tissue Engineering Lab	1-2
ME 387	Soft Tissue Mechanics	3

- b. Specialty in engineering (9-12 units): A set of three or four graduate level courses in engineering mechanics, materials, controls, or design (excluding bioengineering courses) selected to provide depth in one area. Such sets are approved by the Mechanical Engineering Faculty. Comparable specialty sets composed of graduate engineering courses outside the Mechanical Engineering Department can be used with the approval of the student's adviser. Examples can be obtained from the Biomechanical Engineering Group Office (Durand 223).
 - c. Graduate engineering electives (to bring the total number of graduate level engineering units to at least 21). These electives must contribute to a cohesive degree program, and be approved by the student's adviser. No units may come from bioengineering courses, mathematics courses, or seminars.
3. Life science approved electives (minimum 6 units): Undergraduate or graduate biological/medical science/chemistry courses which contribute to a cohesive program.
 4. Biomechanical engineering seminar ME 389 Biomechanical Research Symposium.
 5. General approved electives (to bring the total number of units to 39): These courses must be approved by the student's adviser. Graduate level engineering, math, and physical science courses and upper division undergraduate or graduate life science courses are normally approved.
 6. Unrestricted electives (to bring the total number of units to 45): Students without undergraduate biology are encouraged to use some of these unrestricted units to strengthen their biology background. Students should consult their adviser for recommendations on course loads and on ways to use the unrestricted electives to create a manageable program.

All courses except unrestricted electives must be taken for a letter grade unless letter grades are not an option. A minimum cumulative GPA of 3.0 is required for degree conferral.

Master of Science in Engineering, Product Design

The Masters Program in Design focuses on the synthesis of technology with human needs and market viability (both profit and non-profit models) to create innovative products, services and experiences. This program is offered jointly by the departments of Mechanical Engineering and Art and Art History. It provides a design thinking education that seeks to create design leaders who can transform organizations into cultures of creativity and innovation. Students entering the program from the engineering side will earn a Master of Science in Engineering degree with a concentration in Design (MSE-Design); those from the Art side earn a Master of Fine Arts and Design (MFA-Design). Students complete the core product design courses in their first year of graduate study at Stanford before undertaking the master's project in their second year..

Degree Requirements

Students must complete the following courses. Students making unsatisfactory degree progress by the end of the first year, at the faculty's discretion, may not advance to the second year (Masters Project Year). A minimum cumulative GPA of 3.0 and 60 units are required for degree conferral.

		Units
ME 203	Design and Manufacturing	4
ME 277	Graduate Design Research Techniques	3-4
ME 312	Advanced Product Design: Formgiving	3
ME 313	Human Values and Innovation in Design	3

ME 316A/316B/316C	Product Design Master's Project *	2-6
ARTSTUDI 350A/350B	Art & Design I: History and Theory **	3
Approved Electives - including at least one d.School class ***		28

* ME 316A Product Design Master's Project and B/C are taken sequentially for three quarters during the second year. ME316B & C are listed on the d.School website as Design Garage: A Deep Dive in Design Thinking. Students in the Masters of Science program just take this sequence for 4-6 units per quarter.

** ARTSTUDI 350A Art & Design I: History and Theory & B are taken sequentially for two quarters during the first year, starting in the fall quarter.

*** Students may choose classes (at the 200 level or higher) from any of the schools at the University to fulfill their elective requirement. However, electives that are not already pre-approved must be approved by the student's adviser via petition prior to enrollment. Electives should be chosen to fulfill career objectives; students may focus their energy in engineering, entrepreneurship and business, psychology, or other areas relevant to design. Taking a coherent sequence of electives focused on a subject area is recommended. For example, the patent, negotiation, and licensing classes (ME 208 Patent Law and Strategy for Innovators and Entrepreneurs, ME 265 Technology Licencing and Commercialization) constitute a sequence most relevant to potential inventors. Students interested in social entrepreneurship should apply to the d.school course ME 206A Entrepreneurial Design for Extreme Affordability,B, Extreme Affordability.

Note: All required and approved electives must be taken for a letter grade unless prior approval is granted to take a class CR/NC.

Pre-approved electives list

The following courses are pre-approved for fulfilling the elective requirement for the Masters Degree in Engineering - Design. Electives not on this list must be approved via petition prior to enrollment. Electives must be taken for a letter grade unless prior approval is obtained.

		Units
ME 208	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
ME 212	Calibrating the Instrument	1
ME 265	Technology Licencing and Commercialization	3
ME 238	Patent Prosecution	2
ME 297	Forecasting for Innovators:Technology, Tools & Social Change	3
ME 304	The Designer's Voice	1
ME 315	The Designer in Society	3
MSE 273	Technology Venture Formation	3-4
STRAMGT 353	Entrepreneurship: Formation of New Ventures	4
STRAMGT 356/366	The Startup Garage: Design	4

Additional requirements

As part of their Masters Degree program, and in addition to Design Garage (ME316B/C), students are required to take at least one course offered by the Hasso Plattner Institute of Design (the d.School). All d.School courses require applications submitted the quarter prior to the start of class. All d.School classes (with the exception of 'pop-ups') count as pre-approved electives. Suggest classes are found below.

		Units
ME 206A/206B	Entrepreneurial Design for Extreme Affordability ¹	4
ENGR 231	Transformative Design	3-5

ENGR 280	From Play to Innovation	2-4
ENGR 281	d.media 4.0 - Designing Media that Matters	2-3
ME 301	LaunchPad:Design and Launch your Product or Service	4

- ¹ Students who opt to take ME 206A Entrepreneurial Design for Extreme Affordability & ME 206B Entrepreneurial Design for Extreme Affordability as one of their pre-approved electives should take the sequence during the first year. This shifts ME 312 Advanced Product Design: Formgiving from first year to second year (Winter).

Engineer in Mechanical Engineering

The basic University requirements for the degree of Engineer are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

This degree requires an additional year of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone.

Admission standards are substantially the same as indicated under the master's degree. However, since thesis supervision is required and the availability of thesis supervisors is limited, admission is not granted until the student has personally engaged a faculty member to supervise a research project. This most often involves a paid research assistantship awarded by individual faculty members (usually from the funds of sponsored research projects under their direction). Thus, individual arrangement between student and faculty is necessary. Students studying for the M.S. degree at Stanford who wish to continue to the Engineer degree ordinarily make such arrangements during the M.S. degree program. Students holding master's degrees from other universities are invited to apply and may be admitted providing they are sufficiently well qualified and have made thesis supervision and financial aid arrangements.

Department requirements for the degree include a thesis; up to 18 units of credit are allowed for thesis work (ME 400 Thesis). In addition to the thesis, 27 units of approved advanced course work in mathematics, science, and engineering are expected beyond the requirements for the M.S. degree; the choice of courses is subject to approval of the adviser. Students who have not fulfilled the Stanford M.S. degree requirements are required to do so, with allowance for approximate equivalence of courses taken elsewhere; up to 45 units may be transferable. A total of 90 units is required for degree conferral.

Candidates for the degree must have faculty approval and have a minimum grade point average (GPA) of 3.0 for all courses (exclusive of thesis credit and other independent study courses) taken beyond those required for the master's degree.

Doctor of Philosophy in Mechanical Engineering

The basic University requirements for the Ph.D. degree are discussed in the "Graduate Degree" section of this bulletin. The Ph.D. degree is intended primarily for students who desire a career in research, advanced development, or teaching; for this type of work, a broad background in mathematics and the engineering sciences, together with intensive study and research experience in a specialized area, are the necessary requisites.

Ph.D. students must have a master's degree from another institution, or must fulfill the requirements for the Stanford M.S. degree in Mechanical Engineering or another discipline.

In special situations dictated by compelling academic reasons, Academic Council members who are not members of the department's faculty may

serve as the principal dissertation adviser when approved by the department. In such cases, a member of the department faculty must serve as program adviser and as a member of the reading committee, and agree to accept responsibility that department procedures are followed and standards maintained.

Admission involves much the same consideration described under the Engineer degree. Since thesis supervision is required, admission is not granted until the student has personally engaged a member of the faculty to supervise a research project. Once a student has obtained a research supervisor, this supervisor becomes thereafter the student's academic adviser. Research supervisors may require that the student pass the departmental qualifying examination before starting research and before receiving a paid research assistantship. Note that research assistantships are awarded by faculty research supervisors and not by the department.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of engineering fundamentals by passing a qualifying examination. The academic level and subject matter of the examination correspond approximately to the M.S. program described above. Typically, the exam is taken shortly after the student completes the M.S. degree requirements. The student is required to have a minimum graduate Stanford GPA of 3.5 to be eligible for the exam (grades from independent study courses are not included in the GPA calculation). Once the student's faculty sponsor has agreed that the exam should be scheduled, the student must submit an application folder containing several items including a curriculum vitae, research project abstract, and preliminary dissertation proposal. Information, examination dates, and deadlines may be obtained from the department's student services office.

Ph.D. candidates must complete a minimum of 27 units (taken for a letter grade) of approved formal course work (excluding research, directed study, and seminars) in advanced study beyond the M.S. degree. The courses should consist primarily of graduate courses in engineering and sciences, although the candidate's adviser may approve a limited number of upper-level undergraduate courses and courses outside of engineering and sciences, as long as such courses contribute to a strong and coherent program. In addition to this 27-unit requirement, all Ph.D. candidates must participate each quarter in one of the following (or equivalent) seminars:

		Units
ME 389	Biomechanical Research Symposium	1
ME 390	Thermosciences Research Project Seminar	1
ME 395	Seminar in Solid Mechanics	1
ME 396	Design and Manufacturing Forum	1
ME 397	Design Theory and Methodology Seminar	1-3
AA 297	Seminar in Guidance, Navigation, and Control	1
ENGR 298	Seminar in Fluid Mechanics	1
ENGR 311A/311B	Women's Perspectives	1

The department has a breadth requirement for the Ph.D. degree. This may be satisfied either by a formal minor in another department (generally 20 units) or by at least 9 units of course work (outside of the primary research topic) which are approved by the principal dissertation adviser. If a minor is taken, 9 units from the minor requirements can be counted towards the depth requirement.

The Ph.D. thesis normally represents at least one full year of research work and must be a substantial contribution to the field. Students may register for course credit for thesis work (ME 500) to help fulfill University academic unit requirements, but there is no minimum limit on registered dissertation units, as long as students are registered in at least 8 units (10 is recommended) per quarter prior to TGR. Candidates should note that only completed course units are counted toward the requirement, so ungraded courses or courses with an "N" grade must be cleared before going TGR. Questions should be directed to the department student services office.

The final University oral examination (dissertation defense) is conducted by a committee consisting of a chair from another department and four faculty members of the department or departments with related interests. Usually, the committee includes the candidate's adviser, reading committee members, plus two more faculty. The examination consists of two parts. The first is open to the public and is scheduled as a seminar talk, usually for one of the regular meetings of a seminar series. The second is conducted in private and covers subjects closely related to the dissertation topic.

Ph.D. Minor in Mechanical Engineering

Students who wish a Ph.D. minor in ME should consult with the ME student services office. A minor in ME may be obtained by completing 20 units of approved graduate-level ME courses. Courses approved for the minor must form a coherent program and must be chosen from those satisfying requirement 2 for the M.S. in Mechanical Engineering.

See the *Mechanical Engineering Graduate Student Handbook* produced by the Mechanical Engineering student services office for more information.

Mechanical Engineering Course Catalog Numbering System

The department uses the following course numbering system:

Number	Level
010-099	Freshman and Sophomore
100-199	Junior and Senior
200-299	Advanced Undergraduate and Beginning Graduate
300-399	Graduate
400-499	Advanced Graduate
500	Ph.D. Thesis

Emeriti: (Professors) James L. Adams, Peter Bradshaw*, Daniel B. DeBra, Robert H. Eustis, Thomas J. R. Hughes, James P. Johnston, Thomas R. Kane, William M. Kays, Joseph B. Keller, Charles H. Kruger, Robert H. McKim, Robert J. Moffat*, M. Godfrey Mungal*, J. David Powell, Charles R. Steele,* Douglass J. Wilde;* (*Professors, Research*) Richard M. Christensen, Sidney A. Self, Kenneth J. Waldron, Felix E. Zajac

Chair: Kenneth E. Goodson

Group Chairs: Mark R. Cutkosky (Design), Scott L. Delp (Biomechanical Engineering), Parviz Moin (Flow Physics and Computational Engineering), Peter M. Pinsky (Mechanics and Computation), Mark A. Cappelli (Thermosciences)

Professors: Thomas P. Andriacchi, David M. Barnett, Craig T. Bowman, Brian J. Cantwell, Mark A. Cappelli, Dennis R. Carter, Mark R. Cutkosky, Scott L. Delp, John K. Eaton, Christopher F. Edwards, Charbel Farhat, Kenneth E. Goodson, Ronald K. Hanson, David M. Kelley, Thomas W. Kenny, Larry J. Leifer, Sanjiva K. Lele, Arun Majumdar, Reginald E. Mitchell, Parviz Moin, Drew V. Nelson, Peter M. Pinsky, Friedrich B. Prinz, Bernard Roth, Juan G. Santiago, Eric S. G. Shaqfeh, Sheri D. Sheppard, Hai Wang

Associate Professors: Wei Cai, Eric F. Darve, J. Christian Gerdes, Gianluca Iaccarino, Ellen Kuhl, Marc E. Levenston, Adrian J. Lew, Allison M. Okamura, Beth L. Pruitt

Assistant Professors: Ovijit Chaudhuri, W. Matthias Ihme, David Lentink, Ali Mani, Sindy K.-Y. Tang, Xiaolin Zheng

Professor (Teaching): David W. Beach

Associate Professor (Teaching): Shilajeet S. Banerjee

Courtesy Professors: Fu-Kuo Chang, Reinhold Dauskardt, Oussama Khatib, Paul Yock

Courtesy Associate Professor: Margot G. Gerritsen, Nicholas Giori

Courtesy Professor (Research): J. Kenneth Salisbury

Courtesy Professor (Teaching): Shelley V. Goldman

Senior Lecturers: Vadim Khayms, J. Craig Milroy

Consulting Professors: Gary S. Beaupré, J. Edward Carryer, David M. Golden, Barry M. Katz, Paul Mitiguy, Johannes Schoonman, Edith Wilson

Consulting Associate Professors: Mehdi Asheghi, Rainer J. Fasching, John A. Howard, Gary O'Brien, R. Matthew Ohline, Sunil Puria, Paul L. Saffo III, Lester K. Su, Marc F. Theeuwes

Consulting Assistant Professors: Michael R. Barry, William R. Burnett, Jonathan Edelman

* Recalled to active duty.

Cognate Courses

		Units
CS 106A	Programming Methodology	3-5
CS 223A	Introduction to Robotics	3
ENGR 14	Intro to Solid Mechanics	4
ENGR 15	Dynamics	4
ENGR 30	Engineering Thermodynamics	3
ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology	4
ENGR 40	Introductory Electronics	5
ENGR 70A	Programming Methodology	3-5
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
ENGR 240	Introduction to Micro and Nano Electromechanical Systems	3
ENGR 341	Micro/Nano Systems Design and Fabrication	3-5

Overseas Studies Courses in Mechanical Engineering

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPFLOR 17	The Evolution of Modern Italian Design	5

School of Humanities and Sciences

The largest of Stanford's seven schools, the School of Humanities and Sciences is the center of the University's liberal arts education. Through exposure to the humanities and arts, undergraduate and graduate students consider the ethical, aesthetic, and intellectual dimensions of the human experience, past and present, and are thereby prepared to make thoughtful and imaginative contributions to the culture of the future. Through the study of social, political, and economic events, they acquire theories and techniques for the analysis of specific societal issues, as well as general cross-cultural perspectives on the human condition. And through exposure to the methods and discoveries of mathematics and the sciences, they become well-informed participants and leaders in today's increasingly technological societies.

The School of Humanities and Sciences is comprised of academic departments, which are organized into three clusters, each with its own distinct character.

- Humanities and Arts
 - Art and Art History
 - Classics
 - Division of Literatures, Cultures, and Languages
 - Comparative Literature
 - French and Italian
 - German Studies
 - Iberian and Latin American Cultures
 - Slavic Languages and Literatures
 - East Asian Languages and Cultures
 - English
 - History
 - Linguistics
 - Music
 - Philosophy
 - Religious Studies
 - Theater and Performance Studies
- Social Sciences
 - Anthropology
 - Communication
 - Economics
 - Political Science
 - Psychology
 - Sociology
- Natural Sciences
 - Applied Physics
 - Biology (including Hopkins Marine Station)
 - Chemistry
 - Mathematics
 - Physics
 - Statistics

The school also includes interdisciplinary degree programs that bridge traditionally disparate fields in the humanities and sciences: African and African American Studies; African Studies; American Studies; Archaeology; Biophysics; Comparative Studies in Race and Ethnicity; East Asian Studies; Ethics in Society; Feminist, Gender, and Sexuality Studies; Human Biology; International Policy Studies; International Relations; Latin American Studies; Mathematical and Computational Science;

Modern Thought and Literature; Public Policy; Russian, East European and Eurasian Studies; Science, Technology, and Society; Symbolic Systems; and Urban Studies.

In addition, the school has diverse programs and research centers that do not currently grant degrees such as the Bill Lane Center for the American West; the Center for Computer Research in Music and Acoustics; the Center for Molecular Analysis; the Confucius Institute; the Center for Medieval and Early Modern Studies; the Michelle R. Clayman Center for Gender Research; the Jasper Ridge Biological Preserve; the Institute for Research in the Social Sciences; and Stanford Global Studies. For more information about the School of Humanities and Sciences and a complete listing of research centers and programs, see the School's web site (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/%20http://humsci.stanford.edu/about>).

Prospective applicants and candidates for the degree of Bachelor of Arts, Bachelor of Science, Bachelor of Arts and Sciences, Master of Arts, Master of Fine Arts, Master of Public Policy, Master of Science, Doctor of Musical Arts, or Doctor of Philosophy should consult the relevant department or program for detailed information about application procedures and degree requirements.

Faculty

Dean: Richard P. Saller

Senior Associate Deans: Ralph L. Cohen, Ellen M. Markman, Debra M. Satz

Senior Associate Dean for Finance and Administration: Adam R. Daniel

Associate Dean for Faculty Affairs: Tina Kass

Associate Dean for Graduate and Undergraduate Studies: Susan J. Weersing

Assistant Dean for Diversity Programs, Data and Technology: Ayodele Thomas

Assistant Dean for Curricular and Academic Support: Beth McKeown

Graduate Diversity Recruitment Officer: Joseph L. Brown

Department Chairs: Lanier Anderson (Philosophy), B. Douglas Bernheim (Economics), Jennifer DeVere Brody (Theater and Performance Studies), Ronald Egan (East Asian Languages and Cultures), Paula Findlen (History), Judith L. Goldstein (Political Science), Ian H. Gotlib (Psychology), Mark Granovetter (Sociology), James T. Hamilton (Communication), Paul M. Harrison (Religious Studies), Keith O. Hodgson (Chemistry), Gavin Jones (English), Dan Jurafsky (Linguistics), Hideo Mabuchi (Applied Physics), Peter F. Michelson (Physics), Stephen Palumbi (Hopkins Marine Station), Gabriella Safran (Division of Literatures, Cultures, and Languages), Stephen Makoto Sano (Music), Walter Scheidel (Classics), Tim Stearns (Biology), Nancy J. Troy (Art and Art History), Guenther Walther (Statistics), Brian White (Mathematics), Sylvia J. Yanagisako (Anthropology)

Lecturer: Ayodele Thomas

African and African American Studies

Undergraduate Program in African and African American Studies

The Program in African and African American Studies (AAAS), established in 1969, was the first ethnic studies program developed at Stanford University and the first African and African American Studies program at a private institution in the U.S. The AAAS program provides an interdisciplinary introduction to the study of peoples of African descent as a central component of American culture, offering a course of study that promotes research across disciplinary and departmental boundaries as well as providing research training and community service learning opportunities for undergraduates. It has developed an extensive network of Stanford scholars who work in race studies specific to AAAS and in concert with the Center for Comparative Studies in Race and Ethnicity.

AAAS encourages an interdisciplinary program of study drawn from fields including anthropology, art, art history, economics, education, drama, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, and sociology. The program emphasizes rigorous and creative scholarship and research, and fosters close academic advising with a faculty adviser, the AAAS Associate Director, and the Director.

AAAS is an interdisciplinary program (IDP) affiliated with the Center for Comparative Studies in Race and Ethnicity (p. 395) (CCSRE) and offers a major independent of it. CCSRE offers additional majors in Asian American Studies, Chicana/o Studies, Comparative Studies in Race and Ethnicity, and Native American Studies.

The Interdisciplinary Program in African and African American Studies (AAAS) provides students the opportunity to structure a major or minor with a core curriculum designed to develop a comparative and multidisciplinary understanding of the experiences and communities on the continent of Africa and African Americans within a broader global, diasporic dialogue. Additionally major or minor can focus their coursework in one of eleven thematic concentrations.

The directors of the program and the advisory board constitute the AAAS curriculum committee, the policy making body for the interdisciplinary program.

Mission Statement for the Undergraduate Program in African and African American Studies

The mission of the undergraduate program in African and African American Studies is to provide students with an interdisciplinary introduction to the study of people of African descent as a central component of American culture. Courses in the major promote research across disciplinary and departmental boundaries as well as provide students with research training and community service learning opportunities. Courses of study are drawn from anthropology, art, art history, economics, education, drama, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, and sociology among

others. The program provides an intellectual background for students considering graduate school or professional careers.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an interdisciplinary understanding of scholarship related to the African diaspora and Africa, drawing on interdisciplinary course work and each student's individualized concentration.
2. the ability to identify and critically assess different disciplinary, methodological, and interpretive approaches to the study of the African Americans, Africans, and/or people of the African diaspora.
3. an understanding of comparative approaches to race
4. skills in disciplinary methods necessary for their study.
5. the ability to express their interpretive and analytical arguments in clear, effective prose.

Bachelor of Arts in African and African American Studies Core Curriculum

All core courses taken for the major must be taken for a letter grade.\

Requirements

Majors must complete a total of 60 units, consisting of the following:

1. AFRICAAM 43 Introduction to African American Literature or AFRICAAM 105 Introduction to African and African American Studies (5 units)
2. One Social Science course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?page=0&catalog=&q=AAAS%3a%3ass&filter-coursestatus-Active=on&view=catalog&academicYear=20142015&collapse=>) (5 units)
3. One Humanities course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20142015&q=AAAS%3A%3Ah&collapse=>) (5 units)
4. One course in African Studies. (5 units)
5. AFRICAAM 200X Honors Thesis and Senior Thesis Seminar - WIM. (5 units)
6. 35 units of AAAS Core (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20142015&q=AAAS%3A%3Acore&collapse=>) and Related (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20142015&q=AAAS%3A%3Arelated&collapse=>) courses
 - At least 10 of the 35 units must be core courses (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20142015&q=AAAS%3A%3Acore&collapse=>), which are defined as courses that are primarily focused on Africa (<https://explorecourses.stanford.edu/search?q=AAAS%3A%3Aafrica&view=catalog&page=0&academicYear=20142015&collapse=&filter-coursestatus-Active=on>), African American Studies (<http://explorecourses.stanford.edu/CourseSearch/>

search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3African_american&collapse=), the Caribbean (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3acaribbean+&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>), or the African Diaspora. (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3adiaspora&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)

Students also work closely with a faculty adviser, the AAAS associate director, and the AAAS director in developing a coherent thematic emphasis within their major that reflects their scholarly interests in the field.

Thematic Emphasis

AAAS majors select a thematic emphasis, devoting at least 15 units in their major program of study toward their emphasis. Selecting an emphasis allows students to customize their curriculum and synthesize course work taken across various departments and programs into a coherent focus. Emphases offered include:

- Africa (<https://explorecourses.stanford.edu/search?q=AAAS%3A%3Aafrica&view=catalog&page=0&academicYear=20142015&collapse=&filter-coursestatus-Active=on>)
- African Americans (http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3African_american&collapse=)
- Class (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Aclass&collapse=>)
- Diaspora (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3adiaspora&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)
- Education (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3aeducation&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)
- Gender (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3agender&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)
- Historical Period (https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3ahistorical_period&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015)
- Identities, Diversity, and Aesthetics (IDA) (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3aaida&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)
- Linguistics (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3alanguage+&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)
- Mixed Race (https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3amixed_race&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015)
- Theory (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3atheory&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>)

All emphases (those listed as well as proposed alternatives) must be approved by the director and a course plan developed and approved by the director, associate director, and faculty adviser within the first year of declaring the major.

Core Courses

		Units
AFRICAAM 16N	African Americans and Social Movements	3
AFRICAAM 19	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 30	The Egyptians	3-5
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
AFRICAAM 33	From Moments to Movements: New Media, Narrative, and 21st Century Activism	5
AFRICAAM 34	Race, Policing, and Mass Incarceration	1
AFRICAAM 35	On the Meaning of Freedom	5
AFRICAAM 43	Introduction to African American Literature	3-5
AFRICAAM 47	History of South Africa	3
AFRICAAM 48Q	South Africa: Contested Transitions	3
AFRICAAM 50B	19th Century America	3
AFRICAAM 54N	African American Women's Lives	3-4
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 75E	Black Cinema	2
AFRICAAM 105	Introduction to African and African American Studies	5
AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 123	Great Works of the African American Tradition	5
AFRICAAM 147	History of South Africa	5
AFRICAAM 152G	Harlem Renaissance	5
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
AFRICAAM 262D	African American Poetics	5
AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
AFRICAST 72SI	Conflict in the Congo	1-2
AFRICAST 109	Running While Others Walk: African Perspectives on Development	5

AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 115	South African Encounters	1
AFRICAST 127	African Art and Politics, c. 1900 - Present	4
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 139A	Forgotten Africa: An Introduction to the Archaeology of Africa	5
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 151	AIDS in Africa	3
AFRICAST 190	Madagascar Prefield Seminar	1-2
AFRICAST 195	Back from Africa Workshop	1-2
AFRICAST 199	Independent Study or Directed Reading	1-5
AFRICAST 200	The HIV/AIDS Epidemic in Tanzania: A Pre-Field Seminar	1
AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 224	Memory and Heritage In South Africa Syllabus	1
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 299	Independent Study or Directed Reading	1-10
AFRICAST 301A	The Dynamics of Change in Africa	4-5
AMSTUD 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5
AMSTUD 262D	African American Poetics	5
ARCHLGY 139A	Forgotten Africa: An Introduction to the Archaeology of Africa	5
ARTHIST 127A	African Art and Politics, c. 1900 - Present	4
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
COMPLIT 145B	Africa in Atlantic Writing	3
ENGLISH 43	Introduction to African American Literature	3-5
ENGLISH 143	Introduction to African American Literature	3-5
HISTORY 45B	Africa in the Twentieth Century	3
HISTORY 47	History of South Africa	3
HISTORY 48Q	South Africa: Contested Transitions	3
HISTORY 54N	African American Women's Lives	3-4
HISTORY 145B	Africa in the 20th Century	5
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	3-5
HISTORY 254D	Law, Slavery, and Race	5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4

LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
MUSIC 147J	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
POLISCI 146A	African Politics	4-5
POLISCI 246P	The Dynamics of Change in Africa	4-5
SOC 16N	African Americans and Social Movements	3
SOC 149	The Urban Underclass	4
TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
TAPS 181Q	Alternative Viewpoints: Black Independent Film	4

Directed Reading and Research

Directed reading and research allows students to focus on a special topic of interest. In organizing a reading or research plan, the student consults with the director of the major and one or more faculty members specializing in the area or discipline.

Courses that fulfill directed reading and research requirements:

	Units
AFRICAAM 190 Directed Reading	1-5
AFRICAAM 195 Independent Study	5
AFRICAAM 199 Honors Project	1-5

Senior Seminar

Research and writing of the senior honors thesis or senior paper is under the supervision of a faculty project adviser. All majors in the IDP in AAAS, even those who opt to write honors theses in other departments and programs, must enroll in AFRICAAM 200X Honors Thesis and Senior Thesis Seminar, offered in Autumn Quarter. The course takes students through the process of researching an honors thesis, including conceptualization, development of prospectus, development of theses, research, analysis, and finally the process of drafting and writing. This course meets the Writing in the Major requirement (WIM).

Honors Program in African and African American Studies

For Majors in African and African American Studies

The honors program offers an opportunity to do independent research for a senior thesis. It is open to majors who have maintained a grade point average (GPA) of at least 3.5 in the major and 3.3 overall. The honors thesis is intended to enable students to synthesize skills to produce a document or project demonstrating a measure of competence in their specialty.

The application for honors must be submitted by Spring Quarter of the junior year, but students are encouraged to apply earlier. The honors program begins with a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty adviser and a second reader for the thesis project. The faculty adviser for the honors thesis must be an academic council faculty member and affiliated faculty of the student's major.

Honors students must enroll in AFRICAAM 200X Honors Thesis and Senior Thesis Seminar which fulfills the program's WIM requirement, during Autumn Quarter of the senior year and may take up to an additional 10 units of honors work (AFRICAAM 200Y Honors Thesis and Senior Thesis Research and AFRICAAM 200Z Honors Thesis and Senior Thesis Research) to be distributed across Winter and Spring quarters of senior year to continue their access to peer and faculty support as they write their theses. Students must complete their theses with a grade of 'B+' to receive honors in AAAS.

In May of the senior year, honors students are afforded an opportunity to present their research formally. Prizes for best undergraduate honors thesis are awarded annually by the Program in African & African American Studies.

Applications are available in the AAAS Undergraduate Program office and on the program web site (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/africanandafricanamericanstudies/aaas.stanford.edu>).

Thematic Emphasis

AAAS majors select a thematic emphasis, devoting at least 15 units in their major program of study toward their emphasis. Selecting an emphasis allows students to customize their curriculum and synthesize course work taken across various departments and programs into a coherent focus. Emphases offered include: (For faster navigation click on the links to the right)

Thematic Emphasis in Africa

Students in the African & African American Studies major can choose a concentration in Africa. The Africa Concentration in African & African American Studies is a program designed to investigate how individual African states domestic and foreign policy, law, history, culture, and society are formed within conversations, debates, policies and studies. Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights and other topics are explored.

The concentration is not declared on Axxs; it does not appear on the transcript or diploma. Students interested in the Africa thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Africa concentration.

	Units
AFRICAAM 24 Introduction to Dance in the African Diaspora	4
AFRICAAM 30 The Egyptians	3-5
AFRICAAM 31 RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 47 History of South Africa	3
AFRICAAM 48Q South Africa: Contested Transitions	3
AFRICAAM 115 South African Encounters	1
AFRICAAM 133 Literature and Society in Africa and the Caribbean	4
AFRICAAM 145B Africa in the 20th Century	5
AFRICAAM 146A African Politics	4-5
AFRICAAM 147 History of South Africa	5
AFRICAAM 148 Africa in Atlantic Writing	3
AFRICAAM 190 Directed Reading	1-5
AFRICAAM 195 Independent Study	5
AFRICAAM 199 Honors Project	1-5
AFRICAAM 200X Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 212 AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5

AFRICAAM 261E Mixed Race Literature in the U.S. and South Africa	5
AFRICAST 72SI Conflict in the Congo	1-2
AFRICAST 109 Running While Others Walk: African Perspectives on Development	5
AFRICAST 111 Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 112 AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 115 South African Encounters	1
AFRICAST 127 African Art and Politics, c. 1900 - Present	4
AFRICAST 135 Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 138 Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 139A Forgotten Africa: An Introduction to the Archaeology of Africa	5
AFRICAST 141A Science, Technology, and Medicine in Africa	4
AFRICAST 142 Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 151 AIDS in Africa	3
AFRICAST 190 Madagascar Prefield Seminar	1-2
AFRICAST 195 Back from Africa Workshop	1-2
AFRICAST 199 Independent Study or Directed Reading	1-5
AFRICAST 200 The HIV/AIDS Epidemic in Tanzania: A Pre-Field Seminar	1
AFRICAST 209 Running While Others Walk: African Perspectives on Development	5
AFRICAST 211 Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 212 AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 224 Memory and Heritage In South Africa Syllabus	1
AFRICAST 235 Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 299 Independent Study or Directed Reading	1-10
AFRICAST 301A The Dynamics of Change in Africa	4-5
AMSTUD 261E Mixed Race Literature in the U.S. and South Africa	5
ANTHRO 27N Ethnicity and Violence: Anthropological Perspectives	3-5
ANTHRO 138B Urban Africa	5
ANTHRO 139 Ethnography of Africa	5
ANTHRO 139A Forgotten Africa: An Introduction to the Archaeology of Africa	5
ANTHRO 140 Ethnography of Africa	3
ANTHRO 141A Science, Technology, and Medicine in Africa	4
ANTHRO 185 Medical Anthropology of Contemporary Africa	5
ANTHRO 187A The Anthropology of Race, Nature, and Animality	5
ANTHRO 239 Ethnography of Africa	5
ANTHRO 241 The State in Africa	5
ANTHRO 285 Medical Anthropology of Contemporary Africa	5
ARCHLGY 139A Forgotten Africa: An Introduction to the Archaeology of Africa	5
ARTHIST 127A African Art and Politics, c. 1900 - Present	4
ARTHIST 192B Art of the African Diaspora	4
COMPLIT 145B Africa in Atlantic Writing	3
DANCE 24 Introduction to Dance in the African Diaspora	4
DANCE 26 Dance and at the African Diaspora	4

HISTORY 45B	Africa in the Twentieth Century	3
HISTORY 47	History of South Africa	3
HISTORY 48Q	South Africa: Contested Transitions	3
HISTORY 49C	THE SLAVE TRADE	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 147	History of South Africa	5
HISTORY 244	Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years	5
HISTORY 247	Violence in African History: Conflict and Healing in sub-Saharan Africa	4-5
HISTORY 248S	Colonial States and African Societies, Part I	4-5
HISTORY 249S	Colonial States and African Societies, Part II	4-5
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
POLISCI 11N	The Rwandan Genocide	3
POLISCI 146A	African Politics	4-5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
POLISCI 246P	The Dynamics of Change in Africa	4-5

Thematic Concentration in African Americans

Students in the African & African American Studies major can choose a concentration in African Americans. The African Americans Concentration in African & African American Studies is a program designed to explore the historical and contemporary experiences of African Americans. Attention is paid to the interactions between the social, economic, cultural, historical, linguistic, genetic, geopolitical, ecological, and biomedical factors that shape and have shaped African American society.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Africa thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the African American concentration.

		Units
AFRICAAM 16N	African Americans and Social Movements	3
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 19	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
AFRICAAM 20A	Jazz Theory	3
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 24	Introduction to Dance in the African Diaspora	4
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 33	From Moments to Movements: New Media, Narrative, and 21st Century Activism	5
AFRICAAM 34	Race, Policing, and Mass Incarceration	1
AFRICAAM 43	Introduction to African American Literature	3-5
AFRICAAM 50B	19th Century America	3
AFRICAAM 54N	African American Women's Lives	3-4
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 75E	Black Cinema	2
AFRICAAM 105	Introduction to African and African American Studies	5

AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AFRICAAM 123	Great Works of the African American Tradition	5
AFRICAAM 125V	The Voting Rights Act	5
AFRICAAM 150B	19th-Century America	5
AFRICAAM 152G	Harlem Renaissance	5
AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 158	Black Queer Theory	5
AFRICAAM 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
AFRICAAM 254D	Law, Slavery, and Race	5
AFRICAAM 262D	African American Poetics	5
AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AMSTUD 15	Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
AMSTUD 50N	The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era	3
AMSTUD 51Q	Comparative Fictions of Ethnicity	4
AMSTUD 101	American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations	3-5
AMSTUD 121L	Racial-Ethnic Politics in US	5
AMSTUD 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AMSTUD 143	Introduction to African American Literature	3-5
AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
AMSTUD 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AMSTUD 201	History of Education in the United States	3-5
AMSTUD 214	The American 1960s: Thought, Protest, and Culture	5
AMSTUD 226	Race and Racism in American Politics	5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5

AMSTUD 262D	African American Poetics	5
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
COMPLIT 290	Ferguson in a Global Frame: Human Rights and the Arts	3-5
DANCE 31	Chocolate Head-Space: Crowd-Sourced Performance Experience	2
DANCE 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2
DANCE 60	The Evolution of Hip Hop and the Dance Stage: From Broadway to Hollywood and MTV	1
EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
ENGLISH 43	Introduction to African American Literature	3-5
ENGLISH 143	Introduction to African American Literature	3-5
HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
HISTORY 49C	THE SLAVE TRADE	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 50B	19th Century America	3
HISTORY 50C	The United States in the Twentieth Century	3
HISTORY 54N	African American Women's Lives	3-4
HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
HISTORY 150B	19th-Century America	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 158B	History of Education in the United States	3-5
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	3-5
HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5
HISTORY 254D	Law, Slavery, and Race	5
HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
LAWGEN 114Q	Dilemmas of Regulating Race and Inequality in American Society	3
LINGUIST 65	African American Vernacular English	3-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
MUSIC 20A	Jazz Theory	3
MUSIC 147J	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
MUSIC 186A	Music and Religious Experience in the Contemporary World	3-5
MUSIC 286A	Music and Religious Experience in the Contemporary World	3-5
POLISCI 121L	Racial-Ethnic Politics in US	5
POLISCI 125V	The Voting Rights Act	5
POLISCI 226	Race and Racism in American Politics	5
PSYCH 29N	Growing Up in America	3
PSYCH 183	Mind, Culture, and Society Research Core	2-3
PSYCH 215	Mind, Culture, and Society	3
PUBLPOL 121L	Racial-Ethnic Politics in US	5
SOC 16N	African Americans and Social Movements	3
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 145	Race and Ethnic Relations in the USA	4
SOC 149	The Urban Underclass	4
TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
TAPS 181Q	Alternative Viewpoints: Black Independent Film	4
URBANST 112	The Urban Underclass	4

Thematic Concentration in Class

Students in the African & African American Studies major can choose a concentration in Class. The Class Concentration in African & African American Studies is a program designed to explore the cultural, social, legal, and political construction of racial and ethnic differences in African and or African American history, while examining the historical specificity of markets, money, property, and labor relations and explores the interdependence between the economy and politics, society, and culture.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Africa thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Class concentration.

		Units
AFRICAAM 16N	African Americans and Social Movements	3
AFRICAAM 34	Race, Policing, and Mass Incarceration	1
AFRICAAM 35	On the Meaning of Freedom	5
AFRICAAM 54N	African American Women's Lives	3-4
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
AFRICAAM 254D	Law, Slavery, and Race	5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
ANTHRO 145	Race and Power	5
ANTHRO 245	Race and Power	5
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4

EDUC 232	Culture, Learning, and Poverty	2-3
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
ENGLISH 43	Introduction to African American Literature	3-5
HISTORY 47	History of South Africa	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HISTORY 248S	Colonial States and African Societies, Part I	4-5
HISTORY 254D	Law, Slavery, and Race	5
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
LAWGEN 114Q	Dilemmas of Regulating Race and Inequality in American Society	3
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
POLISCI 246P	The Dynamics of Change in Africa	4-5
PSYCH 29N	Growing Up in America	3
PSYCH 183	Mind, Culture, and Society Research Core	2-3
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 140	Introduction to Social Stratification	3
SOC 148	Comparative Ethnic Conflict	4
SOC 149	The Urban Underclass	4
URBANST 112	The Urban Underclass	4

Thematic Concentration in Diaspora

Students in the African & African American Studies major can choose a concentration in the Diaspora. The Diaspora Concentration in African & African American Studies is a program designed to explore the exchanges among peoples and cultures from the continent of Africa and their global impact through exchanges which included trade, travel, exploration, migration that include the symbolic and aesthetic, as well as the empirical. The Diaspora major will also examine comparisons, connections and genealogical relations among geographically dispersed cases in order to consider past and present African identities in their global contexts.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Diaspora thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Diaspora concentration.

		Units
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 115	South African Encounters	1
AFRICAAM 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 290	Ferguson in a Global Frame: Human Rights and the Arts	3-5

AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 139A	Forgotten Africa: An Introduction to the Archaeology of Africa	5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
ANTHRO 27N	Ethnicity and Violence: Anthropological Perspectives	3-5
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
ANTHRO 139	Ethnography of Africa	5
ANTHRO 139A	Forgotten Africa: An Introduction to the Archaeology of Africa	5
ANTHRO 141A	Science, Technology, and Medicine in Africa	4
ANTHRO 239	Ethnography of Africa	5
ARTHIST 127A	African Art and Politics, c. 1900 - Present	4
ARTHIST 192B	Art of the African Diaspora	4
COMPLIT 145B	Africa in Atlantic Writing	3
COMPLIT 290	Ferguson in a Global Frame: Human Rights and the Arts	3-5
DANCE 24	Introduction to Dance in the African Diaspora	4
DANCE 26	Dance and at the African Diaspora	4
ENGLISH 43	Introduction to African American Literature	3-5
ENGLISH 143	Introduction to African American Literature	3-5
HISTORY 48Q	South Africa: Contested Transitions	3
HISTORY 49C	THE SLAVE TRADE	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 249S	Colonial States and African Societies, Part II	4-5
HISTORY 254D	Law, Slavery, and Race	5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
TAPS 181Q	Alternative Viewpoints: Black Independent Film	4

Thematic Concentration in Education

Students in the African & African American Studies major can choose a concentration in Education. The Education Concentration in African & African American Studies is a program designed to explore the history, policy, and practice in education to understand how issues of race, ethnicity, and difference shape educational opportunity. The goal of the concentration is to develop an understanding of the core issues facing educators and policy makers so that students may learn how they can contribute to the social and political discourse surrounding issues of education and opportunity policy on the continent of Africa and within the global diaspora.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Education thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Diaspora concentration.

		Units
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5

AFRICAAM 106	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5	EDUC 243	Writing Across Languages and Cultures: Research in Writing and Writing Instruction	3-5
AFRICAAM 112	Urban Education	3-4	EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5	EDUC 274X	School Choice: The Role of Charter Schools	3
AFRICAAM 130	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5	EDUC 322	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5
AFRICAAM 165	Race, Athletics and College Achievement	3	HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
AFRICAAM 190	Directed Reading	1-5	HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
AFRICAAM 195	Independent Study	5	HISTORY 158B	History of Education in the United States	3-5
AFRICAAM 199	Honors Project	1-5	HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5	LINGUIST 65	African American Vernacular English	3-5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5	LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5	LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
AFRICAAM 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5	SOC 132	Sociology of Education: The Social Organization of Schools	4
AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5	SOC 135	Poverty, Inequality, and Social Policy in the United States	3
AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5	TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5			
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5			
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4			
AFRICAST 141A	Science, Technology, and Medicine in Africa	4			
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5			
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5			
AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5			
AMSTUD 201	History of Education in the United States	3-5			
AMSTUD 226	Race and Racism in American Politics	5			
ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4			
EDUC 12SC	Hip Hop as a Universal Language	2			
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5			
EDUC 110	Sociology of Education: The Social Organization of Schools	4			
EDUC 112X	Urban Education	3-4			
EDUC 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4			
EDUC 146X	Perspectives on the Education of Linguistic Minorities	3-4			
EDUC 157X	Education & Poverty: Research & Solutions	1			
EDUC 165	History of Higher Education in the U.S.	3-5			
EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1			
EDUC 201	History of Education in the United States	3-5			
EDUC 212X	Urban Education	3-4			
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5			
EDUC 232	Culture, Learning, and Poverty	2-3			
					Units
			AFRICAAM 16N	African Americans and Social Movements	3
			AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
			AFRICAAM 35	On the Meaning of Freedom	5
			AFRICAAM 43	Introduction to African American Literature	3-5
			AFRICAAM 54N	African American Women's Lives	3-4
			AFRICAAM 145A	Poetics and Politics of Caribbean Women's Literature	5
			AFRICAAM 154	Black Feminist Theory	5
			AFRICAAM 158	Black Queer Theory	5
			AFRICAAM 190	Directed Reading	1-5
			AFRICAAM 195	Independent Study	5
			AFRICAAM 199	Honors Project	1-5
			AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
			AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5

Thematic Concentration in Gender

Students in the African & African American Studies major can choose a concentration in Gender. The Gender Concentration in African & African American Studies is a program designed to explore the historical and contemporary experiences and histories of women or men among the cultures from the continent of Africa and the diaspora. Students will also explore how these societies organize gender roles, relations, and identities, and how these intersect with other hierarchies of power, such as class, race, nationality, ethnicity, sexuality, disability and age.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Gender thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Gender concentration.

AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4
AMSTUD 201	History of Education in the United States	3-5
ANTHRO 135H	Conversations in CSRE: Case Studies in the Stanford Community	1-2
ANTHRO 135I	CSRE House Seminar: Race and Ethnicity at Stanford	1-2
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5
ARTHIST 162	Race, Gender, and Sexuality in Contemporary Art	4
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
CSRE 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
ENGLISH 143	Introduction to African American Literature	3-5
FEMGEN 154	Black Feminist Theory	5
HISTORY 54N	African American Women's Lives	3-4
HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 158B	History of Education in the United States	3-5
LINGUIST 156	Language and Gender	4
LINGUIST 256	Language, Gender and Sexuality	1-4
PSYCH 183	Mind, Culture, and Society Research Core	2-3
SOC 16N	African Americans and Social Movements	3
SOC 140	Introduction to Social Stratification	3
SOC 142	Sociology of Gender	5

Thematic Concentration in Historical Period

Students in the African & African American Studies major can choose a concentration in Historical Period. The Historical Period concentration in African & African American Studies is a program designed to explore African and or African American history and politics from a multidisciplinary perspective.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the historical period thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Historical Period concentration.

	Units	
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 30	The Egyptians	3-5
AFRICAAM 50B	19th Century America	3
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 102	Introduction to Public History and Public Service	4-5
AFRICAAM 105	Introduction to African and African American Studies	5
AFRICAAM 107C	The Black Mediterranean: Greece, Rome and Antiquity	4-5
AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 145B	Africa in the 20th Century	5

AFRICAAM 150B	19th-Century America	5
AFRICAAM 152G	Harlem Renaissance	5
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 262D	African American Poetics	5
AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
AFRICAST 139A	Forgotten Africa: An Introduction to the Archaeology of Africa	5
AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
AMSTUD 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
HISTORY 45B	Africa in the Twentieth Century	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 50B	19th Century America	3
HISTORY 50C	The United States in the Twentieth Century	3
HISTORY 54N	African American Women's Lives	3-4
HISTORY 145B	Africa in the 20th Century	5
HISTORY 147	History of South Africa	5
HISTORY 150B	19th-Century America	5
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	3-5
HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5
HISTORY 247	Violence in African History: Conflict and Healing in sub-Saharan Africa	4-5
HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5

Thematic Concentration in Identity, Diversity and Aesthetics (IDA)

Students in the African & African American Studies major can choose a concentration in Identity, Diversity and Aesthetics (IDA). The Identity, Diversity, and Aesthetics Concentration in African & African American Studies is a program designed to explore the intersections of culture, race, the arts, and social transformation. In IDA courses taught by Stanford faculty, lecturers, and distinguished Visiting Artists, students learn how the

arts, activism, and the academy interact to produce aesthetic and societal change.

The IDA concentration requires 15 units including two approved AAAS core courses and AFRICAAM 200X: Honors Thesis & Senior Thesis Seminar (WIM), taken Autumn Quarter of the senior year. IDA Thematic courses may focus on artistic practice and performance, art history, creative writing, community arts, art and social change, writing for performance, critical studies in art and performance, and critical arts theory.

Additionally, IDA concentration students must complete a creative senior project. Possible senior projects include a stage production, a set of recorded music, an anthology of creative writing, a curated or solo exhibition, or a community arts workshop. Students who elect to write an honors thesis may incorporate their project as the basis for their thesis.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Africa thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Identity, Diversity and Aesthetics (IDA) concentration.

		Units
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 19	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
AFRICAAM 20A	Jazz Theory	3
AFRICAAM 24	Introduction to Dance in the African Diaspora	4
AFRICAAM 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
AFRICAAM 34	Race, Policing, and Mass Incarceration	1
AFRICAAM 35	On the Meaning of Freedom	5
AFRICAAM 36	REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.	5
AFRICAAM 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2
AFRICAAM 75E	Black Cinema	2
AFRICAAM 103	Dance, Text, Gesture: Performance and Composition	1
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AFRICAAM 122E	Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces	4
AFRICAAM 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 262D	African American Poetics	5
AFRICAST 127	African Art and Politics, c. 1900 - Present	4
AMSTUD 15	Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4
AMSTUD 262D	African American Poetics	5
ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4
ARTHIST 127A	African Art and Politics, c. 1900 - Present	4
ARTHIST 162	Race, Gender, and Sexuality in Contemporary Art	4
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
ARTHIST 192B	Art of the African Diaspora	4
CSRE 51Q	Comparative Fictions of Ethnicity	4
CSRE 123A	American Indians and the Cinema	5
CSRE 123B	Literature and Human Experimentation	3-5
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
CSRE 129B	Literature and Global Health	3-5
CSRE 134	Museum Cultures: Material Representation in the Past and Present	5
CSRE 145B	Africa in Atlantic Writing	3
CSRE 179G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
DANCE 24	Introduction to Dance in the African Diaspora	4
DANCE 26	Dance and at the African Diaspora	4
DANCE 30	Chocolate Heads Movement Band Performance Workshop	2
DANCE 31	Chocolate Head-Space: Crowd-Sourced Performance Experience	2
DANCE 39	Intro/Beginning Contemporary Modern	1
DANCE 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2
DANCE 58	Beginning Hip Hop	1
DANCE 60	The Evolution of Hip Hop and the Dance Stage: From Broadway to Hollywood and MTV	1
DANCE 103	Dance, Text, Gesture: Performance and Composition	1
DANCE 108	Hip Hop Meets Broadway	1
DANCE 118	Developing Creativity In Dance	2
DANCE 141	Advanced Contemporary Modern Technique	2
DANCE 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	4
EDUC 12SC	Hip Hop as a Universal Language	2
EDUC 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
HISTORY 145B	Africa in the 20th Century	5
ILAC 193	The Cinema of Pedro Almodovar	3-5
MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
MUSIC 20A	Jazz Theory	3
MUSIC 186A	Music and Religious Experience in the Contemporary World	3-5
MUSIC 286A	Music and Religious Experience in the Contemporary World	3-5
TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
TAPS 151H	ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities	4-5
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4

TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
TAPS 181Q	Alternative Viewpoints: Black Independent Film	4

Thematic Concentration in Linguistics

Students in the African & African American Studies major can choose a concentration in Linguistics. The Linguistics Concentration in African & African American Studies is a program designed to explore the relationships between language, race and ethnicity across a wide range of social, cultural and educational contexts.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Language thematic concentration should contact the AAAS undergraduate program office. Students may obtain credit for the study of approved AAAS languages towards their degree. If students take 15 or more units of an approved language relevant to AAAS, they may apply 5 of those units toward their degree.

Students may find the following courses useful in fulfilling requirements in the Linguistics concentration.

		Units
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AMELANG 100A	Beginning Amharic, First Quarter	4
AMELANG 100B	First-Year Amharic, Second Quarter	4
AMELANG 100C	First-Year Amharic, Third Quarter	4
AMELANG 101A	Second-Year Amharic, First Quarter	4
AMELANG 101B	Second-Year Amharic, Second Quarter	4
AMELANG 101C	Second-Year Amharic, Third Quarter	4
AMELANG 103A	First-Year Hausa, First Quarter	4
AMELANG 103B	First-Year Hausa, Second Quarter	4
AMELANG 103C	First-Year Hausa, Third Quarter	4
AMELANG 106A	First-Year Swahili, First Quarter	5
AMELANG 106B	First-Year Swahili, Second Quarter	5
AMELANG 106C	First-Year Swahili, Third Quarter	5
AMELANG 107A	Second-Year Swahili, First Quarter	5
AMELANG 107B	Second-Year Swahili, Second Quarter	5
AMELANG 107C	Second-Year Swahili, Third Quarter	5

AMELANG 108A	Third-Year Swahili, First Quarter	4
AMELANG 108B	Third-Year Swahili, Second Quarter	4
AMELANG 108C	Third-Year Swahili, Third Quarter	4
AMELANG 110A	First-Year Wolof, First Quarter	3
AMELANG 114A	Beginning Afrikaans, First Quarter	4
AMELANG 114B	Beginning Afrikaans, Second Quarter	4
AMELANG 115A	Second year - Afrikaans, First Quarter	4
AMELANG 115B	Second - year Afrikaans, Second Quarter	4
AMELANG 115C	Second - Year Afrikaans, Third Quarter	4
AMELANG 134A	First-Year Igbo, First Quarter	4
AMELANG 134B	First-Year Igbo, Second Quarter	4
AMELANG 134C	First-Year Igbo, Third Quarter	4
AMELANG 135A	Second-Year Igbo, First Quarter	4
AMELANG 136A	First-Year Xhosa, First Quarter	4
AMELANG 136B	First-Year Xhosa, Second Quarter	4
AMELANG 136C	First-Year Xhosa, Third Quarter	4
AMELANG 137A	Second-Year Xhosa, First Quarter	4
AMELANG 137B	Second-Year Xhosa, Second Quarter	4
AMELANG 137C	Second-Year Xhosa, Third Quarter	4
AMELANG 153	Introduction to Twi	1
AMELANG 153A	First-Year Twi, First Quarter	4
AMELANG 153B	First-Year Twi, Second Quarter	4
AMELANG 153C	First-Year Beginning Twi, Third Quarter	4
AMELANG 154A	Second-Year Twi, First Quarter	4
AMELANG 154B	Second-Year Twi, Second Quarter	4
AMELANG 154C	Second-Year Twi, Third Quarter	4
AMELANG 156A	First-Year Zulu, First Quarter	4
AMELANG 156B	First-Year Zulu, Second Quarter	4
AMELANG 156C	First-Year Zulu, Third Quarter	4
AMELANG 157A	Second-Year Zulu, First Quarter	4
AMELANG 157B	Second-Year Zulu, Second Quarter	4

AMELANG 157C	Second-Year Zulu, Third Quarter	4
AMELANG 180A	First-Year Kinyarwanda, First Quarter	4
AMELANG 180B	First-Year Kinyarwanda, Second Quarter	4
AMELANG 182A	Intermediate Fulani, First Quarter	3
AMELANG 182B	Intermediate Fulani, Second Quarter	3
AMELANG 182C	Intermediate Fulani, Third Quarter	3
AMELANG 187A	First-Year Yoruba, First Quarter	4
AMELANG 187B	First-Year Yoruba, Second Quarter	4
AMELANG 187C	First-Year Yoruba, Third Quarter	4
AMELANG 203A	Beginning Hausa, First Quarter	3
AMELANG 203B	Beginning Hausa, Second Quarter	3
AMELANG 206B	Intensive Beginning Swahili, Part B	4
AMELANG 206C	Intensive Beginning Swahili, Part C	4
EDUC 12SC	Hip Hop as a Universal Language	2
EDUC 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
LINGUIST 65	African American Vernacular English	3-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 251	Sociolinguistic Field Methods	3-5
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 256	Language, Gender and Sexuality	1-4

Thematic Concentration in Mixed Race

Students in the African & African American Studies major can choose a concentration in Mixed Race. The Mixed Race Concentration in African & African American Studies is a program designed to explore how African and or African American identities was and is constituted with relation to issues of race and ethnicity. The concentration investigates how mixed race identities effect domestic and foreign policy, law, history, culture, and society are formed within conversations, debates, policies and studies regarding race and ethnicity. Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights and other topics are explored from the angle of how racial and ethnic difference impacts debate and policy.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Mixed Race thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Mixed Race concentration.

		Units
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 41	Genes and Identity	3
AFRICAAM 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4

AFRICAAM 131	Genes and Identity	5
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 158	Black Queer Theory	5
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAAM 261E	Mixed Race Literature in the U.S. and South Africa	5
AMSTUD 51Q	Comparative Fictions of Ethnicity	4
AMSTUD 101	American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations	3-5
AMSTUD 121L	Racial-Ethnic Politics in US	5
AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4
AMSTUD 226	Race and Racism in American Politics	5
ANTHRO 27N	Ethnicity and Violence: Anthropological Perspectives	3-5
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 135H	Conversations in CSRE: Case Studies in the Stanford Community	1-2
ANTHRO 135I	CSRE House Seminar: Race and Ethnicity at Stanford	1-2
ANTHRO 145	Race and Power	5
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5
ANTHRO 245	Race and Power	5
ARTHIST 162	Race, Gender, and Sexuality in Contemporary Art	4
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
COMPLIT 41Q	Ethnicity and Literature	5
COMPLIT 51Q	Comparative Fictions of Ethnicity	4
CSRE 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
ENGLISH 15SC	The New Millennium Mix: Crossings of Race & Culture	2
ENGLISH 43	Introduction to African American Literature	3-5
HISTORY 49C	THE SLAVE TRADE	3
HISTORY 254D	Law, Slavery, and Race	5
POLISCI 11N	The Rwandan Genocide	3
POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3
POLISCI 121L	Racial-Ethnic Politics in US	5
PSYCH 29N	Growing Up in America	3
PSYCH 215	Mind, Culture, and Society	3
PUBLPOL 121L	Racial-Ethnic Politics in US	5
SOC 145	Race and Ethnic Relations in the USA	4
SOC 155	The Changing American Family	4

TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
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Thematic Concentration in Theory

Students in the African & African American Studies major can choose a concentration in Theory. The Theory Concentration in African & African American Studies is a program designed to explore the meta-narratives and theoretical frameworks for analyzing enduring issues of cultural, religious, and political life both within African and or African American societies and between political communities. Students will also explore the role of identities, values and prejudices that are the product of historical processes and the interaction of different peoples.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Theory thematic concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Theory concentration.

		Units
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 33	From Moments to Movements: New Media, Narrative, and 21st Century Activism	5
AFRICAAM 35	On the Meaning of Freedom	5
AFRICAAM 107C	The Black Mediterranean: Greece, Rome and Antiquity	4-5
AFRICAAM 125V	The Voting Rights Act	5
AFRICAAM 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 158	Black Queer Theory	5
AFRICAAM 190	Directed Reading	1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAAM 254D	Law, Slavery, and Race	5
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 195	Back from Africa Workshop	1-2
AMSTUD 121L	Racial-Ethnic Politics in US	5
HISTORY 254D	Law, Slavery, and Race	5
HUMBIO 170	Justice, Policy, and Science	5
LAWGEN 112N	Law and Inequality	3
LAWGEN 114Q	Dilemmas of Regulating Race and Inequality in American Society	3
LINGUIST 156	Language and Gender	4
LINGUIST 251	Sociolinguistic Field Methods	3-5

LINGUIST 255B	Sociolinguistics Classics and Community Studies	3-5
POLISCI 146A	African Politics	4-5
POLISCI 226	Race and Racism in American Politics	5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
PSYCH 75	Introduction to Cultural Psychology	5
RELIGST 246	Constructing Race and Religion in America	4-5
SOC 14N	Inequality in American Society	4
SOC 15N	The Transformation of Socialist Societies	3
SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
URBANST 123	Approaching Research and the Community	2-3

Minor in African and African American Studies

Students who minor in AAAS complete a minimum of 30 units from the list of AAAS courses. These courses must include:

1. AFRICAAM 43 Introduction to African American Literature or AFRICAAM 105 Introduction to African and African American Studies (5 units)
2. One Social Science course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?page=0&catalog=&q=AAAS%3a%3ass&filter-coursestatus-Active=on&view=catalog&academicYear=20142015&collapse=>) (5 units)
3. One Humanities course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20142015&q=AAAS%3A%3Ah&collapse=>) (5 units)

Students should seek to develop a coherent theme in their course selections in consultation with the program director or associate director. An appointment should be made to discuss the rationale for the minor theme preceding submission of the declaration forms.

Director: Dr. H. Samy Alim (Education)

Associate Director: Dr. Cheryl A. Brown

Advisory Committee: H. Samy Alim (Education), Arnetha Ball (Education), Ralph Richard Banks (Law), Jan Barker-Alexander (Director, Black Community Services Center), Jennifer Brody (Drama), Bryan Anthony Brown (Education), Cheryl Brown (Program in African and African American Studies), James Campbell (History), Clayborne Carson (History), Prudence Carter (Education), Jennifer Eberhardt (Psychology), Harry Elam (Drama), Michele Elam (English), James Ferguson (Anthropology), Corey Fields (Sociology), Shelley Fisher Fishkin (English), Linda Darling-Hammond (Education), Sean Hanretta (History), Allyson Hobbs (History), David Palumbo-Liu (Comparative Literature), Vaughn Rasberry (English), John R. Rickford (Linguistics), José David Saldívar (English), Joel Samoff (African Studies)

Affiliated Faculty: David Abernethy (Political Science, emeritus), H. Samy Alim (Education), R. Lanier Anderson (Philosophy), Anthony Antonio (Education), Arnetha Ball (Education), Ralph Richard Banks (Law), Lucius Barker (Political Science, emeritus), Don Barr (Sociology), Shasad Bashir (Religious Studies), Carl Bielefeldt (Religious Studies), Jennifer Brody (Drama), Bryan Anthony Brown (Education), Cheryl Brown (Associate Director, Program in African and African American Studies), Albert Camarillo (History), James Campbell (History), Clayborne Carson (History), Prudence Carter (Education), Gordon Chang (History), Wanda Corn (Art and Art History, emerita), Linda Darling-Hammond (Education),

David Degusta (Anthropology), Sandra Drake (English, emerita), Jennifer Eberhardt (Psychology), Paulla Ebron (Anthropology), Harry Elam (Vice Provost), Michele Elam (English), Corey Fields (Sociology), James Ferguson (Anthropology), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Sean Hanretta (History), Aleta Hayes (Drama), Jeff Chang (Director, Identity Diversity, and Aesthetics), Allyson Hobbs (History), Gavin Jones (English), Terry Karl (Political Science), Anthony Kramer (Drama), Teresa LaFromboise (Education), Brian Lowery (Graduate School of Business), Lisa Malkki (Anthropology), Hazel Markus (Psychology), Barbaro Martinez-Ruiz (Art and Art History), Monica McDermott (Sociology), Nadia De León (Director, Service Learning in Comparative Studies in Race and Ethnicity), Robert Moses (Drama), Paula Moya (English), Elisabeth Mudimbe-Boyi (French and Comparative Literature), Susan Olzak (Sociology), David Palumbo-Liu (Comparative Literature), Arnold Rampersad (English), Vaughn Rasberry (English), John R. Rickford (Linguistics), Richard Roberts (History), Sonia Rocha (Sociology), Michael Rosenfeld (Sociology), José David Saldívar (English), Ramón Saldívar (English), Joel Samoff (African Studies), Gary Segura (Political Science), Paul Sniderman (Political Science), C. Matthew Snipp (Sociology), Ewart Thomas (Psychology), Jeane Tsai (Psychology), Jeremy Weinstein (Political Science), Bryan Wolf (American Art and Culture), Yvonne Yarbo-Bejarno (Spanish and Portuguese)

Related Courses

	Units
AFRICAAM 18A Jazz History: Ragtime to Bebop, 1900-1940	3
AFRICAAM 18B Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 20A Jazz Theory	3
AFRICAAM 24 Introduction to Dance in the African Diaspora	4
AFRICAAM 36 REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.	5
AFRICAAM 41 Genes and Identity	3
AFRICAAM 45 Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2
AFRICAAM 101F Race & Technology	1-2
AFRICAAM 102 Introduction to Public History and Public Service	4-5
AFRICAAM 103 Dance, Text, Gesture: Performance and Composition	1
AFRICAAM 106 Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
AFRICAAM 107C The Black Mediterranean: Greece, Rome and Antiquity	4-5
AFRICAAM 112 Urban Education	3-4
AFRICAAM 115 South African Encounters	1
AFRICAAM 121X Hip Hop, Youth Identities, and the Politics of Language	3-4
AFRICAAM 122E Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces	4
AFRICAAM 125V The Voting Rights Act	5
AFRICAAM 126B Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
AFRICAAM 127A Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
AFRICAAM 130 Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5
AFRICAAM 131 Genes and Identity	5
AFRICAAM 133 Literature and Society in Africa and the Caribbean	4
AFRICAAM 145A Poetics and Politics of Caribbean Women's Literature	5
AFRICAAM 145B Africa in the 20th Century	5
AFRICAAM 146A African Politics	4-5
AFRICAAM 148 Africa in Atlantic Writing	3
AFRICAAM 150B 19th-Century America	5
AFRICAAM 154 Black Feminist Theory	5
AFRICAAM 158 Black Queer Theory	5
AFRICAAM 165 Race, Athletics and College Achievement	3
AFRICAAM 200X Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 223 Literature and Human Experimentation	3-5
AFRICAAM 229 Literature and Global Health	3-5
AFRICAAM 233A Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAAM 254D Law, Slavery, and Race	5
AFRICAAM 261E Mixed Race Literature in the U.S. and South Africa	5
AFRICAAM 290 Ferguson in a Global Frame: Human Rights and the Arts	3-5
AMELANG 108A Third-Year Swahili, First Quarter	4
AMSTUD 15 Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
AMSTUD 50N The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era	3
AMSTUD 51Q Comparative Fictions of Ethnicity	4
AMSTUD 101 American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations	3-5
AMSTUD 121L Racial-Ethnic Politics in US	5
AMSTUD 121X Hip Hop, Youth Identities, and the Politics of Language	3-4
AMSTUD 121Z Political Power in American Cities	5
AMSTUD 143 Introduction to African American Literature	3-5
AMSTUD 150B 19th-Century America	5
AMSTUD 164C From Freedom to Freedom Now: African American History, 1865-1965	5
AMSTUD 166 Introduction to African American History - the Modern Freedom Struggle	3-5
AMSTUD 178 Ethnicity and Dissent in United States Art and Literature	4
AMSTUD 201 History of Education in the United States	3-5
AMSTUD 214 The American 1960s: Thought, Protest, and Culture	5
AMSTUD 226 Race and Racism in American Politics	5
ANTHRO 27N Ethnicity and Violence: Anthropological Perspectives	3-5
ANTHRO 32 Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 121A Hip Hop, Youth Identities, and the Politics of Language	3-4
ANTHRO 135H Conversations in CSRE: Case Studies in the Stanford Community	1-2
ANTHRO 135I CSRE House Seminar: Race and Ethnicity at Stanford	1-2
ANTHRO 138 Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5

ANTHRO 138B	Urban Africa	5	EDUC 243	Writing Across Languages and Cultures: Research in Writing and Writing Instruction	3-5
ANTHRO 139	Ethnography of Africa	5	EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
ANTHRO 139A	Forgotten Africa: An Introduction to the Archaeology of Africa	5	EDUC 274X	School Choice: The Role of Charter Schools	3
ANTHRO 140	Ethnography of Africa	3	EDUC 322	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5
ANTHRO 141A	Science, Technology, and Medicine in Africa	4	ENGLISH 15SC	The New Millennium Mix: Crossings of Race & Culture	2
ANTHRO 145	Race and Power	5	FEMGEN 154	Black Feminist Theory	5
ANTHRO 185	Medical Anthropology of Contemporary Africa	5	HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5	HISTORY 49C	THE SLAVE TRADE	3
ANTHRO 238	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5	HISTORY 50A	Colonial and Revolutionary America	3
ANTHRO 239	Ethnography of Africa	5	HISTORY 50B	19th Century America	3
ANTHRO 241	The State in Africa	5	HISTORY 50C	The United States in the Twentieth Century	3
ANTHRO 245	Race and Power	5	HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
ANTHRO 285	Medical Anthropology of Contemporary Africa	5	HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
ARTHIST 162	Race, Gender, and Sexuality in Contemporary Art	4	HISTORY 106A	Global Human Geography: Asia and Africa	5
ARTHIST 192B	Art of the African Diaspora	4	HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
COMPLIT 41Q	Ethnicity and Literature	5	HISTORY 147	History of South Africa	5
COMPLIT 51Q	Comparative Fictions of Ethnicity	4	HISTORY 150B	19th-Century America	5
COMPLIT 290	Ferguson in a Global Frame: Human Rights and the Arts	3-5	HISTORY 150C	The United States in the Twentieth Century	5
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4	HISTORY 158B	History of Education in the United States	3-5
CSRE 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5	HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5
DANCE 24	Introduction to Dance in the African Diaspora	4	HISTORY 244	Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years	5
DANCE 26	Dance and at the African Diaspora	4	HISTORY 247	Violence in African History: Conflict and Healing in sub-Saharan Africa	4-5
DANCE 30	Chocolate Heads Movement Band Performance Workshop	2	HISTORY 248S	Colonial States and African Societies, Part I	4-5
DANCE 31	Chocolate Head-Space: Crowd-Sourced Performance Experience	2	HISTORY 249S	Colonial States and African Societies, Part II	4-5
DANCE 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2	HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
DANCE 58	Beginning Hip Hop	1	HISTORY 260	California's Minority-Majority Cities	4-5
DANCE 60	The Evolution of Hip Hop and the Dance Stage: From Broadway to Hollywood and MTV	1	HUMBIO 121E	Ethnicity and Medicine	1-3
DANCE 103	Dance, Text, Gesture: Performance and Composition	1	HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
DANCE 108	Hip Hop Meets Broadway	1	HUMBIO 170	Justice, Policy, and Science	5
EDUC 12SC	Hip Hop as a Universal Language	2	LAWGEN 112N	Law and Inequality	3
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5	LAWGEN 114Q	Dilemmas of Regulating Race and Inequality in American Society	3
EDUC 110	Sociology of Education: The Social Organization of Schools	4	LINGUIST 65	African American Vernacular English	3-5
EDUC 112X	Urban Education	3-4	LINGUIST 156	Language and Gender	4
EDUC 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4	LINGUIST 251	Sociolinguistic Field Methods	3-5
EDUC 146X	Perspectives on the Education of Linguistic Minorities	3-4	LINGUIST 255B	Sociolinguistics Classics and Community Studies	3-5
EDUC 157X	Education & Poverty: Research & Solutions	1	LINGUIST 256	Language, Gender and Sexuality	1-4
EDUC 165	History of Higher Education in the U.S.	3-5	MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1	MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
EDUC 201	History of Education in the United States	3-5	MUSIC 20A	Jazz Theory	3
EDUC 212X	Urban Education	3-4	MUSIC 186A	Music and Religious Experience in the Contemporary World	3-5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5	MUSIC 286A	Music and Religious Experience in the Contemporary World	3-5
EDUC 232	Culture, Learning, and Poverty	2-3	POLISCI 11N	The Rwandan Genocide	3
			POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3

POLISCI 121L	Racial-Ethnic Politics in US	5
POLISCI 125V	The Voting Rights Act	5
POLISCI 226	Race and Racism in American Politics	5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
PSYCH 29N	Growing Up in America	3
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 183	Mind, Culture, and Society Research Core	2-3
PSYCH 215	Mind, Culture, and Society	3
PUBLPOL 121L	Racial-Ethnic Politics in US	5
RELIGST 246	Constructing Race and Religion in America	4-5
SOC 14N	Inequality in American Society	4
SOC 15N	The Transformation of Socialist Societies	3
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 132	Sociology of Education: The Social Organization of Schools	4
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 140	Introduction to Social Stratification	3
SOC 142	Sociology of Gender	5
SOC 145	Race and Ethnic Relations in the USA	4
SOC 148	Comparative Ethnic Conflict	4
SOC 155	The Changing American Family	4
TAPS 151H	ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities	4-5
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
URBANST 112	The Urban Underclass	4
URBANST 123	Approaching Research and the Community	2-3
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
OSPCPTWN 49	Water in South Africa: Human Right, Public Trust, or Market Commodity?	4
OSPCPTWN 54	Monuments and Memory	3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 56	HIV Policy Issues and Models	3
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4
OSPPARIS 186F	Contemporary African Literature in French	4

African Studies

Courses offered by the Center for African Studies (CAS) are listed under the subject code AFRICAST on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AFRICAST&filter-catalognumber-AFRICAST=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AFRICAST&filter-catalognumber-AFRICAST=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AFRICAST&filter-catalognumber-AFRICAST=on>).

The Center for African Studies coordinates an interdisciplinary program in African Studies for undergraduates and graduate students. The program seeks to enrich understanding of the interactions among the social, economic, cultural, historical, linguistic, genetic, geopolitical, ecological, and biomedical factors that shape and have shaped African societies.

Courses in African Studies are offered by departments and programs throughout the University. Each year CAS sponsors a range of seminars and workshops to demonstrate to advanced undergraduates and graduate students how topics of current interest in African Studies are approached from different disciplinary perspectives.

Course offerings in African languages are also coordinated by the Center for African Studies. Along with regular courses in several levels of Arabic, Swahili, Xhosa, and Zulu, the center arranges with the African and Middle Eastern Languages and Literatures Program in the Stanford Language Center to offer instruction in other African languages; in recent years, it has offered courses in Afrikaans, Amharic, Igbo, Kinyarwanda, Shona, Twi, Wolof, and Yoruba.

The Center for African Studies offers a master of arts degree for graduate students. Undergraduates and graduate students not pursuing the master's degree can specialize in African Studies under the arrangements described under the Undergraduate (p. 302) and Master's (p. 304) tabs.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in African Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

Overseas Studies Courses in African and African American Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 24B	Targeted Research Project in Community Health and Development	5

Undergraduate Programs in African Studies

Undergraduates may choose an African Studies focus from:

1. A minor in African Studies offers students the ability to combine a focus on Africa with their major in any other discipline. This offers the students a strong regional specialization. For requirements see the "Minor in African Studies (p. 303)" section of this bulletin.
2. A major in a traditionally defined academic department such as Anthropology (p. 311), History (p. 486), or Political Science (p. 584). These departments afford ample opportunity to enroll in courses outside the major, leaving the student free to pursue the interdisciplinary study of Africa.
3. Interdepartmental majors, such as African and African American Studies (p. 287) or International Relations (p. 520), which offer coordinated and comprehensive interdisciplinary course sequences, permitting a concentration in African Studies.

Certificate in African Studies

Students may apply for a certificate in African Studies. Requirements for the certificate are the same as for the minor; however, students may double-count courses applied toward their major or graduate studies. The certificate in African Studies is issued by the Center for African Studies and will not appear on any University record, including the student's transcript. For more information and an application, contact the center.

Minor in African Studies

The Center for African Studies awards a minor in African Studies. Students majoring in any field qualify for this minor by meeting the following requirements:

1. A minimum of 25 units of Africa-related courses. Students may not double-count courses for completing major and minor requirements.
2. At least one quarter's exposure to a sub-Saharan African language. The Center for African Studies and the Special Languages Program may arrange instruction in any of several languages spoken in West, East, Central, and Southern Africa.
3. One introductory course that deals with more than one region of Africa.
4. A minimum 25-page research paper, with a focus on Africa. This paper may be an extension of a previous paper written for an African Studies course.
5. A designated focus of study, either disciplinary or regional, through a three-course concentration.

Upon completion of requirements, final certification of the minor is made by the Center for African Studies and appears on the student's transcript.

Africa-Related Courses

Below is a sample of AFRICAST and related courses that may be counted toward the minor. Other courses may also fulfill the requirements. Please consult your African Studies minor adviser.

		Units
AFRICAST 109	Running While Others Walk: African Perspectives on Development	5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 115	South African Encounters	1

AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 300	Contemporary Issues in African Studies	1
Related courses from other departments		
AFRICAAM 30	The Egyptians	3-5
AFRICAAM 47	History of South Africa	3
AFRICAAM 131	Genes and Identity	5
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAAM 145B	Africa in the 20th Century	5
AMELANG 100A	Beginning Amharic, First Quarter	4
AMELANG 106A	First-Year Swahili, First Quarter	5
AMELANG 114A	Beginning Afrikaans, First Quarter	4
AMELANG 134A	First-Year Igbo, First Quarter	4
AMELANG 136A	First-Year Xhosa, First Quarter	4
AMELANG 153A	First-Year Twi, First Quarter	4
AMELANG 156A	First-Year Zulu, First Quarter	4
AMELANG 180A	First-Year Kinyarwanda, First Quarter	4
AMELANG 187A	First-Year Yoruba, First Quarter	4
ANTHRO 1	Introduction to Cultural and Social Anthropology	5
ANTHRO 13A	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ANTHRO 140	Ethnography of Africa	3
ANTHRO 141B	The Anthropology of Bits and Bytes: Digital Media in the Developing World	5
ANTHRO 147	Nature, Culture, Heritage	5
ANTHRO 185	Medical Anthropology of Contemporary Africa	5
COMPLIT 229	Literature and Global Health	3-5
DANCE 24	Introduction to Dance in the African Diaspora	4
ECON 118	Development Economics	5
HISTORY 48Q	South Africa: Contested Transitions	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 248S	Colonial States and African Societies, Part I	4-5
HISTORY 249S	Colonial States and African Societies, Part II	4-5
HISTORY 283	The New Global Economy, Oil and Origins of the Arab Spring	4-5
HUMBIO 129	Critical Issues in International Women's Health	4
LAWGEN 111Q	Introduction to International Human Rights	3
MUSIC 186C	Music and the Postcolonial World	3-4
OSPBEIJ 67	China-Africa and Middle East Relations	4
OSPCPTWN 16	South Africa Sites of Memory	2
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3

OSPCPTWN 24B	Targeted Research Project in Community Health and Development	5
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
OSPCPTWN 49	Water in South Africa: Human Right, Public Trust, or Market Commodity?	4
OSPCPTWN 50	[Independent Study] Conservation & Resources in Sub-Saharan Africa	2-3
OSPCPTWN 51	Urban Design and Development: Opportunities and Limitations of WDCCT 2014	4
OSPCPTWN 54	Monuments and Memory	3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 56	HIV Policy Issues and Models	3
OSPCPTWN 57	Directed Study in Health Systems and Policy	1-3
OSPCPTWN 58	Racism, Colonialism and Genocide	3-5
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4
POLISCI 11N	The Rwandan Genocide	3
POLISCI 146A	African Politics	4-5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
SURG 150	Global Humanitarian Medicine	1-2
THINK 42	Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being	4

Graduate Study in African Studies

For those who wish to specialize in Africa at the graduate level, African Studies can be designated a field of concentration within the master's and doctoral programs of some academic departments. Students in such departments as Anthropology (p. 310), History (p. 485), Political Science (p. 583), and Sociology (p. 629), and in the School of Education (p. 151), may declare African Studies as the area of specialization for their master's and Ph.D. thesis work. Some other departments, programs, and institutes such as the International Comparative Education Program also permit students to specialize in African Studies.

Financial Aid

The Center for African Studies (CAS) does not offer financial aid. However, CAS offers a variety of fellowship opportunities to Stanford graduate students of different levels and disciplines. The following is a partial list:

1. MA Fellowship: Partial funding for two incoming MA students in African Studies.
2. Susan Ford Dorsey Fellowship for Field Research in Africa: 9-12 month dissertation field research fellowship for PhD candidates in H&S.
3. Summer Research and Language Fellowship: Graduate research fellowship; intensive African language fellowship for graduate and undergraduate students.

Coterminal Bachelor's and Master of Arts in African Studies

The one-year master's program in African Studies is designed for students who have experience working, living, or studying in Africa, and little prior course work on the region.

Undergraduates at Stanford may apply for admission to the coterminal master's program in African Studies. Coterminal degree applications will only be accepted from students in their fourth year, meaning that the program must be completed in the fifth year. An exception can only be made for students who completed an honors thesis in their third year. For University coterminal degree program rules and application forms, see the Registrar (<http://registrar.stanford.edu/shared/publications.htm#Coterm>) web site. Requirements for the master's degree are summarized below.

The annual deadline for all applications, including coterminal and master's, is December 9. All applicants must submit an online application, including a 500-word statement of purpose, resume, 15-20 page double-spaced academic writing sample, three letters of recommendation, official transcripts, and Graduate Record Examination scores. TOEFL scores are required of applicants for whom English is not their first language or who did not attend an undergraduate institution where English is the language of instruction. To apply online and for information on graduate admissions, see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Degree Requirements

University requirements for the master's degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The program requires completion of a minimum of 45 graduate units. Upon entering, each student is assigned a faculty adviser who works with the student to develop a customized program of study.

To receive the M.A. degree in African Studies, students must complete:

1. Core Courses (15 units)

Students must complete the core African Studies M.A. course, AFRICAST 301A The Dynamics of Change in Africa, in Autumn Quarter. Students elect two additional graduate courses taught by African Studies academic council members and drawn from a list of approved courses. Students must also complete, AFRICAST 302 Research Workshop, in Spring Quarter, in which they present and discuss their research and research interests.

2. Cognate Courses (10 units)

A minimum of 10 units of graduate-level credit in two cognate courses from the following thematic clusters not chosen as the student's concentration field:

- a. culture and society
- b. health, well-being, and the environment
- c. political economy and security.

3. Concentration Field (15 units)

Students choose one area of specialization:

- a. culture and society
- b. health, well-being, and the environment
- c. political economy and security
 - Students also choose a group of three related elective courses for graduate credit from the cognate course listings or elsewhere in the Stanford curriculum in consultation with the student's adviser and with the approval of the CAS director. With approval, one introductory course may be substituted in a field such as advanced undergraduate biology or statistics for those interested in epidemic

diseases or public health. The academic adviser, in agreement with faculty in the chosen field, guarantees that each set of courses forms part of a coherent program.

4. Language Requirement

Students take one year of training in an African language, usually at least 3 units per quarter, resulting in intermediate-level proficiency as measured by the American Council on the Teaching of Foreign Languages (ACTFL) or comparable language acquisition standards. Students who have advanced proficiency in several African languages may fulfill this requirement by taking another European language spoken in Africa, such as French or Portuguese, or by taking a year-long sequence in Arabic.

5. Seminar Requirement

Students enroll each quarter in AFRICAST 300 Contemporary Issues in African Studies, 1 unit, in which guest scholars present lectures on African themes and topics.

6. Thesis Option

Students may elect to write a master's thesis; they may register for up to 10 units of thesis research under the guidance of an Academic Council member. Thesis units may be counted toward the electives within the concentration field unit requirements.

7. Grade Requirements

Courses to be counted toward the degree, except for AFRICAST 300 Contemporary Issues in African Studies, must be taken for a letter grade and receive a grade of 'B' or higher.

In addition to AFRICAST courses, master's students will take Africa-related courses across departments and schools due to the interdisciplinary nature of the degree. The following list represents a small sample of courses that may be used to fulfill the requirements of the master's degree. To count toward the completion of the master's degree, courses should be taken at the graduate level and approved by the African Studies graduate adviser.

Courses in AFRICAST

		Units
AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 238	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 300	Contemporary Issues in African Studies	1
AFRICAST 301A	The Dynamics of Change in Africa	4-5

Related Courses from Other Departments

		Units
AMELANG 100A	Beginning Amharic, First Quarter	4
AMELANG 106A	First-Year Swahili, First Quarter	5
AMELANG 114A	Beginning Afrikaans, First Quarter	4
AMELANG 134A	First-Year Igbo, First Quarter	4
AMELANG 136A	First-Year Xhosa, First Quarter	4

AMELANG 153A	First-Year Twi, First Quarter	4
AMELANG 156A	First-Year Zulu, First Quarter	4
AMELANG 180A	First-Year Kinyarwanda, First Quarter	4
AMELANG 187A	First-Year Yoruba, First Quarter	4
ANTHRO 201	Introduction to Cultural and Social Anthropology	5
ANTHRO 239	Ethnography of Africa	5
ANTHRO 247	Nature, Culture, Heritage	5
ANTHRO 285	Medical Anthropology of Contemporary Africa	5
ANTHRO 346	The Social Imagination	5
ANTHRO 353	Landscape	5
ANTHRO 372	Urban Ecologies	5
CEE 265D	Water and Sanitation in Developing Countries	1-3
COMPLIT 229	Literature and Global Health	3-5
CS 546	Seminar on Liberation Technologies	1
ECON 214	Development Economics I	2-5
ECON 215	Economic Development II	2-5
ECON 315	Development Workshop	1-10
EDUC 202	Introduction to Comparative and International Education	4-5
EDUC 377C	Strategic Philanthropy	3
FINANCE 381	Private Equity in Frontier Markets: Creating a New Investible Asset Class	4
HISTORY 345B	African Encounters with Colonialism	4-5
HISTORY 383	The New Global Economy, Oil and Origins of the Arab Spring	4-5
HISTORY 448A	Colonial States and African Societies, Part I	4-5
HISTORY 448B	Colonial States and African Societies, Part II	4-5
IPS 213	International Mediation and Civil Wars	3-5
MED 232	Discussions in Global Health	2
MUSIC 286C	Music and the Postcolonial World	3-4
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 337T	Designing Liberation Technology	3-4
SURG 250	Global Humanitarian Medicine	1-2

Joint Degree Program in African Studies and Law

This joint degree program grants an M.A. degree in African Studies and a Doctor of Jurisprudence (J.D.) degree. It is designed to train students interested in a career in teaching, research, or the practice of law related to African legal affairs. Students must apply separately to the African Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of training in African languages. A number of approved courses may be counted towards both degrees. For more information, see the "Joint Degree Programs (<http://www.stanford.edu/dept/registrar/bulletin/7376.htm>)" section of this bulletin and the Stanford Law School's web site (<http://www.law.stanford.edu/degrees/joint>). Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

Emeriti: David B. Abernethy, Ellen Jo Baron, John Baugh, Joan Bresnan, Susan Cashion, Sandra E. Drake, Peter Egbert, James L. Gibbs, Jr., William B. Gould, Bruce F. Johnston, William R. Leben, Bruce Lusignan, Elisabeth Mudimbe-Boyi, Mary Polan, Hans N. Weiler, Sylvia Wynter

Director: Grant Parker, Richard Roberts

Professors: H. Samy Alim (Education), Jean-Marie Apostolidès (French), Michele Barry (Medicine), Joel Beinin (History), John Boothroyd (Microbiology and Immunology), James T. Campbell (History), Martin Carnoy (Education), Prudence L. Carter (Education), William H. Durham (Anthropology), Harry Elam (Drama), James Fearon (Political Science), James Ferguson (Anthropology), Shelley Goldman (Education), Terry Lynn Karl (Latin American Studies and Political Science), Richard Klein (Anthropology), David Laitin (Political Science), Yvonne Maldonado (Pediatrics), Lynn Meskell (Anthropology), Julie Parsonnet (Medicine and Health Research and Policy), John Rickford (Linguistics), Richard Roberts (History)

Associate Professors: Vincent Barletta (Comparative Literature and Iberian and Latin American Cultures), Alexandria B. Boehm (Civil and Environmental Engineering), Jenna Davis (Civil and Environmental Engineering), Paulla A. Ebron (Anthropology), Oliver Fringer (Civil and Environmental Engineering), Duana Fulwilley (Anthropology), Liisa Malkki (Anthropology), Grant Parker (Classics), Jeremy Weinstein (Political Science)

Assistant Professors: Eran Bendavid (General Internal Medicine), Katherine Casey (Political Economy), Pascaline Dupas (Economics), Vaughn Rasberry (English), Krish Seetah (Anthropology)

Professor (Research): David Katzenstein (School of Medicine), Cheryl Koopman (Psychiatry and Behavioral Sciences)

Professor (Teaching): Robert Siegel (Microbiology and Immunology)

Associate Professor (Clinical): Brian Blackburn (Infectious Diseases), Daryn Reicherter (Psychiatry and Behavioral Sciences), Hugh Brent Solvason (Psychiatry and Behavioral Sciences)

Senior Lecturers: Khalil Barhoum (African and Middle Eastern Languages)

Lecturers: Kwame Assenyoh (African and Middle Eastern Languages), Byron Bland (Law), Jonathan Greenberg (Law), Alvan Ikoku (Comparative Literature), Ronald Jennings (Anthropology), Sarah Mkhonza (African and Middle Eastern Languages), Samuel Mukoma (African and Middle Eastern Languages), Jill Rosenthal (History), Ramzi Salti (African and Middle Eastern Languages), Timothy Stanton (Bing Overseas Studies)

Consulting Professors: Anne Firth-Murray (Human Biology), Joel Samoff (Center for African Studies)

Curators: Karen Fung (African Collection Curator, Green Library), Regina Roberts (Bibliographer, Green Library), Anna Lessenger Soland (Assistant Curator, Arts of Africa and the Americas, Cantor Arts Center)

Senior Research Fellows: Coit Blacker (Freeman Spogli Institute), Larry Diamond (Freeman Spogli Institute, Hoover Institution), Marcel Fafchamps (Freeman Spogli Institute), Helen Stacy (Freeman Spogli Institute), Stephen Stedman (Freeman Spogli Institute, Center for International Security and Cooperation)

Overseas Studies Courses in African Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

OSPCPTWN 18 Xhosa Language and Culture

OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 24B	Targeted Research Project in Community Health and Development	5
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
OSPCPTWN 49	Water in South Africa: Human Right, Public Trust, or Market Commodity?	4
OSPCPTWN 54	Monuments and Memory	3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 56	HIV Policy Issues and Models	3
OSPCPTWN 58	Racism, Colonialism and Genocide	3-5
OSPCPTWN 71	Power and Performance in Community Practice	4

American Studies

Courses offered by American Studies Program are listed under the subject code AMSTUD on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AMSTUD&filter-catalognumber-AMSTUD=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AMSTUD&filter-catalognumber-AMSTUD=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AMSTUD&filter-catalognumber-AMSTUD=on>).

Mission of the Undergraduate Program in American Studies

The mission of the undergraduate program in American Studies is to provide students with a broad understanding of American culture and society. Building on a foundation of courses in history and institutions, literature and the arts, and race and ethnicity, students learn to analyze and interpret America's past and present, forging fresh and creative syntheses along the way. The program is an interdisciplinary major and, beyond the core requirements of the major, students may define and pursue their own interests from fields such as history, literature, art, communication, theater, African American studies, feminist studies, economics, anthropology, religious studies, Chicana/o studies, law, sociology, education, Native American studies, music, and film. The program is designed to provide students majoring in American Studies with excellent preparation for further study in graduate or professional schools as well as careers in government, business, or other specialized fields.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. higher order, interdisciplinary, historically informed understanding of how to think about American culture and society, drawing on course work in: history and institutions; literature, art, and culture;

Units
2

comparative race and ethnicity; and each student's individualized thematic focus.

2. ability to identify and critically to assess different disciplinary, methodological, and interpretive approaches to the study of Americans and their past.
3. ability to produce their own persuasive, nuanced, fact-based interpretations reflecting a close critical reading and analysis of relevant primary or secondary sources.
4. ability to express their interpretive and analytical arguments in clear, effective prose.
5. ability to listen actively and to contribute to productive intellectual discussion in class.

Bachelor of Arts in American Studies

The core requirements illustrate how different disciplines approach the study and interpretation of American life and include three courses in each of two main areas: history and institutions; and literature, culture, and the arts. One additional course in comparative race and ethnicity is also required. The required gateway seminar, AMSTUD 160 Perspectives on American Identity, explores the tensions between commonality and difference from a variety of disciplinary perspectives.

Beyond the core requirements of the major, American Studies expects students to define and pursue their own interests in interpreting important dimensions of American life. Accordingly, each student designs a thematic concentration of at least five courses drawn from fields such as history, literature, art, communication, theater, political science, African American studies, feminist studies, economics, anthropology, religious studies, Chicana/o studies, law, sociology, education, Native American studies, music, and film. At least one of the five courses in a student's thematic concentration should be a small group seminar or a colloquium. With program approval, students may conclude the major with a capstone honors research project during their senior year.

Whether defined broadly or narrowly, the thematic focus or concentration should examine its subject from the vantage of multiple disciplines. Examples of concentrations include: race and the law in America; gender in American culture and society; technology in American life and thought; health policy in America; art and culture in 19th-century America; education in America; nature and the environment in American culture; politics and the media; religion in American life; borders and boundaries in American culture; the artist in American society; and civil rights in America.

Completion of the major thus normally requires 13 courses (totaling at least 60 units), all of which must be taken for a letter grade. Not all courses are offered each year; students should consult ExploreCourses (<http://explorecourses.stanford.edu>) for scheduling information for the current academic year.

Degree Requirements

1. Gateway Seminar

AMSTUD 160	Perspectives on American Identity (WIM course for American Studies)	Units 5
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2. History and Institution

Majors are required to complete three courses in American History and Institutions. Specific requirements are:

AMSTUD/ HISTORY 150A	Colonial and Revolutionary America	Units 5
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AMSTUD/ HISTORY 150B	19th-Century America	5
Select one of the following:		3-5
AMSTUD/ COMM 1B	Media, Culture, and Society	
AMSTUD/ POLISCI 2	Introduction to American National Government and Politics	
AMSTUD 91	Exploring American Religious History	
AMSTUD 107	Introduction to Feminist Studies	
AMSTUD/ ECON 116	American Economic History	
AMSTUD 121Z	Political Power in American Cities	
AMSTUD 135	Deliberative Democracy and its Critics	
AMSTUD 140	Stand Up Comedy and the "Great American Joke" Since 1945	
AMSTUD/ HISTORY 150C	The United States in the Twentieth Century	
AMSTUD 154	American Intellectual and Cultural History to the Civil War	
AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors	
AMSTUD 157	The Constitution: A Brief History	
AMSTUD/ HISTORY 161	Women in Modern America	
AMSTUD/ EDUC 165	History of Higher Education in the U.S.	
AMSTUD/ HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	
AMSTUD 179/POLISCI 122	Introduction to American Law	
AMSTUD/ HISTORY 201	History of Education in the United States	
AMSTUD/ HISTORY 256	America- China Relations	
AMSTUD/ HISTORY 258	Topics in the History of Sexuality: Sexual Violence in America	
AMSTUD 265	Writing Asian American History	
AMSTUD 281	Asian Religions in America; Asian American Religions	
SOC 155	The Changing American Family	

3. Literature, Culture, and the Arts

Majors are required to take a minimum of three courses in literature, culture, and the arts, broadly understood. Specific requirements are:

	Units
At least one course focusing on the period before the Civil War, normally:	
AMSTUD 150/ ENGLISH 123	5
Select two of the following: ¹	6-10
AMSTUD 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice
AMSTUD/ ENGLISH 68N	Mark Twain and American Culture

AMSTUD 120/COMM 120W	Digital Media in Society
AMSTUD 121	Introduction to American Literature
AMSTUD 124A	The American West
AMSTUD/ ARTHIST 132	American Art and Culture, 1528-1910
AMSTUD/ ENGLISH 139B	American Women Writers, 1850-1920
AMSTUD 140	Stand Up Comedy and the "Great American Joke" Since 1945
AMSTUD 145M/ ARTHIST 145	Culture Wars: Art and Social Conflict in the USA, 1890-1950
AMSTUD/ COMPLIT 146	Asian American Culture and Community
AMSTUD/ ENGLISH 146C	Hemingway, Hurston, Faulkner, and Fitzgerald
AMSTUD 152G	Harlem Renaissance
AMSTUD 154X/ ARTHIST 154	The American Civil War: A Visual History
AMSTUD 159X/ ARTHIST 159	American Photographs, 1839-1971: A Cultural History
AMSTUD 178	Ethnicity and Dissent in United States Art and Literature
AMSTUD 183	Re- Imagining American Borders
AMSTUD/ ENGLISH 186	Tales of Three Cities: New York, Chicago, Los Angeles
AMSTUD/ EDUC 226X	Curating Experience: Representation in and beyond Museums
AMSTUD/ ARTHIST 244	The Visual Culture of the American Home Front, 1941-1945
THINK 31	Reimagining America

4. Comparative Race and Ethnicity

Majors are required to take one course that focuses on the comparative study of race and ethnicity rather than a single racial or ethnic group.

Choose one from the following list:

AMSTUD 51Q	Comparative Fictions of Ethnicity	3-5
AMSTUD 54N	African American Women's Lives	
AMSTUD 114Q	Visions of the 1960s	
AMSTUD 121L	Racial-Ethnic Politics in US	
AMSTUD/ COMPLIT 142	The Literature of the Americas	
AMSTUD 152G	Harlem Renaissance	
AMSTUD/ CSRE 183	Re- Imagining American Borders	
AMSTUD 214	The American 1960s: Thought, Protest, and Culture	

AMSTUD 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy
AMSTUD 271	Mexicans in the United States
AMSTUD 272E	Theories of Citizenship and Sovereignty in a Transnational Context
AMSTUD 281	Asian Religions in America; Asian American Religions
SOC 149	The Urban Underclass

5. Concentration and Capstone Seminar

Students must design a thematic concentration of at least five courses, with the help of faculty advisers. The courses, taken together, must give the student in-depth knowledge and understanding of a coherent topic in American cultures, history, and institutions. Thematic concentrations should be approved by the end of the registration period of the Autumn Quarter of the junior year, if at all possible. Sample thematic concentrations and courses that allow a student to explore them are available in the American Studies Office in Building 460.

At least one of the courses in the concentration must be designated as the capstone seminar and must require a substantial research paper on a topic related to the thematic concentration. This paper must be filed in the program office prior to degree conferral. The program office has a list of courses that satisfy the capstone requirement, but students are encouraged to propose others that may fit better with their concentrations. An honors project, or an independent study course with a faculty member culminating in a research paper, may also fulfill this requirement with the Director's approval.

Students may choose, but are not limited to, selections for their thematic concentrations from the following list of suggested courses:

		Units
AFRICAAM 16N	African Americans and Social Movements	3
AFRICAAM 105	Introduction to African and African American Studies	5
AMSTUD 101	American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations	3-5
ANTHRO 82	Medical Anthropology	5
ARTHIST 156	American and European Art, 1945-1968	4
ARTHIST 176	Feminism and Contemporary Art	4
ARTHIST 246A	California Dreaming: West Coast Art and Visual Culture, 1848 - present	5
CHILATST 14N	Growing Up Bilingual	3
CHILATST 125S	Chicano/Latino Politics	5
CHILATST 200	Latin@ Literature	3-5
CHILATST 201B	From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era	5
COMM 1A	Mass Media, Society, and Democracy	4-5
COMM 116	Journalism Law	5
COMM 117	Digital Journalism	5
COMM 125	Perspectives on American Journalism	5
COMM 162	Campaigns, Voting, Media, and Elections	5
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
CSRE 179G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
ECON 153	Economics of the Internet	5

ECON 155	Environmental Economics and Policy	5
ECON 157	Imperfect Competition	5
EDUC 102	Examining Social Structures, Power, and Educational Access	2-3
EDUC 112X	Urban Education	3-4
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
ENGLISH 146C	Hemingway, Hurston, Faulkner, and Fitzgerald	5
ENGLISH 151F	Angelheaded Hipsters: Beat Writers of San Francisco and New York	5
HISTORY 41Q	Mad Women: Women and Mental Illness in U.S. History	3
HISTORY 60N	Revolutionaries and Founders	3
HISTORY 64	Racial and Ethnic Diversity in Modern America	5
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5
HISTORY 201	Introduction to Public History and Public Service	4-5
HISTORY 260	California's Minority-Majority Cities	4-5
HISTORY 264G	Madness in American Society: The Social History of Mental Illness in the United States	5
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4
HUMBIO 120A	American Health Policy	3
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 123	Obesity in America: Clinical and Public Health Implications	3-4
HUMBIO 125	Current Controversies in Women's Health	2-3
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context	4
HUMBIO 175	Health Care as Seen Through Medical History, Literature, and the Arts	3
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
MUSIC 8A	Rock, Sex, and Rebellion	3
MUSIC 11Q	Art in the Metropolis	3
MUSIC 17Q	Perspectives in North American Taiko	4
MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
MUSIC 34N	Performing America: The Broadway Musical	3
NATIVEAM 103S	Native American Women, Gender Roles, and Status	5
NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 240	Psychology and American Indian Mental Health	3-5
POLISCI 110X	America and the World Economy	5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 120B	Campaigns, Voting, Media, and Elections	5
POLISCI 120C	What's Wrong with American Government? An Institutional Approach	5
POLISCI 121	Political Power in American Cities	5
POLISCI 124R	The Federal System: Judicial Politics and Constitutional Law	5
POLISCI 124S	Civil Liberties: Judicial Politics and Constitutional Law	5
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 225C	Fixing US Politics: Political Reform in Principle and Practice	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
PUBLPOL 101	Politics and Public Policy	5
PUBLPOL 125	Law and Public Policy	5
PUBLPOL 132	The Politics of Policy Making	3
PUBLPOL 135	Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area	3
PUBLPOL 154	Politics and Policy in California	3
PUBLPOL 156	Health Care Policy and Reform	4
PUBLPOL 194	Technology Policy	3-4
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 118	Social Movements and Collective Action	4
SOC 138	American Indians in Comparative Historical Perspective	4
SOC 142	Sociology of Gender	5
SOC 145	Race and Ethnic Relations in the USA	4
SOC 150	Race and Political Sociology	3
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
TAPS 180Q	Noam Chomsky: The Drama of Resistance	4
TAPS 248	Family Drama: American Plays about Families	5
URBANST 161	U.S. Urban History since 1920	5
URBANST 166	East Palo Alto: Reading Urban Change	5

¹ Including at least one course outside of literature that emphasizes art, drama, film, music, translation studies, or culture from a different disciplinary or interpretive perspective.

Honors Program

To graduate with honors, American Studies majors must complete a senior thesis and have an overall grade point average of 3.5 in the major, or demonstrated academic competence. Students must apply to enter the honors program no later than the end of registration period in Autumn Quarter of their senior year, and must enroll in 10-15 units of AMSTUD 250 Senior Research, during the senior year. These units are in addition to the units required for the major. The application to enter the program must contain a one-page statement of the topic of the senior thesis, and must be signed by at least one faculty member who agrees to be the student's honors adviser. (Students may have two honors advisers.) The thesis must be submitted for evaluation and possible revision to the adviser no later than four weeks before graduation.

Students are encouraged to choose an honors topic and adviser during the junior year. To assist students in this task, American Studies offers a pre-honors seminar (AMSTUD 240A Pre-Honors Seminar) in which students learn research skills, develop honors topics, and complete honors proposals. Students also may enroll in the American Studies Honors College during September before the senior year. American Studies also provides students the opportunity to work as paid research assistants for faculty members during the summer between their junior and senior year. More information about American Studies honors is available from the program office.

Minor in American Studies

To earn a minor in American Studies, students must complete at least 28 units of course work in the program. Because students may not count courses for both a major and a minor, the specific courses that are used for

an American Studies minor depend on the courses that are used to satisfy the major requirement.

A student must take the following:

	Units
AMSTUD 160 Perspectives on American Identity (The gateway seminar)	5
at least 2 courses from category 2 (History and Institutions)	6-10
at least 2 courses from category 3 (Literature, Culture and the Arts)	6-10
at least 1 course from category 4 (Comparative Race and Ethnicity)	3-5

If the units for these requirements do not total 28, the student must take additional coursework, appropriate to American Studies and approved by the Director or one of the Program Coordinators, to meet the minimum unit requirement. Courses used to satisfy all units taken for the minor must be taken for a letter grade.

Director: Shelley Fisher Fishkin

Program Coordinators: Richard Gillam, Judith Richardson

Committee in Charge: Shelley Fisher Fishkin (English, Chair), Barton J. Bernstein (History, emeritus), Jennifer DeVere Brody (Drama), Scott Bukatman (Art and Art History), James T. Campbell (History), Gordon H. Chang (History), Michele B. Elam (English), James Fishkin (Communication, and by courtesy, Political Science), Estelle Freedman (History), Richard Gillam (American Studies), Leah Gordon (Education), Allyson Hobbs (History), Ari Kelman (Education), Kathryn Gin Lum (Religious Studies), Doug McAdam (Sociology), Richard Meyer (Art and Art History), Ana Minian (History), Clayton Nall (Political Science), Alexander Nemerov (Art and Art History), Hilton Obenzinger (English, American Studies), Jack Rakove (History, Political Science), Vaughn Rasberry (English), Judith Richardson (English), Ramón Saldivar (English, Comparative Literature), Gary Segura (Political Science), Fred Turner (Communication), Caroline Winterer (History), Gavin Wright (Economics), Amy Beth Zegart (Hoover Senior Fellow)

Anthropology

Courses offered by the Department of Anthropology are listed under the subject code ANTHRO on the *Stanford Bulletin's* ExploreCourses web site.

Mission of the Department of Anthropology

The courses offered by the Department of Anthropology are designed to: provide undergraduates with instruction in anthropology; provide undergraduate majors in Anthropology with a program of work leading to the bachelor's degree; and prepare graduate candidates for advanced degrees in Anthropology. Anthropology is devoted to the study of human beings and human societies as they exist across time and space. It is distinct from other social sciences in that it gives central attention to the full time span of human history, and to the full range of human societies and cultures, including those located in historically marginalized parts of the world. It is therefore especially attuned to questions of social, cultural, and biological diversity, to issues of power, identity, and inequality, and to understanding the dynamic processes of social, historical, ecological, and biological change over time. Education in Anthropology provides excellent preparation for living in a multicultural and globally-interconnected world, and helps to equip students for careers in fields including law, medicine, business, public service, research, ecological sustainability, and resource management. Students may pursue degrees in Anthropology at the bachelor's, master's, and doctoral levels.

The Department of Anthropology offers a wide range of approaches to the topics and area studies within the field, including archaeology, ecology,

environmental anthropology, evolution, linguistics, medical anthropology, political economy, science and technology studies, and sociocultural anthropology. Methodologies for the study of micro- and macro-social processes are taught through the use of qualitative and quantitative approaches. The department provides students with excellent training in theory and methods to enable them to pursue graduate study in any of the above mentioned subfields of Anthropology.

Undergraduate Programs in Anthropology

- Bachelor of Arts (B.A.)
- Anthropology Minor

In addition to gaining an excellent foundation for graduate research and study, students majoring in Anthropology can pursue careers in government, international business, international development agencies, international education, law, mass media, nonprofit organizations, and public policy.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the degree program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the Anthropology discipline.
2. the ability to communicate ideas clearly and persuasively in writing.
3. identify analytical problems and make appropriate inferences and analytical arguments.
4. critically evaluate anthropological theory and ethnographic research.

Graduate Programs in Anthropology

Graduate training in Anthropology at Stanford is designed for students who seek the Doctoral (Ph.D.) degree, and for students who seek the Masters of Arts (M.A.) degree only.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Anthropology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses in the primary field, as well as related areas, and through experience with independent work, area specialization and field research.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Anthropology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Anthropology and to interpret and present the results of such research.

Field School and Research Opportunities in Anthropology

Students majoring in Anthropology are encouraged to develop field research projects under the supervision of a department faculty member. The department offers research grants to support individually-designed and other summer field research in Anthropology. The department research grants may be used to support field research as a supplement to other field

research grants such as the UAR research grants. The department also offers opportunities to participate in faculty-led research projects.

Please refer to <http://anthropology.stanford.edu> for information about the department's summer research opportunities, including the following: Beagle II Award, Tambopata, and Franz Boas summer scholars programs, and Michelle Z. Rosaldo Summer Field Research Grant program. Other field school opportunities include the following: Catalhoyuk and Chavin Huanter. *Note:* Required courses for the Franz Boas summer scholars program and the Michelle Z. Rosaldo grant program include:

	Units
ANTHRO 93 Prefield Research Seminar or ANTHRO 93B Prefield Research Seminar: Non-Majors	5
ANTHRO 94 Postfield Research Seminar	5

For more information about research opportunities and deadlines, see the department's web site.

Bachelor of Arts in Anthropology

Undergraduate training in the Department of Anthropology is designed for students who seek the Bachelor of Arts (B.A.) degree, only. Students may declare a major in Anthropology and earn the B.A. degree by completing the requirements below. The Department also offers a minor in Anthropology. The Anthropology B.A. degree program usually requires at least five quarters of enrollment. Students interested in majoring in Anthropology are encouraged to declare by the beginning of their junior year and to work closely with a faculty adviser to develop a coherent plan of study.

To declare a major in Anthropology, apply in Axxess for the B.A. in Anthropology, contact the department's student peer adviser(s) or the undergraduate student services specialist to prepare the department major checklist and planning form; submit the required forms to the undergraduate student services specialist; request a faculty adviser assignment and meet with the assigned faculty adviser for approval of the department major checklist and planning form. Students must apply in Axxess for the major in Anthropology by the time junior status is achieved at 85 units.

Degree Requirements

The B.A. degree in Anthropology may be earned by fulfilling the following requirements:

1. A faculty adviser appointed in the Department of Anthropology. A faculty adviser will be assigned based on the students chosen emphasis. Undergraduate Anthropology (ANTHRO) majors should plan to meet with their faculty adviser at least once each quarter.
2. A program of 65 units, passed with an overall minimum grade point average of 'C':
 - of the 65 units, 50 units must be in courses with the ANTHRO subject code. 15 may be approved from related areas of study, overseas studies, and/or transfer units.
 - any related, overseas studies, or transfer units must be approved by the faculty adviser and by petition to the undergraduate committee.
 - of the 65 units, at least 20 units with a minimum grade of 'C' must be in courses with the ANTHRO subject code numbered 100 or above and taught by Anthropology faculty.
 - no more than 10 units of directed reading-style course work may be counted towards the 50 units required for the major in the ANTHRO subject code.
 - no more than 10 units may be taken for a satisfactory/no credit grade: 5 units in ANTHRO courses, and 5 in related or transfer units.

3. A minimum grade of 'B' in the ANTHRO Writing in the Major (WIM) course from the chosen emphasis. This can be fulfilled by completing the ANTHRO Theory course, ANTHRO 90C or ANTHRO 90B, and should be taken within a year of declaring the Major or before the end of the junior year.
4. A minimum grade of 'B' in the ANTHRO Theory course from the chosen emphasis. This should be taken within a year of declaring the major or before the end of the junior year.
5. A minimum grade of 'B' in the ANTHRO Methods course (ANTHRO 91 Method and Evidence in Anthropology). This should be taken within a year of declaring the major or before the end of the junior year.
6. Students must enroll in the senior Capstone course, (ANTHRO 193 Anthropology Capstone: Contemporary Debates in Anthropology) during their senior year.
7. An approved plan of study which includes an emphasis chosen from the list below. Students must complete a minimum of 20 units in their chosen emphasis of which 10 units must be numbered 100 or above.
 - Culture and Society
 - Ecology, Environment, and Evolution
 - Medical Anthropology
 - Self-Designed Emphasis (with faculty adviser and undergraduate committee approval, only)
8. Competence in a foreign language beyond the first-year level. Such competence is usually demonstrated by completing a 5 unit course at the second-year level with a minimum grade of 'B-'. The requirement may be met by special examination administered through the Language Center, or demonstration of superior placement scores.
 - Up to 5 units from a second-year language course can count towards the "Related to Anthro" category of the major requirements.
9. At least five quarters of enrollment in the major. Each candidate for the B.A. in Anthropology should declare a major by the first day of the first quarter of the third year of study.

Advising is an important component of the Anthropology major. Students are encouraged to work closely with their major adviser throughout their pursuit of the B.A. degree. Advising milestones for the major include the following:

1. In the quarter in which the major is declared, students meet with their assigned faculty adviser, create a rigorous plan of study based on topical breadth, obtain adviser approval of an Anthropology emphasis as part of the plan of study, and obtain the major adviser's signature on the Major Checklist form.
2. Undergraduate Anthropology majors should plan to meet with their major faculty adviser at least once each quarter before the final study list deadline. Any revisions to the initial checklist must be approved by the faculty adviser.
3. Undergraduate Anthropology majors must submit an updated major checklist and planning form to the Undergraduate Student Services Specialist in the quarter before graduating.

Required Courses

1. Writing in the Major courses

Undergraduate majors can fulfill the Writing in the major course requirement for the B.A. in Anthropology by taking the ANTHRO theory course designated from a chosen emphasis.

2. Theory courses

Enroll in one of the following theory courses according to the student's chosen emphasis:

Units

Culture and Society/Medical Anthropology:

ANTHRO 90B	Theory of Cultural and Social Anthropology	5
Ecology, Environment, and Evolution:		
ANTHRO 90C	Theory of Ecological and Environmental Anthropology	5

3. Methods courses

The following course fulfills the ANTHRO undergraduate major methods course requirement for all emphases:

ANTHRO 91	Method and Evidence in Anthropology	5
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4. Capstone Course

The following course fulfills the ANTHRO undergraduate major capstone course requirement for all emphases:

ANTHRO 193	Anthropology Capstone: Contemporary Debates in Anthropology	5
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Department Courses

Students should complete a minimum of 20 units from the courses listed below within their chosen emphases; 10 of these units must be numbered 100, or above. Departmental courses may fulfill the requirements for more than one emphasis. For example: with approval, an Archaeology course may fulfill a course needed to meet a course requirement in the Medical Anthropology emphasis. Undergraduates may also petition to the undergraduate committee for a self-designed emphasis in the Anthropology major.

Cultural & Society Anthropology Courses

ANTHRO 1	Introduction to Cultural and Social Anthropology	5
ANTHRO 4	Language and Culture	4-5
ANTHRO 30Q	The Big Shift	4
ANTHRO 34	Animals and Us	5
ANTHRO 42	Megacities	5
ANTHRO 49	Violence and Belonging in the Middle East	3-5
ANTHRO 90B	Theory of Cultural and Social Anthropology	5
ANTHRO 91	Method and Evidence in Anthropology	5
ANTHRO 122A	Race and Culture in Mexico and Central America	3-5
ANTHRO 124N	Maya Mythology and the Popol Vuh	3
ANTHRO 126	Urban Culture in Global Perspective	5
ANTHRO 136	The Anthropology of Global Supply Chains	5
ANTHRO 140	Ethnography of Africa	5
ANTHRO 141B	The Anthropology of Bits and Bytes: Digital Media in the Developing World	5
ANTHRO 146G	Paperwork	5
ANTHRO 149	South Asia: History, People, Politics	5
ANTHRO 152	Ritual, Politics, Power	5
ANTHRO 187	Nuclear Cultures	5

Medical Anthropology Courses

ANTHRO 82	Medical Anthropology	3-5
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
ANTHRO 154	Anthropology of Drugs: Experience, Capitalism, Modernity	5
ANTHRO 175	Human Skeletal Anatomy	5
ANTHRO 176	Cultures, Minds, and Medicine	1
ANTHRO 182N	Smoke and Mirrors in Global Health	3
ANTHRO 186	Culture and Madness	5

Ecology, Environment & Evolution Anthropology Courses

ANTHRO 10SC	Darwin, Evolution, and Galapagos	2
ANTHRO 90C	Theory of Ecological and Environmental Anthropology	5
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case	3-5
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 163	Conservation and Evolutionary Ecology	5
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	3-5
ANTHRO 169	The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet	3-5

Senior Courses

ANTHRO 95B	Directed Study in Honors and Senior Papers	1-10
ANTHRO 193	Anthropology Capstone: Contemporary Debates in Anthropology	5

Senior Paper/Honors & Research Courses

ANTHRO 92A	Undergraduate Research Proposal Writing Workshop	2-3
ANTHRO 92B	Undergraduate Research Proposal Writing Workshop	2-3
ANTHRO 93	Prefield Research Seminar	5
ANTHRO 93B	Prefield Research Seminar: Non-Majors	5
ANTHRO 94	Postfield Research Seminar	5
ANTHRO 95	Research in Anthropology	1-10
ANTHRO 96	Directed Individual Study	1-10
ANTHRO 97	Internship in Anthropology	1-10

Emphasis Courses

The following course listing includes courses taught by the Anthropology faculty in Archaeology. These courses may be considered towards the published emphasis requirements in the Anthropology bachelors degree with the culture and society, ecology, environment and evolution, medical, and self-designed emphases in the Anthropology undergraduate major.

Archaeology Courses

		Units
ANTHRO 3	Introduction to Prehistoric Archeology	3-5
ANTHRO 34	Animals and Us	5
ANTHRO 91A	Archaeological Methods	5
ANTHRO 98B	Digital Methods in Archaeology	3-5
ANTHRO 100C		2-5
ANTHRO 106	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 108E	Catalhoyuk and Neolithic Archaeology	3
ANTHRO 113B	Religious Practices in Archaeological Cultures	5
ANTHRO 115	The Social life of Human Bones	3-5
ANTHRO 118	Heritage, Environment, and Sovereignty in Hawaii	4
ANTHRO 119	Zooarchaeology: An Introduction to Faunal Remains	5
ANTHRO 134	Object Lessons	5

Plan of Study (example)

Please see the example Plan of Study grid below designed for an ANTHRO major beginning junior year (from 85 units). This sample course schedule details the courses needed to satisfy the requirements for the Culture & Society emphasis.

Junior	Units		
	Autumn	Winter	Spring
Method and Evidence in Anthropology (ANTHRO 91)		5	
Undergraduate Research Proposal Writing Workshop (ANTHRO 92A)	2-3		
Culture, Narrative, and Medicine (ANTHRO 178A)		5	
Language and Culture (ANTHRO 4)	4-5		
Undergraduate Research Proposal Writing Workshop (ANTHRO 92B)			2-3
Introduction to Cultural and Social Anthropology (ANTHRO 1)			5
Theory of Cultural and Social Anthropology (ANTHRO 90B)			5
Sex and Gender (ANTHRO 15)			3
Prefield Research Seminar (ANTHRO 93)			5
Field School Training Workshop (ANTHRO 98F)			1-3
The Anthropology of Global Supply Chains (ANTHRO 136)			5
Medical Anthropology (ANTHRO 82)			3-5
Year Total:	16-18	15-16	14-18
Senior	Units		
	Autumn	Winter	Spring
Urban Culture in Global Perspective (ANTHRO 126)		5	
Senior and Master's Paper Writing Workshop (ANTHRO 199)	1-2		
Postfield Research Seminar (ANTHRO 94)		5	
Anthropology Capstone: Contemporary Debates in Anthropology (ANTHRO 193)		5	
Ritual, Politics, Power (ANTHRO 152)			5
Ethnography of Africa (ANTHRO 139)			5
Senior and Master's Paper Writing Workshop (ANTHRO 199)			1-2
Directed Study in Honors and Senior Papers (ANTHRO 95B)			1-10
South Asia: History, People, Politics (ANTHRO 149)			5
Year Total:	16-17	11-12	6-15
Total Units in Sequence:			78-96

Course selections may vary depending on the students chosen emphasis. The number of units needed to satisfy the ANTHRO major requirements may also vary depending on the student's current undergraduate status and units accomplished previously before declaration of the ANTHRO major.

Research Courses

Courses listed are recommended for students writing a research paper in the major:

		Units
ANTHRO 92A	Undergraduate Research Proposal Writing Workshop	2-3
ANTHRO 93B	Prefield Research Seminar: Non-Majors	5
ANTHRO 93	Prefield Research Seminar	5
ANTHRO 94	Postfield Research Seminar	5
ANTHRO 95	Research in Anthropology	1-10
ANTHRO 199	Senior and Master's Paper Writing Workshop	1-2
Total Units		19-30

Senior Courses

		Units
ANTHRO 95B	Directed Study in Honors and Senior Papers	1-10
ANTHRO 193	Anthropology Capstone: Contemporary Debates in Anthropology	5

Senior Paper

The senior paper program in Anthropology provides majors with the opportunity to conduct original research under the guidance of an

Anthropology faculty member. All Anthropology majors are encouraged to write a senior paper. Interested Anthropology majors of junior standing may apply to the senior paper program by submitting a senior paper application form, including a research topic/title of the proposed senior paper project, a two page abstract/proposal, and a letter of reference from their faculty adviser to the undergraduate student services specialist on or by February 15 in the junior year. Enrollment in ANTHRO 95 Research in Anthropology is recommended during Autumn and Winter quarters of the senior year. Students must enroll in ANTHRO 95B Directed Study in Honors and Senior Papers in the final quarter of the undergraduate degree program before graduating. The senior paper is submitted in the final quarter before graduation. For more information, see the undergraduate student services specialist.

Honors Program

The honors program in Anthropology provides eligible Anthropology majors with an opportunity to conduct original ethnographic, field, laboratory, or library-based research under the guidance of an Anthropology faculty member. All Anthropology majors are urged to consider applying to the Departmental Honors Program in Anthropology. Interested Anthropology majors of junior standing may apply for admission to the honors program by applying first in Axess, submitting an honors program application form, including a research topic/title of the proposed honors project, a two page abstract/proposal, a transcript, and a letter of reference from the faculty or honors adviser, to the Undergraduate Student Services Specialist on or by February 15 in the junior year.

Department majors are eligible to apply for honors candidacy with a 3.4 GPA in the major, a 3.0 GPA in overall course work, and with no more than one incomplete listed on the transcript at the time of application. Students interested in the honors program are encouraged to apply for Summer Quarter research funding through the Department of Anthropology, Undergraduate Advising and Research, and area studies centers. In most cases, honors students apply for such funding early in the junior year. This process requires advanced planning as the Spring Quarter research deadline falls before the honors application due date.

Students must enroll in ANTHRO 95B (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/anthropology>) Directed Study in Honors and Senior Papers in the final quarter of the undergraduate degree program before graduating. The honors thesis is submitted in the final quarter before graduation. Students must submit the final draft of their Honors Thesis to their honors adviser (first reader), second reader, and the undergraduate student services specialist electronically, or printed, no later than May 13, 2015. Honors advisers must complete a Certificate of Honors Eligibility Form, provided by the student services specialist, to confirm a student's honors status no later than May 20, 2015. If ineligible, students must withdraw their request to graduate with honors via Axess. For more information, see the undergraduate student services specialist.

Minor in Anthropology

To declare a minor in Anthropology, apply in Axess; contact the department's student peer adviser(s) or the undergraduate student services specialist to prepare the minor checklist and the minor planning form; submit the required forms to the undergraduate student services specialist; request a faculty adviser assignment; and meet with the assigned faculty adviser for approval of the minor checklist and planning form. These forms are available at <http://anthropology.stanford.edu>. Students must apply in Axess for the undergraduate minor in Anthropology by the last day of the quarter at least two quarters before degree conferral.

Requirements for the minor in Anthropology include the following:

1. A faculty adviser appointed in the Department of Anthropology.
2. A program of 30 units, with a minimum grade of 'C':
 - Of the 30 units, 10 units may be approved from related areas of study, overseas studies, and transfer units.

- *Note:* Any related, overseas studies, or transfer units must be approved by the faculty adviser and by petition to the Undergraduate Committee.
 - Of the 30 units, a minimum of 15 units must be ANTHRO courses numbered 100 or above.
 - No more than 5 units of directed reading-style course work may be counted towards the minor and may only be included among the 10 related units permitted for the minor.
 - No more than 5 units may be taken for a satisfactory/no credit grade.
3. A self-designed course of study chosen from an Anthropology emphasis listed below and approved by the faculty adviser:
 - Culture and Society
 - Ecology, Environment and Evolution
 - Medical Anthropology
 4. A minimum grade of 'C' in two ANTHRO courses listed at the 100 level or higher and taught by Anthropology faculty.
 5. At least two quarters of enrollment in the minor. Each candidate for the minor in Anthropology should declare by the last day of the quarter at least two quarters before the quarter of degree conferral.

Advising milestones for the minor include the following:

1. In the quarter in which the minor is declared, the student must meet with his or her assigned adviser, create a rigorous course of study based on topical breadth, and obtain adviser approval for the checklist.
2. Any revisions to the initial checklist must be approved by the faculty adviser.
3. Undergraduate Anthropology minors must submit an updated minor checklist and planning form to the undergraduate student services specialist in the quarter before graduating.

Coterminal Bachelor's and Master's Degrees in Anthropology

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Graduate enrollment at Stanford University for three consecutive quarters of full tuition for at least 45 units is usually required of all candidates for the coterminal M.A. degree. M.A. students in Anthropology must take a minimum of 45 units of Anthropology course work beyond the Undergraduate degree with an overall minimum grade point average of 3.0. For the Masters degree, all courses must be at or above the 100 level, and, at least 23 of the required 45 units must be taken at either the ANTHRO 200 or 300-level.

The M.A. program usually requires more than one year of study. However, full-time students entering the program with appropriate background should complete the M.A. degree program within three consecutive calendar quarters after the student's first quarter of master's-level enrollment. The University allows no transfer units into the master's program. To provide a meaningful Master's program within one year, advance planning of course work with a faculty adviser is required. Requirements for the coterminal M.A. program must be completed within three years.

It is highly suggested by this department that a student who accepts an offer of admission to the Anthropology Coterminal Master's program, defers their Undergraduate B.A. conferral until the Graduate M.A degree requirements have been completed. The student can then request to graduate in both

the B.A. and M.A. simultaneously. Please see the Undergraduate Student Services Specialist for details.

For further information about the Department's coterminal M.A. degree program requirements, please consult the Department webpages .

Admission to the Coterminal Master's Degree Program

The deadline for graduate applications to the coterminal M.A. degree program in Anthropology is December 9, 2014. Stanford University Undergraduate Majors are eligible to apply for the coterminal M.A. degree program if they have a 3.4 GPA in their Department Major, a 3.0 GPA in overall course work, and have no more than one incomplete listed on the transcript at the time of application. Successful applicants to the M.A. program may enter only in the following Autumn Quarter. However, the department may consider a request for early deferral of admission in the Spring Quarter by petition. Coterminal M.A. degree applicants are not required to submit their Graduate Record Examination scores. Additional coterminal M.A. degree program application procedures are required by the Department. Please consult the Department webpages.

For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Degree Options

Students may pursue one of three possible department tracks in the Anthropology M.A. degree program. The tracks are:

- Archaeology
- Culture and Society
- Ecology and Environment

The tracks are not declarable in Axess.

Master of Arts in Anthropology

University requirements for the terminal M.A. are described in the "Graduate Degrees" section of this bulletin.

The Department of Anthropology offers the terminal M.A. degree to the following:

1. Graduate applicants who apply from outside the University for admission to the terminal M.A. program in Anthropology.
2. Stanford graduate students, taking advanced degrees in other departments or schools at Stanford, who are admitted to the terminal M.A. program in Anthropology.
3. Anthropology Ph.D. students at Stanford University who fulfill the M.A. degree requirements on the way to the Ph.D. degree.

Graduate applicants who apply from outside the University and whose ultimate goal is the Ph.D. degree should apply directly to the Ph.D. degree program. Applicants who are offered admission to the terminal Masters degree program may not transfer to the Ph.D. degree program; they must reapply on the same basis as other Ph.D. applicants and in competition with the Ph.D. applicants.

Graduate applicants, taking an advanced degree in other departments or schools at Stanford, applying for admission to the M.A. in Anthropology should apply via the Department terminal M.A. degree application for current Stanford University graduate students form and via the Registrar electronic graduate authorization petition by December 9, 2014 in consideration of beginning degree matriculation in either the following Spring Quarter or the following Autumn Quarter.

Anthropology Ph.D. students choosing to take the M.A. in Anthropology on the way to the Ph.D. are governed by separate requirements described in the Anthropology Ph.D. Degree Program and Ph.D. Handbook.

Graduate enrollment at Stanford University for three consecutive quarters of full tuition for at least 45 units is required of all candidates for the terminal master's degree. M.A. students in Anthropology must take a minimum of 45 units of course work with an overall minimum grade point average of 3.0. For the Masters degree, all courses must be at or above the 100 level, and, at least 23 of the required 45 units must be taken at either the ANTHRO 200 or 300-level.

The M.A. program may require more than one year of study. However, full-time students entering the program with appropriate background should complete the M.A. degree program within three consecutive calendar quarters after the student's first quarter of master's-level enrollment. The University allows no transfer units into the master's program. To provide a meaningful master's program within one year, advance planning of course work with an adviser is required. Requirements for the terminal master's program must be completed within three years.

For further information about the Department's M.A. degree program requirements, please consult the Department webpages.

Admission to the Master's Degree Program

The deadline for graduate applications to the M.A. degree program in Anthropology is December 9, 2014. Successful applicants to the M.A. program may enter only in the following Autumn Quarter. M.A. degree applicants must file a report of their Graduate Record Examination score electronically. Additional terminal M.A. degree program application procedures are required by the Department. Please consult the Department webpages.

No financial support is available to students enrolled for the M.A. degree.

Degree Options

Students may pursue one of three possible department tracks in the Anthropology M.A. degree program. The tracks are:

- Archaeology
- Culture and Society
- Ecology and Environment

The tracks are not declarable in Axess.

Degree Requirements

Requirements for the coterminal and terminal master's degree program include the following:

1. A faculty adviser appointed in the Department of Anthropology.
2. A program of 45 units, taken at the 100 level or higher with a minimum grade of 'B'. *Note:* At least 23 of the 45 units must be taken at the 200/300 level.
 - of the 45 units, no more than 15 units may be approved from related areas of study or overseas studies.
 - of the 45 units, no more than 10 units of directed reading-style course work may be counted towards the degree.
 - of the 45 units, no more than 5 units may be taken for a satisfactory/no credit grade.
3. A minimum grade of 'B' in one graduate-level ANTHRO Theory course from the chosen track. Please note that ANTHRO theory courses are usually considered as department review courses.
4. A minimum grade of 'B' in one graduate-level ANTHRO Methods course from the chosen track. Please note that ANTHRO methods courses are not considered as department review course.
5. A minimum grade of 'B' in four ANTHRO Review courses from the chosen track, listed at the 200-level or higher, taught by Anthropology faculty, and taken as a five unit course.
6. A self-designed plan of study chosen from the Anthropology tracks listed below:
 - Archaeology
 - Culture and Society
 - Ecology and Environment

7. Submission of an approved plan of study form and an approved department graduate report of degree progress form, inclusive of a field research, laboratory research or library-based paper proposal, by the last day of the first quarter of the Master's degree program.
8. Submission of an approved Master's degree program proposal form by the last day of the first quarter of the Master's degree program.
9. Presentation of the Master's research project at the Department's Master's (Honors) paper presentation event in Spring Quarter - optional.
10. Submission of the Master's paper reviewed by two faculty members (advisor and reader). For the Culture and Society track, the paper can be a field research or library-based research paper. For the Archaeology and the Ecology and Environment tracks, the paper can also be a laboratory research paper.

Required Courses

Archaeology Track, Required Theory (Review) Course

ANTHRO 303	Introduction to Archaeological Theory	5
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Culture and Society Track, Required Theory (Review) Courses

ANTHRO 301	History of Anthropological Theory, Culture and Society	5
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-or-

ANTHRO 301A	Foundations of Social Theory	5
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-or-

ANTHRO 300	Reading Theory Through Ethnography	5
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Ecology and Environment Track, Required Theory (Review) Course

ANTHRO 302	History of Anthropological Theory, Ecology and Environment (or comparable, approved course at the 200 level)	5
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Units

Archaeology Track, Required Methods Course

ANTHRO 307	Archaeological Methods	5
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Culture and Society Track, Required Methods Course

ANTHRO 306	Anthropological Research Methods	5
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Ecology and Environment Track, Required Methods Course

ANTHRO 305	Research Methods in Ecological Anthropology (or comparable, approved course at the 200 level)	5
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-or-

ANTHRO 255	Research Methods in Ecological Anthropology (or comparable, approved course at the 200 level)	5
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Recommended Courses

For all tracks, attendance at the Departmental colloquium each quarter is recommended for all Master's students. Students may enroll in the following course for additional units.

ANTHRO 444	Anthropology Colloquium	1
ANTHRO 445	Anthropology Brown Bag Series	1

Doctor of Philosophy in Anthropology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Admission

The deadline for graduate application to the Ph.D. degree program is December 9, 2014. Successful applicants for the Ph.D. program may enter only in Autumn Quarter. It is the Department of Anthropology's policy not to defer graduate admission. Additional Ph.D. application procedures are required by the department. Please consult the department website.

Financial Support

The department endeavors to provide needed financial support (through fellowships, teaching and research assistantships, and tuition grants) to all students admitted to the program who maintain satisfactory degree progress in years one through five of the Ph.D. program. San Francisco Bay Area residency during the Autumn, Winter, and Spring quarters in academic cohort years one through five is required for eligibility to receive department funding.

First year students who have not obtained a graduate degree previous to entering the Ph.D. program, and who have not obtained extramural funding previously before entering the Ph.D. program, are required to submit one extramural funding application in support of graduate doctoral training (for example, funding support for training during the first three years of the Ph.D. program) by the first day of finals week in the Autumn Quarter of the first year. In order to be eligible to apply for the departments exceptional (pre)dissertation research-related funding support, first-year students must submit at least two intramural or extramural summer research funding proposals (deadlines are usually early Winter Quarter and advanced planning is required) as well as the department graduate report of degree progress form inclusive of a research proposal on or by May 15 in the Spring Quarter of the first year of the Ph.D. program.

Note that two summers of predissertation field research funding support are given to qualified Ph.D. students in Anthropology. The first of two summers of predissertation field research funding support, is given in the Summer Quarter of the second year in the Ph.D. program and provided by way of a predoctoral research affiliateship. The second of two summers of predissertation field research funding support may be taken in either the first or third year Summer Quarter in the Ph.D. and is provided by way of a department fellowship. Careful consideration should be given when choosing to take Summer Quarter funding support, either in the first year for a pilot study, survey work, or approved predissertation research, or, in the third year as a bridge to the field to conduct approved dissertation research.

Second-year students are required to complete one or more full time quarterly teaching assistant assignments and be advanced to candidacy. In order to qualify for a predoctoral research affiliateship given in the Summer Quarter of the second year, Ph.D. students are required to submit at least two predissertation research funding proposals for second year Summer Quarter funding support.

Third-year students must pass the department qualifying examinations, inclusive of the oral component, and receive department approval by the dissertation reading committee for the dissertation proposal. Third-year students who have not secured fourth-year field research funding are required to make at least three extramural funding applications to support dissertation research usually by the end of Autumn Quarter of the third year. Advanced planning is required in order to meet approved dissertation research funding application deadlines. If receiving department funding for fourth year field research, third-year students must submit the department Ph.D. funding agreement form before leaving to conduct field research. Finally, the second of two summers of (pre)dissertation field research funding support may be taken as a bridge to the field in the third year Summer Quarter if this support was not taken previously in the first year Summer Quarter. If this support is taken in the third year Summer Quarter, Ph.D. students may qualify to receive these funds by way of successful completion of the department qualifying examinations, inclusive of the oral component, and receive approval for the dissertation proposal by the

dissertation reading committee by the Summer Quarter final study list deadline.

While in the field, fourth-year students make quarterly reports of their dissertation research progress to the dissertation reading committee via email. Fourth-year students returning from the field must submit the department's graduate report of degree progress form to establish eligibility for fifth year funding for degree progress and dissertation writing support, on or by May 15th in the Spring Quarter of the fourth year.

Fifth-year students are required to complete one or more full time quarterly teaching assistantship assignments. Fifth-year students who have not secured extramural funding for the sixth year are required to make at least two dissertation write-up funding applications to secure extramural or intramural funding for dissertation write-up in order to be eligible for consideration of a department teaching affiliateship in the sixth year. A department offer of teaching affiliateship is always dependent on the availability of funds and is given at the discretion of the department curriculum committee. During the fifth year and after returning from field research, students confirm Bay Area residency to be eligible for department fifth-year dissertation writing funds. Eligibility for department support is based on seminar attendance and dissertation chapter production, as well as on Bay Area residency (the Bay Area is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, or Sonoma counties)

Program

The Ph.D. in Anthropology allows the student to develop a flexible program reflecting special research interests, under the supervision of a faculty committee, chosen by the student. Students are encouraged to plan for completion of all work for the Ph.D. in five years. Matriculation in the Ph.D. is full-time only. In order to be eligible for department and intramural support, students must reside locally through the Autumn, Winter and Spring Quarters of academic years one through five. The University oral examination may be scheduled in the fifth year or beyond depending upon a student's dissertation completion progress. Ph.D. students in Anthropology must complete a minimum of 135 quarter units with a minimum grade point average (GPA) of 3.0 (B). The maximum allowable number of transfer units is 45.

Degree Options

Students may pursue three different tracks in the Anthropology Ph.D. program. The tracks are not declarable in Axxess and do not appear on the transcript or the diploma. The three tracks are:

- Archaeology
- Culture and Society
- Ecology and Environment.

Degree Requirements

For students who matriculate beginning 2014-15, the requirements for the doctoral degree program include the following:

1. Students must submit a department (first year) plan of study form detailing intended courses enrollment and milestone accomplishment to be completed in the first year of the Ph.D. program. The plan of study form should be submitted by the first day of Autumn Quarter. In addition, the plan of study form also confirms the department track: Archaeology, Culture and Society, or Ecology and Environment.
2. Students must pass six graduate level ANTHRO subject code department review courses, with a minimum grade of 'B+', appropriate to the student's chosen track, within the first two years of the degree program. Department review courses are usually those seminar-style courses, taught by tenure-line ANTHRO faculty appointed in the department, at the 300-level.
3. In the first year of the program:

- a. pass with a minimum grade of 'B+' the theory course(s) as required for the chosen track in Archaeology, Culture and Society, and Ecology And Environment:

Archaeology Track, Required Theory (Review) Course		
ANTHRO 303	Introduction to Archaeological Theory	5
Culture and Society Track, Required Theory (Review) Courses		
ANTHRO 300	Reading Theory Through Ethnography	5
ANTHRO 301	History of Anthropological Theory, Culture and Society	5
ANTHRO 301A	Foundations of Social Theory	5
Ecology and Environment Track, Required Theory (Review) Course		
ANTHRO 302	History of Anthropological Theory, Ecology and Environment (or comparable, approved course at the ANTHRO 200 level)	5

- b. pass with a minimum grade of 'B+' one or more methods courses as required for the chosen track in Archaeology and Ecology and Environment:

Archaeology Track, Required Methods Course		
ANTHRO 307	Archaeological Methods	5
(may be taken in either the first or second year of the PhD program)		
Ecology and Environment Track, Required Methods Course		
In the first year, pass at least one of two required methods courses, or a comparable, approved ANTHRO course at the 200-level:		
ANTHRO 304	Data Analysis for Quantitative Research	5
ANTHRO 305	Research Methods in Ecological Anthropology	5
or ANTHRO 255	Research Methods in Ecological Anthropology	

- c. complete at least 45 units by the end of Spring Quarter in the first year.
- d. as scheduled by the department, attend the department ethics workshop for review of ethics in Anthropology. Submit the department review of ethics in anthropology form on or by May 15th in Spring Quarter.
- e. enroll in ANTHRO 310G Introduction to Graduate Studies during Autumn Quarter (all tracks).
- f. Culture and Society track students only enroll in ANTHRO 311G Introduction to Culture and Society Graduate Studies in Anthropology during Winter and Spring quarters for 1-2 units (no more than 5 units total over two quarters).
- g. attend the department colloquial series each quarter. Enrollment in ANTHRO 444 Anthropology Colloquium is optional.
- h. attend the department brown bag series each quarter. Enrollment in ANTHRO 445 Anthropology Brown Bag Series is optional.
- i. submit the department graduate report of degree progress form inclusive of the research proposal to the faculty adviser and the graduate committee on or by May 15th in Spring Quarter of the first year. Receive final approval for the predissertation research proposal from the adviser and the graduate committee by the first day of finals week in Spring Quarter.
- j. submit at least one extramural funding application within the first year (deadlines are usually early Autumn Quarter and advanced

planning is required), or, confirm a waiver of the requirement by graduate committee petition.

- k. to be eligible for exceptional Summer Quarter funding support, submit at least two intramural or extramural summer research funding proposals (deadlines are usually early Winter Quarter and advanced planning is required). If exceptional funding support is needed, submit a request for predissertation first-year Summer Quarter funding support using a department graduate program petition form on or by May 15th in the Spring Quarter. The second of two summers of predissertation field research funding support may be taken in either the first or third year Summer Quarter in the Ph.D. program and is provided by way of a department fellowship. Careful consideration should be given when choosing to use the Summer Quarter funding support in either the first year for a pilot study, survey work, or approved field research or, in the third year as a 'bridge to the field' to conduct approved dissertation field research.
- l. complete the appropriate CITI tutorial for non-medical human subjects, and, either submit a non-medical human subjects protocol, based on the predissertation research proposal, to the Institutional Review Board before departing for Summer Quarter field research in the first year, or confirm approval for exempt status. Alternately, a notice of determination may be confirmed with the Institutional Review Board for a pilot study proposal that does not require protocol submission.
- m. complete the appropriate CITI tutorial for Responsible Conduct of Research on or by May 15 in Spring Quarter.
- n. upon completion of the above requirements, and with recommendation from the faculty adviser and department chair, request the master's degree 'on the way to the Ph.D.' by the first day of finals week in Spring Quarter, if desired.
4. In the second year:
- a. pass with a minimum grade of 'B+' the methods course(s) appropriate for the chosen track in Archaeology, Culture and Society, and Ecology And Environment:

Archaeology Track, Required Methods Course		
ANTHRO 307	Archaeological Methods	5
ANTHRO 370	Advanced Theory and Method in Historical Archaeology	5
Culture and Society Track, Required Methods Course		
ANTHRO 306	Anthropological Research Methods	5
Ecology and Environment Track, Required Methods Course(s)		
ANTHRO 305	Research Methods in Ecological Anthropology	5
or ANTHRO 255	Research Methods in Ecological Anthropology	

- b. pass with a minimum grade of 'B+' the proposal writing course appropriate for the chosen track in Archaeology and in Culture and Society:

Archaeology Track, Required Proposal Writing Course		
ANTHRO 308A	Proposal Writing Seminar in Archaeology	5
Culture and Society Track, Required Proposal Writing Course		
ANTHRO 308	Proposal Writing Seminar in Cultural and Social Anthropology	5

- c. for all tracks, submit the pre-dissertation proposal to the assigned faculty adviser and the graduate committee by the first day of finals week in Spring Quarter. Receive approval for the draft proposal of

- the second year summer pre-dissertation research before departing for field research.
- d. complete at least 40 units of course work in the second year and a total of at least 50 units overall including the Summer Quarter enrollment in ANTHRO 450 Research Apprenticeship (10 units). Students must have completed a total of 95 units overall by the end of the second year.
 - e. pass with a minimum grade of 'B+' any remaining ANTHRO subject code review courses to complete the six review course requirement.
 - f. for the Ecology and Environment track, pass the second of two required methods courses by the end of the second year:

Units**Ecology and Environment Track, Required Methods Courses**

ANTHRO 304	Data Analysis for Quantitative Research (or, comparable approved ANTHRO course at the 200-level)	5
ANTHRO 305	Research Methods in Ecological Anthropology (or, comparable approved ANTHRO course at the 200-level)	5
or ANTHRO 255	Research Methods in Ecological Anthropology	255

- g. as scheduled by the department, attend the teaching assistant training workshop (to be scheduled in the week before the first day of Autumn Quarter).
 - h. complete one or more full time quarterly teaching assistant assignments in the second year.
 - i. submit a second year graduate report of degree progress form inclusive of the research proposal on or by May 15th in Spring Quarter. Receive approvals from the assigned faculty adviser and the graduate committee by the first day of finals week in Spring Quarter.
 - j. by the first day of finals week in Winter Quarter, confirm the qualifying examination committee adviser for each examination committee (i.e. one committee for AREA and one committee for TOPIC) by submitting the department report of qualifying examination form to the department graduate committee.
 - k. by the first day of finals week in Winter Quarter (for those whose native language is English), either pass a foreign research or field language exam, or petition the department's language committee for exemption from a foreign research or field language examination (based on a description of previous field or research language training). For those whose native language is not English, demonstrate satisfactory command of the English language, as evidenced by completion of the first two years of graduate study and a petition to the language committee.
 - l. upon completion of the above requirements and at the recommendation of the Anthropology faculty, petition the University for candidacy by submitting the University application for candidacy for doctoral degree form by the first day of finals week in Winter Quarter. Advancement to candidacy is based on faculty review and approval of the predissertation research proposal demonstrating a capacity for original research submitted on or by May 15th in Spring Quarter of the second year. Failure to advance to candidacy results in the dismissal of the student from the program.
 - m. In order to qualify for a predoctoral research affiliation given in the Summer Quarter of the second year, Ph.D. students are required to submit at least two predissertation research funding proposals for second year Summer Quarter funding support.
5. In the third year, complete the following:
- a. by the last day of the third week of Autumn Quarter, confirm the committee reader for each of the qualifying examination committees (i.e. one committee for AREA and one committee for TOPIC) by submitting the report of qualifying examination form to the department graduate committee.
 - b. by the first day of finals week in Autumn Quarter, submit three dissertation research grant proposals to the faculty adviser for approval. In order to be eligible for fourth year field research funding support, submit approved extramural funding proposals to three funding agencies by the end of the Summer Quarter.
 - c. by the first day of finals week in Autumn Quarter, confirm the dissertation reading committee by submitting the University dissertation reading committee form to the graduate committee.
 - d. by the last day of third week in Winter Quarter, submit the third year department report of qualifying examination status form to the graduate program committee reaffirming committee formulation, and confirming the exam dates, preliminary qualifying bibliographies, and the proposed question set for each examination.
 - e. by the last day of finals week in Winter Quarter, complete the qualifying examinations for area and for topic (two separate examinations to be scheduled one week apart), inclusive of the final bibliographies.
 - f. by the last day of the second week in Spring Quarter, submit a draft of the dissertation proposal to the dissertation reading committee.
 - g. by the last day of the second week in Spring Quarter, confirm a scheduled meeting with the qualifying examination committee/ dissertation reading committee members for the oral component of the qualifying examinations and for approval review of the dissertation proposal.
 - h. meet with the qualifying examination/dissertation reading committee to review the dissertation proposal, inclusive of the oral component of the qualifying examinations, on or by May 15th in Spring Quarter.
 - i. the second of two summers of (pre)dissertation field research funding support provided by way of a fellowship stipend may be taken in either the first or third year Summer Quarters in the Ph.D. program. If not taken in Summer Quarter of the first year, submit the third-year Summer Quarter dissertation bridge to the field funding request via a graduate program petition form on or by May 15th in Spring Quarter.
 - j. by the first day of finals week in Spring Quarter, submit the approved dissertation proposal to the graduate committee.
 - k. before departing for field research, receive approval for the non-medical human subjects protocol from the Institutional Review Board.
 - l. meet with Graduate Program Committee chair to review comments for proposal, all tracks.
6. In the fourth year, complete the following requirements:
- a. by the first day of finals week in the Autumn, Winter and Spring Quarters, submit a quarterly report of dissertation field research via email to the dissertation reading committee.
 - b. to establish eligibility for funding and to confirm Bay Area residency, submit a fourth-year department graduate report of degree progress form to the department graduate committee on or by May 15th in the Spring Quarter.
 - c. submit one or more funding proposals supporting of Summer Quarter in the fourth year.
7. In the fifth year, complete the following requirements:
- a. during the fifth year and after returning from field research, confirm Bay Area residency to be eligible for department fifth year dissertation writing funds. Eligibility for department support is based on seminar attendance as well as on Bay Area residency (the

Bay Area is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, or Sonoma counties).

- b. during the fifth year and after returning from field research, complete one or more full time quarterly teaching assistant assignments in the department.
 - c. during Autumn, Winter, Spring Quarters in the fifth year, students attend a minimum of four out of five class meetings of ANTHRO 400 Dissertation Writers Seminar (required of Culture and Society track, only; and, recommended for the Archaeology and the Ecology and Environment tracks). In each quarter and for all tracks, chapter drafts of the dissertation must be handed in to the dissertation reading committee for review.
 - d. submit the fifth year dissertation writers report of degree progress and time to degree completion form by the last day of finals week in the Autumn, Winter and Spring Quarters.
 - e. fifth year students who have not secured funding support from the beginning of the Summer Quarter of the fifth year through the end of Summer Quarter in the sixth year, should submit one or more funding proposals for dissertation writing funding support.
8. In either the fifth year or in the sixth plus year and beyond, complete the following requirements:
- a. submit a penultimate draft of the dissertation by the last day of the first week of the quarter preceding the quarter in which the oral examination (dissertation defense) has been scheduled, and in which the dissertation is to be submitted in partial fulfillment of degree requirements.
 - b. at least four weeks prior to a proposed date for the oral examination, submit the University oral examination schedule form and a final draft of the dissertation, to the department graduate program committee.
 - c. pass the University oral examination, inclusive of an oral presentation held at the beginning of the oral examination period (approximately 30 minutes for the public presentation with a 15 minute public discussion period preceding a closed session with the oral examination committee), prior to the final submission of the dissertation to the University Registrar and the conferral of the doctoral degree in Anthropology.
9. Complete 30 units of ANTHRO subject code courses at the 300 level. The courses dedicated to the Ph.D. minor must be successfully completed with a minimum (GPA) of 3.0 (B). Directed Individual Study units are not approved for the Ph.D. minor in Anthropology.
10. Request a faculty member within the Department of Anthropology who provides written consent to serve as the adviser for the Ph.D. minor and serve on the student's oral examination and dissertation reading committees.
11. With the faculty adviser, determine a coherent plan and submit the department plan of study form for the Ph.D. minor.
12. Pass with a minimum grade of 'B+' three ANTHRO theory courses, and one ANTHRO course in a geographical or theoretical area, for a total of four department Review courses.

Required Courses

Archaeology Track

	Units
ANTHRO 303 Introduction to Archaeological Theory	5
ANTHRO 307 Archaeological Methods	5
ANTHRO 310G Introduction to Graduate Studies	2
ANTHRO 308A Proposal Writing Seminar in Archaeology	5
Total Units	17

Culture and Society Track

	Units
ANTHRO 300 Reading Theory Through Ethnography	5
ANTHRO 301 History of Anthropological Theory, Culture and Society	5
ANTHRO 301A Foundations of Social Theory	5
ANTHRO 306 Anthropological Research Methods	5
ANTHRO 308 Proposal Writing Seminar in Cultural and Social Anthropology	5
ANTHRO 310G Introduction to Graduate Studies	2
ANTHRO 311G Introduction to Culture and Society Graduate Studies in Anthropology	2
Total Units	29

Ecology and Environment Track

	Units
ANTHRO 302 History of Anthropological Theory, Ecology and Environment	5
ANTHRO 304 Data Analysis for Quantitative Research	5
ANTHRO 305 Research Methods in Ecological Anthropology	5
ANTHRO 310G Introduction to Graduate Studies	2
Total Units	17

Recommended Courses

For all tracks, quarterly attendance (during the Autumn, Winter, and Spring quarters) in the departmental colloquium is recommended for all doctoral students and required for all current first-year, second-year, and fifth-year cohort Ph.D. students. Students may enroll in the following course for additional units.

	Units
ANTHRO 444 Anthropology Colloquium	1
ANTHRO 445 Anthropology Brown Bag Series	1

Ph.D. Minor in Anthropology

University requirements for the Ph.D. Minor are described in the Graduate Degrees section of this Bulletin.

To request the Ph.D. Minor in Anthropology, apply to the department graduate program committee at least three quarters before terminal graduate registration status is confirmed with the following materials: the University application for Ph.D. minor form, the department request for Ph.D. minor adviser form, an approved pre-dissertation proposal, confirmation of qualifying status in the Ph.D. (home) department, confirmation of Ph.D. candidacy in the Ph.D. (home) department, proposed dates for the University oral examination and the dissertation defense, and a recommendation for consideration of the Ph.D. minor made by the Ph.D. (Minor) department adviser. Once approved, a HelpSU request to the University Registrar requesting the addition of the Ph.D. minor to the student's academic career will be submitted by the Anthropology student services officer on behalf of the Ph.D. minor applicant.

The requirements for a Ph.D. Minor in Anthropology include the following:

1. Complete 30 units of ANTHRO subject code courses at the 300 level. The courses dedicated to the Ph.D. minor must be successfully completed with a minimum (GPA) of 3.0 (B). Directed Individual Study units are not approved for the Ph.D. minor in Anthropology.
2. Request a faculty member within the Department of Anthropology who provides written consent to serve as the adviser for the Ph.D. minor and serve on the student's oral examination and dissertation reading committees.

3. With the faculty adviser, determine a coherent plan and submit the plan of study form for the Ph.D. minor.
4. Pass with a minimum grade of 'B+' three ANTHRO theory courses, and one ANTHRO course in geographical or theoretical area, for a total of four department Review courses.

For additional information regarding the Ph.D. Minor in Anthropology, consult the department website.

Faculty

Emeriti: (Professors) Clifford R. Barnett, Harumi Befu, George A. Collier, Jane F. Collier, Carol Delaney, Charles O. Frake, James L. Gibbs, Jr., Renato I. Rosaldo

Chair: Sylvia Yanagisako

Professors: Lisa Curran, William H. Durham, James Ferguson, Thomas Blom Hansen, Ian Hodder, Richard G. Klein, Tanya Luhmann, Lynn Meskell, Sylvia J. Yanagisako

Associate Professors: Rebecca Bliege Bird, Paulla Ebron, James A. Fox, Duana Fullwiley (on leave), Miyako Inoue, S. Lochlann Jain, James Holland Jones, Matthew Kohrman, Liisa Malkki, John W. Rick, Barbara Voss (on leave)

Assistant Professors: Angela Garcia, Krish Seetah, Kabir Tambar, Sharika Thiranagama

Associate Professors (Teaching): Michael V. Wilcox

Senior Research Scientist/Lecturers: Douglas W. Bird

Courtesy Professors: H. Samy Alim, Penelope Eckert, Raymond McDermott

Visiting Professors: James Clifford, Jorge Ramos Gonzalez

Visiting Associate Professors: Ewa Domanska

Lecturers: Ayca Alemdaroglu, Sasa Caval, Claudia Engel, Alma Kunanbaeva

Affiliated Faculty: Li Liu, Richard White

Postdoctoral Fellows: Mary-Ashley Hazel, Philip Labo, Nev Jones, Alan Greene

Teaching Affiliates: Stephanie Bautista, Lisa Poggiali, Eleanor Power, Ian Simpson, Anna West

Overseas Studies Courses in Anthropology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 25	Architecture, Memory, Commemoration	5
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPISTAN 68	Istanbul: Space, Memory, and Protest	5
OSPKYOTO 64	Japanese Popular Culture	4-5

OSPMADRD 25	Politics of "Culture/s" in the Iberian's World: the Multicultural Debate	4
OSPOXFRD 87	The Archaeology of Britain	5
OSPOXFRD 89	Archaeology: Independent Study	5
OSPOXFRD 93	Collecting the World	4

Applied Physics

Courses offered by the Department of Applied Physics are listed under the subject code APPPHYS on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=APPPHYS&filter-catalognumber-APPPHYS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=APPPHYS&filter-catalognumber-APPPHYS=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=APPPHYS&filter-catalognumber-APPPHYS=on>).

The Department of Applied Physics offers qualified students with backgrounds in physics or engineering the opportunity to do graduate course work and research in the physics relevant to technical applications and natural phenomena. These areas include accelerator physics, biophysics, condensed matter physics, nanostructured materials, quantum electronics and photonics, quantum optics and quantum information, space science and astrophysics, synchrotron radiation and applications.

Student research is supervised by the faculty members listed above and also by various members of other departments such as Biology, Chemistry, Electrical Engineering, Materials Science and Engineering, Physics, the SLAC National Accelerator Laboratory, and faculty of the Medical School who are engaged in related research fields.

Research activities are carried out in laboratories including the Geballe Laboratory for Advanced Materials, the Edward L. Ginzton Laboratory, the Hansen Experimental Physics Laboratory, the SLAC National Accelerator Laboratory, the Center for Probing the Nanoscale, and the Stanford Institute for Materials and Energy Science.

The number of graduate students admitted to Applied Physics is limited. Applications to the Master of Science and Ph.D. programs should be received by December 16, 2014. M.S. and Ph.D. students normally enter the department only in Autumn Quarter.

Graduate Programs in Applied Physics

The Department of Applied Physics offers three types of advanced degrees:

- the Doctor of Philosophy
- the coterminal Master of Science in Applied and Engineering Physics
- the Master of Science in Applied Physics, either a terminal degree or an en route degree to the Ph.D. for students enrolled in the Applied Physics Department

Admission requirements for graduate work in the Master of Science and Ph.D. programs in Applied Physics include a bachelor's degree in Physics or an equivalent engineering degree. Students entering the program from an engineering curriculum should expect to spend at least an additional quarter of study acquiring the background to meet the requirements for the M.S. and Ph.D. degrees in Applied Physics.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Applied Physics and to prepare students for a professional career

or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Applied Physics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Applied Physics and to interpret and present the results of such research.

Coterminal Master of Science in Applied and Engineering Physics

Stanford undergraduates, regardless of undergraduate major, who are interested in a M.S. degree at the intersection of applied physics and engineering may choose to apply for the coterminal Master of Science program in Applied and Engineering Physics. The program is designed to be completed in a fifth year at Stanford. Students with accelerated undergraduate programs may be able to complete their B.S. and coterminal M.S. in four years.

Application and Admission

Undergraduates must be admitted to the program and enrolled as a graduate student for at least one quarter prior to B.S. conferral. Applications will be due on the last day of class of the Spring Quarter for Autumn matriculation and at least four weeks before the last day of class in the previous quarter for Winter or Spring matriculation. All application materials must be submitted directly to the Applied Physics department office by the deadlines. To apply for admission to the Applied and Engineering Physics coterminal M.S. program, students must submit the coterminal application which consists of the following:

- Statement of Purpose
- Unofficial Transcript
- Two Letters of Recommendation from members of the Stanford faculty
- Supplemental Form (<http://www.stanford.edu/dept/app-physics/cgi-bin/aep-application-process>)

Program Requirements

Coterminal M.S. students are required to take 45 units of course work during their graduate career. Of these 45 units, the following are required.

Four Breadth Courses (required)

APPPHYS 201	Electrons and Photons	4
APPPHYS 203	Atoms, Fields and Photons	4
APPPHYS 204	Quantum Materials	4
APPPHYS 205	Introduction to Biophysics	4

Three Engineering Depth Courses

9

At least one must be at the 300 level and the other courses must be at the 200 level or above to provide depth in one area. To be approved by the Applied Physics academic adviser.

One Laboratory or Methods Course

3-4

APPPHYS 207	Laboratory Electronics
APPPHYS 208	Laboratory Electronics
APPPHYS 215	Numerical Methods for Physicists and Engineers
APPPHYS 217	Estimation and Control Methods for Applied Physics
APPPHYS 232	Advanced Imaging Lab in Biophysics
APPPHYS 304	Lasers Laboratory

APPPHYS 305	Advanced Nonlinear Optics Laboratory	
EE 234	Photonics Laboratory	
EE 251	High-Frequency Circuit Design Laboratory	
EE 345	Optical Fiber Communication Laboratory	
EE 410	Integrated Circuit Fabrication Laboratory	
ENGR 341	Micro/Nano Systems Design and Fabrication	
ENGR 342	MEMS Laboratory II	
MATSCI 322	Transmission Electron Microscopy Laboratory	
MATSCI 331	Atom-based computational methods for materials	
Seminar ¹		3
Approved Technical Electives ²		6-12
6 units minimum that brings up the total units to 45		
Total Units		45

- ¹ The seminar requirement can be fulfilled by either (i) taking one formal seminar course for credit each term or (ii) attending a minimum of 8 informal or formal research seminars during each of the three terms. Students who attend 8 informal research seminars must submit, with their final M.S. program proposal, a list of the seminars with a paragraph describing the content, signed by their academic adviser.
- ² These include APPPHYS, CS, CME, EE, ME, BIOE, MATSCI, PHYSICS courses (see <http://www.stanford.edu/dept/app-physics/cgi-bin/academic-programs/>) as well as those courses that are formally approved by the Applied Physics Graduate Studies Committee through petition. <http://www.stanford.edu/dept/app-physics/cgi-bin/aep-application-process/>

Of the 45 units required for the coterminal Master of Science program in Applied and Engineering Physics:

- at least 36 units must be letter graded units
- at least 36 units must be at or above the 200 level.
- at least 21 units must be letter graded technical courses at or above the 200 level
- up to 6 units of Directed Studies in Applied Physics (APPPHYS 290) or equivalent independent study course may be counted toward this requirement.
- at least 30 units must be in technical areas. Research, literature, directed studies, and seminar courses may not be included among these 30 units.

Master of Science in Applied Physics

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The minimum requirements for the degree are 45 units, of which at least 39 units must be graduate-level courses in applied physics, engineering, mathematics, and physics. The required program consists of the following:

	Units
Advanced Mechanics	3
Select one of the following:	
PHYSICS 210	Advanced Mechanics
PHYSICS 211	Continuum Mechanics (approved substitute)
Electrodynamics	3
PHYSICS 220	Classical Electrodynamics
Quantum Mechanics	6
Select two of the following:	
PHYSICS 230	Quantum Mechanics
PHYSICS 231	Quantum Mechanics
EE 222	Applied Quantum Mechanics I (approved substitute)

EE 223	Applied Quantum Mechanics II (approved substitute)
PHYSICS 330	Quantum Field Theory I (approved substitute)
PHYSICS 331	Quantum Field Theory II (approved substitute)
PHYSICS 332	Quantum Field Theory III (approved substitute)

Units

APPPHYS 290	Directed Studies in Applied Physics 1-unit seminar courses
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Examples of suitable courses include:

BIO 217	Neuronal Biophysics
EE 222	Applied Quantum Mechanics I
EE 223	Applied Quantum Mechanics II
EE 236C	Lasers
EE 248	Fundamentals of Noise Processes
EE 332	Laser Dynamics
EE 346	Introduction to Nonlinear Optics
PHYSICS 372	Condensed Matter Theory I
PHYSICS 373	Condensed Matter Theory II

1. Courses in Physics and Mathematics to overcome deficiencies, if any, in undergraduate preparation.
2. Basic graduate courses (letter grade required):
3. 33 units of additional advanced courses in science and/or engineering. May be any combination of APPPHYS 290, any 1-unit course, and regular courses. At least 18 of these 33 units must be taken for a letter grade.
4. A final overall grade point average (GPA) of 3.0 (B) is required for courses used to fulfill degree requirements.

There are no department nor University examinations. There is no thesis component. If a student is admitted to the M.S. program only, but later wishes to change to the Ph.D. program, the student must apply to the department's admissions committee.

Doctor of Philosophy in Applied Physics

The University's basic requirements for the Ph.D. including residency, dissertation, and examinations are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The program leading to a Ph.D. in Applied Physics consists of course work, research, qualifying for Ph.D. candidacy, a research progress report, a University oral examination, and a dissertation as follows:

1. *Course Work:*

Advanced Mechanics**Units**

Select one of the following:		3
PHYSICS 210	Advanced Mechanics	
PHYSICS 211	Continuum Mechanics (approved substitute)	

Statistical Physics**3-4**

Select one of the following:		3-4
APPPHYS 217	Estimation and Control Methods for Applied Physics	
APPPHYS 223	Stochastic and Nonlinear Dynamics	

APPPHYS 285	Physics of Disordered Systems
APPPHYS 315	Methods in Computational Biology
APPPHYS 387	Quantum Optics and Measurements

Electrodynamics**3**

PHYSICS 220	Classical Electrodynamics
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Quantum Mechanics**6**

Select two of the following:		6
PHYSICS 230	Quantum Mechanics	
PHYSICS 231	Quantum Mechanics	
PHYSICS 330	Quantum Field Theory I (approved substitute)	
PHYSICS 331	Quantum Field Theory II (approved substitute)	
PHYSICS 332	Quantum Field Theory III (approved substitute)	
EE 222	Applied Quantum Mechanics I (approved substitute)	
EE 223	Applied Quantum Mechanics II (approved substitute)	

Laboratory**3-4**

Select one of the following:		3-4
APPPHYS 207	Laboratory Electronics	
APPPHYS 208	Laboratory Electronics	
APPPHYS 232	Advanced Imaging Lab in Biophysics	
APPPHYS 304	Lasers Laboratory	
APPPHYS 305	Advanced Nonlinear Optics Laboratory	
BIOE 370	Microfluidic Device Laboratory	
EE 234	Photonics Laboratory	
EE 410	Integrated Circuit Fabrication Laboratory	
MATSCI 171	Nanocharacterization Laboratory	
MATSCI 172	X-Ray Diffraction Laboratory	
MATSCI 173	Mechanical Behavior Laboratory	
PHYSICS 301	Astrophysics Laboratory	

- a. Courses in Physics and Mathematics to overcome deficiencies, if any, in undergraduate preparation.
- b. *Basic graduate courses:* These requirements may be totally or partly satisfied with equivalent courses taken elsewhere, pending the approval of the graduate study committee. Letter grades required for all courses:
- c. 21 units of additional advanced courses in science and/or engineering. Units from APPPHYS 290, APPPHYS 390, and any 1-unit courses do not count towards this requirement. Examples of suitable courses include:

BIO 217	Neuronal Biophysics	4
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 236C	Lasers	3

EE 248	Fundamentals of Noise Processes	3
EE 332	Laser Dynamics	3
EE 346	Introduction to Nonlinear Optics	3
PHYSICS 372	Condensed Matter Theory I	3
PHYSICS 373	Condensed Matter Theory II	3

- d. Only 3 units at the 300 or above level may be taken on a satisfactory/no credit basis.
 - e. Additional units of courses as needed to meet the minimum residency requirement of 135. Directed study and research units as well as 1-unit seminar courses can be included.
 - f. A final average overall grade point average (GPA) of 3.0 (B) is required for courses used to fulfill degree requirements.
 - g. Students are normally expected to complete the specified course requirements by the end of their third year of graduate study.
2. *Research*: may be conducted in a science/engineering field under the supervision of a member of the Applied Physics faculty or appropriate faculty from other departments.
 3. *Ph.D. Candidacy*: satisfactory progress in academic and research work, together with passing the Ph.D. candidacy qualifying examination, qualifies the student to apply for Ph.D. candidacy, and must be completed before the third year of graduate registration. The examination consists of a seminar on a suitable subject delivered by the student before the faculty academic adviser (or an approved substitute) and two other members of the faculty selected by the department.
 4. *Research Progress Report*: normally before the end of the Winter Quarter of the fourth year of enrollment in graduate study at Stanford, the student arranges to give an oral research progress report of approximately 45 minutes, of which a minimum of 15 minutes should be devoted to questions from the Ph.D. reading committee.
 5. *University Ph.D. Oral Examination*: consists of a public seminar in defense of the dissertation, followed by private questioning of the candidate by the University examining committee.
 6. *Dissertation*: must be approved and signed by the Ph.D. reading committee.

Emeriti: (Professors) Malcolm R. Beasley, Arthur Bienenstock, Alexander L. Fetter, Theodore H. Geballe, Stephen E. Harris, Walter A. Harrison, Peter A. Sturrock, Yoshihisa Yamamoto; (Professors, Research) Calvin F. Quate, Helmut Wiedemann, Herman Winick; (Courtesy) Gordon S. Kino, Douglas D. Osheroff

Chair: Hideo Mabuchi

Professors: Steven M. Block, Philip H. Bucksbaum, Robert L. Byer, Sebastian Doniach, Martin M. Fejer, Daniel S. Fisher, Ian R. Fisher, Tony F. Heinz (effective Winter Quarter), Harold Y. Hwang, Aharon Kapitulnik, Mark A. Kasevich, Young S. Lee, Hideo Mabuchi, Kathryn A. Moler, Vahé Petrosian, Stephen R. Quake, Zhi-Xun Shen, Yuri Suzuki

Associate Professors: David A. Reis, Mark J. Schnitzer

Assistant Professors: Surya Ganguli, Benjamin L. Lev, Amir H. Safavi-Naeini

Professor (Research): Michel J-F. Digonnet

Courtesy Professors: Mark L. Brongersma, Bruce M. Clemens, Shanhui Fan, David Goldhaber-Gordon, James S. Harris, Lambertus Hesselink, David A. B. Miller, W. E. Moerner, Jelena Vuckovic, Shoucheng Zhang

Courtesy Associate Professors: Zhirong Huang, Andrew J. Spakowitz

Courtesy Assistant Professor: William J. Greenleaf

Consulting Professors: Thomas M. Baer, Raymond G. Beausoleil, John D. Fox, Bernardo A. Huberman, Richard M. Martin, Stuart S. P. Parkin, Daniel Rugar

Archaeology

Courses offered by the Archaeology Program are listed under the subject code ARCHLGY on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ARCHLGY&filter-catalognumber-ARCHLGY=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ARCHLGY&filter-catalognumber-ARCHLGY=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ARCHLGY&filter-catalognumber-ARCHLGY=on>).

Archaeology is the study of the past through its material remains that survive into the present. Archaeology is a discipline that offers direct access to the experiences of a wide range of people in numerous cultures across the globe. Increasingly, archaeology bridges past and present societies through the study of the human heritage and its role in contemporary societies. Stanford's Archaeology Program provides students with an interdisciplinary approach to the material remains of past societies, drawing in equal parts on the humanities, social sciences, and natural sciences.

The Archaeology curriculum draws on faculty from a wide range of University departments and schools. To complete the requirements for the major, students must take courses from the offerings of the program and from the listings of other University departments. The program culminates in a Bachelor of Arts (B.A.) in Archaeology.

Mission of the Undergraduate Program in Archaeology

The mission of the undergraduate program in Archaeology is to provide students with a broad and rigorous introduction to the analysis of the material culture of past societies, drawing on the questions and methods of the humanities, social sciences, and natural sciences. Students in the major learn to relate these analyses to the practice of archaeology in the contemporary world. The program seeks to help each student achieve a high level of understanding through concentrated study of a particular research area. Courses in the major complete a comprehensive curriculum that draws on faculty from a wide range of University departments and programs. Archaeology majors are well prepared for advanced training in professional schools such as education, law, and journalism and, depending upon their choice of upper-division course, graduate programs in the humanities, social sciences, and natural sciences.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. demonstrate an understanding of core knowledge of the history of thought and basic theoretical foundations in archaeology.
2. write clearly and persuasively, communicating ideas about archaeology to multiple audiences and different communities, from the scholarly and to the general public in a variety of formats.
3. learn about the development of archaeology as a discipline and the major trends that have influenced thinking and writing about archaeology today.
4. demonstrate their mastery of the broad historical and theoretical trends in the field through critique of research within archaeology.

Bachelor of Arts in Archaeology

To declare a major in Archaeology, students should apply for the B.A. in Archaeology on Axxess and contact the student services specialist, who provides an application form, answers initial questions, and helps the student choose a faculty adviser. Students should declare by the beginning of their junior year.

All majors must complete 65 units with an overall minimum grade of 'C', which must form a coherent program of study and be approved by the student's faculty adviser and the program director.

Students who plan to pursue graduate work in Archaeology should be aware of the admission requirements of the particular departments to which they intend to apply. These vary greatly. Early planning is advisable to guarantee completion of major and graduate school requirements.

Degree Requirements

The B.A. in Archaeology requires a minimum of 65 units in the major, with an overall minimum grade of 'C', and no more than 10 units may be taken for pass/nopass credit. The major requirements are divided among five components. A course may only be used once to fulfill a component.

1. Core Courses

	Units
20 units must be taken for a letter grade (minimum passing grade of 'B')	
ARCHLGY 1 Introduction to Prehistoric Archeology (Gateway)	5
ARCHLGY 102 Archaeological Methods (Intermediate)	5
ARCHLGY 103 History of Archaeological Thought (Intermediate)	5
ARCHLGY 107A Archaeology as a Profession (Capstone)	5
Total Units	20

ARCHLGY 1 Introduction to Prehistoric Archeology is recommended as a first course. Many upper-level courses in Archaeology require this course as a prerequisite. Students should normally take the capstone course in their final year of course work in the major.

2. Analytical Methods and Computing (5 units)

Quantitative skills and computing ability are indispensable to archaeologists. It is recommended that students take one of the following:

	Units
Select one of the following:	5
ANTHRO 98B Digital Methods in Archaeology (recommended)	
PSYCH 10/ Introduction to Statistical Methods: Precalculus	
STATS 60	
ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists	

3. Archaeological Skills (10 units)

Archaeological skills include archaeological formation processes, botanical analysis, cartography, ceramic analysis, dating methods, faunal analysis, geographic information systems, geology, geophysics, genetics, osteology, remote sensing, soil chemistry, and statistics. With the approval of the instructor and Archaeology director, undergraduates may fulfill part of this requirement from graduate-level courses (typically courses with catalog numbers of 200 or higher).

	Units
ARCHLGY 119 Zooarchaeology: An Introduction to Faunal Remains	5

ARCHLGY 124 Archaeology of Food: production, consumption and ritual	3-5
ARCHLGY 126 Archaeobotany	5
ANTHRO 103A Human Osteoarchaeology	5
ANTHRO 175 Human Skeletal Anatomy	5
EESS 161	4
EESS 164 Fundamentals of Geographic Information Science (GIS)	4
GES 1A Introduction to Geology: The Physical Science of the Earth	5
GES 1B Introduction to Geology	4
GES 1C Introduction to Geology: Dynamic Earth	4
GES 102 Earth Materials: Introduction to Mineralogy	4

4. Theory (at least 10 units)

Topics include archaeological, art-historical, sociocultural, historical, and material culture theory. With the approval of the instructor, undergraduates may fulfill part of this requirement from graduate-level courses (typically courses with catalog numbers of 200 or higher).

	Units
ARCHLGY 151 Ten Things: An Archaeology of Design	3
ANTHRO 90B Theory of Cultural and Social Anthropology	5
ANTHRO 117 Thinking Through Animals	5
ANTHRO 125 Language and the Environment	4-5
ANTHRO 134 Object Lessons	5
ANTHRO 147 Nature, Culture, Heritage	5

5. Electives (20 units)

Select from any of the courses listed below. Courses are arranged around a regional or thematic focus, and therefore, may appear more than once. Students have the option of taking courses around a theme or concentration, and are encouraged to do so by consulting with their faculty adviser(s) to design a course plan. Courses other than those on this list can be used to fulfill this requirement with prior approval of the student's faculty adviser and program director. With the approval of instructor, undergraduates may fulfill part of this requirement from graduate-level courses, typically courses numbered 200 or higher.

• World Archaeology: Mediterranean

	Units
ARCHLGY 118 Engineering the Roman Empire	4-5
ARCHLGY 145 Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean	3
CLASSICS 51 Introduction to the Archaeology of Greece	3-5
CLASSICS 52 Introduction to Roman Archaeology	3-5
CLASSICS 169 Archaeology of Britannia	3-4

• World Archaeology: Americas

	Units
ARCHLGY 10 The Archaeology of Home	3-5
ARCHLGY 102B Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 30Q The Big Shift	4
ANTHRO 100C	2-5

• World Archaeology: Asia

	Units
ARCHLGY 111 Emergence of Chinese Civilization from Caves to Palaces	3-4

ARCHLGY 135	Constructing National History in East Asian Archaeology	3-5
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• Heritage

ARCHLGY 13	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ARCHLGY 135	Constructing National History in East Asian Archaeology	3-5
ARCHLGY 143	Classical Archaeology Today: Ethical Issues of Excavation, Ownership, and Display	3
ANTHRO 112	Public Archaeology: Market Street Chinatown Archaeology Project	4-5
ANTHRO 112B	Advanced Study in Public Archaeology	2-5
ANTHRO 147	Nature, Culture, Heritage	5
THINK 22	Who Owns the Past? Archaeology, Heritage and Global Conflicts	4

• Urbanism and Cities

ANTHRO 112	Public Archaeology: Market Street Chinatown Archaeology Project	5
ANTHRO 112B	Advanced Study in Public Archaeology	2-5

6. Archaeological Fieldwork

Students must take part in a month-long Stanford Archaeology Center field project directed by a Stanford faculty member, and enroll in any coursework that is required for participation in the field project. Projects are typically offered during summer months and funding may be provided. In summer 2013, field schools were located in: Turkey, Peru, China, Mauritius and Italy.

7. Collateral Language Requirement

All Archaeology majors must demonstrate competence in a foreign language beyond the first-year level. Students can meet this requirement by completing a course beyond the first-year level with a grade of 'B' or better, and are encouraged to choose a language that has relevance to their archaeological region or topic of interest. Students may petition to take an introductory-level course in a second language to fulfill this requirement by demonstrating the connection between the language(s) and their research interest(s).

8. Research and Independent Study

Students may count up to 5 units of research and independent study toward the Archaeology major:

including but not limited to:

ARCHLGY 190	Archaeology Directed Reading/Independent Study	1-5
ARCHLGY 195	Independent Study/Research	1-5
ARCHLGY 199	Honors Independent Study	5

Honors Program

The honors program in Archaeology gives qualified majors the chance to work closely with faculty on an individual research project culminating in an honors thesis. Students may begin honors research from a number of starting points, including topics introduced in the core or upper-division courses, independent interests, research on artifacts in Stanford's collections, or fieldwork experiences.

Interested Archaeology majors of junior standing may apply for admission by submitting an honors application form, including a 4-5 page statement of the project, a transcript, and a letter of recommendation from the faculty

member supervising the honors thesis to the student services specialist, no later than the end of the fourth week of the Spring Quarter. Archaeology majors are eligible to apply for honors candidacy. The thesis is due in early May of the senior year and is read by the candidate's adviser and a second reader appointed by the undergraduate committee.

Overseas Studies Courses in Archaeology

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bossp.stanford.edu>) web site. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

Minor in Archaeology

A minor in Archaeology provides an introduction to the study of the material cultures of past societies. It can complement many majors, including but not limited to Anthropology, Applied Physics, Art and Art History, Classics, Earth Systems, Geological and Environmental Sciences, History, and Religious Studies.

Students must complete the declaration process, including the planning form submission and Axxess registration, by the last day of the quarter, two quarters prior to degree conferral; for example, by the last day of Autumn Quarter if Spring graduation is the intended quarter of graduation.

Requirements

To minor in Archaeology, students must complete at least 27 units of relevant course work, including:

1. Core Program (10 units)

		Units
ARCHLGY 1	Introduction to Prehistoric Archeology (Gateway Course, Required)	3-5
ARCHLGY 103	History of Archaeological Thought	5
ARCHLGY 107A	Archaeology as a Profession	5

is recommended as a first course, and many of the upper-level courses in Archaeology require this course as a prerequisite. Students have the option to take ARCHLGY 103 History of Archaeological Thought **or** ARCHLGY 107A Archaeology as a Profession to fulfill the rest of the 10 unit core requirement for the minor.

2. Archaeological Skills (2-5 units)

Archaeological skills include dating methods, faunal analysis, botanical analysis, ceramic analysis, geology, geophysics, soil chemistry, remote sensing, osteology, genetics, statistics, cartography, and geographic information systems. The course(s) must be chosen from the list of courses under Archaeological Skills (requirement 3) in the Bachelor's tab of this section.

3. Theory (5 units)

Topics include archaeological, art historical, sociocultural, historical, and material culture theory. The course(s) must be chosen from the list of courses under Theory (requirement 4) in the Bachelor's tab of this section.

4. Electives (10 units)

Select courses from the list of courses under Electives (requirement 5) in the Bachelor's tab of this section. Students have the option of taking

courses around a theme or concentration, and are encouraged to do so by consulting their faculty advisers to design a course plan.

Cognate Courses

Archaeology is an interdisciplinary program. Students should meet with their adviser about degree requirements and the applicability of courses from other University departments to the Archaeology major or minor. Applicable courses are commonly found in Anthropology (ANTHRO) and Classics (CLASSICS), but are not limited to these departments. Please check with your adviser and the program director for course approvals.

Director: Lynn Meskell (Anthropology; on leave, Winter)

Professors: Ian Hodder (Anthropology; on leave, Winter), Mark Lewis (History, Asian Languages), Li Liu (East Asian Languages and Cultures), Gail Mahood (Geological and Environmental Sciences), Mike Moldovan (Geological and Environmental Sciences), Ian Morris (Classics, History), Amos Nur (Geophysics), Michael Shanks (Classics), Peter Vitousek (Biology)

Associate Professors: Giovanna Ceserani (Classics), Jody Maxmin (Art and Art History, Classics), John Rick (Anthropology), Jennifer Trimble (Classics), Barbara Voss (Anthropology) (on leave)

Assistant Professors: Justin Leidwanger (Classics), Krish Seetah (Anthropology)

Assistant Professor (Teaching): Michael V. Wilcox (Anthropology)

Postdoctoral Fellows: Neil Duncan, Alan Greene, Gertjan Plets

Associated Staff: Laura Jones (Campus Archaeologist), Christina Hodge (Collections Manager)

Overseas Studies Courses in Archaeology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPCPTWN 16	South Africa Sites of Memory	2
OSPCPTWN 17		1
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPAUSTL 40	Australian Studies	3

Art and Art History

Courses offered by the Department of Art & Art History are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes ARTHIST (Art History) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ARTHIST&filter-catalognumber-ARTHIST=on>), ARTSTUDI (Art Practice) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ARTSTUDI&filter-catalognumber-ARTSTUDI=on>), FILMSTUD (Film Studies) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FILMSTUD&filter-catalognumber-FILMSTUD=on>), and FILMPROD (Film Practice) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FILMPROD&filter-catalognumber-FILMPROD=on>).

view=catalog&catalog=&page=0&q=FILMSTUD&filter-catalognumber-FILMSTUD=on), and FILMPROD (Film Practice) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FILMPROD&filter-catalognumber-FILMPROD=on>).

Mission of the Department of Art and Art History

The department offers courses of study in:

1. Art History
2. Art Practice (studio)
3. Design
4. Film and Media Studies
5. Film Production

leading to the following degrees: B.A. degree in Art History; B.A. degree in Art Practice; B.A. degree in Film and Media Studies; M.F.A. degree in Art Practice; M.F.A. degree in Design; M.F.A. degree in Documentary Film and Video; Ph.D. degree in Art History.

The undergraduate program is designed to help students think critically about the visual arts and visual culture. Courses focus on the meaning of images and media, and their historical development, roles in society, and relationships to disciplines such as literature, music, and philosophy. Work performed in the classroom, studio, and screening room is designed to develop a student's powers of perception, capacity for visual analysis, and knowledge of technical processes.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program.

Students in historical studies are expected to demonstrate:

1. knowledge and awareness of art and/or film terminology and concepts;
2. ability to develop effective and nuanced lines of interpretation;
3. improved critical thinking skills using primary and secondary source materials;
4. improvement in analytical writing skills and close reading skills;
5. ability to form and validate their own and others' opinions through knowledge of artistic movements and sociohistorical events.

Students in creative art are expected to demonstrate:

1. enhanced awareness of the role of art in intellectual and cultural life;
2. problem solving skills to organize, analyze and interpret visual information;
3. mastery of techniques and materials of a discipline with awareness of historical and current practices;
4. selection of materials, processes, form, and content to achieve poetic and expressive relationships to artistic media;
5. ability to apply critical analysis to the student's own work and the work of others;
6. effective techniques for the preparation and presentation of work consistent with professional practices in the field.

Learning Outcomes (Graduate)

The purpose of the master's programs is to further develop knowledge and skills in Art and Art History and to prepare students for a professional career or doctoral studies. This is achieved through completion of

courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates in Art History (including Film and Media Studies) who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in their respective disciplines. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to knowledge in their fields and to interpret and present the results of their research.

Iris and B. Gerald Cantor Center For Visual Arts

The Cantor Arts Center at Stanford University is a major resource for the department. The Cantor presents art from around the world in 24 galleries: from Africa to the Americas to Asia, and from ancient to contemporary periods. The Cantor offers changing selections from its 30,000-object collection; the Rodin Sculpture Garden; special exhibitions; and a variety of educational programs. Through collaborations with the teaching program, student internships, and student activities, the Cantor provides a rich resource for Stanford students.

Art History

Undergraduate Program in Art History

The discipline of Art History teaches students how to analyze and interpret works of fine art (paintings, drawings, prints, and sculpture), photography and moving image media (film, video, television, and digital art), material culture (ritual objects, fashion, advertisements, and the decorative, applied, and industrial arts), and the built environment (architecture, urbanism, and design). The department takes it as axiomatic that the skills of visual literacy and analysis are not innate but may be acquired through training and practice. Objects of study are drawn from the cultures of Africa, Asia, the Americas, from the Middle East; from Western, Central, and Eastern Europe; and from antiquity to the present.

Art History is a historical discipline that seeks to reintegrate the work of art into the original context of its making and reception, foregrounding its significant status as both historical document and act of social communication. At the same time, Art History seeks to understand the ways in which the work of art transcends the historical moment of its production, taking on different meanings in later historical periods, including the present. As part of their visual training, students of Art History become proficient in cultural analysis and historical interpretation. Art History thus envisions itself as uniquely well positioned to train students from a variety of disciplines in the light of the dramatic visual turn that has gripped the humanities and the sciences over the course of the last decade, with more and more disciplines becoming vitally interested in visual forms and modes of communication.

Graduate Program in Art History

The doctoral program in Art History at Stanford is relatively small, and affords the graduate student the opportunity to work intensively with individual members of the faculty. The Doctor of Philosophy degree is taken in a particular field, supported by a background in the general history of art. Doctoral candidates also undertake collateral studies in other graduate departments or in one of the University's interdisciplinary programs.

Art Practice (Studio) Undergraduate Program in Art Practice (Studio)

The Art Practice program offers production-based courses founded on the concepts, skills and cultural viewpoints that characterize contemporary art practice. The goal is to educate students, both majors and minors, in the craft, culture, and theory of current fine art practices to prepare them for successful careers as artists. The art practice program is designed to develop in-depth skills in more than one area of the visual arts. It emphasizes the expressive potential of an integration of media, often via a cross-disciplinary, interactive path. Through collaboration and connections with scientists, engineers, and humanities scholars, the program addresses a breadth of topical and artistic concerns central to a vital undergraduate education.

Graduate Program in Painting, Sculpture, New Genres, and Photography

The program provides a demanding course of study designed to challenge advanced students. Participants are chosen for the program on the basis of work that indicates high artistic individuality, achievement, and promise. Candidates should embody the intellectual curiosity and broad interests appropriate to, and best served by, work and study within the University context.

The Graduate Program in Design

Working jointly, the departments of Art & Art History and Mechanical Engineering offer graduate degrees in product and visual design. A large physical environment, the Design Yard, provides professional studio space and well-equipped shops. Flexible programs may include graduate courses in fields such as engineering design, biotechnology, marketing, microcomputers, or the studio and art history curriculum. The program centers on a master's project and may also include work in advanced art and design. The program is structured to balance independent concentration with the use of the University and community, and interaction with the students and faculty of the graduate Design program. Cross-disciplinary interaction is encouraged by a four-person graduate Design faculty.

Film and Media Studies Undergraduate Program in Film and Media Studies

The Bachelor of Arts in Film and Media Studies provides an introduction to film aesthetics, national cinematic traditions, modes of production in narrative, documentary, and experimental films, the incorporation of moving image media by contemporary artists, and the proliferation of new forms of digital media. The program is designed to develop the critical vocabulary and intellectual framework for understanding the role of cinema and related media within broad cultural and historical concepts.

Graduate Program in Documentary Film and Video

The Master of Fine Arts program in documentary production provides a historical, theoretical, and critical framework within which students master the conceptual and practical skills for producing nonfiction film and video. The M.F.A. is a terminal degree program with a two-year, full-time curriculum representing a synthesis of film praxis and film and media history, theory, and criticism. Courses provide an intellectual and theoretical framework within which students' creative work is developed. Students proceed through the program as a cohort. The program does not permit leaves of absence.

The M.F.A. degree is designed to prepare graduate students for professional careers in film, video, and digital media. Graduates are qualified to teach at the university level. The philosophy of the program is predicated on a paradigm of independent media that values artistic expression, social awareness, and an articulated perspective. Students become conversant with the documentary tradition as well as with alternative media and new directions in documentary. Training in documentary production is combined with the development of research skills in film criticism and analysis. Electives in film studies, art history, and studio art provide an intellectual and theoretical framework within which creative work is realized. The parallel focus on production and studies prepares students for an academic position that may require teaching both film studies and production.

Art and Art History Department Course Catalog Numbering System

The first digit of the ARTHIST and FILMSTUD course number indicates its general level of sophistication.

Digit	Area
001-099	Introductory
100-199	Undergraduate level lectures
200-299	Undergraduate seminars/individual work
300-399	Graduate level lectures
400-599	Graduate seminars/individual work

Art History

Digit	Area
001-099	Introductory
100-104	Ancient
105-109	Medieval
110-119	Renaissance
120-139	Early Modern
140-159	Modern
160-179	Contemporary
180-189	Asia
190-195	Africa and the Americas
200-299	Seminars and Colloquia
410-499	Historical Studies
500-599	Critical Studies
600-699	Graduate Research

Art Practice (Studio)

Digit	Area
001-099	Courses for Non-Major (Lower Level)
100-199	Lower Level Undergraduate Courses
200-299	Upper Level Undergraduate Courses
300-399	Graduate Seminars

Film and Media Studies

Digit	Area
004-103	Introductory
111-118	Genre
130-139	National Cinemas
140-149	Aesthetics
150-159	Other
220-299	Undergraduate Seminars
400-660	Graduate Seminars

Film Production

Digit	Area
001-199	Undergraduate Courses
300-399	Graduate Courses
400-499	Graduate Courses for MFA Doc Film Students Only

Bachelor of Arts in Art History Suggested Preparation for the Major

Students considering a major in art history should take either ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval or ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present, during their freshman or sophomore year.

Fields of Study or Degree Options

Students who wish to major in Art History must meet with the undergraduate coordinator. At that time the student selects a faculty adviser and declares the major on AxBSS. Concentrations within the major are approved by the student's major adviser and are not declared on AxBSS. Sample concentrations include:

1. Topical concentrations: art and gender; art, politics, race, and ethnicity; art, science, and technology; urban studies
2. Genre concentrations: architecture; painting; sculpture; film studies; prints and media; decorative arts and material culture
3. Historical and national concentrations: ancient and medieval; Renaissance and early modern; modern and contemporary; America; Africa; Asia; the Americas
4. Interdisciplinary concentrations: art and literature; art and history; art and religion; art and economics; art and medicine (with adviser consent a maximum of two concentration courses may be taken outside the department).

Degree Requirements

All undergraduate majors complete a minimum of 65 units (15 courses that carry 4 or 5 units each). Students are required to complete four core courses, two seminar courses for the major (ARTHIST 294 Writing and the Visual and ARTHIST 296 Junior Seminar: Methods & Historiography of Art History), five Art History foundation courses, three concentration courses, one of which must be a seminar, Art Practice course (4 units). Courses must be taken for a letter grade. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

Required Courses

1. Core Courses (20 units)

	Units
Select four of the following:	20
ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval (meets WAY A-II and ED)	
ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (meets WAY A-II)	
ARTHIST 2 Asian Arts and Cultures (meets WAY A-II)	
ARTHIST 3 Introduction to World Architecture (meets WAY A-II)	
FILMSTUD 4 Introduction to Film Study (meets WAY A-II)	
Total Units	20

2. Foundation Courses (20 units)

In order that students acquire a broad overview of different historical periods and different geographic regions, majors must take five Art History lecture courses, one from each of the following five categories:

	Units
Take one course from each of the following categories:	
Ancient and Medieval	
Select one of the following:	4
ARTHIST 100N The Artist in Ancient Greek Society (meets WAY A-II)	
ARTHIST 101 Archaic Greek Art	
ARTHIST 102 Empire and Aftermath: Greek Art from the Parthenon to Scopas (meets WAY A-II)	
ARTHIST 105B Medieval Journeys: Introduction through the Art and Architecture (meets WAY ED)	
ARTHIST 109 The Book in the Medieval World	
Renaissance and Early Modern	
Select one of the following:	4
ARTHIST 111 Introduction to Italian Renaissance, 1420-1580	
ARTHIST 118N Pagan Mythology and the Making of Modern Europe	
ARTHIST 120 Living in a Material World: Seventeenth-century Dutch and Flemish Painting	
Modern, Contemporary, and the U.S	
Select one of the following:	4
ARTHIST 144 On Looking: Art, Obscenity, and the Ethics of Spectatorship (meets WAY ER)	

ARTHIST 147	MODERNISM AND MODERNITY (meets WAY A-II)
ARTHIST 152	The American West (meets WAY A-II and SI)
ARTHIST 155C	Abstract Expressionism: Painting/Modern/America
ARTHIST 154	The American Civil War: A Visual History (meets WAY A-II)
ARTHIST 156N	Art and the Power of Place: Site, Location, Environment
ARTHIST 160	Intro to Contemporary Art
ARTHIST 164A	Technology and the Visual Imagination
ARTHIST 166	Representing Fashion

Asia, Africa, and the Americas

Select one of the following:	4
ARTHIST 184	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting
ARTHIST 186	Theme and Style in Japanese Art
ARTHIST 188B	From Shanghai Modern to Global Contemporary: Frontiers of Modern Chinese Art
ARTHIST 189C	Global Currents: Early Modern Art Enterprises, Economies, and Imaginaries
ARTHIST 192B	Art of the African Diaspora

Film & Media Studies

Select one of the following:	4
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)
FILMSTUD 100B	History of World Cinema II, 1930-1959 (meets WAY A-II)
FILMSTUD 100C	History of World Cinema III, 1960-Present (meets WAY A-II)
FILMSTUD 101	Fundamentals of Cinematic Analysis (meets WAY A-II)
FILMSTUD 102	Theories of the Moving Image (meets WAY A-II)
FILMSTUD 116	International Documentary
FILMSTUD 164A	Technology and the Visual Imagination

3. Seminar Courses for Majors (10 units)

Writing in the Major (5 units): This course is designed for Art History majors in their junior year, equipping them with the scholarly tools necessary for writing about art in a variety of contexts as they progress through the major. This course fulfills the requirements of Writing in the Major (WIM).

Capstone Junior Seminar (5 units): This course is designed to introduce majors to methods and theories underlying the practice of Art History. The seminar is offered annually, typically during Autumn Quarter.

Units

Take each of the following:	
Writing in the Major	
ARTHIST 294	Writing and the Visual (Required: WIM course) 5

Capstone Junior Seminar

ARTHIST 296 Junior Seminar: Methods & Historiography of Art History 5

4. Seminar Requirement (5 units)

The student needs one additional seminar course within his or her area of concentration.

Select one of the following:

		Units
ARTHIST 203	Greek Art In and Out of Context	4-5
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5
ARTHIST 207C	Phenomenology and Aesthetics in Medieval Art	5
ARTHIST 212	Renaissance Florence, 1440-1540	5
ARTHIST 217B	Architectural Theory from Antiquity to Le Corbusier	5
ARTHIST 225	Cezanne	5
ARTHIST 243C	The Art of Travel	5
ARTHIST 246B	Pop Art	5
ARTHIST 269A	Art and Technology	5
ARTHIST 278	Anatomy of Exhibition	5
ARTHIST 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5

5. Area of Concentration (8-10 units)

The department encourages students to pursue their interests by designing an area of concentration tailored to their own intellectual concerns. This area of concentration provides the student with an in-depth understanding of a coherent topic in Art History and consists of three Art History courses: one must be a seminar, and two of the three courses must be in a single field or concentration constructed by the student in consultation with his or her faculty adviser. Students must submit an area of concentration form, signed by their faculty adviser, during Winter Quarter of the junior year.

6. Art Practice Course (4 units)

Majors are required to complete at least one introductory Art Practice course.

Honors Program in Art History

The purpose of the honors program is to extend and deepen work done in Art History classes. The honors thesis topic typically emerges out of prior course work; it should be focused and have clear parameters. Ordinarily, an honors thesis is not an exploration of an area that the student has never studied before.

Admission to the Program

The minimum requirement for admission to the Honors Program is an overall GPA of 3.5, and at least 3.5 in Art History courses. Students must complete at least five Art History courses at Stanford by the end of their junior year, and four must be completed by the end of Winter Quarter; with the adviser's approval, two of these courses may be taken at an overseas campus or Stanford in Washington. Students interested in pursuing Honors should consult a potential thesis adviser on the Art History faculty during the Autumn Quarter of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year, and it is recommended that they be in residence throughout the senior year. Students considering honors should contact the Director of the Honors Program in their junior year as soon as they begin to think about writing an honors thesis. Those

wishing to do so must announce their intention to write an honors thesis by submitting an intent form signed by their thesis adviser (who need not be the student's academic adviser) by February 1 of their junior year.

Submission of the Thesis Proposal Package

Candidates for the honors program must submit a five-page (double-spaced) thesis proposal, including bibliography and illustrations, and one completed paper that demonstrates the student's ability to conceptualize and write cogently about art historical issues. The deadline for submitting the complete package to the department's undergraduate coordinator is the third week of Spring Quarter of the candidate's junior year. Upon approval by a majority of the faculty at its regular meeting in early May, the candidate is accepted into the honors program.

Research and Writing of the Honors Thesis

Once admitted to the honors program, students work with the Director of the Honors Program and their thesis adviser to define the scope of study, establish a research and writing timetable, and enlist one other faculty member, ideally but not necessarily in the Department of Art and Art History, to serve as a second reader. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students are encouraged to apply for UAR research grants (<https://undergrad.stanford.edu/opportunities/research>) to help finance trips or expenses related to research for their honors thesis.

During their senior year, students must register for 10 units of ARTHIST 297 Honors Thesis Writing, 5 units of which may count towards the student's concentration in Art History. Students are required to register for 2-5 units each quarter during their senior year, for a total of 10 units.

Submission and Approval of the Honors Thesis

With the guidance of the Director of the Honors Program, students and thesis advisers should plan their work so that a complete, final manuscript is submitted to the thesis adviser and the second reader by the beginning of the seventh week of the student's final quarter at Stanford. The thesis adviser assigns a letter grade; both the adviser and the second reader must approve the honors thesis in order to qualify the student to graduate with honors.

Bachelor of Arts in Art Practice (Studio) Degree Requirements

All undergraduate majors complete a minimum of 65 units including six lower level courses, six upper level courses, and four art history courses, including the WIM course ARTHIST 294 Writing and the Visual. All courses must be taken for a letter grade. University units earned by placement tests or advanced placement work in secondary school are not counted within the 65 units. The studio requirements are divided into lower level (introductory, 100 level) and upper level (advanced, 200 level) course work. At the lower level, students focus on a range of subject matter from historical motifs (figure, still life, landscape) to contemporary ideas in art. Upper level courses are designed to stretch the student's understanding of materials, techniques, site, and social relevance. Experimental and challenging in nature, these courses cross area boundaries. Independent study supervised by a member of the permanent faculty is also available to the advanced student.

Students are encouraged to move through the requirements for the major in the sequence outlined. Students are exposed to a range of practices early in their development in order to have a good basis of comparison if they choose to focus on a particular medium. This sequence of courses also

broadens the students' skills and enables them to combine materials and methods. In all courses, students are expected to pass mid-term and final reviews and critiques of their work.

To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Art Practice majors are required to meet with both their adviser and the undergraduate coordinator during the first two weeks of each quarter to have course work approved and make certain they are meeting degree requirements. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

Required Courses

1. Six lower level courses (24 units)

	Units
Select six of the following:	24
ARTSTUDI 130 Interactive Art: Making it with Arduino	
ARTSTUDI 131 Sound Art I	
ARTSTUDI 140 Drawing I	
ARTSTUDI 141 Plein Air Painting Now	
ARTSTUDI 145 Painting I	
ARTSTUDI 147 Artist's Book	
ARTSTUDI 148 Monotype	
ARTSTUDI 148B Introduction to Printmaking Techniques	
ARTSTUDI 151 Sculpture I	
ARTSTUDI 153N Ecology of Materials	
ARTSTUDI 160 Design I : Fundamental Visual Language	
ARTSTUDI 170 Introduction to Photography	
ARTSTUDI 173E Cell Phone Photography	
ARTSTUDI 174B Creativity in the Age of Facebook: Making Art for and from Networks	
ARTSTUDI 177 Video Art I	
ARTSTUDI 178 Art and Electronics	
ARTSTUDI 179 Digital Art I	
FILMPROD 114 Introduction to Film and Video Production	

2. Six upper level courses (24 units):

- ARTSTUDI 230 Interdisciplinary Art Survey is a required course which focuses on direct experiences of multidisciplinary art and art practices. ARTSTUDI 249 Advanced Undergraduate Seminar (8 units)
- Students select four optional courses from the following list.

	Units
Select four of the following:	12-16
ARTSTUDI 236 Future Media, Media Archaeologies	
ARTSTUDI 245 Painting II	
ARTSTUDI 249 Advanced Undergraduate Seminar	
ARTSTUDI 252 Sculpture II	
ARTSTUDI 254 Kinetic Sculpture	
ARTSTUDI 260 Design II	
ARTSTUDI 262 The Chair	
ARTSTUDI 270 Advanced Photography Seminar	
ARTSTUDI 271 The View Camera: Its Uses and Techniques	
ARTSTUDI 274 Alternative Processes	
ARTSTUDI 275 Introduction to Digital Photography and Visual Images	
ARTSTUDI 276 The Photographic Book	
ARTSTUDI 277 Project class: Digital and Analogue Projects in Photography	
ARTSTUDI 278 Intermediate Black and White Photography	
ARTSTUDI 284 Art and Biology	

3. Four Art History courses (17-20 units)

	Units
ARTHIST 294 Writing and the Visual (Required: WIM course)	5
Three other art history courses, one must be from the modern art series.	12-15
One Film & Media Studies course may satisfy an Art History elective.	

Transfer Credit Evaluation

Upon declaring an Art Practice major, a student transferring from another school must have his or her work evaluated by the Director of Undergraduate Studies (DUS) in Art Practice. A maximum of 13 transfer units are applied toward the 65 total units required for the major. A student wishing to have more than 13 units applied toward the major must submit a petition to the Director of Undergraduate Studies in Art Practice and then have his or her work reviewed by a studio committee.

Overseas Study or Study Abroad

A minimum of 52 of the 65 units required for the Art Practice major and a minimum of 32 of the 36 units required for the Art Practice minor must be taken at the Stanford campus. A student must meet with his or her adviser and with the undergraduate coordinator before planning an overseas campus program.

Honors Program in Art Practice

The purpose of the honors program is to extend and deepen work done in Art Practice classes. The honors thesis exhibition topic typically emerges out of prior course work. Ordinarily, an honors thesis exhibition is not an exploration of an area that the student has never studied before. Completion of the program is noted on the diploma and on the transcript.

Admission to the Program

The honors program is open to art practice majors only. The minimum requirement for admission to the honors program is an overall GPA of 3.5, and at least 3.5 in Art Practice courses. Students must complete at least five Art Practice courses at Stanford by the end of their junior year, and four must be completed by the end of Winter Quarter. With adviser approval, two of these courses may be taken at an overseas campus.

Students interested in pursuing honors should consult a potential thesis adviser on the Art Practice faculty during the Autumn Quarter of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year. Students considering honors should contact the Director of the Honors Program in their junior year. Those wishing to do so must announce their intention to write an honors thesis exhibition proposal by submitting an intent form signed by their thesis adviser, who need not be the student's academic adviser, by March 1 of their junior year.

Submission of the Thesis Proposal Package

The thesis proposal package must include:

1. A two-page Honors Thesis Exhibition Project Proposal description of the artwork/project, including an outline of research and goals signed by the thesis adviser.
2. Artwork Samples: 10 JPEGs of recent work (scaled to 8"x 10", no larger than 1MB each) or 5 minutes of video/audio clips. If video/audio work only is submitted, it may consist of up to 15 minutes of clips.
3. Artwork Sample Descriptions: Printed sheet listing each artwork and descriptions of submitted artwork (title, date, medium, dimensions, length if applicable, explanation if needed)
4. Students may include preparatory sketches (artwork samples of proposed work) on the Slideroom application.

Research and Writing of the Honors Thesis

Once admitted to the honors program, students work with the Director of the Honors Program and their thesis adviser to define the scope of study, establish a research and artwork completion timetable, and enlist one other faculty member, ideally but not necessarily on the Art Practice faculty, to serve as a second reader. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students are encouraged to apply for UAR research grants (<https://undergrad.stanford.edu/opportunities/research/get-funded/apply-uar-student-grants>) to help finance trips or expenses related to research for their honors thesis.

During their senior year, students must register for 10 units of ARTSTUDI 297 Honors Thesis Exhibition, 5 units of which may count towards the student's concentration in Art Practice. Students are required to register for 2-5 units each quarter during their senior year, for a total of 10 units.

Submission and Approval of the Honors Thesis

With the guidance of the Director of the Honors Program, students and thesis advisers should plan their work so that a complete art exhibition is installed in the first five weeks of Spring Quarter of their senior year with

Liz Celeste (lizceleste@stanford.edu), Museum Curator for the Department of Art and Art History. The student arranges a meeting with the advisers while the exhibition is on display. The thesis adviser assigns a letter grade; both the main adviser and the second adviser must approve the honors thesis in order to qualify the student to graduate with honors.

Bachelor of Arts in Film and Media Studies

Suggested Preparation for the Major

Students considering a major in film and media studies should take FILMSTUD 4 Introduction to Film Study, and are encouraged to take either ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval or ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present, during their freshman or sophomore year. These courses anchor the major through exposure to film language, genre, and visual and narrative structures. Majors are required to take one course in the fundamentals of film and video production.

Suggested or Recommended Courses (all of which meet major requirements)

		Units
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval (meets WAY A-II and ED)	4
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (meets WAY A-II)	5
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 101	Fundamentals of Cinematic Analysis (meets WAY A-II)	4

Fields of Study or Degree Option

Advanced undergraduate courses are offered in five fields of study. These fields are declared on Axxess; they appear on the transcript but they do not appear on the diploma:

- Film History
- Film and Culture
- Film, Media, and Technology
- Writing, Criticism, and Practice
- Aesthetics and Performance

Working with a faculty adviser, students choose five courses in their field from course offerings in Art and Art History and one course from another department in the University.

Degree Requirements

All undergraduate majors complete a minimum of 64 units (16 courses of 3-5 units each), or 15 courses plus an honors thesis. FILMSTUD 101 Fundamentals of Cinematic Analysis (WIM course) is required for all majors. All courses for the major must be taken for a letter grade. To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

Required Courses

		Units
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 6	Introduction to Digital Media	5
FILMSTUD 100A	History of World Cinema I, 1895-1929	4
FILMSTUD 100B	History of World Cinema II, 1930-1959 (meets WAY A-II)	4
FILMSTUD 100C	History of World Cinema III, 1960-Present (meets WAY A-II)	4
FILMSTUD 101	Fundamentals of Cinematic Analysis (WIM Course, meets WAY A-II)	4
FILMSTUD 102	Theories of the Moving Image (meets WAY A-II)	4
FILMPROD 114	Introduction to Film and Video Production (meets WAY CE)	5
Concentration ¹		
FILMSTUD 290	Movies and Methods: Films of Stanley Kubrick ²	5
Choose one of the following:		
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval (meets WAY A-II and ED)	5
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (meets WAY A-II)	5

¹ Concentration - Five courses, four of which must be in a single film and media studies concentration developed by the student in consultation with an adviser. Concentration areas are: film history; film and culture; aesthetics and performance; film, media, and technology; and writing, criticism, and practice. The remaining course must be related, situating the student's concentration in a broader context.

² Capstone Experience - FILMSTUD 290 Movies and Methods: Films of Stanley Kubrick, offered once a year. The Senior Seminar represents the culminating intellectual experience for Film Studies majors choosing not to write an honors thesis. Honors thesis writers may also take the senior seminar. Seniors who may not be in residence in the quarter that the senior seminar is offered may enroll in their junior year. Movies and Methods provides majors with an opportunity to synthesize their previous work in Film Studies and work in an advanced setting with a faculty member.

Electives (20 units)

		Units
Film Studies Concentration Electives		
FILMSTUD 110N	Darkness in Light: The Filmic Imagination of Horror (meets WAY A-II)	3
FILMSTUD 116	International Documentary	4
FILMSTUD 164A	Technology and the Visual Imagination (substitution course for FILMSTUD 6 requirement)	4
FILMSTUD 245B	History and Politics in Russian and Eastern European Cinema	5
FILMSTUD 250B	Bollywood and Beyond: An Introduction to Indian Film	3-5
FILMPROD 101	Screenwriting (must be approved by the faculty adviser)	5
FILMPROD 104	Visual Writing (must be approved by the faculty adviser, meets WAY CE)	4
FILMPROD 105	Script Analysis (must be approved by the faculty adviser)	4

FILMPROD 110 Advanced Screenwriting (must be approved by the faculty adviser) 5

Honors Program in Film and Media Studies

The purpose of the honors program is to extend and deepen work done in Film and Media Studies classes. The honors thesis topic typically emerges out of prior coursework; it should be focused and have clear parameters. Ordinarily, an honors thesis is not an exploration of an area that the student has never studied before.

Admission to the Program

The minimum requirement for admission to the honor program is an overall GPA of 3.5, and at least 3.5 in Film and Media Studies courses. Students must complete at least five Film and Media Studies courses at Stanford by the end of their junior year, and four must be completed by the end of winter quarter; with the adviser's approval, two of these courses may be taken at an overseas campus. Students interested in pursuing honors should consult a potential thesis adviser on the Film and Media Studies faculty during the Fall Quarter of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year, and it is highly recommended that they be in residence throughout the senior year. Students considering honors should contact the Director of the Honors Program in their junior year as soon as they begin to think about writing an honors thesis. Those wishing to do so must announce their intention to write an honors thesis by submitting an intent form signed by their thesis adviser (who need not be the student's academic adviser) by February 1 of their junior year.

Submission of the Thesis Proposal Package

Candidates for the Honors Program must submit a five-page (double-spaced) thesis proposal, including bibliography, a tentative schedule for research and writing, and one completed paper that demonstrates the student's ability to conceptualize and write cogently about film. The deadline for submitting the complete package to the department's undergraduate coordinator is the third week of Spring Quarter of the candidate's junior year. Upon approval by a majority of the faculty at its regular meeting in early May, the candidate is accepted into the honors program.

Research and Writing of the Honors Thesis

Once admitted to the honors program, students work with the Director of the Honors Program and their thesis adviser to define the scope of study, establish a research and writing timetable, and enlist one other faculty member, ideally but not necessarily in the Department of Art and Art History, to serve as a second reader. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students are encouraged to apply for UAR research grants to help finance trips or expenses related to research for their honors thesis.

During their senior year, students must register for 10 units of FILMSTUD 297 Honors Thesis Writing, 5 units of which may count towards the student's concentration in Film and Media Studies. Students are required to register for two to five units each quarter during their senior year, for a total of ten units.

Submission and Approval of the Honors Thesis

With the guidance of the Director of the Honors Program, students and thesis advisers should plan their work so that a complete, final manuscript is submitted to the thesis adviser and the second reader by the beginning of the

seventh week of the student's final quarter at Stanford. The thesis adviser assigns a letter grade; both the adviser and the second reader must approve the honors thesis in order to qualify the student to graduate with honors.

Required Course

FILMSTUD 297 Honors Thesis Writing

Minor in Art History

A student declaring a minor in Art History must complete 25 units of course work in one of the following four tracks: Open, Modern, Asian, or Architecture. Upon declaring the minor, students are assigned a faculty adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student's departmental file. Only one class may be taken for credit outside of the Stanford campus; this includes courses taken in the Overseas Studies Program. Minors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the minor declaration.

Degree Requirements

A student with a minor in Art History must complete six Art History courses for a total of 25 units.

Open Track

choose one of the following:

ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval

ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present

Plus five Art History lecture courses or seminars in any field.

Modern Track

choose one of the following:

ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval

ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present

Plus five Art History lecture courses or seminars in any aspect of 19th- to 20th-century art.

Asian Track

ARTHIST 2 Asian Arts and Cultures

Plus five Art History lecture courses or seminars in Asian Art (ARTHIST 1A OR ARTHIST 1B may be one of the five courses).

Architecture Track

ARTHIST 3 Introduction to World Architecture

Plus five Art History lecture courses or seminars in Architectural History (ARTHIST 1A OR ARTHIST 1B may be one of the five courses).

Minor in Art Practice (Studio)

A student declaring a minor in Art Practice must complete 36 units of Art Practice and Art History course work. All minors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the internet. Minors are required to meet with both their adviser and the undergraduate coordinator during the first

two weeks of each quarter to have course work approved and to make certain they are meeting degree requirements.

Degree Requirements

A student with a minor in Art Practice must complete nine courses for a total of 36 units.

1. Three lower level courses (12 units) selected from:
- 2.

Select three of the following:

ARTSTUDI 130 Interactive Art: Making it with Arduino (meets WAY CE)

ARTSTUDI 131 Sound Art I (meets WAY CE)

ARTSTUDI 140 Drawing I (meets WAY CE)

ARTSTUDI 141 Plein Air Painting Now

ARTSTUDI 145 Painting I (meets WAY CE)

ARTSTUDI 147 Artist's Book (meets WAY CE)

ARTSTUDI 148B Introduction to Printmaking Techniques (meets WAY CE)

ARTSTUDI 149C Etching

ARTSTUDI 151 Sculpture I (meets WAY CE)

ARTSTUDI 153N Ecology of Materials (meets WAY CE)

ARTSTUDI 160 Design I : Fundamental Visual Language (meets WAY CE)

ARTSTUDI 170 Introduction to Photography (meets WAY CE)

ARTSTUDI 171 Intro to Digital Photo

ARTSTUDI 173E Cell Phone Photography (meets WAY CE)

ARTSTUDI 174B Creativity in the Age of Facebook: Making Art for and from Networks (meets WAY CE)

ARTSTUDI 177 Video Art I (meets WAY CE)

ARTSTUDI 178 Art and Electronics (meets WAY CE)

ARTSTUDI 179 Digital Art I (meets WAY CE)

FILMPROD 114 Introduction to Film and Video Production (meets WAY CE)

3. Three upper level courses (11 units):

a. ARTSTUDI 230 Interdisciplinary Art Survey **Units** 4

b. **Units** 8
Select two of the following:

ARTSTUDI 236 Future Media, Media Archaeologies

ARTSTUDI 245 Painting II

ARTSTUDI 246 Individual Work: Drawing and Painting

ARTSTUDI Advanced Undergraduate Seminar
249

ARTSTUDI Sculpture II
252

ARTSTUDI Kinetic Sculpture
254

ARTSTUDI Design II
260

ARTSTUDI The Chair
262

ARTSTUDI Advanced Photography Seminar
270

ARTSTUDI The View Camera: Its Uses and Techniques
271

ARTSTUDI Individual Work: Photography
272

ARTSTUDI Alternative Processes
274

ARTSTUDI Introduction to Digital Photography and
Visual Images
275

ARTSTUDI The Photographic Book
276

ARTSTUDI Project class: Digital and Analogue Projects in
Photography
277

ARTSTUDI Intermediate Black and White Photography
278

ARTSTUDI Digital Art II
279A

ARTSTUDI Art and Biology
284

4. Three Art History Courses (13 units):

5.

Units

Select two of the following:

8-10

ARTHIST On Looking: Art, Obscenity, and the Ethics of
144 Spectatorship (meets WAY ER)

ARTHIST MODERNISM AND MODERNITY (meets
147 WAY A-II)

ARTHIST The American West (meets WAY A-II and SI)
152

ARTHIST The American Civil War: A Visual History
154 (meets WAY A-II)

ARTHIST Abstract Expressionism: Painting/Modern/
155C America

ARTHIST Art and the Power of Place: Site, Location,
156N Environment

ARTHIST Intro to Contemporary Art
160

ARTHIST Technology and the Visual Imagination
164A

ARTHIST Representing Fashion
166

One other art history course

ARTHIST The Artist in Ancient Greek Society (meets
100N WAY A-II)

ARTHIST Archaic Greek Art
101

ARTHIST Empire and Aftermath: Greek Art from the
102 Parthenon to Scopas (meets WAY A-II)

ARTHIST Medieval Journeys: Introduction through the Art
105B and Architecture (meets WAY ED)

ARTHIST The Book in the Medieval World
109

ARTHIST Introduction to Italian Renaissance, 1420-1580
111

ARTHIST Pagan Mythology and the Making of Modern
118N Europe

ARTHIST Living in a Material World: Seventeenth-century
120 Dutch and Flemish Painting

ARTHIST Aristocrats, Warriors, Sex Workers, and
184 Barbarians: Lived Life in Early Modern Japanese
Painting

ARTHIST Theme and Style in Japanese Art
186

ARTHIST From Shanghai Modern to Global Contemporary:
188B Frontiers of Modern Chinese Art

ARTHIST Global Currents: Early Modern Art Enterprises,
189C Economies, and Imaginaries

ARTHIST Art of the African Diaspora
192B

ARTHIST Greek Art In and Out of Context
203

ARTHIST Cairo and Istanbul: Urban Space, Memory,
205 Protest

ARTHIST Phenomenology and Aesthetics in Medieval Art
207C

ARTHIST Renaissance Florence, 1440-1540
212

ARTHIST Architectural Theory from Antiquity to Le
217B Corbusier

ARTHIST Cezanne
225

ARTHIST The Art of Travel
243C

ARTHIST Pop Art
246B

ARTHIST Art and Technology
269A

ARTHIST Anatomy of Exhibition
278

ARTHIST The Japanese Tea Ceremony: The History,
287A Aesthetics, and Politics Behind a National
Pastime

Courses may not be offered every year and are subject to change.

Minor in Film and Media Studies

A minor in Film Studies requires four core courses and three elective courses for a total of seven courses. Courses must focus on film and use the method of film study towards completion of the minor; courses that use film to illustrate a cultural topic are not eligible. Film Production and Studio Art courses may not be used towards the requirements.

Upon declaring the minor, students are assigned an adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student's departmental file. Only one class may be taken for credit outside the Stanford campus, including Stanford Overseas Studies programs. Minors are required to attend an orientation session presented by the professional staff of the Art Library, which introduces the many tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the minor declaration.

Degree Requirements

The minor in Film Studies requires seven courses for a minimum of 29 units.

Required Courses for the Minor

		Units
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 102	Theories of the Moving Image (meets WAY A-II)	4
Select one of the following:		4
FILMSTUD 100B	History of World Cinema II, 1930-1959 (meets WAY A-II)	
FILMSTUD 100C	History of World Cinema III, 1960-Present (meets WAY A-II)	
One course in a national cinema or an additional course in film history		4-5

Elective Courses for the Minor

Three elective courses, which may include only one film production course. An elective can be chosen from courses in other departments only if approved by the Film Studies coordinator and core faculty for their stress on methods of film analysis. These may include courses in national cinemas, film genres, experimental and documentary film, or film theory.

Elective Courses	Units
FILMSTUD 110N Darkness in Light: The Filmic Imagination of Horror (meets WAY A-II)	12-15
FILMSTUD 114 Introduction to Comics	
FILMSTUD 116 International Documentary	
FILMSTUD 164A Technology and the Visual Imagination	
FILMSTUD 245B History and Politics in Russian and Eastern European Cinema	
FILMSTUD 250B Bollywood and Beyond: An Introduction to Indian Film	
FILMPROD 101 Screenwriting	
FILMPROD 104 Visual Writing (meets WAY CE)	
FILMPROD 105 Script Analysis	
FILMPROD 110 Advanced Screenwriting	
FILMPROD 114 Introduction to Film and Video Production (meets WAY CE)	

Master of Arts in Art History

University requirements for the M.A. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Admission

The department offers M.A. and Ph.D. degrees, although the M.A. is only granted as a step toward fulfilling requirements for the Ph.D. The department does not admit students who wish to work only toward the M.A. degree. Please see the Ph.D. section for admissions information.

Degree Requirements

1. Units

Completing a total of at least 45 units of graduate work at Stanford in the history of art in courses at the 200 level and above, including a seminar in art historiography/visual theory.

2. Languages

Reading knowledge of at least one foreign language, preferably German, French or Italian. Students in Chinese and Japanese art are ordinarily expected to demonstrate reading competence in modern and classical Chinese or Japanese, depending on the student's area of focus. Final determination of which foreign languages will fulfill the requirement is made in consultation with the student's primary adviser.

3. Papers

Submission of one paper from among those written during the year that demonstrates depth of research and capacity to build an argument. The paper should be perfected under the supervision of a member of the department faculty.

4. Area Coverage

Demonstration to the faculty, by course work and/or examination, that the student has adequate knowledge of the major areas of the history of art represented in the department curriculum.

Master of Fine Arts in Art Practice (Studio)

University requirements for the M.F.A. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Admission

The applicant must have a B.A., B.F.A. or B.S. from an accredited school. It is expected that the applicant will have a strong background in art practice, either an undergraduate degree or at least three years of independent studio practice. Students accepted to the program are admitted for the beginning of the following Autumn Quarter. No applicants for mid-year entrance are considered.

Portfolio Specifications—See the department's Graduate Admission (<https://art.stanford.edu/academics/graduate-programs/masters-program/how-apply>) web site for portfolio requirements.

Fields of Study or Degree Options

Fields of study for the M.F.A. degree are offered in Painting, Sculpture, New Genres, and Photography. These fields of study are not declared on Acess; they are not printed on the transcript or the diploma.

Degree Requirements

1. Residency

Completing a minimum of two years (six quarters) of graduate work in residence at Stanford.

2. Units

The student must complete 48 units of study. Students must discuss their programs of study with their academic adviser and the department's student services administrator to ensure that an appropriate program of study is chosen.

3. Seminar Requirement

Six quarters (36 units) of , which includes two weekly seminars (the Object Seminar and the Concept Seminar) and Studio Practice, which is an individual tutorial with a selected member of the faculty.

Units

First Year Seminar Requirements

ARTSTUDI 361	MFA First Year Seminar: Context	2
ARTSTUDI 342A	MFA: Object Seminar (2 units per quarter-Autumn and Winter)	4
ARTSTUDI 342B	MFA: Concept Seminar (2 units per quarter-Autumn and Winter)	4
ARTSTUDI 342C	M.F.A Seminar	2
ARTSTUDI 342	MFA Project: Tutorial (1 unit per quarter)	3
Second-Year Seminar Requirements		
ARTSTUDI 342A	MFA: Object Seminar (4 units per quarter-Autumn and Winter)	8
ARTSTUDI 342B	MFA: Concept Seminar (4 units per quarter-Autumn and Winter)	8
ARTSTUDI 342C	M.F.A Seminar	2
ARTSTUDI 342	MFA Project: Tutorial (1 unit per quarter)	3

4. Elective Requirement

Three courses of academic electives (12 units) are required in the first year. These courses can be chosen from a large variety of disciplines in consultation with the Director of Graduate Studies.

5. Faculty Reviews

The student is expected to pass four faculty reviews. The purpose of these reviews is to evaluate development and to assess the progress of the student.

- At the end of the first quarter; any student judged to be making inadequate progress is placed on probation and requires an additional review at the end of the second quarter
- At the end of the third quarter, at which time recommendation to proceed to the second year is determined.
- At the start of the fifth quarter. If the review is not satisfactory the student is placed on probation and an additional review is scheduled at the end of the 5th quarter.
- At the time of the M.F.A. exhibition.

6. Thesis

The thesis consists of two portions: an exhibition at the end of the final quarter, and a written paper addressing the development of their work over the two-year period at Stanford, to be completed during the fifth quarter. Both the written portion and participation in the M.F.A. exhibition at the end of the year are required.

7. Graduate Student Teaching

Regardless of their source of funding, students are required to assist with the department's teaching program for a minimum of eight hours per week over the period of six quarters; the particulars of this assignment are at the department's convenience.

The studio faculty reserves the right to make use of graduate paintings, sculptures, and photographs in exhibitions serving the interests of the graduate program.

Graduate students must remain in residence at Stanford for the duration of the program.

Master of Fine Arts in Design

University requirements for the M.F.A. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Admission

- The applicant must have a B.A., B.F.A., or B.S. from an accredited school. It is expected that the applicant will have a strong background in studio art, either an undergraduate degree or at least three years of independent studio practice.
- Students accepted to the program are admitted for the beginning of the following Autumn Quarter. No applicants for mid-year entrance are considered.
- Portfolio Specifications—See the department's Graduate Admission (<https://art.stanford.edu/academics/graduate-programs/mfa-design/mfa-design-admission>) web site for portfolio requirements.

Fields of Study or Degree Options

Fields of study for the M.F.A. degree are offered in Design.

Degree Requirements

Residency

- The student must complete a minimum of two years (six quarters) of graduate work in residence at Stanford.

2. Units

The student must complete a minimum of 57 units of course work chosen in consultation with the Director of Graduate Studies in Design. Typically, students working for the M.F.A. degree are encouraged to take full advantage of both sides of the Joint Program in Design, as well as courses that tap the broader resources of the University.

3. Required Courses

Required Courses		Units
ARTSTUDI 350A	Art & Design I: History and Theory	3
ARTSTUDI 350B	Art & Design II: Personal Practice	3
ARTSTUDI 361	MFA First Year Seminar: Context (ARTSTUDI 361 must be taken for 3 units, not 1-3 as listed in Explore Courses)	3
ME 203	Design and Manufacturing	4
ME 277	Graduate Design Research Techniques	3-4
ME 312	Advanced Product Design: Formgiving	3
ME 313	Human Values and Innovation in Design	3
Total Units		22-23

4. Thesis Requirements (18 units)

		Units
ME 316A	Product Design Master's Project	2-6
ME 316B	Product Design Master's Project	2-4
ME 316C	Product Design Master's Project	2-4
ARTSTUDI 360A	Design Masters Project I	4
ARTSTUDI 360B	Design Masters Project II	4

*students must take ME316 A-C for 3-4 credits, not 2-6 as listed in explore courses

Total Units (minimum 18 units required)

17-20

5. Elective Course Distributions

Students are required to take six elective courses, which meet the following distributions and approvals:

- All electives must be approved by the student's adviser prior to enrollment and are expected to form a coherent trajectory with a focus on Design.
- All elective courses must be taken for a letter grade unless a letter grade is not offered.
- At least two electives must be ARTSTUDI courses (200 level or higher) and are taken in addition to the required ARTSTUDI courses.
- The remaining four electives may be chosen from any the schools at the University (200 level or higher).
- ARTSTUDI 260 Design II is a recommended elective, and may be designated as a required course by your adviser on a case by case basis. ARTSTUDI 260 is required if your portfolio and prior experience do not illustrate significantly proficient conceptual and aesthetic problem solving. This requirement is determined during your second quarter in consultation with your adviser. Whether taken voluntarily or as a requirement ARTSTUDI 260 counts towards the two course Art Studio elective distribution requirement.

6. Other Requirements:

- a. Design MFA candidates must participate in the faculty curated Design Show held during the second year of their studies.
- b. Students are expected to pass two faculty reviews. The purpose of these reviews is to evaluate and assess student participation and progress. These reviews are held in the spring quarter of the first year, and in the winter quarter of the second year. Anyone judged to be making inadequate progress will be placed on probation and require an additional review at the end of the next quarter, or any time during that quarter the faculty deems necessary. Failure to pass the probationary review will result in dismissal from the program.
- c. All students are expected to earn a grad of 'B' or better in each course and are required to maintain a GPA of 3.0 in all courses required for the degree. Failure to do so may result in probation or dismissal from the program.

Master of Fine Arts in Documentary Film and Video

University requirements for the M.F.A. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Admission

The program requires residency for two consecutive years. The admissions committee seeks applicants who have some work experience beyond their undergraduate years and can articulate why they want to learn documentary film and video production. The committee looks for evidence of the likelihood of success in a rigorous academic program that emphasizes creative work. The conceptual and technical skills required for documentary work are sufficiently different from fictional narrative to make the Stanford program inappropriate for students interested in narrative filmmaking. The program does not allow for deferred admission or a mid-year enrollment.

Portfolio

The department requires a film or video work for which the applicant has had creative control. The sample work must be well labeled and accompanied by a brief synopsis, running time of the clips, the circumstances of production, and the applicant's role. Total running time for the work sample should not exceed 15 minutes and may consist of more than one project. Work on which the applicant had only a production assistant role is not appropriate for submission. Student work, however, is appropriate for consideration. Applicants who have had only minimal film or video production experience should submit an example of their best creative work in any medium.

Portfolio Specifications—See the department's Graduate Admission (<https://art.stanford.edu/academics/graduate-programs/mfa-documentary-film-and-video/mfa-documentary-film-and-video-admissions>) web site for portfolio requirements.

Fields of Study or Degree Options

Fields of study for the M.F.A. degree are offered in Documentary Film.

Degree Requirements

Residency

Completing two years (six quarters) of graduate work in residence at Stanford.

Units

A minimum of 80 units is required for the M.F.A. degree. In the production core, students are required to conceptualize and visualize their ideas in a series of writing and producing courses that focus on documentary story structure. These courses are taken in tandem with project-based production courses that provide training in the technical and conceptual aspects of cinematography, sound recording, and editing. Discussion of form and content is a signature component of the writing and production courses. The production core is complemented by a series of required film studies courses in documentary plus elective courses in the history, aesthetics, ideology, and theory of all genres of moving image media. All courses must be taken for a letter grade.

M.F.A. Thesis Project

In the second year of the program, each student produces a 15-20 minute documentary that constitutes the thesis project. In FILMPROD 405 Producing Practicum, students choose a topic, research and develop their project, and write a proposal for submission. A project may not begin production until the final proposal has been approved. Most of the production and post-production occurs (in Winter and Spring quarters) in:

		Units
1.	FILMPROD 406A Documentary M.F.A. Thesis Seminar I	4
	FILMPROD 406B Documentary M.F.A. Thesis Seminar II	4

2. Required Courses

- a. Core Production courses (32 units)
Core courses must be taken in sequence.

		Units
FILMPROD 400	Film/Video Writing and Directing	4
FILMPROD 401	Nonfiction Film Production	4
FILMPROD 402	Digital Video	4

FILMPROD 403	Advanced Documentary Directing	4
FILMPROD 404	Advanced Video Production	4
FILMPROD 405	Producing Practicum	4
FILMPROD 406A	Documentary M.F.A. Thesis Seminar I	4
FILMPROD 406B	Documentary M.F.A. Thesis Seminar II	4

b. Core Film Studies courses (25 units)

		Units
FILMSTUD 302	Theories of the Moving Image	4
FILMSTUD 315	Documentary Issues and Traditions	4
FILMSTUD 316	International Documentary	4
FILMSTUD 410A	Documentary Perspectives I	4
FILMSTUD 410B	Documentary Perspectives II	4

c. Electives

To be chosen in consultation with the student's adviser.

d.

	Units
Art History—one course	4
Studio Art and/or Communications—two courses	8
Film Studies—three courses	12
Choice Elective—one course	4

Doctor of Philosophy in Art History

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin. An expanded explanation of department requirements is given in the Art History Graduate Student Handbook.

Admission

In addition to University requirements, the department requires a research paper of approximately 15-20 pages demonstrating the student's capacity to pursue independent investigation of an art historical problem as part of the application. All applicants must have been awarded a B.A., B.F.A., or B.S. from an accredited university.

Degree Requirements

To be eligible for the doctoral degree, the student must complete a minimum of three years of full-time graduate work in Art History, at least two years of which must be in residence at Stanford. Doctoral students must complete a minimum of 135 units. Of these 135, the student must complete at least 100 units of graduate course work at the 200 level or above, including all required courses, with a minimum of 62 units in Art History lecture courses and seminars.

1. Collateral Studies

The student is required to take at least three courses in supporting fields of study (such as anthropology, classics, history, literature, or philosophy), determined in consultation with the department advisers.

These courses are intended to strengthen the student's interdisciplinary study of art history.

2. Distribution Requirements

There are seven areas of distribution: 1) Pre-Modern (Ancient & Medieval), 2) Early Modern (Renaissance/Baroque), 3) 18th Century & 19th Century, 4) Modern/Contemporary, 5) Film, 6) Non-Western: Asia, Africa & Oceania, 7) Architectural History. Students must take at least one course in five different areas. The five courses must be taken outside of the student's area of concentration. Students are encouraged to fulfill the distribution requirement in graduate seminars. If students have entered the Stanford program with an M.A., they may transfer courses taken at the graduate level to fulfill up to two areas of the distribution requirement.

3. Language Requirement

Students in Western Art must demonstrate reading knowledge of two foreign languages. Students in Asian Art are required to demonstrate competence in one Asian language (equivalent to three years of study) and at least one year of study in a second (which may be a classical version of Chinese or Japanese). One of the language requirements should be satisfied by the end of the first year while the second should be fulfilled by the end of the second year. Students entering with a M.A. should already have satisfied one language requirement prior to admission. Foreign language requirements for the Ph.D. are fulfilled by taking the reading examination given each quarter by the various language departments.

4. Graduate Student Teaching

As a required part of their training, graduate students in Art History, regardless of their source of funding, must participate in the department's teaching program.

- Students are required to take ARTHIST 405A: Graduate Pedagogy.
- Students are required to serve as a teaching assistant for a minimum of four quarters. Further opportunities for teaching may be available.
- At least one, one-quarter assignment in a course from the following list:

		Units
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval	5
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present	5
ARTHIST 2	Asian Arts and Cultures	5
ARTHIST 3	Introduction to World Architecture	5
FILMSTUD 4	Introduction to Film Study	5

5. Admission to Candidacy

A graduate student's progress is formally reviewed at the end of Spring Quarter of the second year. The applicant for candidacy must assemble a candidacy file showing that he/she has completed the requirements governing the M.A. program in the History of Art (see above), and an additional 18-24 units by the end of Winter Quarter of the second year. The graduate student does not become a formal candidate for the Ph.D. degree until he/she has fully satisfied these requirements and has been accepted as a candidate by the department faculty.

6. Area Core Examination (ACE)

All graduate students conceptualize an area core and bibliography in consultation with their primary adviser and two other Stanford faculty members, one of whom is drawn from a field other than Art History, or, if in Art History, has expertise outside of the student's main area of interdisciplinary concentration. Students are required to pass an area

core examination, in either written or oral form, during (or before) Winter Quarter of the third year of study. To prepare for the exam, students may enroll in the 5-unit reading course:

ARTHIST 620 Area Core Examination Preparation

7. Dissertation Colloquium

The dissertation colloquium provides an opportunity for the PhD student to share an aspect of her/his dissertation project with the departmental community at large. Colloquium talks should be presented during the early stages of researching and writing, allowing students to incorporate useful feedback from professors and colleagues into their completed dissertation. The colloquium consists of a 30-minute presentation followed by 30 minutes devoted to questions and answers. The presentation should give some attention to the broader issues of the dissertation topic along with a substantial treatment of one part of the project. At least two members of the student's Reading Committee must attend.

8. Dissertation and Oral Defense Requirements

- a. *Reading Committee:* After passing the Area Core Examination (ACE), each student is responsible for the formation of a dissertation reading committee consisting of a principal adviser, who chairs the reading committee, and three readers. Normally, at least two of the three readers are drawn from the department and one may come from outside the department.
- b. *Dissertation Proposal:* By the beginning of Autumn Quarter in the fourth year, students should have identified a dissertation subject and written a proposal in consultation with their principal adviser. To prepare the proposal, students may take:
 - i one 5-unit independent study course:
 - ii ARTHIST 640 Dissertation Proposal Preparation
 - iii and apply for a funded Summer Quarter to research and write the proposal. The proposal is submitted for approval by the Art History faculty at the beginning of the fourth year for comments. In the event that a proposal is not approved, the faculty establishes conditions for its resubmission and reconsideration at a later date.
- c. *Dissertation:* The final draft of the dissertation must be in all the readers' hands at least four weeks before the date of the oral defense. The dissertation must be completed within five years from the date of the student's admission to candidacy for the Ph.D. degree. A candidate taking more than five years must apply for an extension of candidacy.
- d. *Oral Defense Examinations:* The student arranges an oral examination with the four members of the reading committee and a chair of the oral defense chosen from outside the department. The oral examination consists mainly of a defense of the dissertation but may range, at the committee's discretion, over a wider field. The student is expected to discuss research methods and findings at some length and to answer all questions and criticisms put by members of the examining committee. At the end of the defense, the committee votes to pass or fail the student on the defense. The committee may make recommendations for changes in the dissertation manuscript before it is submitted to the University as the final requirement for the granting of the Ph.D. degree in the History of Art. After these changes have been incorporated, the manuscript is given a final review and approval by the student's principal adviser.

Ph.D. Minor in Art History

Units
5

For a minor in Art History, a candidate is required to complete 24 units of graduate-level Art History courses (300 level or above).

Emeriti: (Professors) Keith Boyle, Kristina Branch, Wanda M. Corn, David Hannah, Joel Leivick, Suzanne Lewis, Dwight C. Miller, Kristine Samuelson, Michael Sullivan, Paul V. Turner, Bryan Wolf

Chair: Nancy J. Troy

Area Director for Art History: Nancy J. Troy

Area Director for Film and Media Studies: Pavle Levi

Area Director for Art Practice: Gail Wight

Director of Undergraduate Studies in Art History: Jody Maxmin

Director of Undergraduate Studies in Art Practice: Terry Berlier

Director of Undergraduate Studies in Film and Media Studies: Scott Bukatman

Director of Graduate Studies in Art History: Jean Ma

Director of Graduate Studies in Art Practice: Paul DeMarinis

Director of Graduate Studies in Documentary Film: Jamie Meltzer

Academic Director for Stanford Graduate Design Program: Camille Utterback

Director of Honors Program: Adam Tobin

Writing Specialist: Gabrielle Ann Moyer (Lecturer, Program in Writing and Rhetoric)

Professors: Scott Bukatman (Film Studies), Enrique Chagoya (Painting/Drawing/Printmaking), Paul DeMarinis (Electronic Media), Jan Krawitz (Documentary Film), Pamela M. Lee (Contemporary Art), Michael Marrinan (18th- and 19th-century European Art), Richard Meyer (American Art), Alexander Nemerov (American Art), Nancy J. Troy (Modern Art), Richard Vinograd (Chinese Art), Xiaoze Xie (Painting/Drawing)

Associate Professors: Terry Berlier (Sculpture), Pavle Levi (Film Studies), Jean Ma (Film Studies), Jody Maxmin (Ancient Art), Jamie Meltzer (Documentary Film), Bissera Pentcheva (Medieval Art), Gail Wight (Electronic Media)

Assistant Professors: Fabio Barry (Architectural History), Morten Steen Hansen (Renaissance Art), Camille Utterback (Design)

Senior Lecturer: Adam Tobin (Screenwriting)

Lecturers: Elizabeth L. Bennett (Art History), Robert Dawson (Photography), John Edmark (Design), Lukas Felzmann (Photography), Elizabeth Kessler (Art History), Beatrice Kitzinger (Art History).

Affiliated Professor: John H. Merryman (Law, emeritus)

Overseas Studies Courses in Art History

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 17	Split Images: A Century of Cinema	3-4
OSPFLOR 34	The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art	4
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLOR 54	High Renaissance and Mannerism: the Great Italian Masters of the 15th and 16th Centuries	5
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 111Y	From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADRD 45	Women in Art: Case Study in the Madrid Museums	4
OSPOXFRD 221Y	Art and Society in Britain	4-5
OSPPARIS 54	The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France	4
OSPPARIS 60	Representations of Women in Christian Art: Boldness and Virtue	4
OSPPARIS 72	The Ceilings of Paris	4
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4

Overseas Studies Courses in Art Practice

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPFLOR 41	The Florentine Sketchbook: A Visual Arts Practicum	3-5
OSPFLOR 55	Academy of Fine Arts: Studio Art	1-5
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	4
OSPMADRD 46	Drawing with Four Spanish Masters: Goya, Velazquez, Picasso and Dali	3
OSPPARIS 42	EAP: Drawing with Live Models	2
OSPPARIS 43	EAP: Painting and Use of Color	2
OSPPARIS 44	EAP: Analytical Drawing and Graphic Art	2

Overseas Studies Courses in Film

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students

should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBEIJ 17	Chinese Film Studies	4
OSPBER 17	Split Images: A Century of Cinema	3-4
OSPFLOR 11	Film, Food and the Italian Identity	5
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4
OSPPARIS 79	Film and Immigration in Contemporary French Cinema	3

Astronomy

Astronomy courses are offered primarily through the Physics department, with subject code PHYSICS (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PHYSICS&filter-catalognumber=PHYSICS=on>) on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PHYSICS&filter-catalognumber=PHYSICS=on>) website.

Although Stanford University does not have a degree program in astronomy or astrophysics, teaching and research in various branches of these disciplines are ongoing activities in the departments of Applied Physics, Electrical Engineering, and Physics.

For the convenience of students interested in astronomy, astrophysics, and cosmology, a course program for undergraduate and graduate study is listed in the "Astronomy Cognate Courses (p. 343)" section of this bulletin. The list includes introductory courses for the student who wishes to be informed about the fields of astronomy without the need for prerequisites beyond high school algebra and physics. Courses in astronomy numbered below 100 are designed to serve this group of students. Astronomy courses numbered 100-199 serve the student interested in an initial scientific study of astronomy. The courses numbered 200 and above are for graduate students and advanced undergraduates, subject to prior approval by the course instructor.

Undergraduate Programs in Astronomy

The University does not offer a separate undergraduate major in Astronomy. Students who intend to pursue graduate study in astronomy or space science are encouraged to major in physics, following the advanced sequence if possible, or in electrical engineering if the student has a strongly developed interest in radioscience. The course descriptions for these basic studies are listed under the appropriate department sections of this bulletin. Students desiring guidance in developing an astronomy-oriented course of study should contact the chair of the Astronomy Program Committee. The following courses are suitable for undergraduates and are recommended to students considering advanced study in astronomy or astrophysics:

		Units
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Extragalactic Astrophysics and Cosmology	3
GES 222	Planetary Systems: Dynamics and Origins	3-4

Students planning study in astronomy beyond the B.S. are urged to take:

PHYSICS 260	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 262	Introduction to Gravitation	3

The above-mentioned courses are required for physics majors who choose the curriculum with a concentration in astrophysics (see the "Physics (p. 577)" section of this bulletin).

Stanford Student Observatory

The student observatory, located in the hills to the west of the campus, is equipped with a 24-inch and other small reflecting telescopes. It is used for instruction of the observation-oriented courses, PHYSICS 50 Astronomy Laboratory and Observational Astronomy and PHYSICS 100 Introduction to Observational and Laboratory Astronomy.

The Department of Physics offers a minor in Physics with a concentration in Astronomy.

Minor in Physics with Concentration in Astronomy

Students wishing to pursue advanced work in astrophysical sciences should major in Physics (p. 579) and concentrate in astrophysics. However, students outside of Physics with a general interest in astronomy may organize their studies by completing one of the following Physics minor concentration programs.

Students who take the 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor.

An undergraduate Physics minor with a concentration in Astronomy requires the following courses:

Non-Technical

For students whose majors do not require the PHYSICS 40 or 60 series:

		Units
PHYSICS 21	Mechanics and Heat	3
PHYSICS 23	Electricity and Optics	3
PHYSICS 25 & PHYSICS 26	Modern Physics and Modern Physics Laboratory	4
PHYSICS 50 or PHYSICS 100	Astronomy Laboratory and Observational Astronomy Introduction to Observational and Laboratory Astronomy	3-4
Select two of the following:		6
PHYSICS 15	The Nature of the Universe	
PHYSICS 16	Cosmic Horizons	
PHYSICS 17	Black Holes	

Total Units **19-20**

Technical

For students whose majors require the PHYSICS 40 or 60 series:

Select one of the following Series:
Series A

PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45 & PHYSICS 46	Light and Heat and Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	

Series B

PHYSICS 61	Mechanics and Special Relativity	
PHYSICS 63	Electricity, Magnetism, and Waves	
PHYSICS 65	Quantum and Thermal Physics	
PHYSICS 67	Introduction to Laboratory Physics	

And take the following three courses:

PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3-4
PHYSICS 161	Introduction to Extragalactic Astrophysics and Cosmology	3

Total Units **24-28**

Students are also encouraged to take the electricity and magnetism/optics lab of the appropriate PHYSICS series, PHYSICS 24, PHYSICS 44 or PHYSICS 64 for 1 additional unit.

Graduate Programs in Astronomy

Graduate programs in astronomy and astrophysics and related topics are carried out primarily in the Department of Physics but also the departments of Applied Physics and Electrical Engineering. Students should consult the course listings, degree requirements, and research programs of these departments for more detailed information.

Graduate research opportunities are available in many areas of theoretical and observational astronomy, including research projects using the Hobby Eberly telescope, a 10-meter-class telescope located at McDonald Observatory in Texas. Other observational and experimental opportunities are in ground-based observations of CMB and space-based gamma-ray observations with Fermi and in the future, X-ray observations with NuSTAR.

For further information on graduate research opportunities, see the "Center for Space Science and Astrophysics (p. 712)" section of this bulletin and the Kavli Institute of Particle Astrophysics and Cosmology (<http://kipac.stanford.edu>).

Students planning to conduct research in astronomy and astrophysics are required to take:

Select one of the following:		3
PHYSICS 361	Advanced Topics in Radiative Processes and Stellar Astrophysics	
PHYSICS 362	Advanced Extragalactic Astrophysics and Cosmology	

Students lacking a background in astrophysics, gravitation, and plasma physics should take:

PHYSICS 260	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 262	Introduction to Gravitation	3
PHYSICS 312	Basic Plasma Physics (Not offered 2014-15)	3

Students with special interests in gravitation should take:

PHYSICS 364	Advanced Gravitation (Not offered 2014-15)	3
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Students interested in research programs in space physics involving spacecraft studies of the planets, their satellites, and their near-space environments should see the "Center for Space Science and Astrophysics (p. 712)" section of this bulletin.

Emeriti: (Professors) Von R. Eshleman, Peter A. Sturrock, G. Leonard Tyler, Robert V. Wagoner

Committee in Charge: Vahé Petrosian (Director), Roger W. Romani, Sarah Church

Professors: Roger Blandford (Physics, SLAC), Blas Cabrera (Physics), Sarah Church (Physics), Steven Kahn (Physics, SLAC), Chao-Lin Kuo (Physics, SLAC), Bruce Macintosh (Physics), Peter Michelson (Physics, SLAC), Vahé Petrosian (Physics, Applied Physics), Roger W. Romani (Physics)

Associate Professors: Steve Allen (Physics, SLAC), Tom Abel (Physics, SLAC), Risa Wechsler (Physics, SLAC)

Professor (Research): Philip H. Scherrer (Physics)

Astronomy Cognate Courses Elementary Lectures

The following courses provide a descriptive knowledge of astronomical objects and astrophysics. PHYSICS 15, PHYSICS 16, and PHYSICS 17 are for students not majoring in the sciences and are taught in different quarters by different instructors, and may be taken individually or in any order.

		Units
PHYSICS 15	The Nature of the Universe	3
PHYSICS 16	Cosmic Horizons	3
PHYSICS 17	Black Holes	3

Observatory

The following courses allow students to use the on-campus Stanford Student Observatory, and are intended to familiarize students with observational methods and analysis of astronomical data. PHYSICS 50 is for general students, while PHYSICS 100 involves more advanced observations and is intended for students with a college level background in physics.

		Units
PHYSICS 50	Astronomy Laboratory and Observational Astronomy	3
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4

Advanced Undergraduate

The following courses are for students with a more advanced knowledge of basic physics and mathematics, and form the core courses for a concentration in astrophysics for Physics majors.

		Units
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Extragalactic Astrophysics and Cosmology	3

Graduate

		Units
GES 222	Planetary Systems: Dynamics and Origins	3-4

PHYSICS 260	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 261	Introduction to Extragalactic Astrophysics and Cosmology	3
PHYSICS 262	Introduction to Gravitation	3
PHYSICS 301	Astrophysics Laboratory (Not offered 2014-15)	3
PHYSICS 312	Basic Plasma Physics (Not offered 2014-15)	3
PHYSICS 361	Advanced Topics in Radiative Processes and Stellar Astrophysics (Not offered 2014-15)	3
PHYSICS 362	Advanced Extragalactic Astrophysics and Cosmology (Not offered 2014-15)	3

Athletics, Physical Education, and Recreation

Courses offered through the Department of Athletics, Physical Education, and Recreation are listed under the subject code ATHLETIC (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=ATHLETIC&filter-departmentcode-ATHLETIC=on&filter-coursestatus-Active=on>), OUTDOOR (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=OUTDOOR&filter-departmentcode-OUTDOOR=on&filter-coursestatus-Active=on>), PE (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=PE&filter-departmentcode-PE=on&filter-coursestatus-Active=on>), and WELLNESS (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=WELLNESS&filter-departmentcode-WELLNESS=on&filter-coursestatus-Active=on>) on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/browse>) web site. Most courses are activity classes and carry 1 unit of credit for satisfactory completion of work. Although there is no limitation on the number of activity classes in which a student may enroll, no more than 8 units of these activity classes (and/or other University activity classes) may be applied toward undergraduate graduation requirements. See the "Credit (p. 32)" tab of the "Undergraduate Degrees (p. 23)" section of this bulletin for complete information. Course fees, as applicable, are posted to the student's University account.

Department of Athletics, Physical Education, & Recreation Mission

From its founding in 1891, Stanford University's leaders have believed that physical activity is valuable for its own sake and that vigorous exercise is complementary to the educational purposes of the University. Within this context for human development, it is the mission of Stanford's Department of Athletics, Physical Education, and Recreation to offer a wide range of high quality programs which will encourage and facilitate all participants to realize opportunities for championship athletic participation, physical fitness, health, and well being.

The mission of Stanford Recreation is to provide a balanced and holistic approach to the growth and wellness of our students, faculty, and staff by delivering best-in-class co-curricular programs and resources.

The department's classes and programs aim to promote understanding of the value and role of physical activity as an important dimension of the human condition, to develop performance skills in sport, to develop the habit of participation, and to provide leadership opportunities in aquatics,

sports, and other physical activities. To this end, the program encompasses a diversity of learning and participating opportunities from informal recreation through organized intramural competition, basic instructional classes, and theoretical study to, and including, intercollegiate athletic competition.

There are no degree programs currently offered in Athletics, Physical Education, and Recreation.

Facilities

Athletic facilities are located throughout campus. They include, but are not limited to Arrillaga Center for Sport and Recreation (Squash, Fencing, fitness & physical education facility for students, faculty, & staff), Arrillaga Family Sports Center (Home to DAPER), Arrillaga Outdoor Education & Recreation Center (Outdoor Education, Avery Recreation Pool, fitness & Physical Education facility for students, faculty & staff), Avery Aquatic Center (Swimming & Diving, Water Polo, Synchronized Swimming), Bill & Joyd Smith Family Stadium (Softball), Burnham Pavillion & Ford Center (Gymnastics, Volleyball), Cobb Track and Angell Field (Track & Field), Klein Field at Sunken Diamond (Baseball), Laird Q. Cagan Stadium at Maloney Field (Soccer, Lacrosse), Maples Pavillion (Basketball, Volleyball), Red Barn (Equestrian), Siebel Varsity Golf Training Complex (Golf), Stanford Campus Recreation Association (Stanford's community center for faculty, senior staff and their families), Stanford Golf Course (Golf, Cross Country), Stanford Rowing & Sailing Center (Rowing, Sailing, Lightweight Rowing), Stanford Stadium (Football), Steuber Rugby Stadium & Doyle Family Clubhouse (Rugby), Taube Family Tennis Center (Tennis), West Campus Tennis Courts, Varsity Field Hockey Turf (Field Hockey), Sand Hill Intramural Fields, Roble Field, Tresidder Fitness Center, Manzanita Basketball Court and Field.

Lockers

Lockers are available for rent to faculty/staff and students at the Arrillaga Outdoor Education Recreation Center, Arrillaga Family Sports Center, and the Ford Center.

Contacts

Office: Arrillaga Family Sports Center
Mail Code: 94305-6150
Phone: (650) 723-4591
Web Site: <http://gostanford.com> (<http://gostanford.com>)
Web Site: <http://clubsports.stanford.edu>
Web Site: <http://smap.stanford.edu>

Courses offered by Athletics are listed under the subject code ATHLETIC (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=ATHLETIC&filter-departmentcode-ATHLETIC=on&filter-coursestatus-Active=on>) on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/browse>) web site.

Athletics Programs

Intercollegiate Athletics

In keeping with American university tradition, Stanford offers a broad intercollegiate athletic program. The objectives are to provide the opportunity to compete at the highest possible level without jeopardizing the integrity of the individual or the institution; to adhere strictly to all University, association, and conference rules governing athletic participation; and to encourage effectively the achievement of academic goals by student athletes at the same rate as other University students.

As a member of the National Collegiate Athletic Association (NCAA), Stanford fields both men's and women's varsity teams. Those for men are baseball, basketball, crew, cross country, fencing, football, golf,

gymnastics, sailing, soccer, swimming and diving, tennis, track and field, volleyball, water polo, and wrestling. Those for women are basketball, crew, cross country, fencing, field hockey, golf, gymnastics, lacrosse, sailing, soccer, softball, squash, swimming and diving, synchronized swimming, tennis, track and field, volleyball, sand volleyball and water polo. Both men's and women's teams are affiliated with the Pacific Twelve Conference. Additional or alternative intercollegiate athletic competition is available for all teams.

Club Sports Program

Stanford Club Sports supports intercollegiate competition for non-varsity Club Sports teams at the highest level by providing opportunities for student leadership development as well as appropriate resources to support team and individual success in development, training, and competition. The program is actively supervised by the Associate Director for Recreation Sports and Physical Education, along with the Coordinator for Club Sports and Intramural Sports but the emphasis is for team operations to be student-driven. Students who are returning and committed members of teams that meet the criteria for inclusion in the formal curriculum may register for units of credit, subject to the University's Activity unit (p. 32) policy, for Athletics, Physical Education & Recreation.

Martial Arts Program

The Stanford Martial Arts Program (SMAP) is an umbrella organization that supports the various member martial arts groups on campus. Its main goals are to educate the Stanford community through outreach programming about the variety of martial arts instruction on campus, serve as a centralized communications network among the different groups, and preserve the martial arts as a vital and distinctive component of Stanford life. Academic credit, subject to the University's Activity unit (p. 32) policy, is offered for participation in SMAP classes in accordance with the department's Physical Education guidelines.

Directors

Director, Academic Services Student Athletes: Austin D. Lee

Associate Director for Recreation Sports and Physical Education: Pam Mahlow

Stanford Martial Arts Program: Tim Ghormley

Contacts

Office: Arrillaga Center for Sports and Recreation
Mail Code: 94305-6150
Phone: (650) 723-7686
Web Site: <http://cardinalrec.stanford.edu/pe-classes>
Email: tlillie@stanford.edu

Courses offered by Physical Education are listed under the subject code PE (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=PE&filter-departmentcode-PE=on&filter-coursestatus-Active=on>) on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/browse>) web site.

Physical Education Mission

The goal of the Physical Education program is to improve the overall well-being of undergraduates and graduate students by providing opportunities to learn new skills and concepts. The department aims to achieve this through course offerings such as fitness, aquatics, racquet sports, dance, team sports, golf, outdoor education, martial arts, wellness, and special interest courses such as horsemanship and fencing. Physical Education courses are designed to help students learn and develop their physical fitness and motor skills and a positive attitude toward wellness and physical activity to facilitate a lifelong healthy lifestyle.

Learning Outcomes

Physical Education offers courses applicable to a variety of environments and experiences across campus and in life and pair well with academic and group work. Learning outcomes include:

- Understanding of appropriate warm-up and cool-down routines
- Identify health related components of fitness (cardiovascular endurance, muscular strength and endurance, and flexibility)
- Understanding of basic anatomical terminology and proper stretching technique
- Make intelligent choices that contribute to a healthy, active lifestyle

Directors

Associate Director for Recreation Sports and Physical Education: Pam Mahlow

Assistant Director of Physical Education: Tia Lillie

Wellness Education: Tia Lillie

Teaching Specialists (Activity Class Instructors)

Nanci Conniff (Yoga, Fitness), Michelle Gable (Lifeguarding), Terry Gingell (Golf), Ken Greer (Social Dance), Casey Hall (Golf), Andrew Ho (Golf), Rosa Kheyrkhah (Indoor cycling / Fitness), Lacey Kitch (Dance), Stacie Lonaker (Swimming), Michele Mandell (Fitness), Monica Mark (Dance) Phil Marrone (Golf), Kathryn Imrie (Golf), Tia Lillie (Fitness), Bobbie McWherter (Fitness), Ann Merlo (Yoga), Jim Miller (Golf), Mary O'Connell (Dance/Fitness), Greer Murphy (Fitness), Alejandra Picollo (Dance), Andy Price (Volleyball), Tom Sarsfield (Tennis), Haliel Selig (Yoga), Don Shaw (Sand Volleyball), Shashin Shodhan (Table Tennis), Matt Thornton (Team Sports), Kurt Uchiyama (Golf), Todd Vas Dias (Sailing), Mei Zhang (Tai Chi)

Teaching Specialists (also Athletics/Varsity Coaches)

Craig Amerkhanian (Rowing), Scott Armstrong (Swim Conditioning), Megan Azebu (Synchronized Swimming), Jon Barnea (Waterpolo), Vanessa Bartsch (Horsemanship), Ray Blake (Wrestling), Amy Bokker (Swimming), Frankie Brennan (Tennis & Weight Training), Avery Brown (Horsemanship), Rebecca Carlton (Rowing), Pat Cota (Futsal & Field Hockey), Brandon Coupe (Tennis) Steve Danielson (Futsal & Field Hockey) Lauren Dobashi (Golf), Brooke Eubanks (Total Body Workout), Yasmine Farooq (Rowing), Thom Glielmi (Gymnastics), Mike Graczyk (Indoor Soccer Int/adv.), Scott Green (Gymnastics) Clinton Hayes (Sailing), Nick Kirchof (Soccer), Ted Knapp (Swimming/Diving), Alex Lepeshinski (Fencing), Sarah Lowe (Synchronized Swimming), Greg Meehan (Swimming & Aqua Boot Camp), Lisa Milgram (Fencing), Susan Ortwein (Water Polo), Conrad Ray (Golf), Philip Rowe (Golf), Ken Shibuya (Volleyball/Sand volleyball), John Smith (Indoor Soccer Int/adv.), Chris Swircek (Gymnastics), Mark Talbott (Squash), John Tanner (Water Polo), Alex Tirapelle (Wrestling & Weight Training), Nicole Van Dyke (Indoor Soccer beg. & adv. women), John Vargas (Water Polo), Joe Wagstaffe (Cross Training Fitness), Anne Walker (Golf), Tabitha Yim (Gymnastics), Karl Zhiehn (Gymnastics)

Contacts

Office: Arrillaga Outdoor Education & Recreation Center
Mail Code: 94305-6151
Phone: (650) 736-7768
Web Site: <http://outdoored.stanford.edu>

Email: outdoored@stanford.edu

Courses offered by Outdoor Education are listed under the subject code OUTDOOR (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=OUTDOOR&filter-departmentcode=OUTDOOR=on&filter-coursestatus=Active=on>) on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/browse>) web site.

Outdoor Education Mission

Outdoor Education's purpose is to provide outcome-based learning and adventure opportunities through the intentional use of risk, challenge, and experience as well as advise outdoor education experiences for the Department of Athletics, Physical Education, and Recreation (DAPER), Student Activities and Leadership (SAL), Stanford School of Medicine (SURG), and other formal campus partners.

Facilities

Courses and experiential education take place in the Arrillaga Outdoor Education and Recreation Center, and the outdoors. The Outdoor Center (AOERC) hosts access to equipment, class and lecture area, a resource library, Climbing Center & indoor climbing facility, meeting and trip-planning space. Arrillaga Center for Sports and Recreation hosts a Bouldering Center. Field experiences facilitate a variety of outdoor and adventure disciplines, and vary in locale both near and far from campus.

Learning Outcomes

Outdoor Education offers co-curricular courses applicable to a variety of environments and experiences across campus and in life. Outdoor Education expects student exposure to the following learning outcomes:

- Introduction to the environment through outdoor recreation activities
- Empowerment to move beyond self-imposed limitations
- Development of effective team building and leadership skills
- Education about the environment and sustainability
- Training for critical thinking, and the ability to identify risks and make sound decisions
- Exploration and attainment of new skills which merge outside of the classroom

Directors

Associate Director of Outdoor Education: Chris Pelchat

Coordinator of Outdoor Education: Antja Thompson

Teaching Specialists

Teaching Specialists: Peter Wright, Phil Sandlin, Chris Pelchat, Kelsey McCabe, Antja Thompson, Joel Reid, Mary Stuessy, Erika Halm

Contacts

Office: Arrillaga Center for Sports and Recreation
Mail Code: 94305-6150
Phone: (650) 723-7686
Web Site: <http://cardinalrec.stanford.edu/pe-classes>
Email: tlillie@stanford.edu

Courses offered by Wellness Education are listed under the subject code WELLNESS (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=WELLNESS&filter-departmentcode=WELLNESS=on&filter-coursestatus=Active=on>) on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/browse>) web site.

Wellness Education Mission

Stanford WellnessEd is the student wellness education program at Stanford. The WellnessEd curriculum is designed to inspire students to be the healthiest versions of themselves possible in the cognitive, emotional, social, and physical realms of wellness. The hallmark of the WellnessEd methodology for individual and community change is embodied in its motto: "Learn, Apply, Transform." Program instructors teach students the latest research-based wellness ideas and strategies. Resourced with this learning, students are supported in applying these practical wellness strategies to their own lives, thereby transforming their quality of living and impacting their social spheres in positive ways. In short, WellnessEd trains wellness change agents who change themselves in order to impact the world around them in meaningful ways.

Wellness Certificate

WellnessEd offers a Wellness Certificate that students can earn as part of their Stanford University experience. The certificate requires five classes, including three mind/body wellness courses in theory, practice, and application (WELLNESS 201 Flourishing, WELLNESS 202 Wellness: Mind, Body, Spirit, and WELLNESS 220 Applying Wellness Practicum). Students also take one physical wellness course (WELLNESS 193 Lifestyle Fitness Challenge or WELLNESS 187 Analysis of Human Movement) and one elective course (any WellnessEd course or qualifying wellness course from other programs). Upon completion, students receive a Wellness Certificate from the department and may put this distinction on their resumes or CVs.

		Units
Take 3 mind/body wellness courses in theory, practice, and application		
WELLNESS 195	Wellness: Mind, Body, Spirit	2
WELLNESS 201	Flourishing	2
WELLNESS 220	Applying Wellness Practicum	2
Take one physical wellness course from:		2-4
WELLNESS 193	Lifestyle Fitness Challenge	
WELLNESS 187	Analysis of Human Movement	
Take one elective course (any WellnessEd course or qualifying wellness course from other programs)		1
Total Units		9-11

Learning Outcomes

WellnessEd offers a range of research-based theory and practice classes in the areas of wellness and flourishing. These courses teach ideas and skills that enhance cognitive, emotional, and social wellness across the full variety of environments that students experience. Though we do not offer a degree program, for students who want to deepen their wellness education, we also offer a Wellness Certificate with a 5 course curriculum.

- Understanding of appropriate warm-up and cool-down routines
- Identify health related components of fitness (cardiovascular endurance, muscular strength and endurance, and flexibility)
- Understanding of basic anatomical terminology and proper stretching technique
- Make intelligent choices that contribute to a healthy, active lifestyle

Directors

Associate Director for Recreation Sports and Physical Education: Pam Mahlow

Assistant Director of Physical Education: Tia Lillie

Wellness Education: Tia Lillie

Teaching Specialists:

Teaching Specialists: Aneel Chima, Marlene Bjornsrud, Monica Hanson, Carley Hauck, Tia Lillie, Fred Luskin, Brandon Marcello, Carole Pertofsky, Shani Robins, Rev. Joanne Sanders, Sonya Soohoo, Janelle Spanier, Clyde Wilson

Directors

Athletic Director: Bernard Muir

Senior Associate Athletic Director /Senior Woman Administrator: Beth Goode

Senior Associate Athletic Director, External Relations: Kevin Blue

Senior Associate Athletic Director, Intercollegiate Sports: Earl Koberlein

Senior Associate Athletic Director, Physical Education, Recreation, and Wellness: Eric Stein

Senior Associate Athletic Director, CFO: Brian Talbott

Biology, Hopkins Marine Station

Courses offered by the Hopkins Marine Station are listed under the subject code BIOHOPK on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOHOPK&filter-catalognumber-BIOHOPK=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>).

The Hopkins Marine Station, located 90 miles from the main University campus in Pacific Grove, was founded in 1892 as the first marine laboratory on the west coast of North America. The modern laboratory facilities on the 11-acre campus on Cabrillo Point house nine faculty, all members of the Department of Biology. The Miller Library has a collection of literature in marine science. The Hopkins faculty offers undergraduate and graduate courses in biology which focus on the marine realm and involve topics including oceanography, environmental and comparative physiology, molecular evolution, biomechanics, cellular biology, conservation biology, and neurobiology and behavior. Most courses have laboratory sections that exploit the potential of working with readily available marine plants and animals. Small class sizes encourage close student-faculty interactions. Undergraduates have opportunities to carry out research projects with Hopkins faculty during the academic year or summer months.

Courses at Hopkins Marine Station can satisfy many requirements, from the Natural Sciences GER to major and minor requirements in departments housed in the Schools of Engineering, Humanities and Sciences, and Earth Sciences. Students are encouraged to check with their department's student services office to see which courses at Hopkins may be used to fulfill major or minor requirements.

Summer Program at Hopkins Marine Station

The summer program is open to advanced undergraduate, graduate students, and postdoctoral students, and to teachers whose biological backgrounds, teaching, or research activities can benefit from a summer's study of marine

life. Applications, deadlines, and further information are available at the Hopkins Marine Station (<http://hopkins.stanford.edu>) web site.

Emeriti Professors: David Epel, George N. Somero

Director: Stephen R. Palumbi

Professors: Barbara A. Block, Larry Crowder, Giulio De Leo, Mark W. Denny, William F. Gilly, Fiorenza Micheli, Stephen R. Palumbi, Stuart H. Thompson

Associate Professor: Christopher Lowe

Assistant Professor: Jeremy A. Goldbogen

Lecturer: James Watanabe

Biology

Courses offered by the Department of Biology are listed under the subject code BIO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>).

The department provides:

- a major program leading to the B.S. degree
- a minor program
- a coterminal program leading to the M.S. degree
- a doctoral program leading to the Ph.D. degree, and
- courses designed for the non-major.

Mission of the Undergraduate Program in Biology

The mission of the undergraduate program in Biology is to provide students with in-depth knowledge in the discipline, from molecular biology to ecology. Students in the program learn to think and analyze information critically, to draw connections among the different areas of biology, and to communicate their ideas effectively to the scientific community. The major exposes students to the scientific process through a set of core courses and electives from a range of subdisciplines. The Biology major serves as preparation for professional careers, including medicine, dentistry, veterinary sciences, teaching, consulting, research, and field studies.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to use discipline-specific tools and content knowledge to analyze and interpret scientific data, to evaluate the significance of the data, and to articulate conclusions supportable by the data.
2. the ability, independently and collaboratively, to formulate testable scientific hypotheses and to design approaches to obtain data to test the respective hypotheses.
3. the ability to communicate content understanding and research outcomes effectively using various media.

Mission of the Graduate Program in Biology

For graduate-level students, the department offers resources and experience learning from and working with world-renowned faculty involved in research on ecology, neurobiology, population biology, plant and animal physiology, biochemistry, immunology, cell and developmental biology, genetics, and molecular biology.

The M.S. degree program offers general or specialized study to individuals seeking biologically oriented course work, and to undergraduate science majors wishing to increase or update their science background or obtain advanced research experience.

The training for a Ph.D. in Biology is focused on learning skills required to be a successful research scientist and teacher, including how to ask important questions and then devise and carry out experiments to answer these questions. Students work closely with an established adviser and meet regularly with a committee of faculty members to ensure that they understand the importance of diverse perspectives on experimental questions and approaches. Students learn how to evaluate critically pertinent original literature in order to stay abreast of scientific progress in their areas of interest. They also learn how to make professional presentations, write manuscripts for publication, and become effective teachers.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Biology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Biology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Biology and to interpret and present the results of such research.

Facilities

The offices, labs, and personnel of the Department of Biology are located in the Gilbert Biological Sciences, Herrin Laboratories, Herrin Hall, James H. Clark Center, Lorry I. Lokey Laboratory, and Jerry Yang and Akiko Yamazaki Environment and Energy (Y2E2) buildings. Along with the Carnegie Institution of Washington all are on the main campus. Jasper Ridge Biological Preserve (JRBP) is located near Stanford University's campus in the eastern foothills of the Santa Cruz Mountains. Hopkins Marine Station is on Monterey Bay in Pacific Grove.

Jasper Ridge Biological Preserve encompasses geologic, topographic, and biotic diversity within its 1,189 acres and provides a natural laboratory for researchers from around the world, educational experiences for students and docent-led visitors, and refuge for native plants and animals. See the JRBP (<http://jrpbp.stanford.edu>) web site.

Hopkins Marine Station, located 90 miles from the main University campus in Pacific Grove, was founded in 1892 as the first marine laboratory on the west coast of North America. For more information, including courses taught at Hopkins Marine Station with the subject code BIOHOPK, see the "Hopkins Marine Station (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/biology/%20/schoolofhumanitiesandsciences/biologyhopkinsmarinestation>)" section of this bulletin.

The department's large collections of plants (Dudley Herbarium), fish, reptiles, and amphibians, as well as smaller collections of birds, mammals,

and invertebrates, are housed at the California Academy of Sciences in San Francisco, where they, and extensive collections of the Academy, are available to those interested in the systematics of these groups. Entomological collections, restricted to those being used in particular research projects, are housed in the Herrin Laboratories. No general collections are maintained except for teaching purposes.

The Falconer Biology Library (<http://library.stanford.edu/falconer>) in Herrin Hall contains over 1,200 current subscriptions and an extensive collection of monographs and reference works. A specialized library is maintained at Hopkins Marine Station.

Biology Course Numbering System

The department uses the following course numbering system:

Number	Level
000-099	Introductory and Core
100-199	Undergraduate
200-299	Advanced Undergraduate, Coterminial and PhD
300+	PhD

Bachelor of Science in Biology

The undergraduate major in Biology can serve as a stepping-stone for a wide variety of career opportunities. For students planning to attend medical, dental, or veterinary school, or graduate school in biological and applied sciences, the biology major provides a strong foundation in the basic life sciences. This foundation of knowledge, plus laboratory experience, also prepares students well for research and technical positions in universities, government, and industry.

While a major in Biology provides an excellent background for these technical careers, it can also serve as a valuable and satisfying focus of a liberal arts education for those not planning careers in science-related fields. An understanding of basic biological principles is of increasing importance in today's world. A knowledgeable and concerned citizenry is the best guarantee that these issues will be resolved most effectively. Finally, an understanding of the processes of life can heighten our perception and appreciation of the world around us, in terms of its beauty, variety, and uniqueness.

Advising

Members of the Biology faculty are available for advising on such academic matters as choice of courses, research, suggested readings, and career plans. The student services office maintains a current list of faculty advisers, advising availability, and research interests.

The student services staff and BioBridge (<http://www.stanford.edu/group/biobridge>), the department's peer advising group, are prepared to answer questions on administrative matters, such as requirements for the major, approved out-of-department electives, transfer course evaluations, and petition procedures. This office also distributes the department's Bachelor of Science Handbook (http://biology.stanford.edu/sites/all/files/BS_Handbook.pdf), which delineates policies and requirements, as well as other department forms and informational handouts.

Each undergraduate interested in the Biology major is required to select a department faculty adviser as part of the major declaration process.

Degree Requirements

Candidates for the general Biology B.S. degree must complete the following, which range from 90-105 total units. There is also an option

to add honors to the general major. Honors requirements are explained in detail below.

Core Courses

(must be taken for a letter grade when available):

		Units
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
BIO 42	Cell Biology and Animal Physiology	5
BIO 43	Plant Biology, Evolution, and Ecology	5
or BIOHOPK 43	Plant Biology, Evolution, and Ecology	
BIO 44X	Core Molecular Biology Laboratory	5
BIO 44Y	Core Plant Biology & Eco Evo Laboratory ¹	5
or BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution	

¹ BIO 44Y Core Plant Biology & Eco Evo Laboratory not required if completing honors program. Failure to complete honors program results in student being required to complete BIO 44Y Core Plant Biology & Eco Evo Laboratory.

Required Foundational Breadth Courses

(two courses may be taken credit/no credit):

		Units
Chemistry		
The following CHEM courses are required:		
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	5-10
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity	4-5
or CHEM 1	Structure and Reactivity	
CHEM 35	Synthetic and Physical Organic Chemistry	4-5
or CHEM 2	Organic Monofunctional Compounds	
CHEM 36	Organic Chemistry Laboratory I ¹	3-4
or CHEM 1L & CHEM 2L	Introduction to Organic Chemistry Lab and Organic Chemistry Lab I	
CHEM 130	Organic Chemistry Laboratory ²	3-4
or CHEM 2L & CHEM 3L	Organic Chemistry Lab I and Organic Chemistry Lab II	
CHEM 131	Organic Polyfunctional Compounds	3-4
or CHEM 3	Organic Polyfunctional Compounds	
CHEM 135	Physical Chemical Principles	3
or CHEM 171	Physical Chemistry I	
Physics		
Select one of the following Series:		8-12
PHYSICS 20 Series		
PHYSICS 21	Mechanics and Heat	
PHYSICS 22	Mechanics and Heat Laboratory	
PHYSICS 23	Electricity and Optics	
PHYSICS 24	Electricity and Optics Laboratory	
PHYSICS 40 Series		
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45	Light and Heat	
Mathematics		
Select one of the following Series:		5-10
3-Quarter Calculus Series		

MATH 19	Calculus
MATH 20	Calculus
MATH 21	Calculus
2-Quarter Calculus Series	
MATH 41	Calculus
MATH 42	Calculus
Advanced Calculus and Linear Algebra	
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond) ³
Additional Foundational Breadth Course	
Select one of the following: 3-5	
BIOHOPK 174H	Experimental Design and Probability ⁴
BIO/STATS 141	Biostatistics ⁴
CS 106A or CS 106X	Programming Methodology Programming Abstractions (Accelerated)
MATH 51	Linear Algebra and Differential Calculus of Several Variables ³
STATS 60/ PSYCH 10	Introduction to Statistical Methods: Precalculus

Total Units 41-62

- ¹ Not required if Chem 35 was taken Autumn 2014 or later.
- ² May be substituted with upper-division, above 100-level quantitative or computational course from this list: BIO 102, 182, 183, 220, 221; BIOMEDIN 212, 214, 217, 231, 262, 366, 374; CS courses above 106A (may not fulfill both the CHEM 130 and additional foundational breadth requirement); GENE 212, 214, 244; MATH courses above 102; STATS 116, 166, 215.
- ³ May be counted either toward the math requirement or foundational breadth, but not both.
- ⁴ If taken to fulfill the foundational breadth requirement, these courses do not count toward the 24 elective unit requirement.

Electives

24 units required, distributed as follows:

- Biology (BIO) or Hopkins Marine Station (BIOHOPK) courses numbered 100 or above.
- Approved out-of-department electives (http://biology.stanford.edu/sites/all/files/out_of_dept_electives.pdf) (list also available in the student services office).
- No more than 6 units from any combination of these courses may be applied toward the total number of elective units:

	Units	
BIO 196A	Biology Senior Reflection	3
BIO 196B	Biology Senior Reflection	3
BIO 196C	Biology Senior Reflection	3
BIO 197WA	Senior Writing Project: The Personal Essay in Biology	3
BIO 198	Directed Reading in Biology	1-15
BIO 198X	Out-of-Department Directed Reading	1-15
BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research	3
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	1-15
BIO 290	Teaching of Biology	1-5

BIO 291	Development and Teaching of Core Experimental Laboratories	1-2
BIOHOPK 198H	Directed Instruction or Reading	1-15
BIOHOPK 199H	Undergraduate Research	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15

- One course from at least three of the four central menu areas listed below. The purpose of the central menu is to expose students to a wide range of topics studied within the field of biology and is intended to give students a breadth of knowledge. Please note—this requirement is only for the general major. Students pursuing a specialized field of study should consult the specific degree requirements listed in the "Fields of Study" section below.
- No more than 6 units applied toward the elective unit requirement may be taken CR/NC.

Central Menu Areas

The four Central Menu Areas are:

- Area 1 (Molecular)
- Area 2 (Cell/Developmental)
- Area 3 (Organismal)
- Area 4 (Ecology and Evolution)

Units

1. Molecular (Area 1)		
BIO 104	Advanced Molecular Biology	
BIO 110	DNA Replication and Genomic Maintenance	
BIO 113	Fundamentals of Molecular Evolution ³	
BIO 118	Genetic Analysis of Biological Processes ¹	
BIO 160A	Developmental Biology I ¹	
BIO 160B	Developmental Biology II ¹	
BIO 188	Biochemistry I	
BIO 189	Biochemistry II	
BIO 230	Molecular and Cellular Immunology ¹	
CBIO/PATH 101	Cancer Biology ¹	
CEE 274A/ CHEMENG 174/274	Environmental Microbiology I ⁵	
2. Cell/Developmental (Area 2)		
BIO 118	Genetic Analysis of Biological Processes ¹	
BIO 129A	Cellular Dynamics I: Cell Motility and Adhesion	
BIO 129B	Cellular Dynamics II: Building a Cell	
BIO 137	Plant Genetics	
BIO 154	Molecular and Cellular Neurobiology ²	
BIO 158	Developmental Neurobiology ²	
BIO 160A	Developmental Biology I ¹	
BIO 160B	Developmental Biology II ¹	
BIO 171	Principles of Cell Cycle Control	
BIO 230	Molecular and Cellular Immunology ¹	
CBIO/PATH 101	Cancer Biology ¹	
CEE 274A/ CHEMENG 174/274	Environmental Microbiology I ⁵	
3. Organismal (Area 3)		
BIO 112	Human Physiology	

BIO 153	Cellular Neuroscience: Cell Signaling and Behavior
BIO 154	Molecular and Cellular Neurobiology ²
BIO 158	Developmental Neurobiology ²
BIO 163	Neural Systems and Behavior
BIOHOPK 161H	Invertebrate Zoology
BIOHOPK 162H	Comparative Animal Physiology
BIOHOPK 167H	Nerve, Muscle, and Synapse
MI 185	Topics in Microbiology
4. Ecology and Evolution (Area 4)	
BIO 101	Ecology
BIO 113	Fundamentals of Molecular Evolution ³
BIO 121	Biogeography
BIO 136	Evolutionary Paleobiology
BIO 143	Evolution
BIO 144	Conservation Biology: A Latin American Perspective
BIO 145	Ecology and evolution of animal behavior
BIO 182	Modeling Cultural Evolution
BIOHOPK 163H	Oceanic Biology
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems
CEE 274A/CHEMENG 174/274	Environmental Microbiology I ⁵

1. May be used to satisfy either area I or area II requirement.
2. May be used to satisfy either area II or area III requirement.
3. May be used to satisfy either area I or area IV requirement.
4. May be used to satisfy either area III or area IV requirement.
5. May be used to satisfy area I, area II, or area IV requirement.

Writing in the Major

Select one of the following:

BIO 44Y	Core Plant Biology & Eco Evo Laboratory ¹
BIO 107	Human Physiology Laboratory ²
BIO 137	Plant Genetics ²
BIO 168	Explorations in Stem Cell Biology ^{1,2}
BIO 196A	Biology Senior Reflection ²
BIO 197WA	Senior Writing Project: The Personal Essay in Biology ²
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research ²
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution
BIOHOPK 184H	Holistic Biology ²

¹ If taken during academic year 2014-15.

² This course can also be used to count toward the elective requirement.

Typical Schedule for a Four-Year Program

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles Accelerated (CHEM 31X) ¹		5	
Calculus (MATH 19)	3		
Freshman requirements, seminars, or GERS/WAYS	8		
Structure and Reactivity (CHEM 33)			5
Calculus (MATH 20)		3	
Freshman requirements, seminars, or GERS/WAYS		8	
Synthetic and Physical Organic Chemistry (CHEM 35)			5
Organic Chemistry Laboratory I (CHEM 36)			3
Calculus (MATH 21)			4
Freshman requirements, seminars, or GERS/WAYS			6
Year Total:		16	16
			18
Second Year	Units		
	Autumn	Winter	Spring
Genetics, Biochemistry, and Molecular Biology (BIO 41)		5	
Organic Chemistry Laboratory (CHEM 130)	3		
GERS/WAYS	6		
Cell Biology and Animal Physiology (BIO 42)			5
Core Molecular Biology Laboratory (BIO 44X)			5
Organic Polyfunctional Compounds (CHEM 131)			3
GERS/WAYS			5
Plant Biology, Evolution, and Ecology (BIO 43) or Plant Biology, Evolution, and Ecology (BIOHOPK 43)			5
Core Plant Biology & Eco Evo Laboratory (BIO 44Y) or Core Laboratory in Plant Biology, Ecology and Evolution (BIOHOPK 44Y)			5
GERS/WAYS			8
Year Total:		14	18
			18
Third Year	Units		
	Autumn	Winter	Spring
Mechanics and Heat (PHYSICS 21)		3	
Mechanics and Heat Laboratory (PHYSICS 22)		1	
GERS/WAYS or Electives		10	
Electricity and Optics (PHYSICS 23)			3
Electricity and Optics Laboratory (PHYSICS 24)			1
GERS/WAYS or Electives			10
Physical Chemical Principles (CHEM 135) ²			3
GERS/WAYS or Electives			12
Year Total:		14	14
			15
Fourth Year	Units		
	Autumn	Winter	Spring
General Education/WAYS requirements and/or electives		13	
General Education/WAYS requirements and/or electives			13
General Education/WAYS requirements and/or electives			13
Year Total:		13	13
			13
Total Units in Sequence:			182

¹ This schedule varies slightly if the student takes CHEM 31A Chemical Principles I, CHEM 31B Chemical Principles II

² Or take CHEM 171 Physical Chemistry in autumn

Fields of Study (Subplans)

In addition to the undergraduate major program described above, the department offers the following six fields of study (also known as subplans) for students wishing to concentrate their studies in particular areas of biology:

- Biochemistry and Biophysics
- Ecology and Evolution
- Marine Biology
- Microbes and Immunity
- Molecular, Cellular, and Developmental Biology
- Neurobiology

These fields of study are declared on Axess at the time of the major declaration; they appear on both the transcript and on the diploma. Candidates for the B.S. degree in Biology with a field of study are required to complete the departmental honors program as well as the set of requirements outlined below.

Biochemistry and Biophysics

Candidates for the Biochemistry and Biophysics field of study must complete the following, which range from 101-110 total units:

Core Courses (must be taken for a letter grade when available):

	Units
BIO 41 Genetics, Biochemistry, and Molecular Biology	5
BIO 42 Cell Biology and Animal Physiology	5
BIO 43 Plant Biology, Evolution, and Ecology	5
or BIOHOPK 43 Plant Biology, Evolution, and Ecology	
BIO 44X Core Molecular Biology Laboratory	5

Required Foundational Breadth Courses

Two courses may be taken credit/no credit.

Chemistry

The following CHEM courses are required:

	Units
CHEM 31A Chemical Principles I & CHEM 31B and Chemical Principles II	5-10
or CHEM 31X Chemical Principles Accelerated	
CHEM 33 Structure and Reactivity	4-5
or CHEM 1 Structure and Reactivity	
CHEM 35 Synthetic and Physical Organic Chemistry	4-5
or CHEM 2 Organic Monofunctional Compounds	
CHEM 36 Organic Chemistry Laboratory I ¹	3-4
or CHEM 1L Introduction to Organic Chemistry Lab & CHEM 2L and Organic Chemistry Lab I	
CHEM 130 Organic Chemistry Laboratory	3-4
or CHEM 2L Organic Chemistry Lab I & CHEM 3L and Organic Chemistry Lab II	
CHEM 135 Physical Chemical Principles	3
or CHEM 171 Physical Chemistry I	

Physics

PHYSICS 41 Mechanics	4
PHYSICS 43 Electricity and Magnetism	4
PHYSICS 45 Light and Heat	4

Mathematics

MATH 51 Linear Algebra and Differential Calculus of Several Variables	5
MATH 52 Integral Calculus of Several Variables	5

Additional Foundational Breadth Course

STATS 60 Introduction to Statistical Methods: Precalculus	5
or BIO 141 Biostatistics	

Total Units 49-58

¹ Not required if Chem 35 was taken Autumn 2014 or later.

Required Biology Courses

Must be taken for a letter grade.

	Units
BIO 104 Advanced Molecular Biology	5
BIO 118 Genetic Analysis of Biological Processes	4
BIO 129A Cellular Dynamics I: Cell Motility and Adhesion	4
or BIO 129B Cellular Dynamics II: Building a Cell	
BIO 188 Biochemistry I	3

Approved Biochemistry and Biophysics Courses

Must be taken for a letter grade.

Select three of the following: 8-14

APPPHYS/ BIO 236 Biology by the Numbers	
APPPHYS 293 Theoretical Neuroscience	
APPPHYS 294 Cellular Biophysics	
BIO 132/232/ APPPHYS/ BIOPHYS/ GENE 232 Advanced Imaging Lab in Biophysics	
BIO 152/MCP 222 Imaging: Biological Light Microscopy	
BIO 154/254/ NBIO 254 Molecular and Cellular Neurobiology	
BIO 189/289/ CHEM 183/ CHEMENG 183/283 Biochemistry II	
BIO 214/BIOC 224 Advanced Cell Biology	
BIO 217 Neuronal Biophysics	
BIOE 101 Systems Biology	
BIOE 103 Systems Physiology and Design	
BIOE/RAD 220 Introduction to Imaging and Image-based Human Anatomy	
BIOMEDIN 210 Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
BIOMEDIN/ BIOE/GENE 214/CS 274 Representations and Algorithms for Computational Molecular Biology	
BIOMEDIN 231 Computational Molecular Biology	
BIOPHYS/ SBIO 228 Computational Structural Biology	
BIOPHYS/ SBIO 241 Biological Macromolecules	
CHEM 184 Biological Chemistry Laboratory	
CHEM 185 Biochemistry III	
EE 236A Modern Optics	
MCP 256 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	
PHYSICS 105 Intermediate Physics Laboratory I: Analog Electronics	

Electives

7 units required. Electives must be 100-level or above and chosen from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

Writing in the Major

Select one of the following:

	Units
BIO 44Y	3-16
Core Plant Biology & Eco Evo Laboratory ¹	
BIO 107	
Human Physiology Laboratory ²	
BIO 137	
Plant Genetics ²	
BIO 168	
Explorations in Stem Cell Biology ^{1,2}	
BIO 196A	
Biology Senior Reflection ²	
BIO 197WA	
Senior Writing Project: The Personal Essay in Biology ²	
BIO 199W	
Senior Honors Thesis: How to Effectively Write About Scientific Research ²	
BIOHOPK 44Y	
Core Laboratory in Plant Biology, Ecology and Evolution	
BIOHOPK 184H	
Holistic Biology ²	

¹ If taken during academic year 2014-15.

² This course can also be used to count toward the elective requirement.

Honors Requirements

1. Approved Honors Proposal
2. 10 units of research from the same lab; only research units from BIO or BIOHOPK are permitted as follows:

	Units
BIO 199	5
Advanced Research Laboratory in Experimental Biology	
BIO 199X	5
Out-of-Department Advanced Research Laboratory in Experimental Biology	
BIOHOPK 199H	5
Undergraduate Research	

3. Poster/oral presentation at annual honors symposium
4. Approved Honors Thesis
5. 3.0 GPA in all courses taken for the major with the exception of research and/or teaching units

Ecology and Evolution

Candidates for the Ecology and Evolution field of study must complete the following, which range from 99-116 total units:

Core Courses

Must be taken for a letter grade when available.

	Units
BIO 41	5
Genetics, Biochemistry, and Molecular Biology	
BIO 42	5
Cell Biology and Animal Physiology	
BIO 43	5
Plant Biology, Evolution, and Ecology	
or BIOHOPK 43	
Plant Biology, Evolution, and Ecology	
BIO 101	4
Ecology ¹	
or BIOHOPK 172H	
Marine Ecology: From Organisms to Ecosystems	
Select one of the following:	5
BIO 44X	
Core Molecular Biology Laboratory	

BIO 44Y	Core Plant Biology & Eco Evo Laboratory
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution

¹ This course cannot also be used to count toward the elective requirement.

Required Foundational Breadth Courses

Two courses may be taken credit/no credit.

	Units
Chemistry	
The following CHEM courses are required:	
CHEM 31A & CHEM 31B or CHEM 31X	5-10
Chemical Principles I and Chemical Principles II Chemical Principles Accelerated	
CHEM 33 or CHEM 1	4-5
Structure and Reactivity Structure and Reactivity	
CHEM 35 or CHEM 2	4-5
Synthetic and Physical Organic Chemistry Organic Monofunctional Compounds	
CHEM 36 or CHEM 1L & CHEM 2L	3-4
Organic Chemistry Laboratory I ¹ Introduction to Organic Chemistry Lab and Organic Chemistry Lab I	
Physics	
Select one of the following Series:	8-12
PHYSICS 20 Series	
PHYSICS 21	5
Mechanics and Heat	
PHYSICS 22	5
Mechanics and Heat Laboratory	
PHYSICS 23	5
Electricity and Optics	
PHYSICS 24	5
Electricity and Optics Laboratory	
PHYSICS 40 Series	
PHYSICS 41	5
Mechanics	
PHYSICS 43	5
Electricity and Magnetism	
PHYSICS 45	5
Light and Heat	
Mathematics	
Select one of the following Series:	5-10
3-Quarter Calculus Series	
MATH 19	5
Calculus	
MATH 20	5
Calculus	
MATH 21	5
Calculus	
2-Quarter Calculus Series	
MATH 41	5
Calculus	
MATH 42	5
Calculus	
Advanced Calculus and Linear Algebra	
MATH 51	5
Linear Algebra and Differential Calculus of Several Variables	
Total Units	29-46

¹ Not required if Chem 35 was taken Autumn 2014 or later.

Required Evolutionary Biology Course

Must be taken for a letter grade.

	Units
Select one of the following:	3-5
BIO 113	5
Fundamentals of Molecular Evolution	
BIO 136	5
Evolutionary Paleobiology	
BIO 143	5
Evolution	

BIOHOPK 166H Molecular Ecology

Required Quantitative Methods Course

Must be taken for a letter grade.

	Units
Select one of the following:	3-5
BIO 141 Biostatistics	
BIOHOPK 174H Experimental Design and Probability	
CS 106A Programming Methodology	
or CS 106X Programming Abstractions (Accelerated)	
STATS 60 Introduction to Statistical Methods: Precalculus (or beyond)	

Electives (30 units required)

Only one course can be taken credit/no credit. Electives must be from this approved list:

	Units
BIO 101 Ecology	4
BIO 102 Demography: Health, Development, Environment	3
BIO 116 Ecology of the Hawaiian Islands	4
BIO 117 Biology and Global Change	4
BIO 118 Genetic Analysis of Biological Processes	4
BIO 121 Biogeography	3
BIO 131 Complex Systems Lab	1
BIO 139 Biology of Birds	3
BIO 144 Conservation Biology: A Latin American Perspective	3
BIO 145 Ecology and evolution of animal behavior	3
BIO 146 Population Studies	1
BIO 147	3
BIO 164 Biosphere-Atmosphere Interactions	4
BIO 166 Faunal Analysis: Animal Remains for the Archaeologist	5
BIO 182 Modeling Cultural Evolution	3
BIO 183 Theoretical Population Genetics	3
BIO 186 Natural History of the Vertebrates	4
BIO 216 Terrestrial Biogeochemistry	3
BIO 220 Essential Mathematics for Research in Life and Social Sciences	2
BIO 227 Foundations of Community Ecology	2
BIO 274S Hopkins Microbiology Course	3-12
BIOHOPK 161H Invertebrate Zoology	5
BIOHOPK 162H Comparative Animal Physiology	5
BIOHOPK 163H Oceanic Biology	4
BIOHOPK 166H Molecular Ecology	5
BIOHOPK 172H Marine Ecology: From Organisms to Ecosystems	5
BIOHOPK 173H Marine Conservation Biology ¹	4
BIOHOPK 174H Experimental Design and Probability	3
BIOHOPK 182H Stanford at Sea ³	16
BIOHOPK 184H Holistic Biology ³	16
BIOHOPK 185H Ecology and Conservation of Kelp Forest Communities ³	10-12
BIOHOPK 187H Sensory Ecology	4
BIOHOPK 264H POPULATION GENOMICS	1-2

BIOHOPK 275H Synthesis in Ecology	2
CHEM 130 Organic Chemistry Laboratory	3
CHEM 131 Organic Polyfunctional Compounds	3
EARTHSYS 144/ EESS 164 Fundamentals of Geographic Information Science (GIS)	4
EESS 134	
EESS 158 Geomicrobiology	3
GES 123 Paleobiology	4
GES 240 Geostatistics	2-3
OSPAUSTL 10 Coral Reef Ecosystems ²	3
OSPAUSTL 25 Freshwater Systems ²	3
OSPAUSTL 30 Coastal Forest Ecosystems ²	3

- 1 Only 1 unit can count.
- 2 Only 2 units can count.
- 3 Only 6 units can count.

Writing in the Major

	Units
Select one of the following:	3-16
BIO 44Y Core Plant Biology & Eco Evo Laboratory ¹	
BIO 107 Human Physiology Laboratory ²	
BIO 137 Plant Genetics ²	
BIO 168 Explorations in Stem Cell Biology ^{1,2}	
BIO 196A Biology Senior Reflection ²	
BIO 197WA Senior Writing Project: The Personal Essay in Biology ²	
BIO 199W Senior Honors Thesis: How to Effectively Write About Scientific Research ²	
BIOHOPK 44Y Core Laboratory in Plant Biology, Ecology and Evolution	
BIOHOPK 184H Holistic Biology ²	

- 1 If taken during academic year 2014-15.
- 2 This course can also be used to count toward the elective requirement.

Honors Requirements

1. Approved Honors Proposal
2. 10 units of research from the same lab; only research units from BIO or BIOHOPK are permitted as follows:

	Units
BIO 199 Advanced Research Laboratory in Experimental Biology	
BIO 199X Out-of-Department Advanced Research Laboratory in Experimental Biology	
BIOHOPK 199H Undergraduate Research	

3. Poster/oral presentation at annual honors symposium
4. Approved Honors Thesis
5. 3.0 GPA in all courses taken for the major with the exception of research and/or teaching units

Marine Biology

Candidates for the Marine Biology field of study must complete the following, which range from 92-140 total units:

Core Courses

Must be taken for a letter grade when available.

		Units
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
BIO 42	Cell Biology and Animal Physiology	5
BIO 43	Plant Biology, Evolution, and Ecology	5
or BIOHOPK 43	Plant Biology, Evolution, and Ecology	
Select one of the following:		5
BIO 44X	Core Molecular Biology Laboratory	
BIO 44Y	Core Plant Biology & Eco Evo Laboratory	
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution	

Required Foundational Breadth Courses

Two courses may be taken credit/no credit.

Chemistry

The following CHEM courses are required:

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	5-10
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity	4-5
or CHEM 1	Structure and Reactivity	
CHEM 35	Synthetic and Physical Organic Chemistry	4-5
or CHEM 2	Organic Monofunctional Compounds	
CHEM 36	Organic Chemistry Laboratory I ¹	3-4
or CHEM 1L & CHEM 2L	Introduction to Organic Chemistry Lab and Organic Chemistry Lab I	
CHEM 130	Organic Chemistry Laboratory ²	3-4
or CHEM 2L & CHEM 3L	Organic Chemistry Lab I and Organic Chemistry Lab II	
CHEM 131	Organic Polyfunctional Compounds	3-4
or CHEM 3	Organic Polyfunctional Compounds	

Physics

Select one of the following Series: 8-12

PHYSICS 20 Series

PHYSICS 21	Mechanics and Heat
PHYSICS 22	Mechanics and Heat Laboratory
PHYSICS 23	Electricity and Optics
PHYSICS 24	Electricity and Optics Laboratory

PHYSICS 40 Series

PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat

Mathematics

Select one of the following Series: 5-10

3-Quarter Calculus Series

MATH 19	Calculus
MATH 20	Calculus
MATH 21	Calculus

2-Quarter Calculus Series

MATH 41	Calculus
MATH 42	Calculus

Advanced Calculus and Linear Algebra

MATH 51	Linear Algebra and Differential Calculus of Several Variables
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Additional Foundational Breadth Course 3-5

Select one of the following:

STATS 60	Introduction to Statistical Methods: Precalculus
BIO 141	Biostatistics
BIOHOPK 174H	Experimental Design and Probability

Total Units 38-59¹ Not required if Chem 35 was taken Autumn 2014 or later.² May be substituted with upper-division, above 100-level quantitative or computational course from this list: BIO 102, 182, 183, 220, 221; BIOMEDIN 212, 214, 217, 231, 262, 366, 374; CS courses above 106A (may not fulfill both the CHEM 130 and additional foundational breadth requirement); GENE 212, 214, 244; MATH courses above 102; STATS 116, 166, 215.**Required Biology Courses**

Must be taken for a letter grade.

		Units
BIO 101	Ecology ¹	4
or BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	
BIO 118	Genetic Analysis of Biological Processes	4
BIO 143	Evolution	3

¹ If BIOHOPK 172H is taken to fulfill this requirement, it cannot also count below.**Approved courses**

Must be taken for a letter grade.

Select four of the following:

BIO/ EARTHSYS 116	Ecology of the Hawaiian Islands	Units 15-52
BIOHOPK 161H	Invertebrate Zoology	
BIOHOPK 162H	Comparative Animal Physiology	
BIOHOPK 163H	Oceanic Biology	
BIOHOPK 166H	Molecular Ecology	
BIOHOPK 167H	Nerve, Muscle, and Synapse	
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems ¹	
BIOHOPK 173H	Marine Conservation Biology ((must be take for 3 units))	
BIOHOPK 182H	Stanford at Sea	
BIOHOPK 184H	Holistic Biology	
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities	
OSPAUSTL 10	Coral Reef Ecosystems ²	
OSPAUSTL 25	Freshwater Systems ²	

OSPAUSTL Coastal Forest Ecosystems ²
30

¹ May not also fulfill the required Biology course above.

² These three courses as a whole count as one of the four required courses in this section.

Writing in the Major

Select one of the following:

BIO 44Y	Core Plant Biology & Eco Evo Laboratory ¹
BIO 107	Human Physiology Laboratory ²
BIO 137	Plant Genetics ²
BIO 168	Explorations in Stem Cell Biology ^{1,2}
BIO 196A	Biology Senior Reflection ²
BIO 197WA	Senior Writing Project: The Personal Essay in Biology ²
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research ²
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution
BIOHOPK 184H	Holistic Biology ²

¹ If taken during academic year 2014-15.

² This course can also be used to count toward the elective requirement.

Honors Requirements

- Approved Honors Proposal - one Hopkins Marine Station faculty member must be a reader on the thesis
- 10 units of research from the same lab; only research units from BIO or BIOHOPK are permitted as follows:

BIO 199	Advanced Research Laboratory in Experimental Biology
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology
BIOHOPK 199H	Undergraduate Research

- Poster/oral presentation at annual honors symposium
- Approved Honors Thesis; one Hopkins Marine Station faculty member must be a reader on the thesis
- 3.0 GPA in all courses taken for the major with the exception of research and/or teaching units

Microbes and Immunity

Candidates for the Microbes and Immunity field of study must complete the following, which range from 89-116 total units:

Core Courses

Must be taken for a letter grade when available.

	Units
BIO 41	Genetics, Biochemistry, and Molecular Biology
BIO 42	Cell Biology and Animal Physiology
BIO 43	Plant Biology, Evolution, and Ecology
or BIOHOPK 43	Plant Biology, Evolution, and Ecology
Select one of the following:	5
BIO 44X	Core Molecular Biology Laboratory

BIO 44Y	Core Plant Biology & Eco Evo Laboratory
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution

Required Foundational Breadth Courses

Two courses may be taken credit/no credit.

	Units
Chemistry	
The following CHEM courses are required:	
CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II Chemical Principles Accelerated
CHEM 33 or CHEM 1	Structure and Reactivity
CHEM 35 or CHEM 2	Synthetic and Physical Organic Chemistry Organic Monofunctional Compounds
CHEM 36 or CHEM 1L & CHEM 2L	Organic Chemistry Laboratory I ¹ Introduction to Organic Chemistry Lab and Organic Chemistry Lab I
CHEM 130 or CHEM 2L & CHEM 3L	Organic Chemistry Laboratory ² Organic Chemistry Lab I and Organic Chemistry Lab II
CHEM 131 or CHEM 3	Organic Polyfunctional Compounds
Physics	
Select one of the following Series:	8-12
PHYSICS 20 Series	
PHYSICS 21	Mechanics and Heat
PHYSICS 22	Mechanics and Heat Laboratory
PHYSICS 23	Electricity and Optics
PHYSICS 24	Electricity and Optics Laboratory
PHYSICS 40 Series	
PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat
Mathematics	
Select one of the following Series:	5-10
3-Quarter Calculus Series	
MATH 19	Calculus
MATH 20	Calculus
MATH 21	Calculus
2-Quarter Calculus Series	
MATH 41	Calculus
MATH 42	Calculus
Advanced Calculus and Linear Algebra	
MATH 51	Linear Algebra and Differential Calculus of Several Variables
Additional Foundational Breadth Course	
BIO 141 or BIOHOPK 174H	Biostatistics ³ Experimental Design and Probability
Total Units	39-59

- ¹ Not required if Chem 35 was taken Autumn 2014 or later.
- ² May be substituted with upper-division, above 100-level quantitative or computational course from this list: BIO 102, 182, 183, 220, 221; BIOMEDIN 212, 214, 217, 231, 262, 366, 374; CS courses above 106A (may not fulfill both the CHEM 130 and additional foundational breadth requirement); GENE 212, 214, 244; MATH courses above 102; STATS 116, 166, 215.
- ³ This course cannot also be used to count toward the elective requirement.

Required Courses in Microbiology, Immunology, Molecular Evolution

Must be taken for a letter grade.

	Units
Select four of the following:	
BIO 177	Plant Microbe Interaction
BIO 230	Molecular and Cellular Immunology
BIO 232	Advanced Imaging Lab in Biophysics
BIOHOPK 274	Hopkins Microbiology Course
CEE 177	Aquatic Chemistry and Biology
CEE 274A	Environmental Microbiology I
CEE 274B	Microbial Bioenergy Systems
CEE 274D	Pathogens and Disinfection
EESS 158	Geomicrobiology
HUMBIO 152	Viral Lifestyles
HUMBIO 155H	Humans and Viruses I
IMMUNOL 201	Advanced Immunology I
IMMUNOL 202	Advanced Immunology II
IMMUNOL 209	Translational Immunology
IMMUNOL 260	HIV: The Virus, the Disease, the Research
IMMUNOL 275	Tumor Immunology
MI 104	Innate Immunology
MI 120	Bacteria in Health and Disease
MI 209	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites: Part I
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites
MI 211	Advanced Immunology I

Required Course in Reading Scientific Literature

Must be taken for a letter grade.

	Units
Select one of the following or students may petition for other courses in reading scientific literature: ³	
BIO 178	Microbiology Literature
MI 185	Topics in Microbiology

Electives

12 units required. Electives must be 100-level or above and selected from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of

teaching and research are allowed. Only one course can be taken credit/no credit.

Writing in the Major

	Units
Select one of the following:	
BIO 44Y	Core Plant Biology & Eco Evo Laboratory ¹
BIO 107	Human Physiology Laboratory ²
BIO 137	Plant Genetics ²
BIO 168	Explorations in Stem Cell Biology ^{1,2}
BIO 196A	Biology Senior Reflection ²
BIO 197WA	Senior Writing Project: The Personal Essay in Biology ²
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research ²
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution
BIOHOPK 184H	Holistic Biology ²

¹ If taken during academic year 2014-15.

² This course can also be used to count toward the elective requirement.

Honors Requirements

- Approved Honors Proposal
- 10 units of research from the same lab; only research units from BIO or BIOHOPK are permitted as follows:

	Units
BIO 199	Advanced Research Laboratory in Experimental Biology
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology
BIOHOPK 199H	Undergraduate Research

- Poster/oral presentation at annual honors symposium
- Approved Honors Thesis
- 3.0 GPA in all courses taken for the major with the exception of research and/or teaching units

Molecular, Cellular, and Developmental Biology

Candidates for the Molecular and Cell Biology field of study must complete the following, which range from 99-113 total units:

Core Courses

Must be taken for a letter grade when available.

	Units	
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
BIO 42	Cell Biology and Animal Physiology	5
BIO 43	Plant Biology, Evolution, and Ecology	5
or BIOHOPK 43	Plant Biology, Evolution, and Ecology	5
Select one of the following:		
BIO 44X	Core Molecular Biology Laboratory	5
BIO 44Y	Core Plant Biology & Eco Evo Laboratory	5
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution	5

Required Foundational Breadth Courses

Two courses may be taken credit/no credit.

Chemistry

The following CHEM courses are required:

		Units
CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II Chemical Principles Accelerated	5-10
CHEM 33 or CHEM 1	Structure and Reactivity	4-5
CHEM 35 or CHEM 2	Synthetic and Physical Organic Chemistry Organic Monofunctional Compounds	4-5
CHEM 36 or CHEM 1L & CHEM 2L	Organic Chemistry Laboratory I ¹ Introduction to Organic Chemistry Lab and Organic Chemistry Lab I	3-4
CHEM 130 or CHEM 2L & CHEM 3L	Organic Chemistry Laboratory ² Organic Chemistry Lab I and Organic Chemistry Lab II	3-4
CHEM 131 or CHEM 3	Organic Polyfunctional Compounds	3-4
CHEM 135 or CHEM 171	Physical Chemical Principles Physical Chemistry I	3

Physics

Select one of the following Series:

		Units
PHYSICS 20 Series		8-12
PHYSICS 21	Mechanics and Heat	
PHYSICS 22	Mechanics and Heat Laboratory	
PHYSICS 23	Electricity and Optics	
PHYSICS 24	Electricity and Optics Laboratory	
PHYSICS 40 Series		
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45	Light and Heat	

Mathematics

Select one of the following Series:

		Units
3-Quarter Calculus Series		5-10
MATH 19	Calculus	
MATH 20	Calculus	
MATH 21	Calculus	
2-Quarter Calculus Series		
MATH 41	Calculus	
MATH 42	Calculus	
Advanced Calculus and Linear Algebra		
MATH 51	Linear Algebra and Differential Calculus of Several Variables	

Additional Foundational Breadth Course

BIO 141 or STATS 60	Biostatistics ³ Introduction to Statistical Methods: Precalculus	4-5
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Total Units 42-62

¹ Not required if Chem 35 was taken Autumn 2014 or later.

² May be substituted with upper-division, above 100-level quantitative or computational course from this list: BIO 102, 182, 183, 220, 221; BIOMEDIN 212, 214, 217, 231, 262, 366, 374; CS courses above 106A (may not fulfill both the CHEM 130 and additional foundational breadth requirement); GENE 212, 214, 244; MATH courses above 102; STATS 116, 166, 215.

³ This course cannot also be used to count toward the elective requirement.

Required Biology Courses

Must be taken for a letter grade.

		Units
BIO 104	Advanced Molecular Biology	5
BIO 118	Genetic Analysis of Biological Processes	5
Select two of the following four courses:		8
BIO 129A	Cellular Dynamics I: Cell Motility and Adhesion	
BIO 129B	Cellular Dynamics II: Building a Cell	
BIO 160A	Developmental Biology I	
BIO 160B	Developmental Biology II	

Electives

15 units required. Electives must be 100-level or above and selected from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

Writing in the Major

Select one of the following: 3-16

BIO 44Y	Core Plant Biology & Eco Evo Laboratory ¹
BIO 107	Human Physiology Laboratory ²
BIO 137	Plant Genetics ²
BIO 168	Explorations in Stem Cell Biology ^{1,2}
BIO 196A	Biology Senior Reflection ²
BIO 197WA	Senior Writing Project: The Personal Essay in Biology ²
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research ²
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution
BIOHOPK 184H	Holistic Biology ²

¹ If taken during academic year 2014-15.

² This course can also be used to count toward the elective requirement.

Honors Requirements

- Approved Honors Proposal
- 10 units of research from the same lab; only research units from BIO or BIOHOPK are permitted as follows:

		Units
BIO 199	Advanced Research Laboratory in Experimental Biology	
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	
BIOHOPK 199H	Undergraduate Research	

- Poster/oral presentation at annual honors symposium
- Approved Honors Thesis
- 3.0 GPA in all courses taken for the major with the exception of research and/or teaching units

Neurobiology

Candidates for the Neurobiology field of study must complete the following, which range from 97-112 total units:

Core Courses

Must be taken for a letter grade when available.

	Units
BIO 41	5
BIO 42	5
BIO 43	5
or BIOHOPK 43	
Select one of the following:	5
BIO 44X	
BIO 44Y	
BIOHOPK 44Y	

Required Foundational Breadth Courses

Two courses may be taken credit/no credit.

	Units
Chemistry	
The following CHEM courses are required:	
CHEM 31A & CHEM 31B or CHEM 31X	5-10
CHEM 33 or CHEM 1	4-5
CHEM 35 or CHEM 2	4-5
CHEM 36 or CHEM 1L & CHEM 2L	3-4
CHEM 130 or CHEM 2L & CHEM 3L	3-4
CHEM 131 or CHEM 3	3-4
Physics	
Select one of the following Series:	8-12
PHYSICS 20 Series	
PHYSICS 21	
PHYSICS 22	
PHYSICS 23	
PHYSICS 24	
PHYSICS 40 Series	
PHYSICS 41	
PHYSICS 43	
PHYSICS 45	
Mathematics	
Select one of the following Series:	5-10
3-Quarter Calculus Series	
MATH 19	
MATH 20	
MATH 21	
2-Quarter Calculus Series	
MATH 41	

MATH 42	Calculus	
Advanced Calculus and Linear Algebra		
MATH 51	Linear Algebra and Differential Calculus of Several Variables	
Additional Foundational Breadth Course		
BIO 141	Biostatistics ³	4-5
or STATS 60	Introduction to Statistical Methods: Precalculus	
Total Units		39-59

- Not required if Chem 35 was taken Autumn 2014 or later.
- May be substituted with upper-division, above 100-level quantitative or computational course from this list: BIO 102, 182, 183, 220, 221; BIOMEDIN 212, 214, 217, 231, 262, 366, 374; CS courses above 106A (may not fulfill both the CHEM 130 and additional foundational breadth requirement); GENE 212, 214, 244; MATH courses above 102; STATS 116, 166, 215.
- This course cannot also be used to count toward the elective requirement.

Required Biology Courses

Must be taken for a letter grade.

	Units
BIO 118 or BIO 104	4
BIO 158	4
Select one of the following:	4
BIO 129A	
BIO 129B	
BIO 160A	
BIO 160B	
Select one from the following list of neural systems courses:	4-8
BIO 149	
BIO 150	
BIO 163	
NBIO 206	
Select one of the following cell biology courses:	4-8
BIO 154	
NBIO 206	

- If taken for 8 units, can be used to fulfill the cell biology and neural systems course requirements.

Electives

12 units required. Electives must be at the 100-level or above and selected from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and/or research are allowed. Only one course can be taken credit/no credit.

Writing in the Major

	Units
Select one of the following:	3-16
BIO 44Y	
BIO 107	
BIO 137	
BIO 168	
BIO 196A	

BIO 197WA	Senior Writing Project: The Personal Essay in Biology ²
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research ²
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution
BIOHOPK 184H	Holistic Biology ²

¹ If taken during academic year 2014-15.

² This course can also be used to count toward the elective requirement.

Honors Requirements

1. Approved Honors Proposal
2. 10 units of research from the same lab; only research units from BIO or BIOHOPK are permitted as follows:

BIO 199	Advanced Research Laboratory in Experimental Biology
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology
BIOHOPK 199H	Undergraduate Research

3. Poster/oral presentation at annual honors symposium
4. Approved Honors Thesis
5. 3.0 GPA in all courses taken for the major with the exception of research and/or teaching units

Honors

To graduate with departmental honors, a student must conduct an independent research project typically over the course of at least one year; projects are started no later than Autumn or Winter quarter of the junior year. Research must be done in a Biology Department lab or a lab in another department for which the student has obtained prior approval. Administrative steps include:

1. Submit an approved honors proposal to the department's student services office two quarters prior to graduation. For instance, students graduating Spring Quarter must submit petitions no later than mid-Autumn Quarter.
2. Complete at least 10 units of an approved research project in from the same lab. Only research units from BIO or BIOHOPK are permitted:

BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	1-15
BIOHOPK 199H	Undergraduate Research	1-15

3. Obtain at least a 3.0 (B) grade point average (GPA) in all Biology major requirements taken at Stanford (foundational breadth, core, and elective courses). Grades earned from teaching and research are not computed into this GPA:

BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	1-15
BIO 290 or BIOHOPK 290H	Teaching of Biology Teaching of Biological Science	1-5

Units Further information on the honors program is available in the student services office in Gilbert 108, as well as on the Honors Program and Undergraduate Research in Biology (<http://biology.stanford.edu/research-and-honors>) website.

Hopkins Marine Station

For additional information, see the "Biology, Hopkins Marine Station (p. 346)" section of this bulletin or the Hopkins Marine Station web site (<http://hopkins.stanford.edu>).

Courses offered by the Department of Biology are listed under the subject code BIOHOPK on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOHOPK&filter-catalognumber-BIOHOPK=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>).

Summer Program at Hopkins Marine Station

The summer program is open to advanced undergraduate, graduate students, and postdoctoral students, and to teachers whose biological backgrounds, teaching, or research activities can benefit from a summer's study of marine life. Applications, deadlines, and further information are available at <http://hopkins.stanford.edu>.

Courses

Courses at Hopkins Marine Station can satisfy many requirements, from the Natural Sciences GER to major and minor requirements in departments housed in the Schools of Engineering, Humanities and Sciences, and Earth Sciences. Students are encouraged to check with their department's student services office to see which courses at Hopkins may be used to fulfill major or minor requirements.

Students may go to Hopkins as early as Spring Quarter in the sophomore year, and can also go in the junior and/or senior year to take elective courses. The following Hopkins Marine Station courses may be used toward the Biology degree requirements:

Core

		Units
BIOHOPK 43	Plant Biology, Evolution, and Ecology	5
BIOHOPK 44Y	Core Laboratory in Plant Biology, Ecology and Evolution	5

Electives

		Units
BIOHOPK 160H	Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates	5-8
BIOHOPK 161H	Invertebrate Zoology	5
BIOHOPK 162H	Comparative Animal Physiology	5
BIOHOPK 163H	Oceanic Biology	4
BIOHOPK 165H	The Extreme Life of the Sea	3
BIOHOPK 166H	Molecular Ecology	5
BIOHOPK 167H	Nerve, Muscle, and Synapse	5
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	5
BIOHOPK 173H	Marine Conservation Biology	4
BIOHOPK 174H	Experimental Design and Probability	3
BIOHOPK 177H	Dynamics and Management of Marine Populations	4
BIOHOPK 182H	Stanford at Sea (only 6 units may count towards the major)	16
BIOHOPK 184H	Holistic Biology (only 6 units may count towards the major)	16
BIOHOPK 187H	Sensory Ecology	4
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities	10-12
BIOHOPK 189H	Sustainability and Marine Ecosystems	3
BIOHOPK 264H	POPULATION GENOMICS	1-2
BIOHOPK 274	Hopkins Microbiology Course	9-12
BIOHOPK 275H	Synthesis in Ecology	2

Research and/or Teaching (maximum 6 units combined)

		Units
BIOHOPK 198H	Directed Instruction or Reading	1-15
BIOHOPK 199H	Undergraduate Research	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15
BIOHOPK 300H	Research	1-15

See Biology degree requirements above for further information. Many of the Hopkins Marine Station courses may be used to fulfill department major requirements.

Minor in Biology

Students interested in the minor in Biology must declare the minor and submit their course plan online via Axess no later than two quarters prior to the student's intended quarter of degree conferral. The Biology minor requires a minimum of six courses meeting the following criteria:

1. All courses must be taken for a letter grade.
2. All courses must be worth or approved for 3 or more units.
3. All courses, other than the BIO 41, 42, 43, BIOHOPK 43, OSPASTL 10, 20, or 30 must be at or above the 100-level. Stanford Introductory Seminars may not be used to fulfill the minor requirements.
4. Courses used to fulfill the minor may not be used to fulfill any other department degree requirements (minor or major).
5. Courses must be chosen from the offerings of the Department of Biology or the Hopkins Marine Station, or from the list of approved out-of-department electives (http://biology.stanford.edu/sites/all/files/out_of_dept_electives.pdf).
6. At least one course from the Biology Core must be taken:
- 7.

		Units
BIO 41	Genetics, Biochemistry, and Molecular Biology	5

BIO 42	Cell Biology and Animal Physiology	5
BIO 43	Plant Biology, Evolution, and Ecology	5
or BIOHOPK 43	Plant Biology, Evolution, and Ecology	
8.	The Biology Core Laboratory courses do not count towards the minor:	
9.		Units
BIO 44X	Core Molecular Biology Laboratory	5
BIO/BIOHOPK 44Y	Core Plant Biology & Eco Evo Laboratory	5
10.	Elective credit for research is limited to a maximum of 3 units.	
11.		Units
BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIOHOPK 199H	Undergraduate Research	1-15
	Not allowable is:	
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	

Master of Science in Biology

For information on the University's basic requirements for the M.S. degree, see the "Graduate Degrees (p. 44)" section of this bulletin. Students considering this degree option should meet with staff in the student services office prior to applying.

The M.S. degree program offers general or specialized study to individuals seeking biologically oriented course work and to undergraduate science majors wishing to increase or update their science background or obtain advanced research experience. Students who have majored in related fields are eligible to apply, but course work equivalent to the preparation of a Stanford B.S. in Biology may be required in addition to the general requirements. This includes course work in biology, chemistry, physics and mathematics. The M.S. program does not have an M.S. with thesis option.

Admissions

The department only accepts M.S. program applications from matriculated Stanford students:

1. undergraduates wishing to pursue a coterminal M.S. degree.
2. graduate students from other Stanford programs wishing to pursue an M.S. degree.
3. current Biology Ph.D. students wishing to discontinue the Ph.D. program with an M.S. degree.

Undergraduates must apply in mid-January to start the program in Spring, Autumn, or the following Winter quarter. Graduate students may apply by the third week of any academic quarter.

Required application materials

1. Application for Admission, Preliminary Program Proposal, and Course Transfer Form (<https://biology.stanford.edu/coterm-admissions>)
2. A statement of purpose which explains why the student wishes to enter the program and what the student plans to accomplish while in the program. The statement should also supply information about the student's science capabilities if his or her undergraduate academic record does not accurately reflect them.
3. Unofficial Stanford transcript.
4. Two letters of recommendation, preferably from Biology faculty members in this department. If two such letters are not available, letters from faculty familiar with the student's ability to succeed in a graduate science curriculum are acceptable.
5. Application fee: an application fee is charged to all students regardless of outcome; application fee is applied directly to students' accounts.

General Requirements

The M.S. program consists of Department of Biology and/or Hopkins Marine Station course work, approved out-of-department electives, and foundational breadth courses totaling at least 45 units at or above the 100-level, distributed as follows:

1. A minimum of 23 of the 45 units must be courses designated primarily for graduate students (generally 200-level or higher, but not always).
2. A minimum of 36 units must be chosen from the offerings in the Department of Biology (BIO) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIO&filter-catalognumber-BIO=on>), Hopkins Marine Station (BIOHOPK) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&page=0&catalog=&q=bihopk&collapse=>), the list of approved out-of-department electives (http://biology.stanford.edu/sites/all/files/out_of_dept_electives.pdf), research, teaching and/or foundational breadth courses.

		Units
BIO 198	Directed Reading in Biology	1-15
BIO 198X	Out-of-Department Directed Reading	1-15
BIO 290	Teaching of Biology	1-5
BIO 291	Development and Teaching of Core Experimental Laboratories	1-2
BIO 300	Graduate Research	1-10
BIO 300X	Out-of-Department Graduate Research	1-10
BIOHOPK 198H	Directed Instruction or Reading	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15
BIOHOPK 300H	Research	1-15

- a. a maximum of 18 units may be a combination of Biology research, directed reading and/or teaching;
 - b. a maximum of 9 units may be foundational breadth courses in chemistry, mathematics, statistics, computer science, and/or physics beyond the level required for the undergraduate degree in Biology and at least at the 100-level.
3. No more than 9 units may be other Stanford course work relevant to a student's professional development. Students are required to petition for courses that fall into this category using the General Petition form (http://biology.stanford.edu/sites/all/files/general_petition.pdf).

Each candidate designs a coherent program of study in consultation with her or his department adviser. Although there are no specific courses required, program proposals must adhere to department parameters.

In addition to the unit requirements outlined above, students must adhere to the following:

1. A program proposal, signed by the student's adviser and approved by the chair of the M.S. committee, must be filed by the third week of the first quarter of enrollment. A revised program proposal is required to be filed whenever there are changes to a student's previously approved program proposal.
2. Students may take only 6 units CR/NC.
3. Students must maintain a GPA of 3.0 or higher.
4. Students must receive a grade of 'B-' or better in all courses taken for the degree.

Students not meeting these minimum requirements are subject to departmental academic review and/or dismissal.

The department's Master of Science Handbook (http://biology.stanford.edu/sites/all/files/MS_Handbook.pdf) has additional information about the program, University policy and the department.

Doctor of Philosophy in Biology

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees (p. 43)" section of this bulletin. The training for a Ph.D. in Biology is focused on learning skills required for being a successful research scientist and teacher, including how to ask important questions and then devise and carry out experiments to answer these questions. Students work closely with an established adviser and meet regularly with a committee of faculty members to ensure that they understand the importance of diverse perspectives on experimental questions and approaches. Students learn how to evaluate critically pertinent original literature in order to stay abreast of scientific progress in their areas of interest. They also learn how to make professional presentations, write manuscripts for publication, and become effective teachers.

Admissions

Students seeking entrance to graduate study in Biology ordinarily should have the equivalent of an undergraduate major in Biology at Stanford. However, students from other disciplines, particularly the physical sciences, are also encouraged to apply. Such students are advised at the time of initial registration on how they should complete background training during the first year of graduate study. In addition to the usual basic undergraduate courses in biology, it is recommended that preparation for graduate work include courses in chemistry through organic chemistry, general physics, and mathematics through calculus.

Application, Admission, and Financial Aid

Prospective graduate students must apply via Stanford's online graduate application (<http://gradadmissions.stanford.edu>).

The department's program is divided into three separate areas of concentration:

- ecology/evolution/population studies
- integrative/organismal
- molecular/cellular/developmental/genetic/plant

Included in these concentrations is the option to conduct research at Hopkins Marine Station. These concentrations are recorded in the department as part of the admissions process and for tracking degree progress for admitted students; they do not appear on official university records.

Applicants are required to take the Graduate Record Examination (GRE) general test. The GRE subject test is not required. Applicants should plan on taking the GRE at least one month prior to the application deadline to ensure that official scores are available when applications are evaluated.

Admission to the Ph.D. program is competitive and in recent years it has been possible to offer admission to approximately 10 percent of the applicants.

Applicants who are eligible should apply for nationally competitive predoctoral fellowships, especially those offered by the National Science Foundation.

Admitted students are typically offered financial support in the form of Stanford Graduate Fellowships, research assistantships, NIH traineeships or biology fellowships.

General Requirements

All students must be enrolled in exactly 10 units during autumn, winter, spring and summer quarters until reaching Terminal Graduate Registration (TGR) status and are required to pass all courses in which they are enrolled.

Students must earn a grade of 'B-' or better in all courses applicable to the degree that are taken for a letter grade. Satisfactory completion of each year's general and track specific requirements listed below is required for satisfactory progress towards the degree. Students not making satisfactory degree progress are subject to departmental academic review and/or dismissal.

1. First year advising

Each entering student meets with the first-year advising committee within the first two weeks of Autumn Quarter, Winter Quarter and May 15 of Spring Quarter. The committee reviews the student's previous academic work and current goals and advises the student on a program of Stanford courses, some of which may be required and others recommended. Completion of the core curriculum listed below under "Track Specific Requirements" is required of all students.

2. Ethics

Students must take a course on the ethical conduct of research. This course should be taken in the first year of the program.

		Units
BIO 312	Ethical Issues in Ecology and Evolutionary Biology	1
MED 255	The Responsible Conduct of Research	1

4. Teaching

Teaching experience and training are part of the graduate curriculum.

Each student assists in teaching one course in

a. the department's core lecture or lab series

		Units
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
BIO 42	Cell Biology and Animal Physiology	5
BIO/BIOHOPK 43	Plant Biology, Evolution, and Ecology	5
BIO 44X	Core Molecular Biology Laboratory	5
BIO/BIOHOPK 44Y	Core Plant Biology & Eco Evo Laboratory	5

c. and a second course that can be either a core course or other Biology or Hopkins Marine Station course.

5. Seminars

Graduate seminars devoted to current literature and research in particular fields of biology are an important means of attaining professional perspective and competence. Seminars are presented under individual course listings or are announced by the various research groups. Topics of current biological interest are presented by speakers from Stanford and other institutions. During the first year of study, graduate students are required to attend seminars and make one formal seminar presentation which must be evaluated by a minimum of two Biology faculty members.

6. Fellowship application

All eligible first and second year students must apply for a National Science Foundation (NSF) Graduate Research Fellowship.

7. Adviser/lab selection

By April 1, each first-year student is required to have selected a lab in which to perform dissertation research and to have been accepted by the faculty member in charge.

8. Qualifying exam and admission to candidacy

During the second year, students are required to write a dissertation proposal which is evaluated by a committee of faculty (the dissertation proposal committee) in an oral presentation. Track-specific deadlines are listed below. All students must be admitted to candidacy by the end of their second year. This is contingent upon satisfactory completion of course work, all first and second year requirements, the dissertation proposal and the University's requirements for candidacy outlined in the Candidacy (p. 45) section of this bulletin. If a student does not meet the requirements for admission to candidacy by the end of the second year, the student is subject to dismissal from the Ph.D. program.

9. Committee meetings

Students must meet regularly with their advising committees. For more details, see the Biology PhD Handbook (https://biology.stanford.edu/sites/all/files/PhD_Handbook_1415.pdf).

10. Individual Development Plan meetings

Students must meet once a year with their adviser. For more details, see the Biology PhD Handbook (https://biology.stanford.edu/sites/all/files/PhD_Handbook_1415.pdf).

11. Publishable manuscript

Each student must complete one publishable manuscript (paper) for which s/he is the major contributor.

12. Residency requirement

A minimum of 135 units of graduate registration is required of each candidate at the time of graduation.

13. Doctoral dissertation

A substantial draft of the dissertation must be submitted to the student's oral examination committee at least one month before the oral exam is scheduled to take place. The dissertation must be presented to an oral examination committee (p. 45) comprised of at least five faculty members. In addition, the final written dissertation must be approved by the student's reading committee (p. 45) (a minimum of three approved faculty), and submitted to the Registrar's Office. Upon completion of this final requirement, a student is eligible for conferral of the degree.

Track Specific Requirements

In addition to the general requirements listed above, students must also complete requirements within their concentration. Written petitions for exemptions to core curriculum and lab rotation requirements are considered by the advising committee and the chair of the graduate studies committee. Approval is contingent upon special circumstances and is not routinely granted.

Molecular, Cellular, Developmental, Genetic, and Plant

¹ Up to two of these courses may be "mini courses" in the Biosciences (BIOS).

1. Courses: Students are required to take the following courses prior to Spring Quarter of the 4th year, except for the required first year courses as noted:

		Units
BIOS 200	Foundations in Experimental Biology (must be taken Autumn quarter of the first year)	6

BIO 301	Frontiers in Biology (satisfies first-year seminar requirement; must be taken Autumn and Winter quarters of first year)	1-3
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One additional course in each of the four scientific areas decided upon by the student and the advising committee ¹

1. Cell Biology
2. Biology of Molecules
3. Genetics/Genomics
4. Quantitative Methods

2. Lab Rotations: First-year students are required to complete rotations in at least two different laboratories for a total of 20 weeks during autumn and winter quarters. At least one rotation must be in a lab in the Department of Biology.
3. Two-part qualifying exam: Each student must pass the exam in their second year.
 - a. *Dissertation proposal*: During Autumn Quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature; deadline is November 1.
 - b. *Oral examination*: Held after submission of the written proposal to the dissertation proposal committee. It is an evaluation of the student's ability to summarize the field of study, generate a working hypothesis, develop a degree plan that could be completed in 3-4 years, understand the logic of experimental design, develop a decision tree based on (all) possible results of experiments and draw conclusions and adapt hypotheses depending on results. Deadline is November 15.

Integrative/Organismal

1. Courses: Students are required to take the following courses in their first year:

2.		Units
BIO 301	Frontiers in Biology	1-3

Students specializing in integrative/organismal biology may be required to take additional courses as advised by committee.

3. First-year paper: Students must submit a paper that is evaluated by a minimum of two Academic Council faculty members by May 15. This paper should be a step toward the development of a dissertation proposal and may consist of an analysis of new data or a literature review and synthesis.
4. Two-part qualifying exam: Each student must pass the exam in their second year.
 - a. *Dissertation proposal*: During Spring Quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature; deadline is May 15.
 - b. *Oral examination*: Held after submission of the written proposal to the dissertation proposal committee. It is an evaluation of the student's ability to summarize the field of study, generate a working hypothesis, develop a degree plan that could be completed in 3-4 years, understand the logic of experimental design, develop a decision tree based on (all) possible results of experiments and draw conclusions and adapt hypotheses depending on results. Deadline is June 15.

Ecology, Evolution, and Population Studies

1. Courses: Students are required to take the following courses in their first year:

BIO 302	Current Topics and Concepts in Population Biology, Ecology, and Evolution	1
BIO 303	Current Topics and Concepts in Population Biology, Ecology, and Evolution	1
BIO 304	Current Topics and Concepts in Population Biology, Ecology, and Evolution	1

Students specializing in ecology and evolution may be required to take additional courses as advised by committee.

2. First-year paper: The paper should be read, commented upon and agreed to as satisfactory by two EcoEvo faculty by May 15. This can be satisfied in a number of ways which all involve new writing, undertaken since entering the Stanford program. These may include:
 - a. A new draft research manuscript (a previously published paper is not acceptable).
 - b. Some other piece of new writing, such as a review paper from a course, or an initial literature review of a potential thesis topic. In this case the paper should ordinarily be not less than 10 double-spaced pages in usual sized font, and not more than 10 single spaced pages, plus references. It should be written in the style of a standard scientific paper.
3. Two-part qualifying exam: Each student must pass the exam in their second year.
 - a. *Dissertation proposal*: During Spring Quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature; deadline is May 15.
 - b. *Oral examination*: Held after submission of the written proposal to the dissertation proposal committee. The student should prepare a presentation of the goals of the thesis, typically including preliminary data, models, etc. as appropriate which are relevant to at least the first goal, and should be prepared thereafter to discuss questions raised by the committee in professional scientific depth. Deadline is June 15.

Emeriti Professors: Bruce S. Baker, Winslow R. Briggs, Allan M. Campbell, David Epel, Donald Kennedy, Harold A. Mooney, Peter Ray, Joan Roughgarden, Robert Schimke, George N. Somero, Ward B. Watt, Norman K. Wessells, Dow O. Woodward, Charles Yanofsky

Emeritus Professor (Research): R. Paul Levine

Emeritus Professor (Teaching): Carol L. Boggs

Chair: Tim P. Stearns

Professors: Barbara A. Block, Steven M. Block, Larry B. Crowder, Martha S. Cyert, Gretchen C. Daily (on leave), Giulio De Leo, Mark W. Denny, Rodolfo Dirzo, Paul R. Ehrlich (on leave spring), Marcus W. Feldman, Russell D. Fernald (on leave spring), Christopher B. Field, Wolf Frommer, Judith Frydman, William F. Gilly, Deborah M. Gordon, Elizabeth A. Hadly, Philip C. Hanawalt, H. Craig Heller, Patricia P. Jones, Richard G. Klein, Ron R. Kopito, Sharon R. Long, Liqun Luo, Susan K. McConnell, Fiorenza Micheli, W. James Nelson, Stephen R. Palumbi, Dmitri Petrov, Jonathan Pritchard, Noah A. Rosenberg, Robert M. Sapolsky (on leave autumn), Carla J. Shatz, Kang Shen (on leave winter-spring), Michael A. Simon, Robert D. Simoni (on leave winter-spring), Tim P. Stearns, Stuart H. Thompson, Shripad Tuljapurkar, Peter Vitousek, Virginia Walbot (on leave)

Associate Professors: Dominique Bergmann, Or Gozani, Christopher Lowe, Mary Beth Mudgett (on leave), Mark J. Schnitzer

Assistant Professors: Xiaoke Chen, Scott J. Dixon, Jessica L. Feldman, Hunter B. Fraser (on leave, autumn-winter), Tadashi Fukami, Jeremy A. Goldbogen, Erin Mordecai, Ashby Morrison (on leave), Kabir Peay, M. Kristy Red-Horse, Jan M. Skotheim

Courtesy Professors: Joseph Berry, Carlos D. Bustamante, Daniel Fisher, Arthur R. Grossman, Joseph S. Lipsick, Terry Root, Matthew P. Scott, Alfred Spormann, Irving Weissman, Wing Wong

Courtesy Associate Professors: Kathryn Barton, David Ehrhardt, Sue Rhee, Zhiyong Wang

Courtesy Assistant Professors: José R. Dinneny, Martin Jonikas, Jonathan Payne, Paula V. Welander

Lecturers: Daria Hekmat-Scafe, Jamie Imam, Waheeda Khalfan, Shyamala D. Malladi, Patricia Seawell, Andrew Todhunter, James Watanabe

Consulting Professors: Cathy Laurie, Marc Tessier-Lavigne

Librarian: Michael Newman

Overseas Studies Courses in Biology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPMADRD 73	The Neuroscience of Language Learning	3
OSPSANTG 85	Marine Ecology of Chile and the South Pacific	5

Biophysics

Courses offered by the Biophysics Program are listed under the subject code BIOPHYS (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOPHYS&filter-catalognumber-BIOPHYS=on>) on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOPHYS&filter-catalognumber-BIOPHYS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOPHYS&filter-catalognumber-BIOPHYS=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOPHYS&filter-catalognumber-BIOPHYS=on>).

The Biophysics Program offers instruction and research opportunities leading to the Ph.D. in Biophysics. Students admitted to the program may perform their graduate research in any appropriate department.

The Stanford Biophysics Program is an interdisciplinary, interdepartmental training program leading to the Ph.D. Degree in biophysics. The program centers on understanding biological function in terms of physical and chemical principles. The Program comprises faculty from 16 departments in the Schools of Humanities and Sciences, Medicine, Engineering, and the Stanford Synchrotron Radiation Laboratory. Research in the Program involves two overlapping branches of biophysics: the application of physical and chemical principles and methods to solving biological problems, and the development of new methods.

The Biophysics Program aims to train students in quantitative approaches to biological problems, while also developing their perspective in choosing forefront biological problems. A balanced academic program is tailored to the diverse backgrounds of the students. The program requires graduate-level coursework in physical and biological sciences, participation in seminar series, and most importantly achievement of a high level of proficiency in independent research.

Learning Outcomes (Graduate)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Biophysics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Biophysics and to interpret and present the results of such research.

Graduate Program in Biophysics

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

A small number of qualified applicants are admitted to the program each year. Applicants should present strong undergraduate backgrounds in the physical sciences and mathematics. The graduate course program, beyond the stated requirements, is worked out for each student individually with the help of appropriate advisers from the Committee on Biophysics. The requirements and recommendations for the Ph.D. degree include:

		Units
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 171	Physical Chemistry I	3
CHEM 173	Physical Chemistry II	3
CHEM 175	Physical Chemistry III	3
BIOC 200	Applied Biochemistry	2

		Units
BIOPHYS 241	Biological Macromolecules	3-5
or BIOE 300A	Molecular and Cellular Bioengineering	
BIOPHYS 242	Methods in Molecular Biophysics	3
BIOPHYS 250	Seminar in Biophysics	1
MED 255	The Responsible Conduct of Research	1

At least four additional graduate level courses in physical or biological science, with at least one in physical science and one as a literature-based biological science course

1. Training in a major with connections to biophysics such as physics, chemistry, or biology, with a quantitative background equivalent to that of an undergraduate physics or chemistry major at Stanford.
2. Completion of the following background courses or their equivalents at other institutions:
3. Completion of the following courses or their equivalents:
4. Opportunities for teaching are available during the first nine quarters, at the discretion of the advising committee.
5. The student must prepare a dissertation proposal defining the research to be undertaken, including methods of procedure. This proposal should be submitted by Autumn Quarter of the second year, and it must be approved by a committee of at least three members, including the principal research adviser and at least one member from the Biophysics Program. The candidate must defend the dissertation proposal in an

oral examination. The dissertation reading committee normally evolves from the dissertation proposal review committee.

- The student must present a Ph.D. dissertation as the result of independent investigation that expresses a contribution to knowledge in the field of biophysics.
- The student must pass the University oral exam, taken only after the student has substantially completed the dissertation research. The examination is preceded by a public seminar in which the research is presented by the candidate.

Emeritus: Harden M. McConnell (Chemistry)

Director: Vijay Pande (Chemistry)

Professors: Russ Altman (Genetics, Medical Informatics), Steve Block (Applied Physics, Biology), Steven Boxer (Chemistry), Axel Brunger (Molecular and Cellular Physiology), Gilbert Chu (Oncology), Mark Davis (Microbiology and Immunology), Sebastian Doniach (Physics, Applied Physics), James Ferrell (Chemical and Systems Biology), Daniel Fisher (Applied Physics), Judith Frydman (Biology), K. Christopher Garcia (Molecular and Cellular Physiology, Structural Biology), Gary Glover (Radiology), Philip C. Hanawalt (Biology), Daniel Herschlag (Biochemistry), Keith O. Hodgson (Chemistry), Theodore Jardetzky (Structural Biology), Chaitan Khosla (Chemical Engineering, Chemistry), Peter S. Kim (Biochemistry), Brian Kobilka (Molecular and Cellular Physiology), Eric Kool (Chemistry), Ron Kopito (Biology), Roger D. Kornberg (Structural Biology), Craig Levin (Radiology), Michael Levitt (Structural Biology), Richard Lewis (Molecular and Cellular Physiology), Sharon Long (Biology), Tobias Meyer (Chemical and Systems Biology), W. E. Moerner (Chemistry), Vijay Pande (Chemistry), Norbert Pelc (Bioengineering, Radiology), Joseph D. Puglisi (Structural Biology), Stephen Quake (Bioengineering), Stephen J. Smith (Molecular and Cellular Physiology), Edward I. Solomon (Chemistry), James A. Spudich (Biochemistry, Developmental Biology), Julie Theriot (Biochemistry), William I. Weis (Structural Biology, Molecular and Cellular Physiology), Richard N. Zare (Chemistry)

Associate Professors: Annelise Barron (Bioengineering), Jennifer Cochran (Bioengineering), Miriam Goodman (Molecular and Cellular Physiology), Pehr Harbury (Biochemistry), Merritt Maduke (Molecular and Cellular Physiology), Jianghong Rao (Radiology), Mark Schnitzer (Biology, Applied Physics), Andrew Spakowitz (Chemical Engineering)

Assistant Professors: Zev Bryant (Bioengineering), Lynette Cegelski (Chemistry), Bianxiao Cui (Chemistry), Rhiju Das (Biochemistry), Adam de la Zerda (Structural Biology), Alexander Dunn (Chemical Engineering), William Greenleaf (Genetics), KC Huang (Bioengineering), Manu Prakash (Bioengineering), Ingmar Riedel-Kruse (Bioengineering), Jan Skotheim (Biology), Mary Teruel (Chemical and Systems Biology).

Chemistry

Courses offered by the Department of Chemistry are listed under the subject code CHEM on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHEM&filter-catalognumber-CHEM=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHEM&filter-catalognumber-CHEM=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHEM&filter-catalognumber-CHEM=on>).

Chemistry is central to many scientific disciplines. It enables developments in biotechnology, nanotechnology, catalysis, human health, materials, and earth and environmental sciences. Developing new probes of biological molecules, modeling protein folding and reactivity, manipulating carbon nanotubes, developing new oxidation and polymerization catalysts, and synthesizing organic molecules to probe ion-channels are all research areas

that are pursued actively in the Chemistry Department. The overarching theme of these pursuits is a focus at the atomic and molecular levels, whether this concerns probing the electronic structure and reactivity of molecules as small as dihydrogen or synthesizing large polymer assemblies. The ability to synthesize new molecules and materials and to modify existing biological structures allows the properties of complex systems to be analyzed and harnessed for scientific and societal benefit.

Undergraduate Program Mission

The mission of the undergraduate program in Chemistry is to provide students with the fundamental concepts of the molecular sciences through a program of coursework and laboratory experiences. Students acquire in-depth knowledge of the principles of chemistry, the methodologies necessary to solve complex problems, and the ability to articulate their ideas effectively to the scientific community. The Chemistry program has a long-standing tradition of encouraging undergraduate majors to become involved in research during the academic year and through a ten-week summer research program. The major is designed to provide students with excellent preparation for further study in graduate or professional schools as well as careers in chemistry.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

- understand the knowledge and master the skills to solve problems in the synthesis, measurement and modeling of chemical systems.
- critically assess and integrate the reasoning process used in chemical science and communicate it effectively in written and spoken form.
- apply the knowledge and skills gained by study of specific chemical systems to understand and predict the chemistry of a broad range of complex systems of scientific and societal interest.
- apply the understanding of synthesis, measurement and modeling to extract new chemical information from experimental data and to propose new chemical investigations.

Chemistry Premedical Recommendations

The department recommends that students interested in a health profession take the following courses for a letter grade:

	Units
Select one of the following:	5-10
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II
CHEM 31X	Chemical Principles Accelerated
CHEM 33	Structure and Reactivity
CHEM 35	Synthetic and Physical Organic Chemistry
CHEM 130	Organic Chemistry Laboratory
CHEM 131	Organic Polyfunctional Compounds
CHEM 135 or CHEM 171	Physical Chemical Principles / Physical Chemistry I
CHEM 181	Biochemistry I

Historically, these courses have fulfilled the chemistry requirements at most medical schools. For information on medical school advising and resources, download the Undergraduate Advising and Research

publication (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_planning_school_GraduateSchool.html#5).

Graduate Program

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Chemistry and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in the field of chemistry. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of chemistry and to interpret and present the results of such research.

Fellowships and Scholarships

In addition to school fellowships and scholarships open to properly qualified students, there are several department fellowships in chemistry. Undergraduate scholarships are administered through the Financial Aid Office. Teaching assistantships and research assistantships are open to graduate students. Graduate fellowships, scholarships, and teaching assistantships are administered through the Department of Chemistry.

Teaching Credentials

The requirements for certification to teach chemistry in the secondary schools of California may be ascertained by consulting the section on credentials under the "School of Education (p. 151)" section of this bulletin and the Credential Administrator of the School of Education.

Chemical Physics

Students with an exceptionally strong background in physics and mathematics may, with special arrangement, pursue a program of studies in chemical physics.

Bachelor of Science in Chemistry

Entrance Preparation

Entrance credit in the preparatory subjects of chemistry, physics, and especially mathematics provides flexibility in creating a four-year schedule for students intending to major in Chemistry.

Degree Requirements

Additional information on the undergraduate program, including suggested course schedules, can be found on the Department of Chemistry web site beginning with the section on Requirements for the B.S. Degree (<http://chemistry.stanford.edu/undergradprograms/requirements-bs-degree>). All degree courses must be taken for a letter grade.

Lab Courses

Lab courses have a mandatory, non-refundable fee. Students who have not yet taken a lab course must purchase a department-approved lab coat and safety glasses. The department makes these available for purchase at the lowest possible price during the first few days of each quarter.

Chemistry Option

Requirements for students choosing the Chemistry Option:

	Units
Select one of the following:	5-10
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II
CHEM 31X	Chemical Principles Accelerated
Required Chemistry Courses	
CHEM 33	Structure and Reactivity 5
CHEM 35	Synthetic and Physical Organic Chemistry 5
CHEM 130	Organic Chemistry Laboratory 3
CHEM 131	Organic Polyfunctional Compounds 3
CHEM 132	Synthesis Laboratory 3
CHEM 134	Analytical Chemistry Laboratory 5
CHEM 151	Inorganic Chemistry I 3
CHEM 153	Inorganic Chemistry II 3
CHEM 171	Physical Chemistry I 3
CHEM 173	Physical Chemistry II 3
CHEM 174	Electrochemical Measurements Lab 3
CHEM 175	Physical Chemistry III 3
CHEM 176	Physical Chemistry Laboratory 3
Mathematics or CME	
MATH 41	Calculus
MATH 42	Calculus
Select one of the following series:	
Series A	11-15
MATH 51	Linear Algebra and Differential Calculus of Several Variables
MATH 51M	Introduction to MATLAB for Multivariable Mathematics
or CME 192	Introduction to MATLAB
or CS 106A	Programming Methodology
MATH 53	Ordinary Differential Equations with Linear Algebra
Series B	15
CME 100	Vector Calculus for Engineers
CME 102	Ordinary Differential Equations for Engineers
CME 104	Linear Algebra and Partial Differential Equations for Engineers
Physics Required Courses	
PHYSICS 41	Mechanics 4
PHYSICS 42	Classical Mechanics Laboratory 1
PHYSICS 43	Electricity and Magnetism 4
PHYSICS 44	Electricity and Magnetism Lab 1
Total Units	86-95

Biological Chemistry Option

Requirements for students choosing the Biological Chemistry Option.

	Units
Select one of the following:	5-10

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	
CHEM 31X	Chemical Principles Accelerated	

Required Chemistry and Biology courses

CHEM 33	Structure and Reactivity	5
CHEM 35	Synthetic and Physical Organic Chemistry	5
CHEM 130	Organic Chemistry Laboratory	3
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 132	Synthesis Laboratory	3
CHEM 134	Analytical Chemistry Laboratory	5
CHEM 151	Inorganic Chemistry I	3
CHEM 171	Physical Chemistry I	3
CHEM 173	Physical Chemistry II	3
CHEM 176	Physical Chemistry Laboratory	3
CHEM 181	Biochemistry I	3
CHEM 183	Biochemistry II	3
CHEM 184	Biological Chemistry Laboratory	4
CHEM 185	Biochemistry III	3
BIO 42	Cell Biology and Animal Physiology	5

Mathematics or CME

MATH 41	Calculus	
MATH 42	Calculus	

Select one of the following Series:

Series A 11-15

MATH 51	Linear Algebra and Differential Calculus of Several Variables	
MATH 51M	Introduction to MATLAB for Multivariable Mathematics	
or CME 192	Introduction to MATLAB	
or CS 106A	Programming Methodology	
MATH 53	Ordinary Differential Equations with Linear Algebra	

Series B 15

CME 100	Vector Calculus for Engineers	
CME 102	Ordinary Differential Equations for Engineers	
CME 104	Linear Algebra and Partial Differential Equations for Engineers	

Required Physics Courses

PHYSICS 41	Mechanics	4
PHYSICS 42	Classical Mechanics Laboratory	1
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 44	Electricity and Magnetism Lab	1

Elective 3-4

Select one graduate-level elective course related to your biochemical interests.

CHEM 221	Advanced Organic Chemistry	
CHEM 223	Advanced Organic Chemistry	
CHEM 225	Advanced Organic Chemistry	
CHEM 227	Synthesis and Analysis at the Chemistry-Biology Interface ^{strongly recommended}	
CHEM 235	Applications of NMR Spectroscopy	
CHEM 255	Advanced Inorganic Chemistry	
CHEM 271	Advanced Physical Chemistry	
CHEM 277	Materials Chemistry and Physics ^{not offered 2014-15}	
CHEM 297	Bio-Inorganic Chemistry	
BIOC 241	Biological Macromolecules	
BIOPHYS 232	Advanced Imaging Lab in Biophysics	

BIOE 214	Representations and Algorithms for Computational Molecular Biology	
BIOE 300A	Molecular and Cellular Bioengineering	
BIOE 224	Probes and Applications for Multi-modality Molecular Imaging of Living Subjects	
BIOE 331	Protein Engineering	
BIOE 335	Molecular Motors I	
BIO 214	Advanced Cell Biology	
BIO 230	Molecular and Cellular Immunology	
BIO 232	Advanced Imaging Lab in Biophysics	
CSB 220	Chemistry of Biological Processes	
CSB 260	Concepts and Applications in Chemical Biology	

Total Units 98-108For further information on the undergraduate program, see the Department of Chemistry (<http://chemistry.stanford.edu/undergraduate-programs>) web site.

Chemistry Major Schedule

Below are possible schedules for the traditional concentration and the biological chemistry concentration, each followed by an accelerated schedule.

Traditional Schedule

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles I (CHEM 31A)		5	
Calculus (MATH 41)	5		
Chemical Principles II (CHEM 31B)			5
Calculus (MATH 42)		5	
Structure and Reactivity (CHEM 33)			5
Linear Algebra and Differential Calculus of Several Variables (MATH 51)			5
Year Total:		10	10
		10	10
Second Year	Units		
	Autumn	Winter	Spring
Synthetic and Physical Organic Chemistry (CHEM 35)	5		
Introduction to MATLAB for Multivariable Mathematics (MATH 51M)	1		
Ordinary Differential Equations with Linear Algebra (MATH 53)		5	
Organic Chemistry Laboratory (CHEM 130)			3
Organic Polyfunctional Compounds (CHEM 131)			3
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			3
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1
Year Total:		11	11
		11	13
Third Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)	3		
Electrochemical Measurements Lab (CHEM 174)	3		
Synthesis Laboratory (CHEM 132)			3
Inorganic Chemistry I (CHEM 151)			3
Year Total:		6	6
		6	6
Fourth Year	Units		
	Autumn	Winter	Spring
Physical Chemistry III (CHEM 175)			3
Physical Chemistry Laboratory (CHEM 176)			3
Inorganic Chemistry II (CHEM 153)			3

Year Total:	6	3	
Total Units in Sequence:	86		

Accelerated Schedule for the Traditional Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles Accelerated (CHEM 31X)		5	
Linear Algebra and Differential Calculus of Several Variables (MATH 51)		5	
Introduction to MATLAB for Multivariable Mathematics (MATH 51M)		1	
Structure and Reactivity (CHEM 33)		5	
Mechanics (PHYSICS 41)		4	
Classical Mechanics Laboratory (PHYSICS 42)		1	
Synthetic and Physical Organic Chemistry (CHEM 35)			5
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1
Year Total:	11	10	10

Second Year	Units		
	Autumn	Winter	Spring
Organic Chemistry Laboratory (CHEM 130)	3		
Organic Polyfunctional Compounds (CHEM 131)	3		
Synthesis Laboratory (CHEM 132)			3
Inorganic Chemistry I (CHEM 151)			3
Ordinary Differential Equations with Linear Algebra (MATH 53)			5
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			3
Year Total:	6	11	8

Third Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)	3		
Electrochemical Measurements Lab (CHEM 174)	3		
Physical Chemistry III (CHEM 175)			3
Physical Chemistry Laboratory (CHEM 176)			3
Inorganic Chemistry II (CHEM 153)			3
Year Total:	6	6	3

Total Units in Sequence: 71

Biological Chemistry Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles I (CHEM 31A)		5	
Calculus (MATH 41)		5	
Chemical Principles II (CHEM 31B)			5
Calculus (MATH 42)			5
Structure and Reactivity (CHEM 33)			5
Linear Algebra and Differential Calculus of Several Variables (MATH 51)			5
Year Total:	10	10	10

Second Year	Units		
	Autumn	Winter	Spring
Synthetic and Physical Organic Chemistry (CHEM 35)	5		
Introduction to MATLAB for Multivariable Mathematics (MATH 51M)	1		
Ordinary Differential Equations with Linear Algebra (MATH 53)	5		
Organic Chemistry Laboratory (CHEM 130)			3
Organic Polyfunctional Compounds (CHEM 131)			3
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			3
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1

Year Total:	11	11	13
Third Year	Units		
	Autumn	Winter	Spring

Physical Chemistry II (CHEM 173)	3		
Biochemistry I (CHEM 181)	3		
Inorganic Chemistry I (CHEM 151)			3
Biochemistry II (CHEM 183)			3
Cell Biology and Animal Physiology (BIO 42)			5
Year Total:	6	11	

Fourth Year	Units		
	Autumn	Winter	Spring
Synthesis Laboratory (CHEM 132)			3
Physical Chemistry Laboratory (CHEM 176)			3
Biological Chemistry Laboratory (CHEM 184)			4
Biochemistry III (CHEM 185)			3
Synthesis and Analysis at the Chemistry-Biology Interface (CHEM 227)			3
Year Total:		6	10
Total Units in Sequence:	98		

Accelerated Schedule for the Biological Chemistry Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles Accelerated (CHEM 31X)		5	
Linear Algebra and Differential Calculus of Several Variables (MATH 51)		5	
Introduction to MATLAB for Multivariable Mathematics (MATH 51M)		1	
Structure and Reactivity (CHEM 33)			5
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Synthetic and Physical Organic Chemistry (CHEM 35)			5
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1
Year Total:		11	10

Second Year	Units		
	Autumn	Winter	Spring
Organic Chemistry Laboratory (CHEM 130)	3		
Organic Polyfunctional Compounds (CHEM 131)	3		
Ordinary Differential Equations with Linear Algebra (MATH 53)	5		
Synthesis Laboratory (CHEM 132)			3
Inorganic Chemistry I (CHEM 151)			3
Cell Biology and Animal Physiology (BIO 42)			5
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			3
Year Total:		11	11

Third Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)	3		
Biochemistry I (CHEM 181)	3		
Physical Chemistry Laboratory (CHEM 176)			3
Biochemistry II (CHEM 183)			3
Biological Chemistry Laboratory (CHEM 184)			4
Biochemistry III (CHEM 185)			3
Synthesis and Analysis at the Chemistry-Biology Interface (CHEM 227)			3
Year Total:	6	6	10

Total Units in Sequence: 83

Related Courses

Courses offered by other departments that may be of interest to Chemistry majors include:

		Units
BIO 41	Genetics, Biochemistry, and Molecular Biology	5
BIO 42	Cell Biology and Animal Physiology	5
BIO 43	Plant Biology, Evolution, and Ecology	5
CHEMENG 20	Introduction to Chemical Engineering	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 130	Separation Processes	3
CS 106A	Programming Methodology (recommended for students planning graduate study)	3-5
CS 106B	Programming Abstractions (recommended for students planning graduate study)	3-5
ENGR 31	Chemical Principles with Application to Nanoscale Science and Technology	4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	4
MATH 106	Functions of a Complex Variable	3
MATH 109	Applied Group Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 131P	Partial Differential Equations I	3
MATSCI 151	Microstructure and Mechanical Properties	4
PHYSICS 110	Advanced Mechanics	4
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5

American Chemical Society (ACS) Certification

Students who wish to be certified as having met the minimum requirements of the American Chemical Society for professional training must complete, in addition to the above requirements:

		Units
CHEM 181	Biochemistry I	3
CHEM 183	Biochemistry II	3
PHYSICS 45	Light and Heat	4
PHYSICS 46	Light and Heat Laboratory	1
CHEM 190	Introduction to Methods of Investigation (6 units)	1-5

Honors Program

A bachelor's degree in Chemistry with honors is available to those students interested in chemical research. Admission to the honors program requires a grade point average (GPA) of 3.3 in science courses and an overall GPA of 3.0 in all University courses. Beyond the standard B.S. course requirements for each track, 9 units of research credit and 9 units of course work need to be completed during the junior and senior academic years. A thesis, approved by the honors adviser, must be completed during the senior year. The theses must be submitted to the honors adviser, at least one week before the end of regular classes in Spring Quarter, and must be completed by May 15 to be considered for the Firestone or Golden award. The use of a single course for multiple requirements for honors, major, minor, or coterminal requirements is not allowed. Students who wish to be admitted to the honors program should register with the student services manager in the Mudd Chemistry Building in Spring Quarter of their junior year.

CHEM 190 Introduction to Methods of Investigation research units towards honors may be completed, after being accepted into the program, in any laboratory within Chemistry or with courtesy faculty in Chemistry. Other chemical research can be approved through a formal petitioning of the Undergraduate Affairs Committee. At least 3 units must be completed

during the senior year. Participation in a summer research program in an academic setting between junior and senior years may be used in lieu of 3 units of CHEM 190 Introduction to Methods of Investigation. For each quarter, a progress report reflecting the units undertaken is required. This report must be signed by the honors adviser, and filed in the department student services office before the last day of finals in the quarter during which the research is performed.

The 9 units of course work for honors must be completed from courses approved by the Undergraduate Affairs Committee and taken for a letter grade. At least six of these units need to be taken from the following CHEM courses:

		Units
CHEM 153	Inorganic Chemistry II	3
CHEM 174	Electrochemical Measurements Lab	3
CHEM 175	Physical Chemistry III	3
CHEM 181	Biochemistry I	3
CHEM 183	Biochemistry II	3
CHEM 185	Biochemistry III	3
CHEM 221	Advanced Organic Chemistry	3
CHEM 223	Advanced Organic Chemistry	3
CHEM 225	Advanced Organic Chemistry	3
CHEM 235	Applications of NMR Spectroscopy	3
CHEM 251	Advanced Inorganic Chemistry	3
CHEM 255	Advanced Inorganic Chemistry	3
CHEM 271	Advanced Physical Chemistry	3
CHEM 273	Advanced Physical Chemistry	3
CHEM 275	Advanced Physical Chemistry	3
CHEM 291	Introduction to Nuclear Magnetic Resonance	3
CHEM 297	Bio-Inorganic Chemistry	3

Minor in Chemistry

Courses required for a minor are:

		Units
CHEM 33	Structure and Reactivity	5
CHEM 35	Synthetic and Physical Organic Chemistry	5
CHEM 130	Organic Chemistry Laboratory	3
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 134	Analytical Chemistry Laboratory	5
CHEM 151	Inorganic Chemistry I	3
CHEM 171	Physical Chemistry I Prerequisite MATH 51 and (Math 51M or CME 192 or CS 106A)	3
Total Units		27

Master of Science in Chemistry

The Master of Science is available only to current Ph.D. students or as part of a coterminal program. Applicants for the M.S. degree in Chemistry are required to complete, in addition to the requirements for the bachelor's degree, a minimum of 45 graduate-level units and a M.S. thesis. Of the 45 units, approximately two-thirds must be in the department and must include at least 12 units of graduate level lecture courses exclusive of the thesis. Courses offered in previous years that may count toward the M.S. include CHEM 285.

		Units
Of the 12 units, at least 6 units must be from:		
CHEM 221	Advanced Organic Chemistry	3
CHEM 223	Advanced Organic Chemistry	3

CHEM 225	Advanced Organic Chemistry	3
CHEM 235	Applications of NMR Spectroscopy	3
CHEM 251	Advanced Inorganic Chemistry	3
CHEM 253	Advanced Inorganic Chemistry	3
CHEM 255	Advanced Inorganic Chemistry	3
CHEM 271	Advanced Physical Chemistry	3
CHEM 273	Advanced Physical Chemistry	3
CHEM 275	Advanced Physical Chemistry	3
CHEM 277	Materials Chemistry and Physics	3
CHEM 280	Single-Molecule Spectroscopy and Imaging	3
CHEM 291	Introduction to Nuclear Magnetic Resonance	3
CHEM 297	Bio-Inorganic Chemistry	3

Doctor of Philosophy in Chemistry

Process to Candidacy

Graduate students are eligible to become formal candidates for the Ph.D. degree after taking the department placement examinations, satisfactory completion of most of the formal lecture course requirements, and satisfactory progress on a dissertation research project. There is no foreign language requirement for the Ph.D. degree. Admission to candidacy for the Ph.D. degree must be done before June of the second year of graduate registration.

Placement Examinations

Each new graduate student must take placement examinations upon entrance. These consist of three written examinations of two hours each in the fields of inorganic, organic, and physical chemistry, and cover such material as ordinarily is given in a rigorous one-year undergraduate course in each of these subjects. Students concentrating in biophysical chemistry or chemical physics must take examinations in biophysical or chemical physics, physical chemistry, and organic or inorganic chemistry. All placement examinations are given the week before instruction begins in Autumn Quarter, and must be taken at that time. Each new graduate student meets with a member of the graduate study committee to define a program of courses based on results of the placement examinations.

General Requirements

After taking the departmental placement examinations, students select a research adviser by interviewing members of the Chemistry faculty. An Application to Start Research form is submitted to the Department as research begins under the supervision of the adviser. All students in good standing are required to start research by the end of February, during Winter Quarter of the first year of graduate registration.

Candidates for the Ph.D. degree are required to participate continually in the department colloquium (CHEM 300 Department Colloquium) and in the division seminar of the major subject (CHEM 229 Organic Chemistry Seminar, CHEM 259 Inorganic Chemistry Seminar, or CHEM 279 Physical Chemistry Seminar).

Candidates for advanced degrees must have a minimum grade point average (GPA) of 3.0 for all Chemistry lecture courses as well as for all courses taken during graduate study. Required courses must be taken for a letter grade. Most course work ends in the second year of studies, and students will then focus on full-time dissertation research.

Students may major in organic, chemical biology, physical, biophysical, chemical physics, or inorganic chemistry. All graduate students are required to take six graduate-level lecture courses (course numbers greater than 199) of at least 3 units each in chemistry or related disciplines (e.g.,

biochemistry, electrical engineering, mathematics, chemical engineering, chemical and systems biology, physics, materials science), to be selected in consultation with their research adviser and the Graduate Study Committee. All six courses must be taken for a letter grade. At least three of the six courses should be taken within the Chemistry Department. A minimum of four courses should be completed by the end of the first year.

Course Requirements

		Units
Students majoring in organic chemistry or chemical biology must complete:		
CHEM 231	Organic Chemistry Seminar Presentation (Autumn, Winter, and Spring of the second year)	1
CHEM 233A	Creativity in Organic Chemistry (Research Progress)	1
CHEM 233B	Creativity in Organic Chemistry (Research Progress)	1
CHEM 233C	Creativity in Organic Chemistry (Research Progress)	1

Students majoring in physical or biophysical chemistry or chemical physics must complete:

CHEM 271	Advanced Physical Chemistry (in the first year)	3
CHEM 273	Advanced Physical Chemistry (in the first year)	3
CHEM 275	Advanced Physical Chemistry (in the first year)	3
CHEM 278A	Research Progress in Physical Chemistry	1
CHEM 278B	Research Progress in Physical Chemistry	1

Students majoring in inorganic chemistry must complete:

CHEM 258A	Research Progress in Inorganic Chemistry	1
CHEM 258B	Research Progress in Inorganic Chemistry (Seminar Presentation)	1
CHEM 258C	Research Progress in Inorganic Chemistry (Research Proposal)	1

Continuous enrollment in CHEM 301 Research in Chemistry is expected after the student has chosen a research supervisor.

Post-Candidacy

Before candidates may request scheduling of the University oral examination, clearance must be obtained from the dissertation adviser and an academic review meeting made with the Student Services Manager for the Department of Chemistry.

During the period in which a dissertation is being read by members of the faculty, candidates must be available for personal consultation until the dissertation has received final department approval.

Ph.D. Minor in Chemistry

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in chemistry must complete, with a GPA of 3.0 or higher, 20 graduate-level units in Chemistry including four lecture courses of at least three units each.

Emeriti: (Professors) Hans C. Andersen, John I. Brauman, James P. Collman, Carl Djerassi, Wray H. Huestis, Harden M. McConnell, Robert Pecora, John Ross

Chair: Keith O. Hodgson

Vice Chair: T. Daniel P. Stack

Professors: Carolyn R. Bertozzi, Steven G. Boxer, Hongjie Dai, Michael D. Fayer, Keith O. Hodgson, Chaitan Khosla, Eric T. Kool, Todd J. Martínez, W. E. Moerner, Vijay S. Pande, Edward I. Solomon, Barry M. Trost, Robert M. Waymouth, Paul A. Wender, Richard N. Zare

Associate Professors: Christopher E. D. Chidsey, Justin Du Bois, T. Daniel P. Stack

Assistant Professors: Noah Z. Burns, Lynette Cegelski, Bianxiao Cui, Matthew Kanan, Hemamala Karunadasa, Thomas E. Markland, Yan Xia

Courtesy Professors: Zhenan Bao, Stacey F. Bent, Karlene A. Cimprich, Curtis W. Frank, Daniel Herschlag

Courtesy Associate Professors: James K. Chen, Yi Cui, Jianghong Rao, Thomas J. Wandless

Lecturers: Charles Cox, Megan McClory, Jennifer Schwartz Poehlmann, Heidi Vollmer-Snarr

Classics

Courses offered by the Department of Classics are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject code CLASSICS (<https://explorecourses.stanford.edu/search?q=CLASSICS&view=catalog&page=0&academicYear=&filter-coursestatus-Active=on&filter-departmentcode-CLASSICS=on&collapse=&filter-catalognumber-CLASSICS=on>).

The study of Classics has traditionally centered on the literature and material culture of ancient Greece and Rome, including Greek and Latin language, literature, philosophy, history, art, and archaeology. At Stanford, Classics also explores connections with other ancient cultures and with the modern world, as well as specialized fields such as ancient economics, law, papyrology, and science. The department's faculty approaches Classics from an interdisciplinary perspective that crosses geographical, temporal, and thematic territories. Studying ancient epic poetry can lead to looking at modern cinema afresh; ancient Athenian politics opens new perspectives on modern politics; and the study of Rome presents parallels with other empires just as Latin illuminates the history of English and the Romance languages. In short, Classics at Stanford is an interdisciplinary subject concerned not only with Greek and Roman civilization but also with the interaction of cultures and societies that influenced the ancient Mediterranean basin and continue to influence human society across the globe.

Mission of the Undergraduate Program in Classics

The mission of the undergraduate program in Classics is to provide students with a broad background centered on the literature and material culture of ancient Greece and Rome, including Greek and Latin language, literature, philosophy, history, art, and archaeology. At Stanford, students in the Classics program also explore the connections between ancient cultures and the modern world as well as specialized fields such as ancient economics, law, papyrology, and science. The program's faculty approaches Classics from an interdisciplinary perspective that crosses geographical, temporal and thematic territories. The program is concerned not only with Greek and Roman civilization but also with the interaction of cultures and societies that influenced the ancient Mediterranean basin and continue to influence human society across the globe.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. The ability to develop effective and nuanced lines of interpretation.
2. Critical thinking skills using primary source materials.

3. Facility with the methodologies and presuppositions underlying interpretive positions in secondary literature and in their own work.
4. Well-developed analytical writing skills and close reading skills.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Classics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Classics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Classics and to interpret and present the results of such research.

Course Numbering

CLASSICS courses are numbered according to level and area of study.

Digit	Area
001-099	Introductory Courses
001-030	Beginning and Intermediate Language and Introductory Seminars
031-050	General Topics
051-075	Art And Archaeology
076-099	Ancient History
100-199	Undergraduate Language, Core, Electives, and Independent Study
100-110	Advanced Language
111-150	General Topics
151-175	Art and Archaeology
176-196	Ancient History
197-199	Independent Study
200-299	Graduate Language Surveys and Electives
200-210	Language
211-250	General Topics
251-275	Art and Archaeology
276-297	Ancient History
298-299	Independent Study
300-399	Graduate Seminars and Dissertation Research
300-310	Workshops
311-350	General Topics
351-375	Art and Archaeology
376-398	Ancient History
399	Independent Study (dissertation research)

Bachelor of Arts in Classics

Those interested in majoring in Classics are encouraged to declare by spring of sophomore year, but are urged to discuss their plans with the undergraduate director as early as possible. Students who choose the Greek and Latin field of study (option 5 below) should begin the curriculum as soon as possible because it is difficult to complete the language requirements without an early start; those with no previous knowledge of Latin or Greek should begin study in the freshman year, in a summer

program following freshman year, or at the beginning of the sophomore year.

To declare the major, a student must fill out the Declaration of Major on Axxess and meet with the Director of Undergraduate Studies in the Department of Classics. At that time, the Director Undergraduate Studies assigns the student a department adviser. To build a mentoring relationship, students should meet with their adviser at least once a quarter. At the time of declaration, the student should also schedule an orientation with the Department of Classics' student services officer. Each student's progress towards fulfillment of the major requirements is recorded in a file kept in the student services officer's office. It is the student's responsibility to work with the adviser and student services officer to keep this file up to date.

A letter grade is required for all courses taken for the major. No course receiving a grade lower than 'C' is counted toward fulfilling major requirements. Enrollment in an independent study section (CLASSICS 198 Directed Readings) requires the prior approval of the Director of Undergraduate Studies, and a maximum of three such enrollments for a maximum total of 10 units may be counted toward the major. University credit earned by placement tests or advanced placement work in secondary school is not counted towards any major requirement in the department. Work done at other universities or colleges is subject to department evaluation and the university's transfer credit process. Counting graduate courses or cognate courses towards the major requires advance approval by the Director of Undergraduate Studies. Students are encouraged to meet with the Director of Undergraduate Studies to discuss options for pursuing a period of study in the Mediterranean region (see Study Abroad below).

The B.A. degree may be earned by fulfilling the requirements for one of the following fields of study. These fields of study are declared on Axxess; they appear on the transcript but not on the diploma. The fields of study are:

- Classical Studies
- Ancient History
- Greek
- Latin
- Greek and Latin

The Philosophy and Literature focus described below may be added to some of the major plans. This focus is not declared on Axxess, and does not appear on the transcript or diploma.

A. Classical Studies

This major is recommended for students who wish to study classical civilizations in depth but do not wish to study the languages to the extent required by the Greek, Latin or Greek and Latin options described below. It is not suitable for students who wish to do graduate work in Classics or to teach Latin or Greek in high school, as the language work is insufficient for these purposes.

	Units
Students must complete at least 60 units of approved courses including:	
+	
CLASSICS 150 Majors Seminar	5
at least two courses in Latin or Greek at the intermediate-level or higher ²	6-20
CLASSICS 11L Intermediate Latin: Introduction to Literature	
CLASSICS 12L Intermediate Latin: Plautus	
CLASSICS 13L Intermediate Latin: Cicero and Catullus	
CLASSICS 101L Advanced Latin	

CLASSICS 102L	Advanced Latin: Livy
CLASSICS 103L	Advanced Latin: Latin Lovers
CLASSICS 11G	Intermediate Greek: Prose
CLASSICS 12G	Intermediate Greek: Herodotus - the father of history?
CLASSICS 13G	Intermediate Greek: Homer
CLASSICS 101G	Advanced Greek: Plato's Phaedrus
CLASSICS 102G	Advanced Greek: Lyric Poetry
CLASSICS 103G	Advanced Greek: Scientific Writing
or one course in one of the languages at the intermediate-level or higher, plus the beginning series of the other language ²	
CLASSICS 1L	Beginning Latin
CLASSICS 2L	Beginning Latin
CLASSICS 3L	Beginning Latin
CLASSICS 1G	Beginning Greek
CLASSICS 2G	Beginning Greek
CLASSICS 3G	Beginning Greek
remaining units from your choice of CLASSICS courses ¹	35-49
Total Units	60

¹ Up to 8 units of THINK 10, THINK 16, THINK 35/THINK 35A (note that this is the same course), IHUM 39A,B, IHUM 69A, the Autumn Quarter of SIMILE, or SLE may be counted toward the major; IHUM courses are no longer offered.

² Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.

+ Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), all language courses (10 or 20 units), ePortfolio (2 units), senior capstone project (5 units), and additional CLASSICS courses for a total minimum of 55 units. See the Joint Major with CS (p. 375) tab for more information.

B. Ancient History:

	Units
Students must complete at least 60 units of approved courses and must satisfy the following requirements: ⁺	
Writing in the Major (WIM)	5
CLASSICS 150 Majors Seminar	5
Core Requirement	6-10
Complete two survey courses in ancient history; some such courses offered this year include:	
CLASSICS 81 Ancient Empires: Near East	
CLASSICS 82 The Egyptians	
CLASSICS 83 The Greeks	
CLASSICS 84 The Romans	
Depth Requirement	33-37
Complete at least 33 units of ancient history and civilization courses, drawn from CLASSICS 31-99 and CLASSICS 110-197. ^{1,2}	
Breadth Requirements	12-15
Complete at least 4 units in each of the following three areas ³	

1. Archaeology and art; suggested courses include CLASSICS 51-75 and CLASSICS 151-175: ⁴ 4

CLASSICS 51	Introduction to the Archaeology of Greece
CLASSICS 54	Introduction to World Architecture
CLASSICS 151	Ten Things: An Archaeology of Design
CLASSICS 153	Ancient Urbanism
CLASSICS 154	Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean
CLASSICS 159	Appropriations of Greek Art
CLASSICS 161	Archaic Greek Art
CLASSICS 162	Empire and Aftermath: Greek Art from the Parthenon to Scopas
CLASSICS 163	Greek Art In and Out of Context
CLASSICS 168	Engineering the Roman Empire
CLASSICS 169	Archaeology of Britannia

2. Comparative ancient civilizations: complete a course on the ancient world outside the Mediterranean and western Asia. Suggested courses include: 4

ANTHRO 3	Introduction to Prehistoric Archeology
ANTHRO 24N	Maya Hieroglyphic Writing
ANTHRO 100B	Lifeways of the Ancient Maya
ANTHRO 101	The Aztecs and Their Ancestors: Introduction to Mesoamerican Archaeology
ANTHRO 102A	Ancient Civilizations: Complexity and Collapse
ANTHRO 105	Ancient Cities in the New World
ANTHRO 106	Incas and their Ancestors: Peruvian Archaeology
ANTHRO 115B	Peoples and Cultures of Ancient Mesoamerica
ANTHRO 124	Maya Mythology and the Popol Vuh
ANTHRO 139A	Forgotten Africa: An Introduction to the Archaeology of Africa
CHINGEN 141	Emergence of Chinese Civilization from Caves to Palaces

3. Historical and social theory. Suggested courses include: 4

ANTHRO 1	Introduction to Cultural and Social Anthropology
ANTHRO 90B	Theory of Cultural and Social Anthropology
ANTHRO 90D	Social Theory in the Anthropological Sciences
SOC 1	Introduction to Sociology at Stanford
SOC 140	Introduction to Social Stratification
SOC 142	Sociology of Gender
SOC 170	Classics of Modern Social Theory
HUMBIO 2B	Culture, Evolution, and Society

Total Units 60

- ¹ 4 units of THINK 10, THINK 16, THINK 35A, IHUM 39A or B, IHUM 69A, or Autumn Quarter of SIMILE may be counted toward this requirement (IHUM courses are no longer offered).
- ² Latin and Ancient Greek courses may also count toward this requirement if approved by the Director of Undergraduate Studies.
- ³ The courses chosen must be approved in advance by the undergraduate director, and are normally chosen from the list of areas noted.

- ⁴ IHUM 40B may be counted toward this requirement (this course is no longer offered).
- + Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), two history core courses (10 units), courses in ancient history and civilization (21 units), ancient history breadth courses (12 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 55 units. See the Joint Major with CS (p. 375) tab for more information.

C. Greek

Units

Students must complete at least 60 units of approved courses including:

CLASSICS 150	Majors Seminar	5
At least 31 units of Ancient Greek courses at the intermediate-level or higher. It is recommended that these include CLASSICS 105A/B, though this series should not be taken until students have completed three years of Greek. ²		

CLASSICS 11G	Intermediate Greek: Prose
CLASSICS 12G	Intermediate Greek: Herodotus - the father of history?
CLASSICS 13G	Intermediate Greek: Homer
CLASSICS 101G	Advanced Greek: Plato's Phaedrus
CLASSICS 102G	Advanced Greek: Lyric Poetry
CLASSICS 103G	Advanced Greek: Scientific Writing

At least three additional CLASSICS courses from CLASSICS 31-99 or 9-15 110-197 ¹

Recommended additional coursework in Latin, Sanskrit, Biblical Greek or ancient history.

CLASSICS 1L	Beginning Latin
CLASSICS 2L	Beginning Latin
CLASSICS 3L	Beginning Latin
CLASSICS 6G	Biblical Greek
CLASSICS 7G	Biblical Greek
SPECLANG 183A	First-Year Sanskrit, First Quarter
SPECLANG 183B	First-Year Sanskrit, Second Quarter
CLASSICS 81	Ancient Empires: Near East
CLASSICS 82	The Egyptians
CLASSICS 83	The Greeks
CLASSICS 84	The Romans

Total Units 60

- ¹ Up to 8 units of THINK 10, THINK 16, THINK 35/THINK 35A (note that this is the same course), IHUM 39A/B, IHUM 69A, the Autumn Quarter of SIMILE, or SLE may be counted toward the major (IHUM courses are no longer offered).
- ² Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.

- + Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), Greek courses at the intermediate-level or higher (31 units), additional CLASSICS courses (12 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 55 units. See the Joint Major with CS (p. 375) tab for more information.

D. Latin

Students must complete at least 60 units of approved courses including:

+	CLASSICS 150	Majors Seminar	5
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At least 31 units of Latin courses at the intermediate-level or higher. 31

It is recommended that this include CLASSICS 104A/B, though this series should not be taken until students have completed three years of Latin.²

CLASSICS	Intermediate Latin: Introduction to Literature	11L
CLASSICS	Intermediate Latin: Plautus	12L
CLASSICS	Intermediate Latin: Cicero and Catullus	13L
CLASSICS	Advanced Latin	101L
CLASSICS	Advanced Latin: Livy	102L
CLASSICS	Advanced Latin: Latin Lovers	103L

At least three additional CLASSICS courses from CLASSICS 31-99 or 9-15 110-197¹

Recommended additional coursework in Ancient Greek, Biblical Greek or ancient history

CLASSICS 1G	Beginning Greek
CLASSICS 2G	Beginning Greek
CLASSICS 3G	Beginning Greek
CLASSICS 6G	Biblical Greek
CLASSICS 7G	Biblical Greek
CLASSICS 81	Ancient Empires: Near East
CLASSICS 82	The Egyptians
CLASSICS 83	The Greeks
CLASSICS 84	The Romans

Total Units: 60

¹ Up to 8 units of THINK 10, THINK 16, THINK 35/THINK 35A (note that this is the same course), IHUM 39A/B, IHUM 69A, the Autumn Quarter of SIMILE, or SLE may be counted toward the major (IHUM courses are no longer offered).

² Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.

- + Students enrolled in the CS+Classics joint major program will need to complete the Major's Seminar (5 units), Latin courses at the intermediate-level and above (31 units), additional CLASSICS courses (12 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 55 units. See the Joint Major with CS (p. 375) tab for more information.

E. Greek and Latin

Units

Students must complete at least 65 units of approved courses including:

+	CLASSICS 150	Majors Seminar	5
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At least 30 units of Latin courses at the intermediate-level and higher. 30
1, 2

OR at least 30 units of Latin at the beginning-level and higher, as long as Greek is at the intermediate-level and higher

CLASSICS 1L	Beginning Latin
CLASSICS 2L	Beginning Latin
CLASSICS 3L	Beginning Latin
CLASSICS 11L	Intermediate Latin: Introduction to Literature
CLASSICS 12L	Intermediate Latin: Plautus
CLASSICS 13L	Intermediate Latin: Cicero and Catullus
CLASSICS 101L	Advanced Latin
CLASSICS 102L	Advanced Latin: Livy
CLASSICS 103L	Advanced Latin: Latin Lovers
CLASSICS 104A	Latin Syntax
CLASSICS 104B	Latin Syntax

At least 30 units of Ancient Greek courses at the intermediate-level or higher.^{1, 2} 30

OR at least 30 units of Greek at the beginning-level and higher, as long as Latin is at the intermediate-level and higher

CLASSICS 1G	Beginning Greek
CLASSICS 2G	Beginning Greek
CLASSICS 3G	Beginning Greek
CLASSICS 11G	Intermediate Greek: Prose
CLASSICS 12G	Intermediate Greek: Herodotus - the father of history?
CLASSICS 13G	Intermediate Greek: Homer
CLASSICS 101G	Advanced Greek: Plato's Phaedrus
CLASSICS 102G	Advanced Greek: Lyric Poetry
CLASSICS 103G	Advanced Greek: Scientific Writing
CLASSICS 105A	Greek Syntax: Prose Composition
CLASSICS 105B	Greek Syntax: Prose Composition

Recommended additional coursework in Biblical Greek, Sanskrit or ancient history³

SPECLANG 183A	First-Year Sanskrit, First Quarter
SPECLANG 183B	First-Year Sanskrit, Second Quarter

SPECLANG 184A	Second-Year Sanskrit, First Quarter
SPECLANG 184B	Second-Year Sanskrit, Second Quarter
SPECLANG 184C	Second-Year Sanskrit, Third Quarter
CLASSICS 6G	Biblical Greek
CLASSICS 7G	Biblical Greek
CLASSICS 81	Ancient Empires: Near East
CLASSICS 82	The Egyptians
CLASSICS 83	The Greeks
CLASSICS 84	The Romans
Total Units:	60

- ¹ Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.
 - ² It is recommended that this include CLASSICS 104A and CLASSICS 104B (for Latin); and CLASSICS 105A and CLASSICS 105B (for Greek). But this series should not be taken until completion of advanced-level course work in the relevant language.
 - ³ Sanskrit is only allowed if both Greek and Latin requirements are fulfilled with course work at the intermediate-level and above.
- + Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), Latin courses (24 units), Greek courses (24 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 60 units. See the Joint Major with CS (p. 375) tab for more information.

F. Philosophy and Literature Focus:

Students who wish to add a Philosophy and Literature focus to the Classical Studies, Greek, Latin, or Greek and Latin majors should also take the courses listed below:

	Units	
PHIL 81	Philosophy and Literature	5
PHIL 80	Mind, Matter, and Meaning	5
One course in each of the following areas:		
1. aesthetics, ethics, and social and political philosophy		3-5
PHIL 170	Ethical Theory	
PHIL 170D	Trust and Trustworthiness	
2. philosophy of language, mind, metaphysics, and epistemology		3-5
PHIL 180	Metaphysics	
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	
3. history of philosophy (course with prefix PHIL at the 100-level or above)		3-5
Two related courses in Classics or Philosophy. Students may double count a Classics course in Philosophy or ancient science for one of the two related courses provided that this course fulfills the Philosophy and Literature requirements and is approved by a member of the committee in Philosophy and Literature.		6-10
One capstone seminar in consultation with the Director of Undergraduate Studies. This year's offerings are:		3-5
COMPLIT 217	The Poetry of Friedrich Holderlin	
FRENCH 228E	Getting Through Proust	
PHIL 193D	Dante and Aristotle	
PHIL 194L	Montaigne	

Honors Program

A minimum grade point average (GPA) of 3.6 within the major is required for students to enroll in the honors program. To be considered for honors in Classics, the student must select a professor who can supervise his or her honors thesis. A preliminary proposal, approved by the supervisor, is due April 15 of the junior year, and a final version is due at the beginning of the senior year. The proposal must outline the project in detail, list relevant courses that have been taken, and name the supervisor. The department gives approval only if a suitable faculty supervisor is available and if it is satisfied that the student has a sufficient basis of knowledge derived from department course work in the general areas the thesis covers, such as art, Greek, Latin, history, literature, or philosophy. If the proposal is approved, the student may sign up for CLASSICS 199 Undergraduate Thesis: Senior Research, during the senior year for a maximum of 6 units per term, up to an overall total of 10 units. These units may be counted towards fulfillment of the student's major requirements if relevant. Honors are awarded only if the essay receives a grade of 'B+' or higher from the supervisor and a second reader, who is chosen by the department. In addition, students must graduate with a GPA of 3.6 or higher within the major to receive honors.

Study Abroad

Classics students may travel for several reasons: to complete accredited coursework (typically language courses or history surveys) for transfer towards the degree, to participate in archaeological digs of ancient sites, and to perform independent travel-research related to an honors project or independent study. Students considering academic programs sponsored by other institutions are encouraged to review Stanford's policies on transfer credit and to discuss possible programs with the Director of Undergraduate Studies before applying. Students seeking archaeological dig experience should inquire for opportunities through the Classics Department and through the Stanford Archaeology Center (<http://archaeology.stanford.edu>). Students who would like to construct an independent travel-research project should discuss their goals and itinerary with the Director of Undergraduate Studies.

While Classics-specific coursework is not always available through the Bing Overseas Program, students sometimes find Classics faculty at Bing campuses who are willing to provide independent instruction for credit. Pre-approval of courses and independent study syllabi by the Director of Undergraduate Studies is required for credit towards the major or minor.

Some departmental funding is available for summer language programs in the United States, and departmental funds are also available for travel and study in the Mediterranean. Students are encouraged to seek out multiple sources of funding, including offerings from UAR, to supplement their departmental applications. After discussing their plans with the Director of Undergraduate Study, applicants submit a departmental research grant application that includes expenses, a statement of purpose, and an endorsement by the student's faculty adviser. Food expenses are not normally reimbursed. Limited funding is available each year; preference is shown to majors and students with strong records.

Joint Major Program: Classics and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Classics Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 229)m" section of this bulletin for details on Computer Science requirements.

Students majoring in the joint major program in Classics and Computer Science complete the degree requirements for Classics with the following changes:

1. Completion of 5 less overall units than a usual Classics major. The + footnote on each track describes where the unit relief may be taken.
2. ePortfolio course (2 units): The ePortfolio is preparation for the capstone project, and as such, must be taken by Spring quarter of the Junior year. The ePortfolio will reflect on the intersections (and possible disjunctions) between Computer Science and Classics. This may be an independent study or group seminar class. Topics might center on critical review of existing projects that join Computer Science and Classics, including analyses and reflections on two-to-three different digital humanities projects in the field of Classics. It might also include a commentary from a Classicist perspective on work in foundational Computer Science courses, an analysis of the implications of computational technology for historical or literary study in Classics, or the application of Classicists' methodologies to technological problems or issues.
3. Senior capstone project (5 units): The capstone project will be an original and integrative research project, guided by advisers in both departments, drawing on knowledge and skills in both areas, and counting towards the joint major on the Classics side. This will likely be independent study with Classics faculty or a course with a required project. It is also possible for honors thesis work in Classics to count towards this requirement, if the thesis project has a significant computational component. Projects might include analysis of archaeological or historical data, digital editions of texts, analyses of ancient corpora, digital representations and engagements with historical problems in the study of the ancient world, study of natural language processing as applied to literary analysis of ancient texts.

All ePortfolio and senior capstone projects must be approved by the Director of Undergraduate Studies.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/student-services-center>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in Classics

The Director of Undergraduate Studies meets with each student who opts for the minor to discuss curriculum choices and assigns the student an adviser in the relevant field. Students are required to work closely with their advisers to create a cohesive curriculum within each area. Students who minor in Classics are required to take CLASSICS 150 Majors Seminar, which is writing intensive. Completion of the minor requires a minimum of 20 units.

Students may choose among four fields of study for the minor in Classics:

- Classical Languages
- Ancient History
- Literature and Philosophy
- Classical Studies

These fields of study are declared on Axess; they do not appear on the transcript or the diploma.

I. Classical Languages

Students are required to take a minimum of five courses in Greek or in Latin. In addition to the five required courses, students must take CLASSICS 150 Majors Seminar. Students wishing to combine Greek and Latin may only do so if courses for one of the two languages are all intermediate level or above. Choose from the following courses this year:

		Units
CLASSICS 1L	Beginning Latin	5
CLASSICS 2L	Beginning Latin	5
CLASSICS 3L	Beginning Latin	5
CLASSICS 11L	Intermediate Latin: Introduction to Literature	5
CLASSICS 12L	Intermediate Latin: Plautus	5
CLASSICS 13L	Intermediate Latin: Cicero and Catullus	5
CLASSICS 101L	Advanced Latin	3-5
CLASSICS 102L	Advanced Latin: Livy	4-5
CLASSICS 103L	Advanced Latin: Latin Lovers	3-5
CLASSICS 1G	Beginning Greek	5
CLASSICS 2G	Beginning Greek	5
CLASSICS 3G	Beginning Greek	5
CLASSICS 11G	Intermediate Greek: Prose	5
CLASSICS 12G	Intermediate Greek: Herodotus - the father of history?	5
CLASSICS 13G	Intermediate Greek: Homer	5
CLASSICS 101G	Advanced Greek: Plato's Phaedrus	3-5
CLASSICS 102G	Advanced Greek: Lyric Poetry	3-5
CLASSICS 103G	Advanced Greek: Scientific Writing	3-5

II. Ancient History

Students are required to take a minimum of five courses in history, art history, and archaeology (any course within CLASSICS 51-99 or CLASSICS 151-197). Courses taken outside of the department may be substituted for one or more of these courses with prior, written approval from the Director of Undergraduate Studies. In addition to the five required courses, students must take CLASSICS 150 Majors Seminar. Courses

offered in Latin and Greek that focus on historical topics or authors may count toward this minor with prior, written approval from the Director of Undergraduate Studies. Students may count up to 4 units of IHUM 69A or the fall quarter of SIMILE towards the breadth requirement; note that IHUM courses are no longer offered. Choose from the following courses this year:

		Units
CLASSICS 51	Introduction to the Archaeology of Greece	3-5
CLASSICS 52	Introduction to Roman Archaeology	3-5
CLASSICS 54	Introduction to World Architecture	5
CLASSICS 81	Ancient Empires: Near East	4-5
CLASSICS 82	The Egyptians	3-5
CLASSICS 83	The Greeks	4-5
CLASSICS 84	The Romans	3-5
CLASSICS 88	Origins of History in Greece and Rome	4-5
CLASSICS 151	Ten Things: An Archaeology of Design	3
CLASSICS 153	Ancient Urbanism	5
CLASSICS 154	Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean	3-4
CLASSICS 159	Appropriations of Greek Art	4-5
CLASSICS 161	Archaic Greek Art	4
CLASSICS 162	Empire and Aftermath: Greek Art from the Parthenon to Scopas	4
CLASSICS 163	Greek Art In and Out of Context	4-5
CLASSICS 168	Engineering the Roman Empire	4-5
CLASSICS 169	Archaeology of Britannia	3-4

III. Literature and Philosophy

Students are required to take a minimum of five courses in classical literature or philosophy, including classical science. Courses taken outside of the department (for instance, from the Philosophy department) may be substituted for one or more of these courses with prior, written approval from the Director of Undergraduate Studies. In addition to the five required courses, students must take CLASSICS 150 Majors Seminar. Courses offered in Latin and Greek that focus on philosophical or literary topics or authors may count toward the minor. Choose from the following courses this year:

		Units
CLASSICS 16N	Sappho: Erotic Poetess of Lesbos	4-5
CLASSICS 35	Becoming Like God: An Introduction to Greek Ethical Philosophy	3-5
CLASSICS 42	Philosophy and Literature	5
CLASSICS 121	Ecology in Philosophy and Literature	3-5
CLASSICS 136	The Greek Invention of Mathematics	3-5
CLASSICS 181	Classical Seminar: Origins of Political Thought	4-5

IV. Classical Studies

Students are required to take a minimum of five courses in Classics plus CLASSICS 150 Majors Seminar. Students may count up to 4 units of THINK 10, THINK 16, THINK 35 (no longer offered), IHUM 39A, IHUM 69A (IHUM courses no longer offered), SLE or fall quarter of SIMILE towards the breadth requirement.

Master of Arts in Classics

University requirements for the master's degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

I and II. Language and Literature, and Philosophy Fields of Study

Students who have completed an undergraduate major in Classics (Greek, Latin, or Greek and Latin fields of study) or equivalent may be accepted as candidates for the M.A. degree in Classics and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students with an undergraduate major in Classics (Ancient History or Classical Studies fields of study) or without an undergraduate major in Classics may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing at least 25 units of graduate courses and 20 units of work at the 100 level or higher.
2. Completion of one Greek language course at the 100 level (if the undergraduate major field of study was Latin) or one Latin language course at the 100 level (if the undergraduate major field of study was Greek). This requirement is waived for students with an undergraduate major in Classics (Greek and Latin field of study).
3. Passing an examination testing the candidate's ability to translate into English from a selected list of Greek and/or Latin authors. This exam is a minimum of two hours, requiring a grade of "B" or higher to pass.
4. Completion of the syntax sequence in at least one language. For Latin, this is CLASSICS 204A Latin Syntax and CLASSICS 204B Latin Syntax. For Greek, this is CLASSICS 205A Greek Syntax: Prose Composition and CLASSICS 205B Greek Syntax: Prose Composition.
5. Writing a thesis, or passing of an examination on a particular author or topic, or having written work accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent, provided each paper has earned the grade of B+ or higher.
6. Students must pass a reading exam in one of the following languages: German, French or Italian. In exceptional circumstances, the Graduate Committee will permit a different language, e.g. Modern Greek or Russian, to be substituted in keeping with research plans. As of September 2014, modern language exams will be based on individualized reading lists: five academic monographs or equivalent, chosen by the student in consultation with the Director of Graduate Studies and agreed in writing at least two months in advance. Students will be allowed to use paper and online dictionaries. Exams will be offered twice a year: at the start of the Fall term and the end of the Spring term. Incoming graduates may choose to be tested as early as the Fall term exam. The department strongly encourages students to take modern language exams as early as possible in the program. If the first attempt to pass the exam is unsuccessful, the student will be allowed to retake the test only once. Failing the second examination will mean automatic dismissal from the program. A grade of B- or higher is required to pass.
7. Completion and approval of a Program Proposal for a Master's Degree form during the first quarter of enrollment, at least five days prior to the Final Study List deadline.

Candidates for the Ph.D. degree in Classics may also, on the recommendation of the department, become candidates for the M.A. degree. In this case, requirement 5 above is waived provided that the student has completed some work beyond the course requirements listed under requirements 1 and 2 above. Current Stanford graduate students in other degree programs may be considered for the M.A. degree, but must be admitted into the program and must complete all requirements listed above.

III. Classical Archaeology

Students who have completed an undergraduate major in Classics with a Classical Archaeology field of study, or in a closely related field, may be accepted as candidates for the M.A. degree in Classics with a Classical Archaeology field of study, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students without an undergraduate major in Classics with a Classical Archaeology field of study may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing at least 25 units of graduate courses and 20 additional units of work at the 100 level or higher.
2. Completion with a grade of 'B' or higher of at least 15 units of graduate-level courses in classical archaeology, in addition to CLASSICS 331 Words and Things in the History of Classical Scholarship. (see 4).
3. Passing an examination testing the candidate's ability to translate into English from a selected list of Greek and/or Latin authors. This exam is a minimum of two hours, requiring a grade of "B" or higher to pass.
4. Completion with a grade of 'B' or higher of CLASSICS 331 Words and Things in the History of Classical Scholarship, or an equivalent course on the history of thought in classical archaeology approved by the Classics department's graduate committee.
5. Writing a thesis, or passing an exam on a particular topic, or having written work accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent, provided each paper has earned the grade of B+ or higher.
6. Students must pass a reading exam in one of the following languages: German, French or Italian. In exceptional circumstances, the Graduate Committee will permit a different language, e.g. Modern Greek or Russian, to be substituted in keeping with research plans. As of September 2014, modern language exams will be based on individualized reading lists: five academic monographs or equivalent, chosen by the student in consultation with the Director of Graduate Studies and agreed in writing at least two months in advance. Students will be allowed to use paper and online dictionaries. Exams will be offered twice a year: at the start of the Fall term and the end of the Spring term. Incoming graduates may choose to be tested as early as the Fall term exam. The department strongly encourages students to take modern language exams as early as possible in the program. If the first attempt to pass the exam is unsuccessful, the student will be allowed to retake the test only once. Failing the second examination will mean automatic dismissal from the program. A grade of B- or higher is required to pass.
7. Completion and approval of a Program Proposal for a Master's Degree form during the first quarter of enrollment, at least five days prior to the Final Study List deadline.

Candidates for the Ph.D. degree may also, on the recommendation of the department, become candidates for the M.A. degree. In their case, requirement 5 above is waived provided that the student has completed some work beyond the course requirements listed under requirements 1 and 2 above. Current Stanford graduate students in other degree programs may be considered for the M.A. degree, but must be admitted into the program and must complete all requirements listed above.

IV. Ancient History

Students who have completed an undergraduate major in Classics with an Ancient History field of study, or in a closely related field may be accepted as candidates for the M.A. degree in Classics with an Ancient History

field of study, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students without an undergraduate major in Classics with an Ancient History field of study may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing 30 units of graduate courses and 15 additional units of work at the 100 level or higher.
2. Satisfactory completion of 20 units of graduate-level courses in Classics and of 10 units of graduate-level courses in other programs.
3. Satisfactory completion of 15 additional units of courses in either ancient Greek or Latin at the 100 level or higher.
4. Writing a thesis, or passing an exam on a particular topic, or having written work accepted by the Graduate Committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent, provided each paper has earned the grade of B+ or higher.
5. Students must pass a reading exam in one of the following languages: German, French or Italian. In exceptional circumstances, the Graduate Committee will permit a different language, e.g. Modern Greek or Russian, to be substituted in keeping with research plans. As of September 2014, modern language exams will be based on individualized reading lists: five academic monographs or equivalent, chosen by the student in consultation with the Director of Graduate Studies and agreed in writing at least two months in advance. Students will be allowed to use paper and online dictionaries. Exams will be offered twice a year: at the start of the Fall term and the end of the Spring term. Incoming graduates may choose to be tested as early as the Fall term exam. The department strongly encourages students to take modern language exams as early as possible in the program. If the first attempt to pass the exam is unsuccessful, the student will be allowed to retake the test only once. Failing the second examination will mean automatic dismissal from the program. A grade of B- or higher is required to pass.
6. Completion and approval of a Program Proposal for a Master's Degree form during the first quarter of enrollment, at least five days prior to the Final Study List deadline.

Candidates for the Ph.D. degree may also (on the recommendation of the department) become candidates for the M.A. degree. In their case, requirement 4 above is waived provided that they have completed some work beyond the course requirements listed under requirements 1 and 2 above. Current Stanford graduate students in other degree programs may be considered for the M.A. degree, but must be admitted into the program and must complete all requirements listed above.

Coterminal Bachelor's and Master's Degree in Classics

Stanford students in any undergraduate major who wish to pursue graduate work in Classics may apply for Stanford's coterminal master's program. Students considering a co-term are encouraged to consult with the Director of Undergraduate Studies and the department's student services officer about their plans before filing an application. No courses used to satisfy the undergraduate requirements (either as General Education Requirements or department requirements) may be applied toward the M.A. No courses taken more than two quarters prior to the first quarter of the master's program may be applied toward the M.A. Applicants must have a minimum GPA of 3.7 in the major, and no Incomplete grades on record. Undergraduate course work in Greek and Latin and one of the required modern languages is normally a prerequisite for graduate-level work.

To apply, students submit the Application for Admission to Coterminal Master's Program form, two letters of recommendation from Classics faculty, a sealed, official copy of their undergraduate transcript, a 1-3 page statement of purpose and a 10-15 page writing sample to the student services officer. GRE scores are not required. Applications are due in early January of the intended graduation year for the undergraduate degree; please see the departmental website (<http://classics.stanford.edu>) for the specific deadline.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Doctor of Philosophy in Classics

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. There are four specializations within the Classics Ph.D. program: language and literature; classical archaeology; ancient history; and the joint program in ancient philosophy. These specializations will appear on the transcript and the diploma.

I. Language and Literature

Candidates for the Ph.D. degree in Classics with specialization in language and literature must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree no later than the end of the fourth year. These must include the following courses:

		Units
CLASSICS 201L	Survey of Latin Literature: Literature of the Roman Republic	3-5
CLASSICS 202L	Survey of Latin Literature: Augustan Age Latin	3-5
CLASSICS 203L	Survey of Latin Literature: Imperial Latin	3-5
CLASSICS 201G	Survey of Greek Literature: Archaic Greek	3-5
CLASSICS 202G	Survey of Greek Literature: Classical Greek	3-5
CLASSICS 203G	Survey of Greek Literature: Hellenistic and Late Greek	3-5
CLASSICS 204A	Latin Syntax	4
CLASSICS 204B	Latin Syntax	2
CLASSICS 205A	Greek Syntax: Prose Composition	2
CLASSICS 205B	Greek Syntax: Prose Composition	4
CLASSICS 206A	The Semantics of Grammar	2
CLASSICS 206B	The Semantics of Grammar	2

Plus twelve graduate seminars, nine of which must be Classics seminars, and one of the remaining three of which must be outside the department. The other two seminars may be in Classics, from other departments (with the graduate director's approval), and/or directed readings.^{1,2}

¹ No more than two directed readings may be counted towards this requirement.

2. Classics seminars are sometimes offered for a spread of units (3, 4 or 5). In some cases, instructors allow a student to complete a seminar for less units without requiring a written paper but with completion of all other requirements.
2. Maintain satisfactory progress throughout the degree program. The Classics department sets a higher standard for satisfactory progress than the University minimum requirements. To maintain that standard, students are expected to:
 - Maintain good grades (within the Classics department, this normally means grades in the A range; an accumulation of grades of B+ or lower may indicate problems).
 - pass all required exams by the required deadlines
 - write a *minimum* of three seminar papers per year in the first three years
 - demonstrate high quality research and writing
 - take no more than one incomplete grade at a time (unless given special permission by the Director of Graduate Studies)
 - take incomplete grades only occasionally and finish any Incompletes in a timely manner
 - demonstrate effective teaching when serving as a Teaching Assistant or Teaching Fellow

Students who fail to maintain satisfactory progress will have travel and discretionary funds withheld until the situation is redressed.

3. Students must apply and be approved to advance to candidacy by the end of Summer Quarter of their second year.
4. Examinations:
 - As soon as students arrive, they must take diagnostic exams in Greek and Latin. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work.
 - Students must take Greek and Latin translation exams at the end of each survey sequence (Spring Quarter of the first and second years). Students are exempted from the final exam in Spring Quarter Survey in order to prepare for these translations exams. These exams are based on the Greek and Latin reading lists available on the Classics Department (<http://classics.stanford.edu>) web site. Greek and Latin survey courses cover less than half of the material on which the translation exams test, and students need to prepare much of the work on their own. It is possible to take both exams in the first year if the student chooses. However, the student cannot choose to delay the first year exam to take both in the second year. The exam consists of a choice of six of eight passages, and students are allowed three hours. A grade of 'B-' or higher, on every passage, is required to pass. If a student does not attain a 'B-', the exam must be retaken and passed later in the summer before registering for the Autumn Quarter, in order to continue in the program. The exam can only be retaken once.
 - Students must pass two modern language translation exams: (1) German and (2) French or Italian. In exceptional circumstances, the Graduate Committee will permit a different language, e.g. Modern Greek or Russian, to be substituted for (2), in keeping with dissertation research plans. As of September 2014, modern language exams will be based on individualized reading lists: five academic monographs or equivalent, chosen by the student in consultation with the Director of Graduate Studies and agreed in writing at least two months in advance. Students will be allowed to use paper and online dictionaries. Exams will be offered twice a year: at the start of the Fall term and the end of the Spring term. Incoming graduates may choose to be tested as early as the Fall term exam. The department strongly encourages students to take modern language exams as early as possible in the program (at least one modern language by the end of the first year), and certainly after any summer language courses they may have

taken. Students will have two opportunities to pass the modern language examinations. Failing the second opportunity will mean automatic dismissal from the program. At the latest, students are required to pass the first modern language exam by the end of the second year, and the second modern language exam by the end of the third year, in order to maintain satisfactory progress. A grade of B- or higher is required to pass.

- Students must take general examinations in Greek literature and Latin literature, and choose two more exams from the following fields: Ancient Philosophy, Greek history, Roman history, Greek archaeology and Roman archaeology. Students must select the remaining two fields in consultation with the graduate director no later than June of the second year of graduate study. Candidates must have taken at least one course at Stanford in each of the chosen fields (in the case of ancient philosophy, a seminar or its equivalent); exceptions must be granted by the Director of Graduate Studies. Students need to prepare by conferring with the professor overseeing the exam. One general examination (and a second if approved by the graduate director) must be taken in the first two to three weeks of the student's second year, Autumn Quarter. Remaining exams will be taken during the first two to three weeks of the third year, Autumn Quarter.
 - The University oral examination, which is a defense of the candidate's dissertation. In order to take this exam, a significant portion of the dissertation must be completed and approved by the dissertation adviser(s), the exam committee must have been established and approved by the Chair, and a date and time must have been arranged with the department. The exam consists of a public presentation with question and answer period (no longer than an hour), followed by a private examination between the student and the exam committee (also no longer than an hour).
5. During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Failure to pass this re-examination results in dismissal. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate and the dissertation director collaborate to select an appropriate dissertation reading committee in accordance with University rules.
 6. Students are required to undertake the equivalent of four one-quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Under certain circumstances, summer teaching may satisfy this requirement.

II. Classical Archaeology

Candidates for the Ph.D. degree in Classics with a specialization in classical archaeology must fulfill the requirements following below.

Students are encouraged to enroll in or audit other undergraduate courses that may fill gaps in their undergraduate training. All students are expected to take part in archaeological fieldwork in the classical world areas. At least three consecutive quarters of course work must be taken at Stanford.

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the candidate's fourth year, including:

CLASSICS 331	Words and Things in the History of Classical Scholarship ¹	Units 4-5
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At least three graduate (200 or 300) level courses in Latin and/or Greek literature ³	9-15
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CLASSICS 201L	Survey of Latin Literature: Literature of the Roman Republic
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CLASSICS 202L	Survey of Latin Literature: Augustan Age Latin
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CLASSICS 203L	Survey of Latin Literature: Imperial Latin
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CLASSICS 201G	Survey of Greek Literature: Archaic Greek
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CLASSICS 202G	Survey of Greek Literature: Classical Greek
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CLASSICS 203G	Survey of Greek Literature: Hellenistic and Late Greek
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The interdepartmental graduate core sequence in archaeology. The Archaeology Center announces the courses which fulfill this requirement. The core sequence currently comprises a seminar in archaeology theory and a course on archaeological methods.

ANTHRO 303	Introduction to Archaeological Theory
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ANTHRO 307	Archaeological Methods
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At least one further course outside the Classics department. ²	3-5
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At least five graduate seminars in classical archaeology. Suggested courses this year include: ²	15-25
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CLASSICS 352	Doing Business in Classical Antiquity: Mediterranean Exchange
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CLASSICS 353	Archaeology: Post-Humanist Agendas
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CLASSICS 367	Mediterranean Networks
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At least three graduate seminars in ancient history. Suggested courses this year include: ²	9-15
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CLASSICS 376	Art, Ekphrasis, and Music in Byzantium and Islam
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CLASSICS 377	Animation, Performance, Presence in Medieval Art
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CLASSICS 381	Classical Seminar: Origins of Political Thought
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CLASSICS 382	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests
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CLASSICS 384A	Ancient Greek Economic Development
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CLASSICS 384B	Ancient Greek Economic Development
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CLASSICS 391	Early Empires: Han and Rome
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CLASSICS 396	Humanities+Design: Visualizing the Grand Tour
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2. ¹ Must be taken as early as possible in the candidate's Stanford career.
- ² Students may petition to count independent study courses in place of up to two required courses, but no more.
- ³ Students who enter the program with only one ancient language at the level needed for graduate study are strongly encouraged to take additional course work to reach graduate (200 and above) level in another language.

Maintain satisfactory progress throughout the degree program. The Classics department sets a higher standard for satisfactory progress than the University minimum requirements. To maintain that standard, students are expected to:

- Maintain good grades (within the Classics department, this normally means grades in the A range; an accumulation of grades of B+ or lower may indicate problems).
- pass all required exams by the required deadlines
- write a *minimum* of three seminar papers per year in the first three years
- demonstrate high quality research and writing
- take no more than one incomplete grade at a time (unless given special permission by the Director of Graduate Studies)
- take incomplete grades only occasionally and finish any Incompletes in a timely manner
- demonstrate effective teaching when serving as a Teaching Assistant or Teaching Fellow

Students who fail to maintain satisfactory progress will have travel and discretionary funds withheld until the situation is redressed.

3. Students must apply and be approved to advance to candidacy by the end of Summer Quarter of their second year.
4. Examinations:
 - As soon as students arrive, they must take diagnostic exams in Greek and Latin. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work.
 - Students must pass two modern language translation exams: (1) German and (2) French or Italian. In exceptional circumstances, the Graduate Committee will permit a different language, e.g. Modern Greek or Russian, to be substituted for (2), in keeping with dissertation research plans. As of September 2014, modern language exams will be based on individualized reading lists: five academic monographs or equivalent, chosen by the student in consultation with the Director of Graduate Studies and agreed in writing at least two months in advance. Students will be allowed to use paper and online dictionaries. Exams will be offered twice a year: at the start of the Fall term and the end of the Spring term. Incoming graduates may choose to be tested as early as the Fall term exam. The department strongly encourages students to take modern language exams as early as possible in the program (at least one modern language by the end of the first year), and certainly after any summer language courses they may have taken. Students will have two opportunities to pass the modern language examinations. Failing the second opportunity will mean automatic dismissal from the program. At the latest, students are required to pass the first modern language exam by the end of the second year, and the second modern language exam by the end of the third year, in order to maintain satisfactory progress. A grade of B- or higher is required to pass.
 - Students must demonstrate graduate-level competency with an ancient language in one of two ways:
 - Option 1:* A translation examination from Latin or Greek into English. This examination must be taken Spring Quarter of the first year or Spring Quarter of the second year. A grade of 'B-' or higher on every passage is required to pass. If a student does not meet that standard, the exam must be retaken and passed later in the summer before registering for Autumn Quarter, in order to continue in the program. The exam can only be retaken once.
 - Option 2:* Students must complete the course and take the final offered at the end of each quarter of Greek or Latin survey. Students must earn a 'B-' or higher on each final to pass.
 - Students must take general examinations in Greek archaeology and Roman archaeology, and choose two more exams from the following fields: Ancient Philosophy, Greek history, Roman history, Greek literature and Latin literature. Students must select the remaining two fields in consultation with the graduate director

no later than June of the second year of graduate study. Candidates must have taken at least one course at Stanford in each of the chosen fields (in the case of ancient philosophy, a seminar or its equivalent); exceptions must be granted by the Director of Graduate Studies. Students need to prepare by conferring with the professor overseeing the exam. One general examination (and a second if approved by the graduate director) must be taken in the first two to three weeks of the student's second year, Autumn Quarter. Remaining exams will be taken during the first two to three weeks of the third year, Autumn Quarter.

- The University oral examination, which is a defense of the candidate's dissertation. In order to take this exam, a significant portion of the dissertation must be completed and approved by the dissertation adviser(s), the exam committee must have been established and approved by the Chair, and a date and time must have been arranged with the department. The exam consists of a public presentation with question and answer period (no longer than an hour), followed by a private examination between the student and the exam committee (also no longer than an hour).
5. During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Failure to pass this re-examination results in dismissal. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate and the dissertation director collaborate to select an appropriate dissertation reading committee in accordance with University rules.
 6. Students are required to undertake the equivalent of four one quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Under certain circumstances, summer teaching may satisfy this requirement.

III. Ancient History

Candidates for the Ph.D. degree in Classics with specialization in ancient history must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year. These must include:

HISTORY 304	Approaches to History	5
Two proseminars. These introduce students to primary sources of evidence for ancient history that require special training: papyrology, epigraphy, paleography, numismatics, and archaeology. This year's offerings are: ^{1,2}		8-10
CLASSICS 213	Proseminar: Documentary Papyrology	
CLASSICS 215	Paleography of Medieval and Early Modern Manuscripts	
CLASSICS 216	Advanced Paleography	
Three skills courses relevant to the individual student's chosen research approach. For example, a student could take classes in economics, demography, legal history, or anthropology. Courses can also be used to learn other ancient or modern languages, either by course work or directed reading. ¹		9-15
Ten graduate seminars (200-level or above). At least five of these seminars must be taken in the department. ^{2,3}		30-50

ANCIENT LANGUAGE COURSEWORK

Option 1: Students focus more on one ancient language by taking 15 units of one survey series (CLASSICS 201L/202L/203L or CLASSICS 201G/202G/203G) and 5 units of the alternate series, plus the following courses:⁴

CLASSICS 206A	The Semantics of Grammar
CLASSICS 206B	The Semantics of Grammar
CLASSICS 204A	Latin Syntax
CLASSICS 204B	Latin Syntax
CLASSICS 205A	Greek Syntax: Prose Composition
CLASSICS 205B	Greek Syntax: Prose Composition

Option 2: Student emphasize broader linguistic skills. This requires students to take both ancient language surveys.

CLASSICS 201L	Survey of Latin Literature: Literature of the Roman Republic
CLASSICS 202L	Survey of Latin Literature: Augustan Age Latin
CLASSICS 203L	Survey of Latin Literature: Imperial Latin
CLASSICS 201G	Survey of Greek Literature: Archaic Greek
CLASSICS 202G	Survey of Greek Literature: Classical Greek
CLASSICS 203G	Survey of Greek Literature: Hellenistic and Late Greek

- 1 Students must consult their advisers and the graduate director to determine the appropriate coursework.
 - 2 With the approval of their advisers and graduate director, students may take seminars outside of the department or at another university with which Stanford has an exchange agreement to fulfill this requirement.
 - 3 Two of these seminars may be replaced by directed readings with adviser and graduate director approval.
 - 4 Students who select Greek for their primary language should consult with the graduate director for a course to replace the Semantics of Grammar requirement.
2. Maintain satisfactory progress throughout the degree program. The Classics department sets a higher standard for satisfactory progress than the University minimum requirements. To maintain that standard, students are expected to: Students who fail to maintain satisfactory progress will have travel and discretionary funds withheld until the situation is redressed.
- Maintain good grades (within the Classics department, this normally means grades in the A range; an accumulation of grades of B+ or lower may indicate problems).
 - pass all required exams by the required deadlines
 - write a *minimum* of three seminar papers per year in the first three years
 - demonstrate high quality research and writing
 - take no more than one incomplete grade at a time (unless given special permission by the Director of Graduate Studies)
 - take incomplete grades only occasionally and finish any Incompletes in a timely manner
 - demonstrate effective teaching when serving as a Teaching Assistant or Teaching Fellow
- Students who fail to maintain satisfactory progress will have travel and discretionary funds withheld until the situation is redressed.
3. Students must apply and be approved to advance to candidacy by the end of Summer Quarter of their second year.
 4. Examinations:
 - As soon as students arrive, they must take diagnostic exams in Greek and Latin, as well as Greek and Roman history. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work. The history exams are mainly on narrative history, especially important names, dates, and events. Depending on performance, students may be asked to sit in on the undergraduate history courses and take a directed reading or a graduate survey if offered.
 - Students must take the final offered at the end of each quarter of Greek or Latin survey (for Option 1 above) or both Greek and Latin surveys (for Option 2 above). Students must earn a 'B-' or higher on each final to pass.
 - Students must pass two modern language translation exams: (1) German and (2) French or Italian. In exceptional circumstances, the Graduate Committee will permit a different language, e.g. Modern Greek or Russian, to be substituted for (2), in keeping with dissertation research plans. As of September 2014, modern language exams will be based on individualized reading lists: five academic monographs or equivalent, chosen by the student in consultation with the Director of Graduate Studies and agreed in writing at least two months in advance. Students will be allowed to use paper and online dictionaries. Exams will be offered twice a year: at the start of the Fall term and the end of the Spring term. Incoming graduates may choose to be tested as early as the Fall term exam. The department strongly encourages students to take modern language exams as early as possible in the program (at least one modern language by the end of the first year), and certainly after any summer language courses they may have taken. Students will have two opportunities to pass the modern language examinations. Failing the second opportunity will mean automatic dismissal from the program. At the latest, students are required to pass the first modern language exam by the end of the second year, and the second modern language exam by the end of the third year, in order to maintain satisfactory progress. A grade of B- or higher is required to pass.
 - Students must take general examinations in Greek history and Roman history, and choose two more exams from the following fields: Ancient Philosophy, Greek archaeology, Roman archaeology, Greek literature and Latin literature. Students must select the remaining two fields in consultation with the graduate director no later than June of the second year of graduate study. Candidates must have taken at least one course at Stanford in each of the chosen fields (in the case of ancient philosophy, a seminar or its equivalent); exceptions must be granted by the Director of Graduate Studies. Students need to prepare by conferring with the professor overseeing the exam. In preparing for the general examinations, candidates are expected to make full use of relevant secondary material in modern languages. They should therefore plan to satisfy the requirements in French and German as soon as possible, preferably before the translation examinations. One general examination (and a second if approved by the graduate director) must be taken in the first two to three weeks of the student's second year, Autumn Quarter. Remaining exams will be taken during the first two to three weeks of the third year, Autumn Quarter.
 - The University oral examination, which is a defense of the candidate's dissertation. In order to take this exam, a significant portion of the dissertation must be completed and approved by the dissertation adviser(s), the exam committee must have been established and approved by the Chair, and a date and time must

- have been arranged with the department. The exam consists of a public presentation with question and answer period (no longer than an hour), followed by a private examination between the student and the exam committee (also no longer than an hour).
- During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Failure to pass this re-examination results in dismissal. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate and the dissertation director collaborate to select an appropriate dissertation reading committee in accordance with University rules.
 - Candidates are required to undertake the equivalent of four one quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Under certain circumstances, summer teaching may satisfy this requirement.

IV. Joint Program in Ancient Philosophy

This specialization is jointly administered by the departments of Classics and Philosophy and is overseen by a joint committee composed of members of both departments. It provides students with the training, specialist skills, and knowledge needed for research and teaching in ancient philosophy while producing scholars who are fully trained as either philosophers or classicists.

Graduate students admitted by the Classics department receive their Ph.D. from the Classics department. This specialization includes training in ancient and modern philosophy. Each student in the program is advised by a committee consisting of one professor from each department.

Candidates for the Ph.D. degree in Classics with specialization in ancient philosophy must fulfill the following requirements:

	Units
Students must take three courses in the Philosophy department ¹	9-15
One course in logic which can be fulfilled at the 100-level or higher	
One course in aesthetics, ethics, or political philosophy (200-level or higher)	
One course in metaphysics, epistemology, philosophy of mind, or philosophy of science.	
At least three courses in ancient philosophy at the 200 level or above, one of which must be in the Philosophy department. ¹	9-15

- ¹ All courses taken in the Philosophy department count for seminar credit (i.e., as contributing to the 12-seminar requirement in the Language and Literature track in the Classics department).

Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year. This includes all the requirements listed for the language and literature specialization in the graduate program in Classics (see above). Students must also take the below courses focusing on philosophy.

- Examinations:* The requirements are the same as those listed in the language and literature specialization, except that one of the four areas of general examination must be taken in ancient philosophy in addition to the exams in Greek literature and Latin literature.

- Dissertation Proposal:* The requirements are the same as those listed in the language and literature specialization.
- Teaching:* The requirements are the same as those listed in the language and literature specialization.

Classics and a Minor Field

The Ph.D. in Classics may be combined with a minor in another field, such as anthropology, history, humanities, or classical linguistics. Requirements for the minor field vary, but can include about six graduate-level courses in the field and one written examination, plus a portion of the University oral exam (dissertation defense). Students must consult with the department in which the minor is offered for exact requirements. Students who pursue this are expected to take five years. The department encourages such programs for especially able and well prepared students. The following timetable would be typical for a five-year program:

- First Year: course work, almost entirely in Classics. One translation exam taken in June. One or both modern language exams taken.
- Second Year: course work, both in Classics and the minor field. Second translation exam completed. French and German exams completed.
- Third Year: course work, both in Classics and the minor field. General examinations in Classics.
- Fourth Year: remaining course work, both in Classics and the minor field. General examination in the minor field. Preparation for dissertation.
- Fifth Year: dissertation, University oral examination.

Ph.D. Minor in Classics

For a graduate minor, the department recommends at least 20 units in Latin or Greek at the intermediate-level or above, and at least one course at the graduate (200) level or above. Students interested in this minor must discuss their proposed course plan with the Director of Graduate Studies as well as their Ph.D. department before obtaining Classics department approval.

Emeriti: (Professors) Mark W. Edwards, Marsh H. McCall, Jr.,* Susan Treggiari

Chair: Walter Scheidel

Director of Graduate Studies: Grant Parker

Director of Undergraduate Studies and Joint Major Advisor: Giovanna Ceserani

Professors: Alessandro Barchiesi, Andrew M. Devine, Richard P. Martin, Ian Morris, Reviel Netz, Andrea Nightingale, Josiah Ober (Classics, Political Science), Anastasia-Erasmia Peponi, M. Rush Rehm (Classics, TAPS), Richard Saller (Classics, History), Walter Scheidel (Classics, History), Michael Shanks, Susan A. Stephens

Associate Professors: Giovanna Ceserani, Christopher B. Krebs, Jody Maxmin (Art and Art History, Classics), Grant Parker, Jennifer Trimble

Assistant Professor: Justin Leidwanger

Courtesy Professors: Fabio Barry (Art and Art History), Chris Bobonich (Philosophy), Alan Code (Philosophy), Charlotte Fonrobert (Religious Studies), Ian Hodder (Anthropology), Bissera Pentcheva (Art and Art History), Caroline Winterer (History), Yiqun Zhou (East Asian Languages and Cultures)

Visiting Professor: Thomas A. Schmitz

Lecturers: Maud Gleason, John Klopacz

* Recalled to active duty.

Communication

Courses offered by the Department of Communication are listed under the subject code COMM on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMM&filter-catalognumber-COMM=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMM&filter-catalognumber-COMM=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMM&filter-catalognumber-COMM=on>).

Stanford's Department of Communication focuses on media in all its forms. The department studies the processes and effects of mass communication: the nature and social role of the various media; their structure, function, and ethics; and their impact on the political system, culture, and society. In this context, it considers not only traditional mass media, such as newspapers, magazines, radio, television, and film, but also information technology, online media, virtual reality, and the Internet. Students are trained as social scientists who can study the media and as potential practitioners in the use of the media in journalism, mass communications, and digital media. The department combines theory and practice and fosters individual research opportunities for its students, employing both quantitative and qualitative approaches.

The Department of Communication engages in research in communication and offers curricula leading to the B.A., M.A., and Ph.D. degrees. The M.A. degree prepares students for a career in journalism. The department also offers current Stanford University undergraduates a coterminal program with an M.A. emphasis in Media Studies. The Ph.D. degree leads to careers in university teaching and research-related specialties.

The John S. Knight Journalism Fellowships foster journalistic innovation, entrepreneurship and leadership. Knight Fellows are outstanding journalists and journalism entrepreneurs from around the world who spend a year at Stanford to pursue and test their ideas for improving the quality of news and information reaching the public. The John S. and James L. Knight Foundation sponsors twelve U.S. journalists. They are joined by eight International Fellows sponsored by the Lyle and Corrine Nelson International Fellowship Fund, the Knight Foundation, Yahoo! Inc., the Enlight Foundation, and others.

Mission of the Undergraduate Program in Communication

The mission of the undergraduate program in Communication is to expose students to a broad-based understanding of communication theory and research. Students in this major are expected to become familiar with the fundamental concerns, theoretical approaches, and methods of the field, and to acquire advanced knowledge in one or more sub-areas of the discipline. This is accomplished by several levels of study: a core curriculum; intermediate-level electives; and optional internships. Majors also have the opportunity to do advanced research projects. The department is committed to providing students with analytical and critical skills needed for success in graduate programs, professional schools, or immediate career entry.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of communication.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of communication.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Communication and to prepare students for professional careers or doctoral studies. This is achieved through completion of courses in the primary field, as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Communication. Through completion of advanced coursework and rigorous training in research, the doctoral program prepares students to make original contributions to the knowledge of Communication and to interpret and present the results of such research.

Admission

Prospective Undergraduates: Applications are available at Undergraduate Admissions (<http://admission.stanford.edu>).

Prospective Coterminal Students: Applications are available on the University Registrar's (<http://studentaffairs.stanford.edu/registrar/forms/coterm>) web site.

Prospective Graduate Students: Applications are available online at Graduate Admissions (<http://gradadmissions.stanford.edu>).

The department requires that applicants for graduate admission submit verbal, quantitative, and analytic scores from the Graduate Record Examination (GRE). Admission to each graduate degree program is competitive and based on the pool of applicants each year rather than on standard criteria that can be stated in advance. See Communication Department admission procedures and requirements (<http://comm/phd/general/commdeptapplicationguide.pdf>) for detailed information about admission to the department.

Bachelor of Arts in Communication Preparation

Before declaring the major, students must have completed or be concurrently enrolled in one of the following:

		Units
COMM 1A	Mass Media, Society, and Democracy	5
COMM 1B	Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

Students interested in declaring the major should apply via Axxess and meet with the student services administrator in Building 120, Room 110A, during scheduled office hours. Students are required to take at least 60 units (approximately 12 courses), not counting statistics, to complete the major.

Program of Study

The undergraduate curriculum is intended for liberal arts students who wish to develop an understanding of communication in society, drawing on the perspective of the social sciences. Undergraduates majoring in

Communication are expected to become acquainted with the fundamental concerns, theoretical approaches and methods of the field, and to acquire advanced knowledge in one or more of the sub-areas of communication: institutions, processes, and effects.

While the department does not attempt to provide comprehensive practical training at the undergraduate level, the curriculum provides a diverse range of internship opportunities, including professional print journalism, some of which are funded by the department's Rebele Internship Program. The department is committed to providing students with analytical and critical skills for future success in graduate programs, professional schools, or immediate career entry.

The major is structured to provide several levels of study: a core curriculum intended to expose students to a broad-based understanding of communication theory and research, and a number of intermediate-level options and electives. Majors also have the opportunity to do advanced research in the form of an honors thesis.

All undergraduate majors are required to complete a set of core communication courses which include:

	Units
COMM 1A Mass Media, Society, and Democracy or COMM 1B Media, Culture, and Society	5
COMM 106 Communication Research Methods	5
COMM 108 Media Processes and Effects	5
COMM 104W Reporting, Writing, and Understanding the News or COMM 120W Digital Media in Society or COMM 137W The Dialogue of Democracy or COMM 142W Media Economics	5

COMM 104W, 120W, 137W, and 142W satisfy the WIM (Writing in the Major) requirement. Core courses are usually offered only once each year.

The department also requires completion of or concurrent registration in an introductory statistics course (STATS 60 Introduction to Statistical Methods: Precalculus) when registering for COMM 106 Communication Research Methods in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding. The statistics course does not count toward the 60 units to complete the Communication major.

In addition to the core courses and the statistics requirement, undergraduate majors select courses from the two areas described below. Many of the courses require core courses as prerequisites. Majors select a total of four area courses, taking at least one from each area.

Area I: Communication Processes and Effects

Area I emphasizes the ways in which communication scholars conduct research in, and consider the issues of, human communication. These studies aim to provide expert guidance for social policy makers and media professionals and include the following courses:

	Units
COMM 122 Content Analysis: Studying Communication Artifacts	5
COMM 123 Argumentation and Persuasion	5
COMM 135 Deliberative Democracy and its Critics	3-5
COMM 137W The Dialogue of Democracy	5
COMM 160 The Press and the Political Process	5
COMM 162 Campaigns, Voting, Media, and Elections	5
COMM 164 The Psychology of Communication About Politics in America	4
COMM 166 Virtual People	5

COMM 168	Experimental Research in Advanced User Interfaces	1-5
COMM 169	Computers and Interfaces	5
COMM 172	Media Psychology	5
COMM 183	Social Media Literacies	5
COMM 326	Advanced Topics in Human Virtual Representation	1-5

Area II: Communication Systems and Institutions

Area II considers the roles and interaction of institutions such as broadcasting, journalism, constitutional law, and business within communication and mass communication contexts and includes the following courses:

	Units
COMM 104W Reporting, Writing, and Understanding the News	5
COMM 113 Computational Methods in the Civic Sphere	5
COMM 116 Journalism Law	5
COMM 117 Digital Journalism	5
COMM 120W Digital Media in Society	5
COMM 125 Perspectives on American Journalism	5
COMM 131 Media Ethics and Responsibility	5
COMM 140 Digital Media Entrepreneurship	3-5
COMM 142W Media Economics	5
COMM 151 The First Amendment: Freedom of Speech and Press	5
COMM 182 Social Media Issues	5
COMM 143 Communication Policy and Regulation offered in 2013-14 also fulfills the Area II requirement.	5

The remainder of the 60 required units may be fulfilled with any elective Communication courses or crosslisted courses in other departments.

To be recommended for the B.A. degree in Communication, the student must complete at least 60 units (approximately 12 courses) in the department. No more than 10 units of course work outside of the department or transfer credit may be applied to meet department requirements. Communication majors must receive a letter grade for all Communication courses unless they are offered only for satisfactory/no credit (S/NC), and must maintain a grade point average (GPA) of 2.0 (C) in courses towards the major. Only courses with a grade of C- or above count towards the major.

Honors Program

The honors program provides undergraduates the opportunity to undertake a significant program of research in an individual professor/student mentoring relationship. The aim is to guide students through the process of research, analysis, drafting, rethinking, and redrafting, which is essential to excellence in scholarship. Working one-on-one with a faculty adviser, seniors earn 15 Communication units culminating in an honors thesis. In order to be eligible for the honors program, interested majors must have completed the following requirements:

1. Core Requirements

	Units
Complete the following core requirements:	
COMM 1A Mass Media, Society, and Democracy or COMM 1B Media, Culture, and Society	5
COMM 106 Communication Research Methods (receive a grade of B+ or better)	5
COMM 108 Media Processes and Effects	5
STATS 60/ PSYCH 10 Introduction to Statistical Methods: Precalculus	5

2. Select an adviser; and
3. Submit an application to the department by the end of their junior year. See the department's honors web site to download an application form (<http://comm.stanford.edu/undergraduate/honors>).

Students are expected to make steady progress on their honors thesis throughout the year.

A final copy of the honors thesis must be read and approved by the adviser and submitted to the department by the eighth week of Spring Quarter (exact date to be arranged). It becomes part of a permanent record held by the department. Honors work may be used to fulfill Communication elective credit, but must be completed and a letter grade submitted prior to graduation. A student failing to fulfill all honors requirements may still receive independent study credit for work completed, which may be applied toward fulfilling major requirements.

The designation "with honors" is awarded by the Department of Communication to those graduating seniors who, in addition to having completed all requirements for the Communication major:

1. complete an honors thesis;
2. maintain a distinguished GPA in all Communication course work;
3. are recommended by the Communication faculty.

Minor in Communication Preparation

Before declaring the minor, students must have completed or be concurrently enrolled in one of the following:

		Units
COMM 1A	Mass Media, Society, and Democracy	5
COMM 1B	Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

Students interested in declaring the minor should do so no later than Spring Quarter of their junior year by applying via Axess and meeting with the student services administrator in building 120, room 110A, during scheduled office hours.

Program of Study

The minor is structured to provide a foundation for advanced course work in communication through a broad-based understanding of communication theory and research.

Students are required to take 35 units (approximately 7 courses), not counting statistics, to complete the minor. The curriculum consists of three introductory communication core courses that include:

		Units
COMM 1A	Mass Media, Society, and Democracy	5
or COMM 1B	Media, Culture, and Society	
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

Core courses are usually offered only once each year. The department also requires completion of -- or concurrent registration in -- an introductory statistics course (STATS 60 Introduction to Statistical Methods: Precalculus) when registering for COMM 106 Communication Research Methods in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding. The statistics course does not count toward the 35 units to complete the Communication minor.

In addition to the three core courses and the statistics course, students are required to take one course in each of the two areas as specified below.

The remainder of the 35 required units may be fulfilled with any intermediate-level elective Communication courses or crosslisted courses in other departments. No more than 5 units of course work outside of the department or transfer credit may be applied to meet department requirements. Communication minors must receive a letter grade for all Communication courses unless they are offered only for satisfactory/no credit (S/NC), and must maintain a grade point average (GPA) of 2.0 (C) in courses towards the minor. Only courses with a grade of C- or above count towards the minor. Some courses are not offered every year. Refer to ExploreCourses (<http://explorecourses.stanford.edu>) for details.

Area I: Communication Processes and Effects

		Units
Select one of the following:		
COMM 122	Content Analysis: Studying Communication Artifacts	5
COMM 123	Argumentation and Persuasion	5
COMM 135	Deliberative Democracy and its Critics	5
COMM 137W	The Dialogue of Democracy	5
COMM 160	The Press and the Political Process	5
COMM 162	Campaigns, Voting, Media, and Elections	5
COMM 164	The Psychology of Communication About Politics in America	5
COMM 166	Virtual People	5
COMM 168	Experimental Research in Advanced User Interfaces	5
COMM 169	Computers and Interfaces	5
COMM 172	Media Psychology	5
COMM 183	Social Media Literacies	5
COMM 326	Advanced Topics in Human Virtual Representation	1-5

Area II: Communication Systems/Institutions

		Units
Select one of the following:		
COMM 104W	Reporting, Writing, and Understanding the News	5
COMM 113	Computational Methods in the Civic Sphere	5
COMM 116	Journalism Law	5
COMM 117	Digital Journalism	5
COMM 120W	Digital Media in Society	5
COMM 125	Perspectives on American Journalism	5
COMM 131	Media Ethics and Responsibility	5
COMM 140	Digital Media Entrepreneurship	3-5
COMM 142W	Media Economics	5
COMM 151	The First Amendment: Freedom of Speech and Press	5
COMM 182	Social Media Issues	5

COMM 143 Communication Policy & Regulation offered in 2013-14 also fulfills Area II requirement.

Elective courses

Totalling 10 units.

Master of Arts in Communication / Graduate Program in Journalism

University requirements for the master's degree are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

The department awards a terminal M.A. degree in Communication with a subplan in Journalism. This subplan prints on the transcript, but not on the diploma. Applicants for this program are evaluated for admission on different criteria. Work to fulfill graduate degree requirements must be in courses numbered 100 or above.

Stanford students who are completing an M.A. degree and who desire entry into the Ph.D. program must file a Graduate Program Authorization Petition (<http://studentaffairs.stanford.edu/registrar/students/grad-auth-pet>) in Axess. Such students are considered alongside all other doctoral applicants.

Journalism

Stanford's graduate program in Journalism focuses on the knowledge and skills required to report, analyze, and write authoritatively about public issues and digital media. The curriculum combines a sequence of specialized reporting and writing courses with seminars and courses devoted to deepening the students' understanding of the roles and responsibilities of American news media in their coverage of public issues.

The program emphasizes preparation for the practice of journalism and a critical perspective from which to understand it. The program's objective is twofold:

1. to graduate talented reporters and writers to foster public understanding of the significance and consequences of public issues and the debates they engage; and
2. to graduate thoughtful journalists to respond openly and eloquently when called on to explain and defend the methods and quality of their reporting and writing.

Curriculum

The curriculum includes several required courses as shown below, including a master's project class:

		Units
COMM 216	Journalism Law	4
COMM 225	Perspectives on American Journalism	4
COMM 240	Digital Media Entrepreneurship	3-5
COMM 273D	Public Affairs Data Journalism I	4
COMM 274D	Public Affairs Data Journalism II	4
COMM 275	Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video	3-4
COMM 279	News Reporting & Writing Fundamentals	3-4
COMM 289P	Journalism Thesis	4
COMM 291	Graduate Journalism Seminar	1

Additionally, students are usually required to take two specialized reporting courses, chosen from a list of seven or eight, and two approved electives from among graduate-level courses in the Department of Communication, or from among courses on campus that deal substantively with issues of public importance. The M.A. degree in Communication (Journalism) requires a minimum of 45 units.

Except for COMM 291 Graduate Journalism Seminar and COMM 289P Journalism Thesis, all courses must be taken for a letter grade. To remain

in good academic standing, students must maintain a grade point average (GPA) of 3.0 or better. Graduation requires a GPA of 3.0 or better.

Journalism Project

The Journalism Thesis (COMM 289P), a requirement for graduation, is intended as an opportunity for students to showcase their talents as writers and reporters. It is also an opportunity to undertake an in-depth critique of an area of journalism in which the author has a special interest. Work on the project usually begins during Winter Quarter and continues through Spring Quarter in the form of the class COMM 289P, Master's Project. Completed master's projects must be submitted to the project adviser no later than the last day of classes in the Spring Quarter. The project represents a major commitment of time, research, and writing. Although it is not a requirement that the project be published, it must be judged by a member of the faculty to be of a quality acceptable for publication. At a minimum, the project should demonstrate the rigor and discipline required of good scholarship and good journalism; it should offer ample evidence of students' ability to gather, analyze, and synthesize information in a manner that goes beyond what ordinarily appears in daily news media. The deadline to submit the master's thesis is the last day of classes in Spring Quarter.

Media Studies Coterminal Master's Program

The Department of Communication offers current Stanford University undergraduates a one-year coterminal program with an M.A. subplan in Media Studies specializing in either social sciences or journalism. This subplan prints on the transcript, but not on the diploma.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Admission

Applications for coterminal study must be submitted at least four quarters in advance of the expected master's degree conferral date. Applicants must have earned a minimum of 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. This includes allowable advanced placement (AP) and transfer credit. Applications must be submitted no later than January 22, 2015, for admission beginning in either Spring Quarter 2014-15 or Autumn or Winter Quarter 2015-16. Journalism track students may begin the program only in Spring Quarter of their senior year. Requirements include: Application for Admission to Coterminal Master's Program form, preliminary program proposal, statement of purpose, letters of recommendation from Stanford professors (two for social sciences, three for journalism track), a written statement from a Communication professor agreeing to act as a graduate adviser (social sciences track only), three samples of writing (journalism track only), and a current unofficial Stanford transcript. GRE scores are not required. Coterminal applications are submitted directly to the department. Review procedures and the Graduate Admissions Committee determine criteria.

Degree Requirements

The Media Studies coterminal master's program provides a broad introduction to scholarly literature in mass communication and offers a social sciences or journalism track. Journalism track students may begin the program only in Spring Quarter of their senior year during which time one elective course is taken towards the master's program and any remaining requirements for the undergraduate degree are completed. In the following academic year, journalism track students follow the same curriculum as students in the Graduate Program in Journalism (see Master of Arts-Journalism section), less one elective course. Social Science track students need to satisfy the following four basic requirements:

1. **Required Units and GPA:** students must complete a minimum of 45 units in Communication and related areas, including items 2 and 3 below. Courses must be taken for a letter grade if offered. Courses in related areas outside the department must be approved by the student's adviser. A minimum of 36 units must be in the Communication department. No more than two courses (not including the statistics prerequisite) may be below the 200 level. To remain in good academic standing students must maintain a grade point average (GPA) of 3.0 or better. Graduation requires a GPA of 3.0 or better.
2. **Core Requirements:** students must complete COMM 206 Communication Research Methods, COMM 208 Media Processes and Effects and an approved statistics course such as STATS 160 Introduction to Statistical Methods: Precalculus. Other courses occasionally are approved as a substitute before the student is admitted to the program. The statistics course does not count toward the 45 units.
3. **Six Media Studies Courses:** Students must complete a minimum of six additional Communication courses concerned with the study of media from the following list. Not all the listed courses are offered every year and the list may be updated from one year to the next. In addition to the core requirements and a minimum of six courses listed below, students may choose additional courses from the list and any related course approved by the student's adviser.

		Units
COMM 211	Mass Media, Society, and Democracy	4
COMM 213	Computational Methods in the Civic Sphere	4
COMM 216	Journalism Law	4
COMM 217	Digital Journalism	4
COMM 220	Digital Media in Society	4
COMM 222	Content Analysis: Studying Communication Artifacts	4
COMM 223	Argumentation and Persuasion	4
COMM 225	Perspectives on American Journalism	4
COMM 231	Media Ethics and Responsibility	4
COMM 235	Deliberative Democracy and its Critics	3-5
COMM 237	The Dialogue of Democracy	4
COMM 240	Digital Media Entrepreneurship	3-5
COMM 242	Media Economics	4
COMM 243	Communication Policy and Regulation	4
COMM 251	The First Amendment: Freedom of Speech and Press	4
COMM 260	The Press and the Political Process	4
COMM 262	Campaigns, Voting, Media, and Elections	4
COMM 264	The Psychology of Communication About Politics in America	4
COMM 266	Virtual People	4
COMM 269	Computers and Interfaces	4
COMM 272	Media Psychology	4
COMM 277A	Computational Journalism	4
or COMM 277C	Specialized Writing and Reporting: Environmental Journalism	
or COMM 277D	Specialized Writing and Reporting: Magazine Journalism	
or COMM 277G	Specialized Writing and Reporting: Covering Silicon Valley	
or COMM 277I	Becoming a Watchdog: Investigative Reporting Techniques	
or COMM 277S	Specialized Writing and Reporting: Sports Journalism	
or COMM 271	Moving Pictures: How the Web, Mobile and Tablets are Revolutionizing Video Journalism	

or COMM 275	Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video	
or COMM 276	Advanced Digital Media Production	
COMM 282	Social Media Issues	4
COMM 283	Social Media Literacies	4
COMM 326	Advanced Topics in Human Virtual Representation	1-5

4. **The Media Studies M.A. Project:** students following the social sciences track enroll in COMM 290 Media Studies M.A. Project to complete a project over two consecutive quarters that must be preapproved and supervised by the adviser. The completed M.A. project must be submitted to the adviser no later than the last day of classes of the second consecutive quarter.

Additional courses are chosen in consultation with an academic adviser.

Doctor of Philosophy in Communication

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin. The minimum number of academic units required for the Ph.D. at Stanford is 135, up to 45 of which can be transferred either from a master's degree at the University or from another accredited institution.

The department offers a Ph.D. in Communication, which focuses on theory and research. First-year students are required to complete introductory courses in communication theory and research, research methods, and statistics. These core courses, grounded in the social science literature, emphasize how people respond to media and how media institutions function. In addition, Ph.D. students must complete a minimum of three literature survey courses and related advanced seminars in Communication. Students also take significant course work outside the department in their area of interest. Each student builds a research specialty relating communication to current faculty interests in such areas as ethics, computational journalism, information processing, information technology, law, online communities, politics and voting, and virtual reality. Regardless of the area of specialization, the Ph.D. program is designed primarily for students interested in university research and teaching or other research or analyst positions.

The Ph.D. program encompasses four to five years of graduate study (subsequent to completion of the Bachelor's degree) during which, in addition to fulfilling University residency requirements, Ph.D. candidates are required to:

1. Complete all departmental course requirements listed below with grades of 'B+' or above, with the exception of STATS 160 ('B' minimum) and an advanced methods course ('B-' minimum). Required courses:

		Units
COMM 206	Communication Research Methods	4
COMM 208	Media Processes and Effects	4
COMM 301	Communication Research, Curriculum Development and Pedagogy	1
COMM 311	Theory of Communication	1-5
COMM 314	Qualitative Social Science Research Methods	1-5
COMM 317	The Philosophy of Social Science	1-5
COMM 318	Quantitative Social Science Research Methods	1-5
STATS 160	Introduction to Statistical Methods: Precalculus	5

One advanced methods course.

2. Pass the general qualifying examinations by the end of the second academic year of study and pass a specialized area examination by the end of the fourth academic year of study.

3. Demonstrate proficiency in tools required in the area of research specialization. Identified with the advice of the faculty, such tools may include detailed theoretical knowledge, advanced statistical methods, a foreign language, computer programming, or other technical skills.
4. Complete at least two pre-dissertation research projects (the Major Project and the Minor Project) by the end of the student's 11th academic quarter.
5. Teach or assist in teaching at least two courses, preferably two different courses, at least one of which is ideally a core undergraduate course:

		Units
COMM 1A	Mass Media, Society, and Democracy	5
COMM 1B	Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

6. Complete a dissertation proposal and proposal meeting approved by the dissertation committee.
7. Apply for candidacy by the end of the first week of the student's sixth quarter.
8. Complete a dissertation satisfactory to a reading committee of three or more faculty members in the Department of Communication and one faculty member outside of the Department of Communication.
9. Pass the University oral examination, which is a defense of the dissertation.

Because the multifaceted nature of the department makes it possible for the Ph.D. student to specialize in areas that draw on different related disciplines, the plan of study is individualized and developed between the faculty adviser and the student.

Ph.D. candidacy is valid for five years.

Additional information is available on the Ph.D. program page (<http://comm.stanford.edu/phd/rules>) of the department web site.

Ph.D. Minor in Communication

Candidates for the Ph.D. degree in other departments who elect a minor in Communication are required to complete a minimum of 20 units of graduate courses in the Department of Communication, including a total of three theory or research methods courses, and are examined by a representative of the department. A department adviser in consultation with the individual student determines the particular communication theory and methods courses.

Emeriti: (Professors) Henry S. Breitrose, Donald F. Roberts; (Professor, Teaching) Marion Lewenstein

Chair: James T. Hamilton

Director, Doctoral Program in Communication: Jeremy Bailenson

Director, John S. Knight Journalism Fellowships: James R. Bettinger

Director, Media Studies: Byron Reeves

Director, Undergraduate Studies: Theodore L. Glasser

Managing Director, John S. Knight Journalism Fellowships: Dawn E. Garcia

Director, Journalism: James T. Hamilton

Professors: James S. Fishkin, Theodore L. Glasser, James T. Hamilton, Shanto Iyengar, Jon Krosnick, Byron B. Reeves

Associate Professors: Jeremy Bailenson, Fred Turner

Courtesy Professors: Jan Krawitz, Nathaniel Persily, Walter Powell, Kristine M. Samuelson

Lorry I. Lokey Professor of the Practice: Ann Grimes

Hearst Professionals in Residence: Daniel Nguyen, Cheryl Phillips

Lorry I. Lokey Visiting Professor in Professional Journalism: Geri Migielicz

Carlos Kelly McClatchy Visiting Lecturer: Janine Zacharia

Lecturers: Thomas Hayden, Gary Pomerantz, Howard Rheingold, Gaurav Sood, Philip Taubman, David Voelker, James Wheaton

Overseas Studies Courses in Communication

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBEIJ 20	Communication, Culture, and Society: The Chinese Way	4
OSPBEIJ 42	Chinese Media Studies	4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5

Comparative Literature

Courses offered by the Department of Comparative Literature, are listed under the subject code COMPLIT on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPLIT&filter-catalognumber-COMPLIT=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPLIT&filter-catalognumber-COMPLIT=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPLIT&filter-catalognumber-COMPLIT=on>).

The Department of Comparative Literature offers courses in the history and theory of literature through comparative approaches. The department accepts candidates for the degrees of Bachelor of Arts and Doctor of Philosophy. The department is a part of the Division of Literatures, Cultures, and Languages (p. 411).

The field of Comparative Literature provides students the opportunity to study imaginative literature in all its forms. While other literary disciplines focus on works of literature as parts of specific national or linguistic traditions, Comparative Literature draws on literature from multiple contexts in order to examine the nature of literary phenomena from around the globe and from different historical moments, while exploring how literature interacts with other elements of culture and society. We study literary forms such as fictional narratives, performance and poetry, as well as cinema, music, and emerging aesthetic media.

Along with the traditional model of comparative literature that juxtaposes two or more national literary cultures, the department supports teaching and research that examine literary phenomena with additional tools of inquiry such as literary theory, the relationship between literature and philosophy, and the enrichment of literary study with other disciplinary methodologies. Comparative Literature also encourages the study of aspects of literature that surpass national boundaries, such as transnational literary movements or the creative adaptation of particular genres to local cultures. In each case, students emerge from the program with enhanced verbal and writing skills, a command of literary studies, the ability to read analytically and critically, and a more global knowledge of literature.

Mission of the Undergraduate Program in Comparative Literature

The mission of the undergraduate program in Comparative Literature is to enhance students' verbal and written communication skills, their ability to read analytically and critically as well as to develop their global knowledge of literary cultures and the specific properties of literary texts. The program provides students with the opportunity to study imaginative literature in all of its forms, investigating the complex interplay of the literary imagination and historical and social experience.

Along with providing core courses that introduce students to major literary forms in a comparative frame, our program of study is flexible in order to accommodate student interest in areas such as specific geographic regions, historical periods, and interdisciplinary connections between literature and other fields such as philosophy, music, the visual arts, gender and queer theory, studies in race and ethnicity. A Comparative Literature major prepares a student to become a better reader and interpreter of literature, through enhanced examination of texts and the development of a critical vocabulary with which to discuss them. Attention to verbal expression and interpretive argument serves students who plan to proceed into careers requiring strong language and communication skills, as well as deeper cross-cultural knowledge of the world.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to interpret a literary text in a non-native language or to compare literary texts from different linguistic traditions, which may be read in translation.
2. a self-reflective understanding of the critical process necessary to read and understand texts.
3. skills in writing effectively about literature.
4. skills in oral communication and public speaking about literature.

Graduate Programs in Comparative Literature

The department offers a Doctor of Philosophy and a Ph.D. minor in Comparative Literature.

Learning Outcomes (Graduate)

Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to

1. make original contributions to the knowledge of Comparative Literature and to interpret and present the results of such research,
2. teach literary analysis and interpretation at all levels with broad historical, cultural and linguistic understanding, and
3. apply such analysis, interpretation and understanding to a range of fields and vocations.

Bachelor of Arts in Comparative Literature

The major in Comparative Literature requires students to enroll in a set of core courses offered by the department, to complete electives in the department, and to enroll in additional literature courses, or other courses approved by the Chair of Undergraduate Studies, offered by other departments. This flexibility to combine literature courses from several departments and to address literature from multiple traditions is the hallmark of the Comparative Literature major. Students may count courses which read literature in translation; however, students, and especially those planning to pursue graduate study in Comparative Literature, are encouraged to develop a command of non-native languages.

Declaring the Major

Students declare the major in Comparative Literature through Axess. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study. Majors are also urged to attend department events such as public talks and conferences.

Advising

Students majoring in Comparative Literature should consult with the Chair of Undergraduate Studies at least once a quarter. The chair monitors progress to completion of the degree. Students are also encouraged to develop relationships with other faculty members who may act as mentors.

Overseas Campuses and Abroad Programs

The Department of Comparative Literature encourages time abroad, both for increased proficiency in language and the opportunity for advanced course work. Course work done at campuses other than Stanford is counted toward the major at the discretion of the Chair of Undergraduate Studies and is contingent upon the Office of the University Registrar's approval of transfer credit. To that end, students abroad are advised to save syllabi, notes, papers, and correspondence.

Degree Requirements

All majors in Comparative Literature (including honors) are required to complete the following requirements. All courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each core course.

1. COMPLIT 101 What is Comparative Literature?. This gateway to the major is normally taken by the end of sophomore year. It provides an introduction to literature and its distinctions from other modes of linguistic expression, and a fundamental set of interpretive skills. This course fulfills the Writing in the Major requirement.
2. *Core Courses (5 units each)*
Students should complete these courses as soon as possible. Each course draws on examples from multiple traditions to ask questions about the logic of the individual genres.

COMPLIT 121 Poems, Poetry, Worlds

Units

5

COMPLIT 122	Literature as Performance: The Potentials of Theater	5
COMPLIT 123	The Novel, the Global South	5

- COMPLIT 199 Senior Seminar: The Pleasures of Reading. This senior seminar is designed as a culmination to the course of study while providing reflection on the nature of the discipline. Topics vary.
- Electives:** Majors must complete at least 40 units of electives. The remaining courses should form a coherent intellectual focus requiring approval from the Director of Undergraduate Studies and may be drawn from Comparative Literature offerings, from other literature departments, or from other fields of interdisciplinary relevance. Up to 10 units of Thinking Matters or SLE courses may be counted towards the elective requirement. Electives are subject to adviser consultation and approval.
- Total unit load:** Students must complete course work for a total of at least 65 units.

Philosophical and Literary Thought

Undergraduates may major in Comparative Literature and Philosophy. The Philosophy specification is not declared in Axxess and does not appear on either the transcript or the diploma. Students in this option take courses alongside students from other departments that also have specialized options associated with the program for the study of Philosophical and Literary Thought. Each student in this option is assigned an adviser in Comparative Literature, and student schedules and courses of study must be approved in writing by the adviser, the Chair of Undergraduate Studies of Comparative Literature, and the Chair of Undergraduate Studies of the program. See the Philosophy + Literature @ Stanford (<http://phililit.stanford.edu>) web site.

A total of 65 units must be completed for this option, including the following requirements:

- Seven courses taught by Comparative Literature faculty. Of the seven, the following five (5 units each) are required courses:

		Units
COMPLIT 101	What is Comparative Literature?	5
COMPLIT 121	Poems, Poetry, Worlds	5
COMPLIT 122	Literature as Performance: The Potentials of Theater	5
COMPLIT 123	The Novel, the Global South	5
COMPLIT 199	Senior Seminar: The Pleasures of Reading	5

The remaining two courses must be instructed by Comparative Literature faculty and approved by the Chair of Undergraduate Studies.

- Philosophy and Literature Gateway Course (4 units):** COMPLIT 181 Philosophy and Literature. This course should be taken as early as possible in the student's career, normally in the sophomore year.
- Philosophy Writing in the Major (5 units):** PHIL 80 Mind, Matter, and Meaning. Prerequisite: introductory philosophy class.
- Aesthetics, Ethics, Political Philosophy (ca. 4 units):** One course from the PHIL 170 series.
- Language, Mind, Metaphysics, and Epistemology (ca. 4 units):** One course from the PHIL 180 series.
- History of Philosophy (ca. 8 units):** Two courses in the history of philosophy, numbered above PHIL 100.
- Related Courses (ca. 8 units):** Two upper division courses relevant to the study of philosophy and literature as identified by the committee in charge of the program. A list of approved courses is available from the undergraduate advisor of the program in philosophical and literary thought.

- One course, typically in translation, in a literature distant from that of the student's concentration and offering an outside perspective on that literary tradition.
- Capstone Seminar (ca. 4 units):** In addition to COMPLIT 199 Senior Seminar: The Pleasures of Reading, students take a capstone seminar of relevance to philosophy and literature approved by the undergraduate adviser of the program in philosophical and literary thought. The student's choice of a capstone seminar must be approved in writing by the Chair of Undergraduate Studies of Comparative Literature and by the Chair of Undergraduate Studies of the program. Offered this year are:

		Units
COMPLIT 217	The Poetry of Friedrich Holderlin	3-5
FRENCH 228E	Getting Through Proust	3-5
PHIL 193D	Dante and Aristotle	5
PHIL 194L	Montaigne	4

- Seminar Paper Requirement:** Students must write at least one seminar paper that is interdisciplinary in nature. This paper brings together material from courses taken in philosophy and literature, and may be an honors paper (see below), an individual research paper (developed through independent work with a faculty member), or a paper integrating materials developed for two separate courses (by arrangement with the two instructors). Though it may draw on previous course work, the paper must be an original composition, 18-20 pages in length. It must be submitted to the Chair of Undergraduate Studies and receive approval no later than the end of Winter Quarter in the fourth year of study.

At least two of the courses counted toward requirements 1, 2, 7, 8, and 9 must be taught by Comparative Literature faculty. Transfer units may not normally be used to satisfy requirements 2, 3, 4, 5, 6 and 9. Units devoted to acquiring language proficiency are not counted toward the 65-unit requirement.

Honors Program

Comparative Literature majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than

5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional): DLCL 189C Honors Thesis Seminar, 2-4 units S/NC, under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required): DLCL 189A Honors Thesis Seminar, 4 units S/NC, taught by a DLCL appointed faculty member. Course focuses on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required): DLCL 189B Honors Thesis Seminar, 2-4 units letter grade, under the primary thesis adviser. Focus is on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
4. Spring quarter of the senior year (option; mandatory if not taken during junior year): DLCL 189C Honors Thesis Seminar, 2-4 units S/NC, under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
5. Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation, 1 unit S/NC. Enroll with primary thesis adviser.

Minor in Comparative Literature

The undergraduate minor in Comparative Literature represents an abbreviated version of the major. It is designed for students who are unable to pursue the major but who nonetheless seek an opportunity to gain a deeper understanding of literature. Plans for the minor should be discussed with the Chair of Undergraduate Studies. The minimum number of units required for a minor at Stanford is 20, and all courses must be taken for a letter grade. Requirements for the minor in Comparative Literature include:

	Units
COMPLIT 101 What is Comparative Literature?	5
Select one of the following:	5
COMPLIT 121 Poems, Poetry, Worlds	
COMPLIT 122 Literature as Performance: The Potentials of Theater	
COMPLIT 123 The Novel, the Global South	
At least two other Comparative Literature courses.	10

Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Modern Languages. This minor draws on literature and language courses offered in this and other literature departments. See the "Literatures, Cultures, and Languages (p. 412)" section of this bulletin for requirements.

Doctor of Philosophy in Comparative Literature

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The Ph.D. program is designed for students whose linguistic background, breadth of interest in literature, and curiosity about the problems of literary scholarship and theory (including the relation of literature to other disciplines) make this program more appropriate to their needs than the Ph.D. in one of the individual literatures. Students take courses in at least three literatures (one may be that of the native language), to be studied in

the original. The program is designed to encourage familiarity with the major approaches to literary study prevailing today.

Before starting graduate work at Stanford, students should have completed an undergraduate program with a strong background in one literature and some work in a second literature studied in the original language. Since the program demands an advanced knowledge of two non-native languages and a reading knowledge of a third non-native language, students should at the time of application have an advanced enough knowledge of one of the three to take graduate-level courses in that language when they enter the program. They should be making enough progress in the study of a second language to enable them to take graduate courses in that language not later than the beginning of the second year, and earlier if possible. Language courses at the 100- or 200- level may be taken with approval from the Chair of the department or the Chair of Graduate Studies. Applicants are expected to take an intensive course in the third language before entrance.

Students are admitted under a financial plan which attempts to integrate financial support and completion of residence requirements with their training as prospective university teachers. Tenure as a Ph.D. student, assuming satisfactory academic progress, is for a maximum of five years.

Application Procedures

Competition for entrance into the program is extremely keen. The program is kept small so that students have as much opportunity as possible to work closely with faculty throughout the period of study. Applicants should review all course and exam requirements, advancement requirements, and teaching obligations carefully before applying to the program. Because of the special nature of comparative literary studies, the statement of purpose included in the application for admission must contain the following information:

1. A detailed description of the applicant's present degree of proficiency in each of the languages studied, indicating the languages in which the applicant is prepared to do graduate work at present and outlining plans to meet additional language requirements of the program.
2. A description of the applicant's area of interest (for instance, theoretical problems, genres, periods) within literary study and the reasons for finding comparative literature more suitable to his or her needs than the study of a single literature. Applicants should also indicate their most likely prospective primary field, including the literatures on which they intend to concentrate.
3. An explanation of how the applicant's undergraduate education has prepared them for work in our program. If there are any gaps in the applicant's preparation, they should explain how they plan to address those gaps.
4. The applicant's specific reasons for wishing to study in our department of Comparative Literature.
5. All applicants should arrange to have the results of the general section of the Graduate Record Examination sent to Stanford University, ETS code 4704.
6. A letter of recommendation that focuses on the applicant's language skills, or a current ACTFL Oral Proficiency Interview (OPI) certificate, or a critical paper written in a non-native language.
7. Recommendations should, if possible, come from faculty in at least two of the literatures in which the student proposes to work.
8. Applicants must submit a copy of an undergraduate term paper which they consider representative of their best work, preferably containing a comparative analysis.

For further information see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Degree Requirements

Residence

A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the B.A. degree. The student must take 135 units of graduate work, in addition to the doctoral dissertation. At least three consecutive quarters of course work must be taken at Stanford.

Languages

Students must know three non-native languages, two of them sufficiently to qualify for graduate courses in these languages and the third sufficiently to demonstrate the ability to read a major author in this language. Only the third language may be certified by examination. The other two are certified by graduate-level course work specified below. Language preparation must be sufficient to support graduate-level course work in at least one language during the first year and in the second language during the second year. Students must demonstrate a reading knowledge of the third non-native language no later than the beginning of the third year.

Literatures made up of works written in the same language (such as Spanish and Latin American) are counted as one. One of the student's three literatures usually is designated as the primary field, the other two as secondary fields, although some students may offer two literatures at the primary level (six or more graduate courses).

Teaching

Students, whatever their sources of financial support, are ordinarily required to undertake a total of five quarters of supervised apprenticeships and teaching at half time. Students must complete whatever pedagogy courses are required by the departments in which they teach. The department's minimum teaching requirement is a total of three quarters.

Minimum Course Requirements

Students are advised that the range and depth of preparation necessary to support quality work on the dissertation, as well as demands in the present professional marketplace for coverage of both traditional and interdisciplinary areas of knowledge, render these requirements as bare minimums. The following are required:

1. Required Courses:

	Units
COMPLIT 369 Introduction to Graduate Studies: Criticism as Profession	3
COMPLIT 396L Pedagogy Seminar I	2
DLCL 301 The Learning and Teaching of Second Languages	3

- A sufficient number of courses (six or more) in the student's primary field to assure knowledge of the basic works in one national literature from its beginnings until the present.
- At least two additional complementary courses, with most of the reading in the original, in each of two different national literatures. Students whose primary field is a non-native language are required to take two courses in one additional literature not their own.

Minimum course requirements must be completed before the student is scheduled to take the University oral examination. These requirements are kept to a minimum so that students have sufficient opportunity to seek out new areas of interest. A course is an offering of 3-5 units. Independent study may take the place of up to two of the required courses, but no more; classroom work with faculty and other students is central to the program. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the university, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective

measures which may include a written warning, academic probation, and/or the possible release from the program.

Dissertation Reading Committee

The chair of the dissertation committee must be an Academic Council member and a member of the Comparative Literature faculty. Under highly unusual circumstances a student may petition to have a Stanford faculty member from outside Comparative Literature serve, but it would be at the discretion of the department as to whether or not to honor that request.

Examinations

Three examinations are required. The first two are one-hour exams. The first of these two is taken at the end of the student's first year of study; the second is taken at the start of the second year. Students should meet with the members of the exam committee to discuss their plans for the exams. The first of these is on literary genre, designed to demonstrate the student's knowledge of a substantial number of literary works in a single genre, ranged over several centuries and over at least three national literatures. This exam is also designed to demonstrate the student's grasp of the theoretical problems involved in his or her choice of genre and in the matter of genre in general. The second of these examinations is on literary theory and criticism, designed to demonstrate the student's knowledge of a particular problem in the history of literary theory and criticism, or the student's ability to develop a particular theoretical position. In either case, this exam should demonstrate wide reading in theoretical and critical texts from a variety of periods. The third and last is the University oral examination, which covers a literary period, to consist of in-depth knowledge of a period of approximately a century in three or more literatures with primary emphasis on a single national literature or, in occasional cases, two national literatures.

- First One-Hour Examination:** The genre exam is generally administered the second week of April of the student's first year. All first-year students take the exam during the same period, with an examination committee established by the department. Exam lists should be approved by the Chair of Graduate Studies well in advance of the exam. Students are urged to focus on poetry, drama, or the novel or narrative, combining core recommendations from the department with selections from their individual areas of concentration. Any student who does not pass the exam has the opportunity to retake the exam the second week of May of the same quarter. Students who do not pass this exam a second time may be dismissed from the program.
- Second One-Hour Examination:** The theory exam is administered the Autumn Quarter of the student's second year. All second-year students take the exam during the same period, with an examination committee established by the department. Exam lists should be approved by the Chair of Graduate Studies well in advance of the exam. Any student who does not pass the exam has the opportunity to retake the exam the second week of the Winter Quarter. Students who do not pass this exam a second time may be dismissed from the program.
- University Oral Examination:** Students are required to take this exam during the Autumn Quarter of their third year. The oral exam is individually scheduled, with a committee established by the student in consultation with the Chair of Graduate Studies. The reading list covers chiefly the major literary texts of a period of approximately one hundred years but may also include some studies of intellectual backgrounds and modern critical discussions of the period. Students must demonstrate a grasp of how to discuss and define this period as well as the concept of periods in general. This examination is not to be on the dissertation topic, on a single genre, or on current criticism, but rather on a multiplicity of texts from the period. Students whose course work combines an ancient with a modern literature have the option of dividing the period sections into two wholly separate periods.

Qualifying Procedures Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the PhD program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, coursework, performance on the Qualifying Exam (Genre Exam), and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of Comparative Literature conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (<http://exploreddegrees.stanford.edu/graduatedegrees/#doctoraltext-candidacy>) and GAP (<http://gap.stanford.edu/4-6.html>).

Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

Prospectus Colloquium

The prospectus colloquium normally takes place during the spring of the third year. The student should furnish the committee with a five-page prospectus, 20-page draft of a chapter, and working bibliography well before the colloquium. The colloquium lasts one hour, begins with a brief introduction to the dissertation prospectus by the student lasting no more than five minutes, and consists of a discussion of the prospectus by the student and the three readers of the dissertation. At the end of the hour, the faculty readers vote on the outcome of the colloquium. If the outcome is favorable (by majority vote), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory (by majority vote), the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second colloquium.

The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. It must be submitted in its final form to the readers no later than one week before the colloquium. A prospectus should not exceed ten double spaced pages, in addition to

which it should include a working bibliography of primary and secondary sources. It should offer a synthetic overview of the dissertation, describe its methodology and the project's relation to prior scholarship on the topic, and lay out a complete chapter by chapter plan.

It is the student's responsibility to schedule the colloquium no later than the first half of the quarter after that quarter in which the student passed the University Oral Examination. The student should arrange the date and time in consultation with the department administrator and with the three examiners. The department administrator schedules an appropriate room for the colloquium.

Members of the dissertation reading committee are ordinarily drawn from the University oral examination committee.

Ph.D. Minor in Comparative Literature

This minor is designed for students working toward the Ph.D. in the various foreign language departments. Students working toward the Ph.D. in English are directed to the program in English and Comparative Literature described among the Department of English offerings. Students must have:

1. A knowledge of at least two foreign languages, one of them sufficient to qualify for graduate-level courses in that language, the second sufficient to read a major author in the original language.
2. A minimum of six graduate courses, of which three must be in the department of the second literature and three in the Department of Comparative Literature, the latter to include a seminar in literary theory or criticism. At least two of the three courses in comparative literature should originate in a department other than the one in which the student is completing the degree. Except for students in the Asian languages, students must choose a second literature outside the department of their major literature.

Emeriti: (Professors) John Freccero, René Girard, Herbert Lindenberger, Elisabeth Mudimbe-Boyi, Mary Pratt; (Courtesy Professors) W. B. Carnochan, Gerald Gillespie, David G. Halliburton, Marjorie G. Perloff

Director: Amir Eshel

Chair of Graduate Admissions: Amir Eshel

Chair of Graduate Studies: Hans U. Gumbrecht

Chair of Undergraduate Studies: Haiyan Lee

Professors: Vincent Barletta (Iberian and Latin American Cultures, Comparative Literature), John Bender (English, Comparative Literature) (on leave, Spring), Russell Berman (German Studies, Comparative Literature), Margaret Cohen (Comparative Literature, English), Amir Eshel (German Studies, Comparative Literature), Roland Greene (English, Comparative Literature) (on leave), Hans U. Gumbrecht (French and Italian, Iberian and Latin American Cultures, Comparative Literature), Joshua Landy (French & Italian, Comparative Literature) Franco Moretti (English, Comparative Literature), David Palumbo-Liu (Comparative Literature), Patricia Parker (English, Comparative Literature), Joan Ramón Resina (Iberian and Latin American Cultures, Comparative Literature) (on leave), José David Saldívar (Comparative Literature), Ramón Saldívar (English, Comparative Literature), Ban Wang (East Asian Languages and Cultures, Comparative Literature)

Associate Professors: Monika Greenleaf (Slavic Languages and Literatures, Comparative Literature) (on leave), Haiyan Lee (East Asian Languages and Cultures, Comparative Literature), Indra Levy (East Asian Languages and Cultures, Comparative Literature)

Assistant Professor: Alexander Key (Arabic and Comparative Literature)

Courtesy Professor: Nancy Ruttenburg

Senior Lecturer: Vered K. Shemtov (Hebrew)

Lecturers: Nikolas Damiris (Winter) Petra Dierkes-Thrun, Burcu Karahan (Turkish)

Mellon Fellow: Alvan Ikoku

Comparative Studies in Race and Ethnicity (CSRE)

The Undergraduate Program in Comparative Studies in Race and Ethnicity is home to five areas of study:

- Asian American Studies (courses listed as ASNAMST (<https://explorecourses.stanford.edu/search?q=ASNAMST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-ASNAMST=on&filter-catalognumber-ASNAMST=on>) on ExploreCourses)
- Chicana/o-Latina/o Studies (courses listed as CHILATST ([https://explorecourses.stanford.edu/search?q=CHILATST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=\)](https://explorecourses.stanford.edu/search?q=CHILATST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=))) on ExploreCourses)
- Comparative Studies (courses listed as CSRE (<https://explorecourses.stanford.edu/search?q=CSRE&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CSRE=on&filter-catalognumber-CSRE=on>) on ExploreCourses)
- Jewish Studies (courses listed as JEWISHST (<https://explorecourses.stanford.edu/search?q=JEWISHST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-JEWISHST=on&filter-catalognumber-JEWISHST=on>) on ExploreCourses)
- Native American Studies (courses listed as NATIVEAM (<https://explorecourses.stanford.edu/search?q=NATIVEAM&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-NATIVEAM=on&filter-catalognumber-NATIVEAM=on>) on ExploreCourses)

Students can pursue a major or minor in any of these five areas, and are encouraged to build their interdisciplinary study around a focus or theme. Students can then select from more than 150 course options from across many departments and schools to put together a curriculum, in consultation with our staff and faculty. The major requires 60 units of study and a culminating research project (either a senior paper or honors thesis).

Mission of the Undergraduate Program in Comparative Studies in Race and Ethnicity

The Interdepartmental Program in Comparative Studies in Race and Ethnicity (CSRE) is an interdisciplinary program offering students the

opportunity to investigate the significance of race and ethnicity in all areas of human life.

Devoted to a rigorous analysis of race and ethnicity and using a comparative and interdisciplinary approach, CSRE is committed to promoting and deepening students' understanding of the multiple meanings of racial and ethnic diversity both in the United States and abroad in ways that prepare students for living and working effectively in a multicultural, global society.

The interdisciplinary and integrated nature of our academic programs means that students can take courses from across the university including: anthropology, art, communication, economics, education, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, sociology, theater and performance, among others.

Learning Outcomes (Undergraduate)

The Program in Comparative Studies in Race and Ethnicity expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the undergraduate program. Students are expected to:

1. demonstrate an understanding of interdisciplinary approaches to the knowledge of experiences related to race and ethnicity in the United States.
2. demonstrate the ability to employ diverse analytical resources and comparative modes of study as tools to frame and address research questions.
3. be critical readers of both primary and secondary sources, who can use and properly cite both types of evidence in their written work.
4. actively and critically engage in verbal and/or written discussion of issues.
5. demonstrate analytical writing skills that convey their understanding of the topic.
6. expand their ability to think critically about issues in political, social, scientific, economic and cultural life stemming from the diversity of experiences related to race and ethnicity.

Undergraduate Program in Comparative Studies in Race and Ethnicity

Majors: Core Curriculum

The Interdepartmental Program in Comparative Studies in Race and Ethnicity (CSRE) provides students the opportunity to structure a major or minor in comparative ethnic studies or to focus their course work in a single ethnic studies area. Five majors and minors (Asian American Studies, Chicana/o-Latina/o Studies, Comparative Studies, Jewish Studies, and Native American Studies) are offered as part of the IDP in CSRE. All core courses taken for the major must be taken for a letter grade. The directors of the program and of each major constitute the CSRE curriculum committee, the policymaking body for the interdisciplinary program.

Students who declare any of the five majors participate in a common curriculum consisting of at least two core courses, a methodologies course, and a senior seminar.

There are two types of introductory courses taught by senior CSRE affiliated faculty: core courses that are interdisciplinary and compare how race and ethnicity have historically appeared across groups; and foundational courses that focus on a specific racial or ethnic group. These requirements illustrate how different disciplines approach the study and

interpretation of race and ethnicity and provide a foundation for the student's program of study.

Minors

Students who wish to minor in the study areas must complete a minimum of 30 units from the approved course list, one of which must be a core course and a second that is foundational to the area of study. Proposals for the minor must be approved by the director of each study area.

Directed Reading and Research

Directed reading and research allows students to focus on a special topic of interest. In organizing a reading or research plan, the student consults with the director of the major and one or more faculty members specializing in the area or discipline.

Courses that fulfill directed reading and research requirements:

	Units
ASNAMST 200R Directed Research	1-5
ASNAMST 200W Directed Reading	1-5
CHILATST 200R Directed Research	1-5
CHILATST 200W Directed Reading	1-5
CSRE 200R Directed Research	1-5
CSRE 200W Directed Reading	1-5
NATIVEAM 200R Directed Research	1-5
NATIVEAM 200W Directed Reading	1-5

Senior Seminar

Research and writing of the senior honors thesis or senior paper is under the supervision of a faculty project adviser. All majors in the IDP in CSRE, even those who opt to write honors theses in other departments and programs, must enroll in CSRE 200X CSRE Senior Seminar, offered in Autumn Quarter. The course takes students through the process of researching an honors thesis, including conceptualization, development of prospectus, development of theses, research, analysis, and finally the process of drafting and writing. This course meets the Writing in the Major requirement (WIM). Those who opt to write senior papers are organized into tutorial groups in Autumn Quarter.

Special Programs

CSRE majors have several unique opportunities available to them. The program supports full-time paid summer research internships for those who apply to complete a self-designed research project in collaboration with a community agency. The Public Policy Institute is a two week, pre-Autumn Quarter seminar that provides exposure to critical public policy issues. The residence-based institute provides room and board and all seminar materials for participants, including a visit to Sacramento to meet with policy makers. CSRE also sponsors quarterly luncheons and community programs for all majors and minors, and has a number of service learning courses that couple academic work with work in communities.

Murray House

Murray House, 566 Governor's Avenue, is an undergraduate residence with a CSRE focus that is devoted to developing an intellectual community amongst students interested in the study of race and ethnicity. Programs, including an in-house seminar, are developed with the guidance of CSRE faculty to increase the understanding of issues of race and ethnicity amongst

its residents through social events and discussions. Students may apply for pre-assignment to Murray House to participate in the CSRE Focus. Contact Residential Education for more information.

Honors Program in Comparative Studies in Race and Ethnicity

For Majors in Comparative Studies in Race and Ethnicity

The Interdepartmental Program in Comparative Studies in Race and Ethnicity offers a program leading to honors for majors in:

- Asian American Studies
- Chicana/o-Latina/o Studies
- Comparative Studies
- Jewish Studies
- Native American Studies

The honors program offers an opportunity to do independent research for a senior thesis. It is open to majors who have maintained a grade point average (GPA) of at least 3.5 in the major and 3.3 overall. The honors thesis is intended to enable students to synthesize skills to produce a document or project demonstrating a measure of competence in their specialty.

The application for honors must be submitted by May 20 of the junior year, but students are encouraged to apply earlier. The application includes a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty adviser and a second reader for the thesis project. The faculty adviser for the honors thesis must be an academic council faculty member and affiliated faculty of the student's major.

Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

An honors colloquium held near the end of Spring Quarter affords students an opportunity to present their research formally. Prizes for best undergraduate honors thesis are awarded annually by the CSRE curriculum committee.

Applications are available in the CSRE Undergraduate Program office and on the program web site (<http://csre.stanford.edu/honors.php>).

For Majors in Other Departments

The Interdisciplinary Honors Program for Non-Majors in Comparative Studies in Race and Ethnicity is intended to complement study in any major. Students who participate in the honors program receive their degree from their program of study with departmental honors in Comparative Studies in Race and Ethnicity.

Honors certification will be open to students majoring in any field with a GPA in their chosen major of 3.5 and an overall GPA of 3.3. As a prerequisite, students apply for entry by Spring Quarter of the junior year (deadline June 1), but students are encouraged to begin earlier. During the application process, students outline a plan for course work and design an

honors project in consultation with their proposed thesis adviser and the CSRE senior seminar coordinator.

The application describes how the student may fulfill the course requirements for interdisciplinary honors in CSRE and includes a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty adviser and a second reader for the thesis project. The faculty adviser for the honors thesis must be an academic council faculty member and affiliated faculty of the Center for Comparative Studies in Race and Ethnicity. Applications are available in the CSRE undergraduate program office and on the program web site (<http://csre.stanford.edu/honors.php>).

Students pursuing a minor in Asian American Studies, Chicana/o-Latina/o Studies, Comparative Studies in Race and Ethnicity, Jewish Studies or Native American Studies who wish to pursue honors in their area of study, apply through the process for non-majors. Students may use their course work for the minor toward the requirements of the interdisciplinary honors program.

Requirements:

Students applying for the interdisciplinary honors program in CSRE are required to take the following courses:

CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity
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And a second course identified as core or foundational to CSRE.

Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

Foundational Courses

		Units
AFRICAAM 43	Introduction to African American Literature	3-5
AFRICAAM 105	Introduction to African and African American Studies	5
ASNAMST 146S	Asian American Culture and Community	3-5
CHILATST 171	Mexicans in the United States	5
CHILATST 180E	Introduction to Chicana/o-Latina/o Studies	5

NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

These courses must be completed with a grade of 'B+' or better for the honors program.

In addition, students are required to take:

		Units
A core, foundational, thematic, or cognate course related to the topic of the proposal or honors research (selected in consultation with the thesis advisor)		
CSRE 200X	CSRE Senior Seminar	5
CSRE 200Y	CSRE Senior Honors Research (in Winter and Spring quarters)	1-10
CSRE 200Z	CSRE Senior Honors Research (in Winter and Spring quarters)	1-10

These courses must be completed with a minimum grade of 'B+'. Throughout the year, students work with faculty adviser and the senior seminar coordinator to complete their theses. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

An honors colloquium held near the end of Spring Quarter affords students an opportunity to present their research formally. Prizes for best undergraduate honors thesis are awarded annually by the CSRE curriculum committee.

Asian American Studies

Director: Anthony Antonio

Asian American Studies (AAS) provides an interdisciplinary approach to understanding the historical and current experiences of persons of Asian ancestry in the United States. In using the term Asian American, the AAS faculty recognize that the term seeks to name a rapidly developing, complex, and heterogeneous population and that there is neither a single Asian American identity nor one community that comprises all Asian Americans. Asian Americans include those with ancestral ties to countries or regions in East Asia, South Asia, Southeast Asia, or the Philippines, among others.

AAS brings together courses that address the artistic, historical, humanistic, political, and social dimensions of Asian Americans and is an appropriate course of study for students interested in a variety of concerns related to Asian Americans, including: artistic and cultural contributions; current social significance; historical experiences; immigration, intellectual, and policy issues; relationships with other social groups; and the construction of the notion of Asian American as it addresses important theoretical and practical issues.

1. Core Curriculum

Asian American majors must take the 15-unit CSRE core curriculum including two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course that focuses on a non-Asian ethnic group may be counted toward the 15-unit core requirement.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5

CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

2. Foundational Course

Majors are required to take one foundational course in Asian American Studies. Students who completed ENGLISH 43C/143C in a previous year may count this toward their Foundational Course Requirement.

		Units
ASNAMST 146S/COMPLIT 146/CSRE 146S	Asian American Culture and Community	3-5

3. Area Study

Majors must complete an additional 35 units of course work from an approved list. One course must have an international dimension, preferably a focus on Asia. One course should have a comparative focus, not restricted to Asian American identity. The remaining courses must have an Asian American focus and must be selected from social science and humanities departments.

4. Language Study (optional)

Students may obtain credit for their study of a related Asian language towards their degree. If students take 15 or more units of an Asian language relevant to Asian American Studies, they may apply 5 of those units toward their Asian American Studies degree.

5. Research/Methodology Requirement

Majors are required to complete 5 units of course work focused on research methods relevant to their disciplinary approach as a student in Asian American Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

6. Community Engagement Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in a service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

7. Senior Paper or Honors Thesis

All Asian American Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support

as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

Chicana/o-Latina/o Studies

Director: Tomás Jiménez

Chicana/o-Latina/o Studies is an interdisciplinary major focusing on the U.S. population with origins in the countries of Mexico, Latin America, and/or South America. Students who major or minor in Chicana/o-Latina/o Studies have an opportunity to select from courses in the humanities, social sciences, and courses offered by affiliated faculty in the School of Education. The Chicana/o-Latina/o Studies program affords students an opportunity to explore the culture, society, economy, and politics of this important and growing segment of our national population.

Bachelor of Arts in Chicana/o-Latina/o Studies

A total of 60 units of course work are required for the major.

1. Core Curriculum

Chicana/o-Latina/o Studies majors must take the 15-unit CSRE core curriculum including two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course that focuses on a non-Latino origin group may be counted toward the 15-unit core requirement.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

2. Foundational Courses

Majors are required to take one foundational course in Chicana/o-Latina/o Studies. Students who completed CHICANST/SOC 166 in a previous year may count this toward their foundational course requirement.

		Units
CHILATST 180E	Introduction to Chicana/o-Latina/o Studies	5
CHILATST 171	Mexicans in the United States	5

3. Thematic Concentration

Chicana/o-Latina/o Studies majors select a thematic concentration which allows students to customize their curriculum and to synthesize course work taken across various departments into a coherent focus. Majors complete an additional 35 units of courses relevant to the thematic concentration and approved by the adviser.

4. Language Study (optional)

Students may obtain credit for the study of the Spanish language towards their degree. If students take 15 or more units of Spanish language relevant to Chicana/o-Latina/o Studies, they may apply 5 of those units toward their Chicana/o-Latina/o Studies degree.

5. Research/Methodology Requirement

Majors are required to complete 5 units of course work focused on research methods relevant to their disciplinary approach as a student in Chicana/o-Latina/o Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

6. Community Engagement Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in a service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

7. Senior Paper or Honors Thesis

All Chicana/o-Latina/o Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

Comparative Studies in Race and Ethnicity

Director: David Palumbo-Liu

Comparative Studies in Race and Ethnicity does not focus on a particular ethnic group. Rather, a student in consultation with the adviser designs a curriculum in relation to a thematic concentration that compares various ethnic groups or explores topics that cut across group experiences in the United States and elsewhere in the world. For example, students may compare groups within the U.S., or compare groups in the U.S. to ethnic groups elsewhere, or study the diaspora of a single group or the sovereignty of indigenous peoples within and across different national contexts. Students in this major are able to take advantage of courses in over 22 fields offered by the affiliated faculty of CSRE.

Bachelor of Arts in Comparative Studies in Race and Ethnicity

A total of 60 units of course work are required for the major.

1. Core Curriculum

All CSRE majors enroll in the 15-unit core curriculum, which consists of two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course may be counted toward the 15-unit core requirement.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

2. Thematic Concentration

Comparative Studies majors complete another 40 units of course work relevant to the thematic concentration (p. 401) they have chosen in consultation with the adviser.

3. Research/Methodology Requirement

Majors are required to complete 5 units of coursework focused on research methods relevant to their disciplinary approach as a student in Comparative Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

4. Community Engagement Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in a service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

5. Senior Paper or Honors Thesis

All CSRE majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement,

and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

Jewish Studies

Director: Charlotte Fonrobert

The Jewish Studies major provides students with an understanding of Jewish history, language, literature, religion, thought and politics. Jewish culture originated in the ancient Near East and continues today in many different forms across the globe. Drawing from the Humanities, the Social Sciences and from courses offered by affiliated faculty in the School of Education, the Jewish Studies major seeks to help students understand Jewish identity, thought and self-expression within larger historical and social contexts, and to develop their ability to analyze human experience from different disciplinary perspectives.

In addition to the undergraduate major and minor offered through the interdepartmental program in CSRE, the Taube Center for Jewish Studies offers a full range of guest lectures, conferences, and symposia. Graduate students interested in Jewish Studies should see the separate Jewish Studies (p. 531) section of this bulletin for program information, opportunities, and additional course descriptions.

Bachelor of Arts in Jewish Studies

A total of 60 units of course work are required for the major.

1. Core Curriculum

Jewish Studies majors must take the 15-unit CSRE core curriculum including two core courses and a senior seminar taken in Autumn Quarter of the senior year.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

2. Foundational Courses

Majors are required to take one foundational course in Jewish Studies. Courses offered this year include:

		Units
JEWISHST 71	Jews and Christians: Conflict and Coexistence	3
JEWISHST 183	The Holocaust	4

3. Thematic Concentration

Jewish Studies majors select a thematic concentration which allows students to customize their curriculum and to synthesize course work taken across various departments into a coherent focus. Majors complete at least 20 units of courses at the 100 level or above relevant to the thematic concentration as approved by the Jewish Studies director.

4. Language

One year of Hebrew or another approved Jewish language. Students able to satisfy the first year Hebrew requirement through a proficiency exam are still expected to take an additional year of Hebrew at a higher level or a first year in an additional Jewish language. A maximum of 15 units of language may be counted toward the 60 unit total required for the major.

5. Research/Methodology Requirement

Majors are required to complete 5 units of coursework focused on research methods relevant to their disciplinary approach as a student in Jewish Studies. Students select the methodology course(s) in consultation with their faculty adviser.

6. Community Engagement Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in a service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

7. Senior Paper or Honors Thesis

All Jewish Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

Native American Studies

Director: C. Matthew Snipp

Native American Studies (NAS) provides an intensive approach to understanding the historical and contemporary experiences of Native American people. Attention is paid not only to the special relationship between tribes and the federal government, but to issues across national boundaries, including tribal nations within Canada, and North, Central, and South America. In using the term Native American, the NAS faculty recognize the heterogeneous nature of this population. Native Americans include the Alaska Native population, which comprises Aleuts, Eskimo,

and other Native American people residing in Alaska, as well as Native Hawaiian communities.

The purpose of the Native American Studies major and minor is to introduce students to approaches in the academic study of Native American people, history, and culture. Students who major in Native American Studies have the opportunity of doing advanced work in related fields, including literature, sociology, education, and law. In addition to specialized course work on Native American issues, students also are expected to concentrate in a traditional discipline such as anthropology, history, or psychology to ensure a well rounded educational experience. The area of concentration and related course work should be chosen in consultation with a faculty adviser in Native American Studies. All courses in the program promote the discussion of how academic knowledge about Native Americans relates to the historical and contemporary experiences of Native American people and communities.

Bachelor of Arts in Native American Studies

A total of 60 units of course work are required for the major.

1. Core Curriculum

Native American Studies majors must take the 15-unit CSRE core curriculum, including two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course that focuses on a non-Native American group may be counted toward the 15-unit core requirement.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

2. Foundational Courses

Majors are required to take one foundational course in Native American Studies. Students who completed NATIVEAM/ANTHRO 16 in a previous year may count this course toward their Foundational Course requirement.

		Units
Select one of the following:		
NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

3. Area Study

Majors complete an additional 40 units of course work that satisfy three categories in their area of study: Native American focus, comparative focus, and a methodology/research course.

4. Language Study (optional)

Students may obtain credit for their study of a related native language towards their degree. If students take 15 or more units of a native language relevant to Native American Studies, they may apply 5 of those units toward their Native American Studies degree.

5. Research/Methodology Requirement

Majors are required to complete 5 units of coursework focused on research methods relevant to their disciplinary approach as a student in Native American Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

6. Community Engagement Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in a service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

7. Senior Paper or Honors Thesis

All Native American Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

Thematic Concentration in American Diversity

The American Diversity concentration is designed for students who wish to explore how the United States was and is constituted with relation to issues of race and ethnicity. The concentration investigates how American domestic and foreign policy, law, history, culture, and society are formed within conversations, debates, policies and studies regarding race and ethnicity. Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights and other topics are explored from the angle of how racial and ethnic difference impacts debate and policy.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the American Diversity thematic concentration should contact the CSRE undergraduate program office.

The American Diversity concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course

may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the American Diversity thematic concentration.

		Units
AFRICAAM 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AMSTUD 143	Introduction to African American Literature	3-5
AMSTUD 183	Re- Imagining American Borders	5
CSRE 14N	Growing Up Bilingual	3
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 108	Introduction to Feminist Studies	4-5
CSRE 125V	The Voting Rights Act	5
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
CSRE 150	Race and Political Sociology	3
CSRE 164	Immigration and the Changing United States	4
CSRE 201B	From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era	5
CSRE 203A	The Changing Face of America: Building Leaders for Civil Rights and Education	5
EDUC 114N	Growing Up Bilingual	3
EDUC 201	History of Education in the United States	3-5
HISTORY 50B	19th Century America	3
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5
POLISCI 125V	The Voting Rights Act	5
POLISCI 327	Minority Behavior and Representation	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 140	Introduction to Social Stratification	3
SOC 150	Race and Political Sociology	3
SOC 155	The Changing American Family	4
SOC 164	Immigration and the Changing United States	4

Thematic Concentration in Education, Access, and Equity

The concentration in Education, Access, and Equity explores history, policy, and practice in education to understand how educational opportunity is shaped by issues of race, ethnicity, and difference. The goal of the concentration is to develop an understanding of the core issues facing educators and policy makers so that students may learn how they can contribute to the social and political discourse surrounding issues of education and opportunity policy in the U.S.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Education, Access, and Equity concentration should contact the CSRE undergraduate program office.

The Education, Access, and Equity concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar(WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology

requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Education, Access, and Equity thematic concentration.

		Units
AFRICAAM 112	Urban Education	3-4
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
CSRE 11W	Service-Learning Workshop on Issues of Education Equity	1
CSRE 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
CSRE 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
CSRE 203A	The Changing Face of America: Building Leaders for Civil Rights and Education	5
CSRE 216X	Education, Race, and Inequality in African American History, 1880-1990	3-5
CSRE 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
EDUC 100B	EAST House Seminar: Current Issues and Debates in Education	1
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 110	Sociology of Education: The Social Organization of Schools	4
EDUC 112X	Urban Education	3-4
EDUC 120C	Education and Society	4-5
EDUC 146X	Perspectives on the Education of Linguistic Minorities	3-4
EDUC 148X	Critical Perspectives on Teaching and Tutoring English Language Learners	3
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 165	History of Higher Education in the U.S.	3-5
EDUC 178X	Latino Families, Languages, and Schools	3-5
EDUC 197	Education, Gender, and Development	4
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
HISTORY 158C	History of Higher Education in the U.S.	3-5
LINGUIST 65	African American Vernacular English	3-5
SOC 132	Sociology of Education: The Social Organization of Schools	4

Thematic Concentration in Identity, Diversity and Aesthetics (IDA)

Students in the Comparative Studies in Race and Ethnicity major can choose a concentration in Identity, Diversity and Aesthetics (IDA). The Identity, Diversity, and Aesthetics Concentration in Comparative Studies in Race & Ethnicity is a program designed to explore the intersections of culture, race, the arts, and social transformation. In IDA courses taught by Stanford faculty, lecturers, and distinguished Visiting Artists, students learn how the arts, activism, and the academy interact to produce aesthetic and societal change.

The concentration is not declared in Axxess; it does not appear on the transcript or diploma. Students interested in IDA should contact the CSRE undergraduate program office.

The IDA concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. CSRE majors are also required to take a course in research methods (5 units). In addition to the core curriculum, students complete 40 units of course work relevant to the thematic concentration. Thematic courses may focus on artistic practice and performance, art history, creative writing, community arts, art and social change, writing for performance, critical studies in art and performance, and critical arts theory.

Additionally, IDA concentration students must complete a creative senior project. Possible senior projects include a stage production, a set of recorded music, an anthology of creative writing, a curated or solo exhibition, or a community arts workshop. Students who elect to write an honors thesis may incorporate their project as the basis for their thesis.

Students may find the following courses useful in fulfilling requirements in the Identity, Diversity and Aesthetics (IDA) concentration.

		Units
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 34	Race, Policing, and Mass Incarceration	1
AFRICAAM 35	On the Meaning of Freedom	5
AFRICAAM 36	REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.	5
AFRICAAM 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2
AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
CHILATST 179	Chicano & Chicana Theater: Politics In Performance	3-5
COMPLIT 290	Ferguson in a Global Frame: Human Rights and the Arts	3-5
CSRE 51Q	Comparative Fictions of Ethnicity	4
CSRE 53J	Love Notes: Queers of Color on Politics of the Heart	3
CSRE 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
CSRE 122E	Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces	4
CSRE 123A	American Indians and the Cinema	5
CSRE 123B	Literature and Human Experimentation	3-5
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
CSRE 129B	Literature and Global Health	3-5
CSRE 134	Museum Cultures: Material Representation in the Past and Present	5
CSRE 142	The Literature of the Americas	5
CSRE 145B	Africa in Atlantic Writing	3
CSRE 172	Out of Place: (W)riting Home	4
CSRE 177	Writing for Performance: The Fundamentals	5
CSRE 177B	Introduction to Dance on the Global Stage	4
CSRE 179C	Chroniclers of Desire: Creative Non-Fiction Writing Workshop	3-5
CSRE 179G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
CSRE 201B	From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era	5
DANCE 30	Chocolate Heads Movement Band Performance Workshop	2

DANCE 39	Intro/Beginning Contemporary Modern	1
DANCE 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2
DANCE 118	Developing Creativity In Dance	2
DANCE 141	Advanced Contemporary Modern Technique	2
DANCE 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	4
ILAC 193	The Cinema of Pedro Almodovar	3-5
MUSIC 17Q	Perspectives in North American Taiko	4
NATIVEAM 167	Performing Indigeneity on Global Stage	4
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4

Thematic Concentration in Intersectionality

The intersectionality concentration is designed for students who wish to explore the intersections between race and ethnicity and other social identities including gender, sexuality, class, and ability. This concentration investigates how notions of racial and ethnic identity are complicated by gender, sexuality and other categories. Students will examine the construction of power systems to better contextualize how certain identities become privileged over others. Drawing from contributions of women of color feminism and queer of color studies, this concentration challenges normative constructions of 'race' and 'ethnicity' by equipping students with analytical tools from feminist theory, queer theory, post-colonial theory, critical race theory, and other critical methods.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in Intersectionality thematic concentration should contact the CSRE undergraduate program office.

The Intersectionality concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Intersectionality thematic concentration.

		Units
AFRICAAM 54N	African American Women's Lives	3-4
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
ARTHIST 176	Feminism and Contemporary Art	4
CHILATST 120	Queer Raza	3-5
COMPLIT 110	Introduction to Comparative Queer Literary Studies	3-5
CSRE 28SI	What is Whiteness? Historical and Contemporary Definitions of White Racial Identity in the U.S.	1-2
CSRE 53J	Love Notes: Queers of Color on Politics of the Heart	3
CSRE 108	Introduction to Feminist Studies	4-5
CSRE 162	Women in Modern America	4-5
CSRE 168	New Citizenship: Grassroots Movements for Social Justice in the U.S.	5
CSRE 172	Out of Place: (W)riting Home	4
CSRE 179G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
CSRE 192E	Topics in the History of Sexuality: Sexual Violence in America	4-5
FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5
HISTORY 257C	LGBT/Queer Life in the United States	4-5

LINGUIST 156	Language and Gender	4
NATIVEAM 103S	Native American Women, Gender Roles, and Status	5
PHIL 153	Feminist Theories and Methods Across the Disciplines	2-5
TAPS 160N	Chican@/Latin@ Performance in the U.S.	4
TAPS 164T	Queer Art and Performance	4-5

Thematic Concentration in Public Service

The Public Service thematic concentration is open to students in any major in the Comparative Studies in Race and Ethnicity Undergraduate Program. The concentration allows a student to develop an area of study focused on community development, public service, and social change. Studying how issues of race and ethnicity impact and are impacted by community and social problems, this concentration is designed to ensure that students interested in service and community have access to a structured curriculum that provides a solid grounding in the theory and practice of community and civic engagement in order to provide the skills and experiences that enable students to become leaders and actors in the sphere of public life.

Students who wish to pursue a thematic concentration in public service must organize their studies to include 15 units, including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). Public Service concentration students should also prepare to complete 25 units (at least 5 courses) relevant to the theme of public service. Three of these courses should include a service learning component (i.e., require the student to participate in service in the local community as a central component to the course).

Students who select a thematic concentration in public service must complete an internship as part of their program of study. This internship can be completed during the academic year for credit or during the summer, but must be at least 300 hours.

Finally, students who pursue the concentration in public service should select a topic for their senior paper or honors thesis that reflects their interest in community work (i.e., service or organizing) or a community issue or concern that is addressed through public service.

This concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in this thematic concentration should contact the CSRE Undergraduate Program Office for details about its requirements.

Students may find the following courses useful in fulfilling requirements for the Public Service thematic concentration:

		Units
AFRICAAM 166	Introduction to African American History - the Modern Freedom Struggle	3-5
ANTHRO 169A	New Citizenship: Grassroots Movements for Social Justice in the U.S.	5
ASNAMST 112	Public Archaeology: Market Street Chinatown Archaeology Project	4-5
ASNAMST 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
ASNAMST 146S	Asian American Culture and Community	3-5
CHILATST 177A	Well-Being in Immigrant Children & Youth: A Service Learning Course	3
CHILATST 183X	Practicum in English-Spanish School & Community Interpreting	3-4

CSRE 11W	Service-Learning Workshop on Issues of Education Equity	1
CSRE 53J	Love Notes: Queers of Color on Politics of the Heart	3
CSRE 128	WHAT WE WANT IS WE: Identity in Visual Arts, Social Engagement, and Civic Propositions	4
CSRE 146	Community Matters: Research and Service with Community Organizations	2-4
CSRE 146S	Asian American Culture and Community	3-5
CSRE 162A	Spirituality and Nonviolent Urban and Social Transformation	3
CSRE 168	New Citizenship: Grassroots Movements for Social Justice in the U.S.	5
CSRE 178	Ethics and Politics of Public Service	5
CSRE 201	Introduction to Public History and Public Service	4-5
CSRE 201B	From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era	5
CSRE 203A	The Changing Face of America: Building Leaders for Civil Rights and Education	5
CSRE 260	California's Minority-Majority Cities	4-5
DANCE 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	4
ETHICSOC 133	Ethics and Politics of Public Service	5
HISTORY 259A	Poverty and Homelessness in America	4-5
HUMBIO 178	Ethics and Politics of Public Service	5
PHIL 175A	Ethics and Politics of Public Service	5
POLISCI 133	Ethics and Politics of Public Service	5
PUBLPOL 103D	Ethics and Politics of Public Service	5
RELIGST 162	Spirituality and Nonviolent Urban and Social Transformation	3
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 141	Controversies about Inequality	5
URBANST 112	The Urban Underclass	4
URBANST 122	Ethics and Politics of Public Service	5

Thematic Concentration in Race and Health

The concentration in Race and Health is designed for students who are seeking an interdisciplinary exploration of health disparities, health access, and health policy. Through course work, students examine how health experiences are influenced by issues of race and ethnicity.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Race and Health concentration should contact the CSRE undergraduate program office.

The Race and Health concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Race and Health thematic concentration.

		Units
ANTHRO 82	Medical Anthropology	4

ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
ANTHRO 185A	Race and Biomedicine	3-5
HRP 212	Cross Cultural Medicine	3
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 128	Community Health Psychology	4
HUMBIO 129	Critical Issues in International Women's Health	4
MED 159A	Service-Learning in Migrant Health	2
MED 159B	Service-Learning in Migrant Health	2
NATIVEAM 240	Psychology and American Indian Mental Health	3-5
PEDS 222	Beyond Health Care: Seeking Health in Society	3
PEDS 250	Social and Environmental Determinants of Health	3
PSYCH 101	Community Health Psychology	4

Thematic Concentration in Race and the American City

The Race and the American City concentration is designed for students who wish to develop methodologies, data, and theoretical and conceptual materials concerning how urban life, infrastructure, and policies are influenced by race and ethnicity. As virtual laboratories of social interaction, cities embody negotiations around resources, residences, financial districting, economic flow, health and educational resources, environmental policies, and city planning. A primary goal is for students to learn how they might contribute to the social and political discourse on race and ethnicity in the U.S. Participation in a public service internship and/or Stanford in Washington is encouraged.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the Race and the American City concentration should contact the CSRE undergraduate program office.

The Race and the American City concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Race and the American City thematic concentration.

		Units
CSRE 260	California's Minority-Majority Cities	4-5
PEDS 250	Social and Environmental Determinants of Health	3
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 155	The Changing American Family	4
URBANST 112	The Urban Underclass	4
URBANST 114	Urban Culture in Global Perspective	5
URBANST 162	Managing Local Governments	4

Asian American Studies Minor

A total of 30 units of approved course work is required for the minor. One CSRE core course and at least one foundational course are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

Students in Asian American Studies may find the following courses useful in fulfilling course requirements in the major or minor.

Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

Foundational Courses

Students who completed ASNAMST 159/HISTORY 159 or ENGLISH 43C/143C last year may count this toward their Foundational Course Requirement. These are not offered in 2012-13.

		Units
ASNAMST 146S	Asian American Culture and Community	3-5

Thematic Courses

		Units
ASNAMST 112	Public Archaeology: Market Street Chinatown Archaeology Project	4-5
ASNAMST 52D	Asian American Human Development: Cultural Perspectives on Psychology, Education and Critical Issues	3
ASNAMST 185A	Race and Biomedicine	3-5
ASNAMST 131	Trauma, healing, and empowerment in Asian America	3-5
ASNAMST 107	Asian American Leadership: Controversies, Dilemmas, and Decision-Making Strategies (adding new course for spring quarter)	3-5
ASNAMST 187	Geography, Time, and Trauma in Asian American Literature	5
ASNAMST 189	The Vietnamese Experience in America	3
ASNAMST 265	Writing Asian American History	5

Chicana/o-Latina/o Studies Minor

A total of 30 units of approved course work is required for the minor. One CSRE core course and at least one foundational course are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

Students in Chicana/o-Latina/o Studies may find the following courses useful in fulfilling course requirements in the major or minor.

Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

Foundational Courses

CHILATST 180E Introduction to Chicana/o-Latina/o Studies

Thematic Courses

		Units
CHILATST 14N	Growing Up Bilingual	3
CHILATST 125S	Chicano/Latino Politics	5
CHILATST 179	Chicano & Chicana Theater: Politics In Performance	3-5
CHILATST 120	Queer Raza	3-5
CHILATST 125S	Chicano/Latino Politics	5
CHILATST 172	Theories of Citizenship and Sovereignty in a Transnational Context	4-5
CHILATST 164	Immigration and the Changing United States	4
CHILATST 177A	Well-Being in Immigrant Children & Youth: A Service Learning Course	3
CHILATST 177B	Well-Being in Immigrant Children & Youth: A Service Learning Course	1-3
CHILATST 177C	Well-Being in Immigrant Children & Youth: A Service Learning Course	1-3
CHILATST 13SL	Second-Year Spanish: Emphasis on Service Learning, Third Quarter	4-5
CHILATST 140	Migration in 21st Century Latin American Film	3-5
CHILATST 183X	Practicum in English-Spanish School & Community Interpreting	3-4
CHILATST 200	Latin@ Literature	3-5
CHILATST 201B	From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era	5
CHILATST 201C	Critical Concepts in Chican@ Literature	3-5
CHILATST 275B	Governance, Resistance, and Identity in Modern Mexico	5

Comparative Studies Minor

Students who wish to minor in Comparative Studies must complete a minimum of 30 units from the approved course list. Two core courses

(or one core and one foundational course) are needed to fulfill the minor requirements.

Students in Comparative Studies may find the following courses useful in fulfilling course requirements in the major or minor.

Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

Foundational Courses

		Units
AFRICAAM 43	Introduction to African American Literature	3-5
AFRICAAM 105	Introduction to African and African American Studies	5
ASNAMST 146S	Asian American Culture and Community	3-5
CHILATST 171	Mexicans in the United States	5
CHILATST 180E	Introduction to Chicana/o-Latina/o Studies	5
NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

Thematic Courses

		Units
CSRE 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
CSRE 107	The Black Mediterranean: Greece, Rome and Antiquity	4-5
CSRE 117S	History of California Indians	5
CSRE 11W	Service-Learning Workshop on Issues of Education Equity	1
CSRE 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	4
CSRE 135I	CSRE House Seminar: Race and Ethnicity at Stanford	1-2
CSRE 142	The Literature of the Americas	5
CSRE 142A	What is Hemispheric Studies?	5
CSRE 145	Race and Ethnic Relations in the USA	5
CSRE 146S	Asian American Culture and Community	3-5

CSRE 14N	Growing Up Bilingual	3
CSRE 162	Women in Modern America	4-5
CSRE 166B	Immigration Debates in America, Past and Present	3-5
CSRE 16N	African Americans and Social Movements	3
CSRE 177	Writing for Performance: The Fundamentals	5
CSRE 177B	Introduction to Dance on the Global Stage	4
CSRE 179C	Chroniclers of Desire: Creative Non-Fiction Writing Workshop	3-5
CSRE 179G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
CSRE 183	Re- Imagining American Borders	5
CSRE 189W	Language and Minority Rights	3
CSRE 192E	Topics in the History of Sexuality: Sexual Violence in America	4-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 201B	From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era	5
CSRE 201C	Critical Concepts in Chican@ Literature	3-5
CSRE 203A	The Changing Face of America: Building Leaders for Civil Rights and Education	5
CSRE 216X	Education, Race, and Inequality in African American History, 1880-1990	3-5
CSRE 226	Race and Racism in American Politics	5
CSRE 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
CSRE 28SI	What is Whiteness? Historical and Contemporary Definitions of White Racial Identity in the U.S.	1-2
CSRE 45Q	Understanding Race and Ethnicity in American Society	5
CSRE 51Q	Comparative Fictions of Ethnicity	4
CSRE 52D	Asian American Human Development: Cultural Perspectives on Psychology, Education and Critical Issues	3
CSRE 53J	Love Notes: Queers of Color on Politics of the Heart	3
CSRE 103S	Native American Women, Gender Roles, and Status	5
CSRE 106A	Gang Colors: The Racialization of Violence and the American City	5
CSRE 135H	Conversations in CSRE: Case Studies in the Stanford Community	1-2
CSRE 145F	Race and Power	5
CSRE 150	Race and Political Sociology	3
CSRE 162A	Spirituality and Nonviolent Urban and Social Transformation	5
CSRE 178	Ethics and Politics of Public Service	5
CSRE 187A	The Anthropology of Race, Nature, and Animality	5
CSRE 226X	Curating Experience: Representation in and beyond Museums	4
CSRE 260	California's Minority-Majority Cities	4-5
CSRE 279C	Chroniclers of Desire: Creative Non-Fiction Writing Workshop	3-5
CSRE 279G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
CSRE 289E	Queer of Color Critique: Race, Sex, Gender in Cultural Representations	3-5

Jewish Studies Minor

Students who wish to minor in Jewish Studies must complete one CSRE core course, one Jewish Studies foundational course, at least one quarter

of the Hebrew language or another approved Jewish language, and draw remaining courses from an approved list of Jewish Studies courses. A total of 30 units of approved course work is required for the Jewish Studies minor. Proposals must be approved by the director.

Students in Jewish Studies may find the following courses useful in fulfilling course requirements in the major or minor.

Foundational Courses

		Units
JEWISHST 71	Jews and Christians: Conflict and Coexistence	3
JEWISHST 183	The Holocaust	4

Thematic Courses

Students may take any JEWISHST courses in fulfillment of this requirements

		Units
JEWISHST 4N	A World History of Genocide	3-5
JEWISHST 5	Biblical Greek	3-5
JEWISHST 5B	Biblical Greek	3-5
JEWISHST 37Q	Zionism and the Novel	4
JEWISHST 101A	First-Year Hebrew, First Quarter	5
JEWISHST 102A	Second-Year Hebrew, First Quarter	4
JEWISHST 104	Hebrew Forum	2-4
JEWISHST 104A	First-Year Yiddish, First Quarter	4
JEWISHST 120	Sex and Gender in Judaism and Christianity	3
JEWISHST 127D	Readings in Talmudic Literature	1
JEWISHST 139	Rereading Judaism in Light of Feminism	4
JEWISHST 143	Literature and Society in Africa and the Caribbean	4
JEWISHST 144B	Poetic Thinking Across Media	4
JEWISHST 147A	The Hebrew Bible in Literature	3-5
JEWISHST 199B	Directed Reading in Yiddish, Second Quarter	1-5
JEWISHST 282	Circles of Hell: Poland in World War II	5
JEWISHST 286	Jews Among Muslims in Modern Times	4-5
JEWISHST 287S	Research Seminar in Middle East History	4-5
JEWISHST 291X	Knowing God: Learning Religion in Popular Culture	4
JEWISHST 299A	Directed Reading in Yiddish, First Quarter	1-5

Native American Studies Minor

Students who wish to minor in Native American Studies must complete one CSRE core course and at least one foundational course in Native American Studies. Additional courses relevant to the area of concentration selected by the student in consultation with a faculty adviser must also be completed. A total of 30 units of approved course work is required for the minor. Proposals must be approved by the director.

Students in Native American Studies may find the following courses useful in fulfilling course requirements in the major or minor.

Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 125V	The Voting Rights Act	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 184C	Zionism	5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5

CSRE 200X	CSRE Senior Seminar	5
CSRE 226	Race and Racism in American Politics	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 184	Zionism	5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 184	Zionism	5
PSYCH 75	Introduction to Cultural Psychology	5

Foundational courses

Students who completed NATIVEAM/ANTHRO 16 may count this course toward their Foundational Course requirement. This course is not offered in 2012-13.

		Units
NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	5

Thematic courses

		Units
NATIVEAM 103S	Native American Women, Gender Roles, and Status	5
NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 139	American Indians in Contemporary Society	5
NATIVEAM 143A	American Indian Mythology, Legend, and Lore	3-5
NATIVEAM 167	Performing Indigeneity on Global Stage	4
NATIVEAM 240	Psychology and American Indian Mental Health	3-5

Asian American Studies

Director: Anthony Antonio (Education)

Affiliated Faculty and Teaching Staff: Gordon Chang (History), Hien Do (Asian American Studies) Kathryn Gin Lum (Religious Studies), Pamela Lee (Art and Art History), Jean Ma (Art and Art History), David Palumbo-Liu (Comparative Literature), Stephen Sano (Music), Stephen Sohn (English), Stephen Murphy-Shigematsu (Asian American Studies), Jeanne L. Tsai (Psychology), Linda Uyechi (Music), Barbara Voss (Anthropology), Christine Min Wotipka (Education), Sylvia Yanagisako (Anthropology)

Chicana/o-Latina/o Studies

Director: Tomás Jiménez (Sociology)

Affiliated Faculty and Teaching Staff: Albert Camarillo (History), Susana Gallardo (Chicana/o-Latina/o Studies), Angela Garcia (Anthropology), Kenji Hakuta (Education), Tomás Jiménez (Sociology), Melissa Michaelson (Chicana/o-Latina/o Studies), Ana Minian (History), Cherríe Moraga (Drama), Paula Moya (English), Amado Padilla (Education), José David Saldívar (Comparative Literature), Ramón Saldívar (English), Gary Segura (Political Science), Guadalupe Valdés (Education), Yvonne Yarbrow-Bejarano (Iberian and Latin American Cultures)

Comparative Studies in Race and Ethnicity

Director: David Palumbo-Liu (Comparative Literature)

Core Affiliated Faculty:

- Anthropology: Duana Fullwiley, Angela Garcia, Barbara Voss, Sylvia Yanagisako
- Comparative Literature: David Palumbo-Liu, José David Saldívar, Alexander Key
- Drama: Jennifer Brody, Harry Elam, Cherríe Moraga
- English: Michele Elam, Paula Moya, Vaughn Rasberry, Ramón Saldívar
- History: Al Camarillo, James Campbell, Gordon Chang, Allyson Hobbs, Ana Minian,
- Iberian and Latin American Cultures: Lisa Surwillo, Hector Hoyos
- Linguistics: John Rickford
- Political Science: Gary Segura, Lauren Davenport
- Psychology: Jennifer Eberhardt, Hazel Markus, Jeanne Tsai
- Religious Studies: Kathryn Gin Lum, Charlotte Fonrobert
- Sociology: Corey Fields, Tomás Jiménez, Matthew Snipp, Aliya Saperstein
- Taube Center for Jewish Studies: Vered Shemtov
- Graduate School Education: H. Samy Alim, Anthony Antonio, Prudence Carter, Teresa LaFromboise, Guadalupe Valdes, Christine Min Wotipka, Ari Kelman
- School of Law: Richard Banks, Richard Ford
- Lecturers: Karen Biestman, Stephen Murphy-Shigematsu, Hilton Obenzinger, Laura Saldívar, James Steyer

Affiliated Faculty and Teaching Staff: David Abernethy (Political Science, emeritus), Arnetha Ball (Education), Lucius Barker (Political Science, emeritus), Donald Barr (Pediatrics), Bryan Brown (Education), Cheryl Brown (African and African American Studies), Martin Carnoy (Education), Clayborne Carson (History), Jeff Chang (Comparative Studies in Race and Ethnicity), Karen Cook (Sociology), Michele Dauber (Law), Linda Darling-Hammond (Education), Carolyn Duffey (American Studies), Jennifer Eberhardt (Psychology), Ala Ektekar (Comparative Studies in Race and Ethnicity), Paulla Ebron (Anthropology), Penny Eckert (Linguistics), James Ferguson (Anthropology), Shelley Fisher Fishkin (English), James Fishkin (Communication), Estelle Freedman (History), Susana Gallardo (Chicana/o Studies), Gabriel Garcia (Medicine), Kathryn Gin Lum (Religious Studies), Leah Gordon (Education), David Grusky (Sociology), Sean Hanretta (History), Gina Hernandez-Clarke (Comparative Studies in Race and Ethnicity), Miyako Inoue (Anthropology), Shanto Iyengar (Communication), Tomás Jiménez (Sociology), Gavin Jones (English), Terry Karl (Political Science), Pamela Karlan (Law), Matthew Kohrman (Anthropology), Jan Krawitz (Art and Art History), Jon Krosnick (Communication), Teresa LaFromboise (Education), David Laitin (Political Science), Liisa Malkki (Anthropology), Hazel Markus (Psychology), Ruben Martínéz (Comparative Studies in Race and Ethnicity), Barbaro Martínez-Ruiz (Art and Art History), Douglas McAdam (Sociology), Jisha Menon (Theater and Performance Studies), Ana Minian (History), Elisabeth Mudimbe-Boyi (French and Italian), Thomas S. Mullaney (History), Stephen Murphy-Shigematsu (Asian American Studies), Hilton Obenzinger (American Studies), Susan Olzak (Sociology), Amado Padilla (Education), Arnold Rampersad (English), Vaughn Rasberry (English), Robert Reich (Political Science), Cecilia Ridgeway (Sociology), Richard Roberts (History), Aron Rodrigue (History), Michael Rosenfeld (Sociology), Joel Samoff (History), Debra Satz (Philosophy), Vered Shemtov (Division of Literatures, Cultures and Languages), C. Matthew Snipp (Sociology), Paul Sniderman (Political Science), Jayashiri Srikantiah (Law), Ewart Thomas (Psychology), Jeanne L. Tsai (Psychology), Linda Uyechi (Music), Gregory Walton (Psychology), Richard White (History), Jeremy Weinstein (Political Science), Michael Wilcox (Anthropology), Bryan Wolf (Art and Art History), Sylvia Yanagisako (Anthropology), Yvonne Yarbrow-Bejarano (Iberian and Latin American Cultures), Steven Zipperstein (History)

Teaching Fellows: Adam Horowitz, Mark Gardiner

Senior Seminar Coordinator: Patricia Seo

Jewish Studies

Director: Charlotte Fonrobert (Religious Studies)

Affiliated Faculty and Teaching Staff: Zachary Baker (Stanford University Libraries), Joel Beinin (History), Jonathan Berger (Music), Arnold Eisen (Religious Studies, emeritus), Amir Eshel (German Studies), John Felstiner (English, emeritus), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Avner Greif (Economics), Katherine Jolluck (History), Ari Kelman (Education), Jon Levitow (Language Center), Mark Mancall (History, emeritus), Norman Naimark (History), Reviel Netz (Classics), Jack Rakove (History), Aron Rodrigue (History), Noah Rosenberg (Biology), Gabriella Safran (Slavic Languages and Literatures), Vered Karti Shemtov (Language Center, Comparative Literature), Lee Shulman (Education, emeritus), Peter Stansky (History, emeritus), Marie-Pierre Ulloa (French), Amir Weiner (History), Sam Wineburg (Education), Steven Zipperstein (History)

Hebrew Instructional Staff: Gallia Porat, Estee Greif

Visiting Faculty: Avi Tchamni (Music)

Writer in Residence: Maya Arad

Native American Studies

Director: C. Matthew Snipp (Sociology)

Affiliated Faculty and Teaching Staff: JoEllen Anderson (Native American Studies), Jared Aldern (Native American Studies), Karen Biestman (Native American Studies), Kenneth Fields (English), Teresa LaFromboise (Education), Samantha Peralto (Language Center), Delphine Red Shirt Shaw (Native American Studies), C. Matthew Snipp (Sociology), Michael Wilcox (Anthropology)

Asian American Studies

Students in Asian American Studies may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units
COMPLIT 41Q	Ethnicity and Literature	5
EDUC 181	Multicultural Issues in Higher Education	4
EDUC 193F	Psychological Well-Being on Campus: Asian American Perspectives	1
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 265	Writing Asian American History	5
MUSIC 17Q	Perspectives in North American Taiko	4
PSYCH 217	Topics and Methods Related to Culture and Emotion	1-3

Chicana/o-Latina/o Studies

Students in Chicana/o-Latina/o Studies may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units
EDUC 146X	Perspectives on the Education of Linguistic Minorities	3-4
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 178X	Latino Families, Languages, and Schools	3-5
EDUC 193B	Peer Counseling in the Chicano/Latino Community	1
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
HISTORY 165	Mexican American History through Film	4-5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 201	Introduction to Public History and Public Service	4-5

HISTORY 203E	Global Catholicism	5
ILAC 193	The Cinema of Pedro Almodovar	3-5
POLISCI 125V	The Voting Rights Act	5
POLISCI 327	Minority Behavior and Representation	5
RELIGST 203	Myth, Place, and Ritual in the Study of Religion	3-5
TAPS 160N	Chican@/Latin@ Performance in the U.S.	4

Comparative Studies in Race and Ethnicity

Students in Comparative Studies in Race and Ethnicity may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units
AFRICAAM 43	Introduction to African American Literature	3-5
AFRICAAM 54N	African American Women's Lives	3-4
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 105	Introduction to African and African American Studies	5
AFRICAAM 147	History of South Africa	5
AFRICAAM 152G	Harlem Renaissance	5
AFRICAAM 166	Introduction to African American History - the Modern Freedom Struggle	3-5
AFRICAAM 261E	Mixed Race Literature in the U.S. and South Africa	5
AFRICAAM 262D	African American Poetics	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AMSTUD 140	Stand Up Comedy and the "Great American Joke" Since 1945	5
AMSTUD 143	Introduction to African American Literature	3-5
ANTHRO 22N	Ethnographies of North America: An Introduction to Cultural and Social Anthropology	3-4
ANTHRO 30Q	The Big Shift	4
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 82	Medical Anthropology	4
ANTHRO 102	Urban Ethnography	5
ANTHRO 106A	Gang Colors: The Racialization of Violence and the American City	5
ANTHRO 320A	Race, Ethnicity, and Language	3-4
ARTHIST 176	Feminism and Contemporary Art	4
CHILATST 179	Chicano & Chicana Theater: Politics In Performance	3-5
COMM 160	The Press and the Political Process	4-5
COMPLIT 41Q	Ethnicity and Literature	5
COMPLIT 110	Introduction to Comparative Queer Literary Studies	3-5
COMPLIT 290	Ferguson in a Global Frame: Human Rights and the Arts	3-5
CSRE 108	Introduction to Feminist Studies	4-5
DANCE 30	Chocolate Heads Movement Band Performance Workshop	2
DANCE 45	Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact	2

DANCE 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	4	PHIL 153	Feminist Theories and Methods Across the Disciplines	2-5
EDUC 100A	EAST House Seminar: Current Issues and Debates in Education	1	POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3
EDUC 100B	EAST House Seminar: Current Issues and Debates in Education	1	POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5
EDUC 112X	Urban Education	3-4	POLISCI 121L	Racial-Ethnic Politics in US	5
EDUC 146X	Perspectives on the Education of Linguistic Minorities	3-4	POLISCI 327	Minority Behavior and Representation	5
EDUC 148X	Critical Perspectives on Teaching and Tutoring English Language Learners	3	PSYCH 25N	Psychology, Inequality, and the American Dream	3
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5	PSYCH 27N	The Psychology of Prejudice	3
EDUC 165	History of Higher Education in the U.S.	3-5	PSYCH 75	Introduction to Cultural Psychology	5
EDUC 178X	Latino Families, Languages, and Schools	3-5	PSYCH 150	Race and Crime	3
EDUC 193B	Peer Counseling in the Chicano/Latino Community	1	PSYCH 183	Mind, Culture, and Society Research Core	2-3
EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1	PSYCH 215	Mind, Culture, and Society	3
EDUC 193F	Psychological Well-Being on Campus: Asian American Perspectives	1	PSYCH 217	Topics and Methods Related to Culture and Emotion	1-3
EDUC 193N	Peer Counseling in the Native American Community	1	PSYCH 245	Social Psychological Perspectives on Stereotyping and Prejudice	3
EDUC 201	History of Education in the United States	3-5	RELIGST 188A	Issues in Liberation: El Salvador	4
EDUC 232	Culture, Learning, and Poverty	2-3	SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
EDUC 242	Language Use in the Chicano Community	3-5	SOC 118	Social Movements and Collective Action	4
EDUC 367	Cultural Psychology	3-5	SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
EDUC 381	Multicultural Issues in Higher Education	4	SOC 120	Interpersonal Relations	4
FEMGEN 140D	LGBT/Queer Life in the United States	4-5	SOC 132	Sociology of Education: The Social Organization of Schools	4
FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5	SOC 133	Law and Wikinomics: The Economic and Social Organization of the Legal Profession	1-5
HISTORY 48Q	South Africa: Contested Transitions	3	SOC 135	Poverty, Inequality, and Social Policy in the United States	3
HISTORY 50B	19th Century America	3	SOC 136	Sociology of Law	4
HISTORY 50C	The United States in the Twentieth Century	3	SOC 140	Introduction to Social Stratification	3
HISTORY 54N	African American Women's Lives	3-4	SOC 141	Controversies about Inequality	5
HISTORY 150B	19th-Century America	5	SOC 142	Sociology of Gender	5
HISTORY 150C	The United States in the Twentieth Century	5	SOC 145	Race and Ethnic Relations in the USA	4
HISTORY 158C	History of Higher Education in the U.S.	3-5	SOC 155	The Changing American Family	4
HISTORY 201	Introduction to Public History and Public Service	4-5	TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
HISTORY 203E	Global Catholicism	5	TAPS 160N	Chican@/Latin@ Performance in the U.S.	4
HISTORY 255	Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice	5	TAPS 164T	Queer Art and Performance	4-5
HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5	URBANST 112	The Urban Underclass	4
HISTORY 257C	LGBT/Queer Life in the United States	4-5	URBANST 114	Urban Culture in Global Perspective	5
HISTORY 259A	Poverty and Homelessness in America	4-5	URBANST 140	Urban Ethnography	5
HISTORY 261	Race, Gender, and Class in Jim Crow America	5	Native American Studies		
HRP 212	Cross Cultural Medicine	3	Students in Native American Studies may find the following related courses useful in fulfilling course requirements in the major or minor.		
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4			
HUMBIO 121E	Ethnicity and Medicine	1-3	Units		
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4	ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5
HUMBIO 129	Critical Issues in International Women's Health	4	EDUC 193N	Peer Counseling in the Native American Community	1
ILAC 193	The Cinema of Pedro Almodovar	3-5	RELIGST 203	Myth, Place, and Ritual in the Study of Religion	3-5
JEWISHST 183	The Holocaust	4	RELIGST 303	Myth, Place, and Ritual in the Study of Religion	3-5
LINGUIST 65	African American Vernacular English	3-5	SPECLANG 189A	First-Year Hawaiian, First Quarter	4
LINGUIST 150	Language in Society	4-5	SPECLANG 189B	First-Year Beginning Hawaiian, Second Quarter	4
LINGUIST 156	Language and Gender	4	SPECLANG 189C	First-Year Hawaiian, Third Quarter	4
MED 159A	Service-Learning in Migrant Health	2			
MED 159B	Service-Learning in Migrant Health	2			
MUSIC 17Q	Perspectives in North American Taiko	4			

SPECLANG 247A	First-Year Lakota, First Quarter	4
SPECLANG 247B	First-Year Lakota, Second Quarter	4
SPECLANG 247C	First-Year Lakota, Third Quarter	4
SPECLANG 248	Introduction to Siouan Language & Culture II	5

Overseas Studies Courses in Comparative Studies in Race and Ethnicity

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 43	Culture Clashes: Race, Ethnicity and Migration in Germany and the U.S.	3
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
OSPMADRD 62	Spanish California: Historical Issues	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPMADRD 75	Sefarad: The Jewish Community in Spain	4

Division of Literatures, Cultures, and Languages

Courses offered by the Division of Literatures, Cultures, and Languages are listed under the subject code DLCL on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=DLCL&filter-catalognumber-DLCL=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=DLCL&filter-catalognumber-DLCL=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=DLCL&filter-catalognumber-DLCL=on>).

The Division of Literatures, Cultures, and Languages consists of five academic departments (Comparative Literature (p. 389), French and

Italian (p. 460), German Studies (p. 476), Iberian and Latin American Cultures (p. 503), and Slavic Languages and Literatures (p. 618)), five focal groups (Digital Humanities, Humanities Education, Philosophy and Literature, Poetics, and Renaissances) as well as the Language Center (p. 532), which oversees language instruction at Stanford.

All the departments of the division offer academic programs leading to B.A., M.A., and Ph.D. degrees.

The division brings together scholars and teachers dedicated to the study of literatures, cultures, and languages from humanistic and interdisciplinary perspectives. The departments in the division are distinguished by the quality and versatility of their faculty, a wide variety of approaches to cultural traditions and expressions, and the intense focus on the mastery of languages. This wealth of academic resources, together with small classes and the emphasis on individual advising, creates a superior opportunity for students who wish to be introduced to or develop a deeper understanding of non-English speaking cultures.

The division's departments and the Language Center offer instruction at all levels, including introductory and general courses that do not require knowledge of a language other than English. These courses satisfy a variety of undergraduate requirements and can serve as a basis for developing a minor or a major program in the member departments. The more advanced and specialized courses requiring skills in a particular language are listed under the relevant departments, as are descriptions of the minor and major programs.

The DLCL itself offers four undergraduate minor programs, one Ph.D. minor program, and several graduate courses focused on the teaching of second languages, the teaching of literature, and academic professionalization.

Focal Groups

While the five departments in the Division of Literatures, Cultures, and Languages serve common interests in literary and cultural traditions and their languages, the DLCL's Focal Groups bring together faculty members and graduate students who share topics and approaches that range across languages and national literatures. These groups are designed to respond directly to the research interests of the faculty as a community, and reflect long-term commitments by the participants. They are conceived as portals that open from the Division outward to the wider community of literary and humanities scholars at Stanford. The membership may include any member of the Stanford faculty or any Ph.D. student with an interest in the topic. Most Focal Groups include participants from several humanities departments outside the DLCL.

Thus the DLCL is characterized by two axes of intellectual inquiry:

- the departmental axis, which is organized by language, nation, and culture
- the focal axis, which may be organized by genre, period, methodology, or other criteria.

The convergence of the two axes, departments and Focal Groups, locates faculty members and graduate students in at least two intersecting communities. The DLCL believes that this convergence gives institutional form to the intellectual conditions under which many scholars of literature and culture presently work.

Each Focal Group maintains a standing research workshop at which both faculty and graduate student members discuss their work. Several Focal Groups offer formal courses; and all groups are responsible for overseeing research-oriented activities and extracurricular events in the relevant area, including sponsoring conferences, publications, podcasts, and other activities that disseminate the outcomes of their research.

Digital Humanities

Chairs: Amir Eshel (Comparative Literature, German Studies) Mike Widner (Academic Technology Specialist)

Faculty Members: Cécile Alduy (French and Italian), John Bender (Comparative Literature, English), Russell Berman (Comparative Literature, German Studies), Dan Edelstein (French and Italian), Amir Eshel (Comparative Literature, German Studies), Roland Greene (Comparative Literature, English), Alexander Key (Comparative Literature), Marília Librandi-Rocha (Iberian and Latin American Cultures), David Palumbo-Liu (Comparative Literature), Kathryn Starkey (German Studies)

The Digital Humanities Focal Group (DHFG) promotes faculty and graduate research in the digital humanities through lectures series, praxis workshops, curriculum, and the identification and development of digital humanities research projects, especially those eligible for grant-funding opportunities. DHFG sponsors a lecture series and convenes regular workshops alternating between praxis and theory. These activities provide fora in which faculty and graduate students can share work in progress, discuss the state of the field, and identify important research that should be shared with the DLCL and broader academic communities. Crucially, the DHFG promotes digital research on underrepresented literatures and cultures to counteract the English-language dominance of much work in the field.

The DHFG also establishes strategic partnerships with similar endeavors at Stanford such as the Center for Spatial and Textual Analysis (<http://cesta.stanford.edu>), the Literary Lab (<http://litlab.stanford.edu>), HCI (<http://hci.stanford.edu>), etc. and with the larger academic community through organizations like the Association for Computers and the Humanities (<http://ach.org>), the Praxis Network (<http://praxis-network.org>), and HASTAC (<http://www.hastac.org>).

Humanities Education

Chair: Russell A. Berman (Comparative Literature, German Studies)

Faculty Members: Cécile Alduy (French and Italian), Elizabeth Bernhardt (German Studies, Language Center), Eamonn Callan (School of Education), Adrian Daub (German Studies), Thomas Ehrlich (School of Education), Marisa Galvez (French and Italian), Pam Grossman (School of Education), David Lummus (French and Italian), Orrin Robinson (German Studies), Gabriella Safran (Slavic Languages and Literatures), Kathryn Starkey (German Studies), Mitchell Stevens (School of Education), Jennifer Summit (English), Guadalupe Valdés (School of Education)

Web Site: <http://dlcl.stanford.edu/groups/humanities-education>

The Focal Group on Humanities Education explores issues concerning teaching and learning in the humanities, including research on student learning, innovation in pedagogy, the role of new technologies in humanities instruction, and professional issues for humanities teachers at all educational levels.

Philosophy and Literature

Chairs: R. Lanier Anderson (Philosophy), Joshua Landy (French and Italian)

Faculty Members: Keith Baker (History), John Bender (Comparative Literature, English), Russell Berman (Comparative Literature, German Studies), Alexis Burgess (Philosophy), Martón Dornbach (German Studies), Jean-Pierre Dupuy (French and Italian), Amir Eshel (Comparative Literature, German Studies), Gregory Freidin (Slavic Languages and Literatures), Robert Harrison (French and Italian), David Hills (Philosophy), Héctor Hoyos (Iberian and Latin American Cultures), Michelle Karnes (English), Alexander Key (Comparative Literature), Sianne Ngai (English), Marília Librandi Rocha (Iberian and Latin

American Cultures), Joan Ramon Resina (Iberian and Latin American Cultures, Comparative Literature), Nariman Skakov (Slavic Languages and Literatures), Blakey Vermeule (English), Laura Wittman (French and Italian), Lee Yearley (Religious Studies)

Web Site: <http://philit.stanford.edu>

The Focal Group on Philosophy and Literature brings together faculty and students from nine departments to investigate questions in aesthetics and literary theory, philosophically-inflected literary texts, and the form of philosophical writings. Fields of interest include both continental and analytic philosophy, as well as cognitive science, political philosophy, rational choice theory, and related fields. The group offers undergraduate tracks within eight majors, a graduate workshop, and a lecture series.

Workshop in Poetics

Chairs: Roland Greene (Comparative Literature, English), Nicholas Jenkins (English)

Faculty Members: Marisa Galvez (French and Italian), Alexander Key (Comparative Literature), David Lummus (French and Italian), Michael Predmore (Iberian and Latin American Cultures)

Web Site: <http://dlcl.stanford.edu/groups/workshop-poetics>

The Workshop in Poetics Focal Group is concerned with the theoretical and practical dimensions of the reading and criticism of poetry. During the four years of its existence, the Workshop has become a central venue at Stanford enabling participants to share their individual projects in a general conversation outside of disciplinary and national confinements. The two dimensions that the workshop sees as urgent are:

- poetics in its specificity as an arena for theory and interpretive practice.
- historical poetics as a particular set of challenges for the reader and scholar.

The core mission is to offer Stanford graduate students a space to develop and critique their current projects.

Renaissances

Chair: Roland Greene (Comparative Literature, English)

Faculty Members: Cécile Alduy (French and Italian), Shahzad Bashir (Religious Studies), Paula Findlen (History), Tamar Herzog (History), Nicholas Jenkins (English), Alexander Key (Comparative Literature), David Lummus (French and Italian), Bissera Pentcheva (Art and Art History), Morten Steen Hansen (Art and Art History), Jennifer Summit (English)

Web Site: <http://dlcl.stanford.edu/groups/renaissances>

The Renaissances Group brings together faculty members and students from over a dozen departments at Stanford to consider the present and future of early modern literary studies (a period spanning the fourteenth through the seventeenth centuries). Taking seriously the plural form of the group's name, we seek to explore the early modern period from a wide range of disciplinary, cultural, linguistic, and geographical perspectives.

Minor in Medieval Studies

Faculty Director: Kathryn Starkey

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Medieval Studies. The minor in Medieval Studies:

- provides Stanford students with an historical knowledge, framework, and depth through which to view globalism;
- embeds the study of medieval culture in a coherent framework that resonates with contemporary issues of community building, the virtual world and mobility;

- and promotes an innovative crossdisciplinary and skill-based approach to Medieval Studies.

Students in any field qualify for the minor by meeting the following requirements:

Students complete a total of 25 units (including a core course) in courses relevant to the major in departments across the University including, but not restricted to, English, East Asian Studies, History, Religious Studies, Music, all DLCL courses (CompLit, German, French, Italian, ILAC and Slavic), and Classics.

One of the following three introductory core courses is required to be taken for 5 units. Students engage creatively with the Middle Ages and produce projects that will be collected in a database and shared with the Stanford community. The core courses are offered on a regular basis by faculty across the University.

		Units
DLCL 121	Performing the Middle Ages	3-5
DLCL 122	The Digital Middle Ages	3-5
DLCL 123	Medieval Journeys: Introduction through the Art and Architecture	3-5

Electives may be selected from a large number of offerings in a variety of disciplines according to student interests, but they must follow a coherent course of study. This course of study must be approved by the faculty director. Up to 5 units may be taken in a medieval language, such as (but not limited to) Old English, Old Norse, Medieval Latin, Old French, Middle High German, Classical Arabic. No transfer credit may be used toward the Medieval Studies minor. Appropriate courses offered through BOSP may count toward the minor.

Course work in this minor may not duplicate work counted toward other majors or minors. Advanced placement credit and transfer credit do not apply to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be required in this minor. Students declare the Minor in Medieval Studies through Axess.

Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers an undergraduate minor that draws upon courses in literature and language within the division's departments and elsewhere in the University. The minor in Modern Languages is offered to students who want to supplement the course work in their major with course work in modern languages and literatures. The minor must be approved by the chairs of undergraduate studies of the respective language departments. Students in any field qualify for the minor by meeting the following requirements:

	Units
A minimum of 20 units (10 units per language) at the intermediate level (second year) or beyond, not including conversational, oral communication, business, or medical language courses in two languages other than English offered by the DLCL.	20
At least one additional course, at the 100 level or above, in each modern language being studied in the minor. These courses must be taught by DLCL Academic Council members or other senior members of the DLCL faculty.	6-10

Students are recommended to study, work, or intern abroad for at least eight weeks at a location where one of the languages is spoken. Course work in this minor may not duplicate work counted toward other majors or minors. Advanced Placement credit and transfer credit do not apply to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be required in this minor. Students declare the minor in Modern Languages through Axess.

Minor in Translation Studies

Minor Adviser: Cintia Santana

The Division of Literatures, Cultures, and Languages, in cooperation with East Asian Languages and Cultures and the English Department, teaches undergraduates to develop and apply their foreign language knowledge to the production and analysis of translations. The minor is designed to give students majoring in a variety of fields the tools to consider the practical and theoretical issues brought up by translation as an aesthetic, cultural, and ethical practice.

Course work in this minor may not duplicate work counted toward other majors or minors. Course selection must be approved by the minor adviser. For further information, contact the minor adviser, Cintia Santana (csantana@stanford.edu).

Students must take a minimum of 26 units for a letter grade, in fulfillment of the following requirements:

	Units
1. Prerequisite: Complete or test out of a first-year course in the language of interest.	
2. Core course: At least 5 units in a Translation Studies core course: * JAPANGEN Translating Japan, Translating the West 121	5
3. Language study: At least 8 units, second year or beyond (not including conversation/oral communication) and/or relevant literature courses taught in the target language. OSP and transfer units may be considered in consultation with the minor adviser.	8
4. Literature study: At least 5 units in a relevant literature course at the 100-level or above, taught in a DLCL department, East Asian Languages and Cultures, of Classics, and determined in consultation with the minor adviser. For students interested in translation from English into another language, an appropriate literature course in the English Department may be substituted.	5
5. Electives: At least 5 units in a creative writing course, or a course that foregrounds translation in departments such as Anthropology, any DLCL department, English, East Asian Languages and Cultures, Classics, Linguistics (e.g., LINGUIST 130A), or Computer Science (e.g., CS 124), determined in consultation with the minor adviser.	5
6. Final project: up to 3 units for a significant translation and/or translation studies project (including the original translation of 20 pages of prose, 10 poems, or similar appropriate amount to be determined in consultation with the minor adviser) to be carried out under the supervision of an instructor; this can be completed in one of the courses for the minor or as an independent study.	3
Total Units	26

* Core course ENGLISH/DLCL 293 will be offered in 2015-16.

Minors in Other Departments

Minor in Middle Eastern Languages, Literatures, and Cultures

Minor Adviser: Khalid Obeid (kyobeid@stanford.edu)

The Language Center offers a "Minor in Middle Eastern Languages, Literatures, and Cultures". See the Language Center's "Minors (p. 534)" tab for the full requirements; go to the menu in the right hand column and click on the link to the "Minor in Middle Eastern Languages, Literatures, and Cultures".

The undergraduate minor in Middle Eastern Languages, Literatures, and Cultures has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Middle Eastern and African languages, and to the cultures and civilizations of the Middle East and Africa.

Ph.D. Minor in Humanities

Faculty Director: Lisa Surwillo

The Ph.D. minor in Humanities is a sequence of interdisciplinary seminars covering the following five periods: antiquity, medieval, early-modern, enlightenment, and modern. A framing seminar that leads students to reflect on what it means to teach and study the humanities in the 21st century is also required. The program is designed to provide students with broad historical knowledge and skills for conducting interdisciplinary research; to prepare students to teach beyond their area of expertise; and to create communities of students and faculty from different departments working on similar periods.

This degree is declared by submitting a Ph.D. minor form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf) and one-page statement of intent before attaining TGR status. Students must request a meeting with the faculty director every Spring Quarter to review progress to degree.

To pursue the Ph.D. Minor in Interdisciplinary Humanities, students must fulfill the following requirements, for a minimum of 20 units.

		Units
DLCL 320	Humanities Education in the Changing University	3
DLCL 220	Humanities Education (if DLCL 320 is not offered, students can take DLCL 220 for 3 consecutive quarters (autumn/ winter/ spring) totaling 3 units)	1
Complete three of the five core seminars		
DLCL 321	Classical Seminar: Rethinking Classics	
DLCL 322	Medieval Seminar	
DLCL 323	Early Modern Seminar	
DLCL 324	The Enlightenment	
DLCL 325	Modern Seminar (for AY 14-15 COMPLIT 321A satisfies for DLCL 325)	

Take one additional graduate course (numbered 200 or above) on one of these periods (usually corresponding to the student's area of specialization) in a department other than the student's home department.

Demonstrate the ability to use at least one foreign language for scholarly work (for instance, by engaging with a primary or secondary source in a seminar paper for any class). Students may petition to have this requirement waived, if it is deemed to be irrelevant to the student's course of study.

Certificate in Language Program Management

Faculty Director: Elizabeth Bernhardt

Programs in contemporary foreign language teaching preparation entail a knowledge base that has grown over the past 30 years, rooted in data from an explosion of linguistic as well as applied linguistic research. In tandem with the language center's primary focus on learning research and theory, which graduate students explore in the teaching preparation program, the Language Program Management certificate focuses on developing the professional leadership and academic skills necessary for a career that includes the coordination and management of language learning. The program funds summer internships which enable the completion of a certificate in Language Program Management and are intended to help Stanford graduate students prepare themselves for such work in

complement to their literary studies. The certificate program is not declared on Axxess and does not appear on the transcript or diploma.

Prerequisites:

1. Foreign language acquisition: Oral Proficiency Interview (OPI) rating of at least advanced mid
2. Academic and professional development:
 - DLCL 301 The Learning and Teaching of Second Languages
 - Modified Oral Proficiency Interview (MOPI) Assessment workshop (2 days)
 - Limited OPI Tester Certification (average 6 months)
 - Teaching of three first-year language courses through the Language Center

These are generally met by the end of a graduate student's second year in the PhD program. Once meeting these criteria, the student may be admitted to the Program.

Upon admission to the program, students must complete the following:

1. DLCL 302 The Learning and Teaching of Second-Language Literatures: a course designed to focus student attention on the development of oral language proficiency through the upper levels and emphasize the need for upper register speaking and writing for literature learning and teaching.
2. OPI workshop (additional 2 days of training at the Advanced and Superior levels): this workshop is the extension of the MOPI. It focuses on upper register performance on the FSI-ACTFL scale. Hosted by either the Language Center, regional workshop, or at the national meeting of the ACTFL.
3. Completion of Writing Proficiency Familiarization workshop (Winter Quarter): Workshop conducted by a certified writing tester and structured in parallel to the MOPI/OPI assessment paradigm.
4. DLCL 303 Language Program Management (Summer Quarter): an administrative internship including, but not limited to, experiences with the following:
 - Shadow faculty and staff in select areas of administration and supervision within the Language Center and DLCL
 - Placement testing and student advisement
 - Technology in teaching and learning
 - Processes for teacher observation and feedback
 - Procedures in staff supervision and Human Resources
 - Course scheduling, budgeting, staffing, and searches
 - Interface with external programs (e.g., BOSP, Bechtel, CTL)

Division Chair: Gabriella Safran

DLCL Senior Lecturer: Cintia Santana

East Asian Languages and Cultures

Courses offered by the Department of East Asian Languages and Cultures are listed on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site under the subject codes:

- CHINGEN (Chinese General) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHINGEN&filter-catalognumber-CHINGEN=on>)

- CHINLIT (Chinese Literature) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHINLIT&filter-catalognumber-CHINLIT=on>)
- JAPANGEN (Japanese General) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=JAPANGEN&filter-catalognumber-JAPANGEN=on>)
- JAPANLIT (Japanese Literature) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=JAPANLIT&filter-catalognumber-JAPANLIT=on>)
- KORGEN (Korean General) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=KORGEN&filter-catalognumber-KORGEN=on&filter-coursestatus-Active=on>)
(<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=KORLANG&filter-catalognumber-KORLANG=on>)
- KORLIT (Korean Literature).
 - Courses with the suffix -GEN do not require reading knowledge of an Asian language.

Language courses are listed on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site under:

- CHINLANG (Chinese Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHINLANG&filter-catalognumber-CHINLANG=on>)
- JAPANLNG (Japanese Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=JAPANLNG&filter-catalognumber-JAPANLNG=on>)
- KORLANG (Korean Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=KORLANG&filter-catalognumber-KORLANG=on>)

The Department of East Asian Languages and Cultures offers programs for students who wish to engage with the cultures of China, Japan, and Korea as articulated in language, linguistics, literature, film, cultural studies, and visual arts. Students emerge with a sophisticated understanding of culture as a dynamic process embodied in language and other representational media, especially the verbal and visual forms that are central to humanistic study. Department faculty represent a broad range of research interests and specialties, and visiting scholars and postdoctoral fellows from the Stanford Humanities Center, the Andrew W. Mellon Fellowship of Scholars in the Humanities, the Freeman Spogli Institute for International Studies, and the Center for East Asian Studies add to the intellectual vitality of the department.

East Asian Languages and Cultures offers a full range of courses at the undergraduate and graduate levels. Undergraduate courses concentrate on language, literature, and other cultural forms from the earliest times to the present, covering traditional and contemporary topics from Confucian conceptions of self and society to inflections of gender in the twentieth century. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals. Graduate programs offer courses of study involving advanced language training, engagement with primary texts and other materials, literary history, and training in research methodologies and critical approaches.

East Asian language skills provide a foundation for advanced academic training and professional careers in fields such as business, diplomacy, education, and law. The department also offers opportunities for students who choose to double-major or minor in other academic disciplines,

including anthropology, art history, economics, education, history, linguistics, philosophy, political science, religious studies, and sociology.

The department accepts candidates for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy in Chinese and Japanese, and Bachelor of Arts in East Asian Studies. It also offers undergraduate minors and the Ph.D. minor in Chinese or Japanese language and literature.

For information concerning other opportunities for study about Asian history, societies, and cultures, see the following departments and programs: Anthropology, Art and Art History, Business, Comparative Literature, East Asian Studies, Economics, History, Law, Linguistics, Philosophy, Political Science, Religious Studies, and Sociology.

Undergraduate Mission Statements for East Asian Languages and Cultures Chinese Major

The mission of the undergraduate program in Chinese is to expose students to a variety of perspectives in Chinese language, culture, and history by providing them with training in writing and communication, literature, and civilization. Emphasis in courses is on developing powers of critical thinking and expression that serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. in their own work a good grasp of the course material and methodologies in the studies of Chinese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

Japanese Major

The mission of the undergraduate program in Japanese is to expose students to a variety of perspectives in Japanese language, culture, and history by providing students with training in writing and communication, literature, and civilization. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.

2. in their own work a good grasp of the course material and methodologies in the studies of Japanese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

East Asian Studies Major

The mission of the program in East Asian Studies is to enable students to obtain a comprehensive understanding of East Asia broadly conceived, which is the area stretching from Japan through Korea and China to the contiguous areas of the Central Asian land mass. Majors are expected to have a good mastery of an East Asian language, and focus on a particular sub-region or a substantive issue involving the region as a whole. Emphasis in classes is on developing powers of critical thinking and expression to serve students well no matter what their ultimate career goals in business, government service, academia, or the professions.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. in their own work a good grasp of the course material and methodologies in East Asian studies.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

Study Abroad

There are several exciting opportunities for Stanford students interested in Japan and China. The Kyoto Center for Japanese Studies (KCJS (<http://www.kcjs.jp>)), is designed for undergraduates wishing to do advanced work in Japanese language and Japanese studies. The language requirement is two years of Japanese. Students may attend either one or two semesters.

The BOSP Kyoto program (<https://undergrad.stanford.edu/programs/bosp/explore/kyoto>) combines a Winter and/or Spring quarter of academic study with an optional internship in Japan. Founded in collaboration with the School of Engineering, it provides students with the opportunity to fit language immersion and practical classroom experience into their busy schedules. It also welcomes students in the sciences, social sciences, and humanities. Winter quarter participants must have completed JAPANLNG 1. Spring quarter participants must have completed JAPANLNG 2. Preference is given to students with additional language study, as well as those who have taken courses in Japanese literature and culture. It is hosted on the Doshisha University campus in the heart of Kyoto. For information about either program in Kyoto, students should contact the Bing Overseas Studies Program office in Sweet Hall.

The Inter-University Center for Japanese Language Studies (IUC) (<https://web.stanford.edu/dept/IUC/cgi-bin>), located in Yokohama, is designed for students who seek the most advanced level of training in Japanese. This program accepts students with high intermediate Japanese language skills who seek Japan-related careers.

Undergraduates interested in studying Chinese language, history, culture, and society are encouraged to apply to the Stanford Program in Beijing (<https://undergrad.stanford.edu/programs/bosp/explore/beijing>), also offered through the Bing Overseas Studies Program. This program is located at Peking University and is open Autumn and Spring Quarters. There is no language prerequisite for the fall quarter; for spring quarter, students must take CHINLANG 2.

Students should take note of the Inter-University Program for Chinese Language Studies (IUP) (<http://ieas.berkeley.edu/iup>) at Tsinghua University (iub@socrates.berkeley.edu; 510-642-3873) and the Inter-University Center (IUC) for Japanese Language Studies (<http://stanford.edu/dept/IUC>) in Yokohama (stacey.campbell@stanford.edu; 650-725-1490). Stanford is a member of these consortia.

Graduate students interested in the graduate exchange program with the Department of Chinese at Peking University in Beijing should consult the chair of the department early in the academic year.

Graduate Programs in East Asian Languages and Cultures Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in East Asian Languages and Cultures and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in East Asian Languages and Cultures. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of East Asian Languages and Cultures and to interpret and present the results of such research.

Admission

All students contemplating application for admission to graduate study must have a creditable undergraduate record. The applicant need not have majored in Chinese or Japanese as an undergraduate, but must have had the equivalent of at least three years of training in the language in which he or she intends to specialize, and must also demonstrate a command of English adequate for the pursuit of graduate study. Applicants should not wish merely to acquire or improve language skills, but to pursue study in one of the following fields: Chinese archaeology, Chinese linguistics, Chinese literature, Chinese philosophy, Japanese cultural history, Japanese literature, Japanese linguistics, and Japanese visual culture.

Bachelor of Arts

The department offers the following degrees:

- Bachelor of Arts in Chinese
- Bachelor Arts in Japanese
- Bachelor of Arts in East Asian Studies

Bachelor of Arts in Chinese

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses.

The following courses as well as their prerequisites must be completed with a grade point average (GPA) of 2.0 or better.

Course List

	Units
I. Gateway Course	
CHINGEN 91 Introduction to China	5
II. First-year Modern Chinese	
Select one the following series	8-15
Series A	

CHINLANG 1	First-Year Modern Chinese, First Quarter
CHINLANG 2	First-Year Modern Chinese, Second Quarter
CHINLANG 3	First-Year Modern Chinese, Third Quarter
Series B	
CHINLANG 1B	First-Year Modern Chinese for Bilingual Students, First Quarter
CHINLANG 2B	First-Year Modern Chinese for Bilingual Students, Second Quarter
CHINLANG 3B	First-Year Modern Chinese for Bilingual Students, Third Quarter
Series C	
CHINLANG 5	Intensive First-Year Modern Chinese

III. Second-year Modern Chinese

Select one of the following series: 8-15

Series A	
CHINLANG 21	Second-Year Modern Chinese, First Quarter
CHINLANG 22	Second-Year Modern Chinese, Second Quarter
CHINLANG 23	Second-Year Modern Chinese, Third Quarter
Series B	
CHINLANG 21B	Second-Year Modern Chinese for Bilingual Students, First Quarter
CHINLANG 22B	Second-Year Chinese for Bilingual Students, Second Quarter
CHINLANG 23B	Second-Year Chinese for Bilingual Students, Third Quarter
Series C	
CHINLANG 25	Intensive Second-Year Modern Chinese

IV. Third-year Modern Chinese

Select one of the following series: 9-15

Series A	
CHINLANG 101	Third-Year Modern Chinese, First Quarter
CHINLANG 102	Third-Year Modern Chinese, Second Quarter
CHINLANG 103	Third-Year Modern Chinese, Third Quarter
Series B	
CHINLANG 101B	Third-Year Modern Chinese for Bilingual Students, First Quarter
CHINLANG 102B	Third-Year Modern Chinese for Bilingual Students, Second Quarter
CHINLANG 103B	Third-Year Modern Chinese for Bilingual Students, Third Quarter

V. Classical Chinese

CHINLIT 125	Beginning Classical Chinese, First Quarter	4-5
or CHINLIT 126	Beginning Classical Chinese, Second Quarter	
or CHINLIT 127	Beginning Classical Chinese, Third Quarter	

VI. Additional Courses

22-25

Three CHINGEN or CHINLIT courses at the 100 level with one in each of the following areas: pre-modern China, modern China, and Chinese linguistics. Five other content courses, as approved by the undergraduate faculty adviser

CHINGEN 70N	Animal Planet and the Romance of the Species
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CHINGEN 101	How to Be Modern in China: A Gateway to the World Course
CHINGEN 118	Constructing National History in East Asian Archaeology
CHINGEN 119	Popular Culture and Casino Capitalism in China
CHINGEN 120	Soldiers and Bandits in Chinese Culture
CHINGEN 133	Literature in 20th-Century China (required, satisfies WIM requirement)
CHINGEN 143	Images of Women in Ancient China and Greece
CHINGEN 146	Gods, Ghosts, and Ancestors: Anthropology of Chinese Folk Religion
CHINGEN 150	Sex, Gender, and Power in Modern China
CHINGEN 194	The History and Culture of Peking Opera
CHINLIT 155	Classical Poetry: Reading, Theory, Interpretation

VII. Capstone

CHINGEN 198	Senior Colloquium in Chinese Studies	1
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Total Units 57-81

Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include:

- a thesis outline
- a list of all relevant courses the student has taken or plans to take
- a preliminary reading list including a work or works in Chinese,
- the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved:

1. Research begins in Spring Quarter of the junior year, or by Autumn Quarter of the senior year at the latest, when the student enrolls in CHINLIT 189A Honors Research.
2. In Winter Quarter of the senior year, students enroll for 5 units in independent study, CHINLIT 199 Individual Reading in Chinese, with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year.
3. Students enroll in CHINGEN 198 Senior Colloquium in Chinese Studies in the senior year to polish and present their theses (instead of writing a capstone essay).
4. 8-11 units of credit are granted for honors course work and the finished thesis.

Bachelor of Arts in Japanese

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses. The following courses as well as their prerequisites must be completed with a grade point average (GPA) of 2.0 or better:

		Units
I. Gateway Course		
JAPANGEN 92	Introduction to Japan (Gateway course)	5
II. First-year Japanese		
		15

JAPANLNG 1	First-Year Japanese Language, Culture, and Communication, First Quarter	
JAPANLNG 2	First-Year Japanese Language, Culture, and Communication, Second Quarter	
JAPANLNG 3	First-Year Japanese Language, Culture, and Communication, Third Quarter (or JAPANLANG 5)	
III. Second-year Modern Japanese		15
JAPANLNG 21	Second-Year Japanese Language, Culture, and Communication, First Quarter	
JAPANLNG 22	Second-Year Japanese Language, Culture, and Communication, Second Quarter	
JAPANLNG 23	Second-Year Japanese Language, Culture, and Communication, Third Quarter (or JAPANLNG 20)	
IV. Third-year Modern Japanese		15
JAPANLNG 101	Third-Year Japanese Language, Culture, and Communication, First Quarter	
JAPANLNG 102	Third-Year Japanese Language, Culture, and Communication, Second Quarter	
JAPANLNG 103	Third-Year Japanese Language, Culture, and Communication, Third Quarter (or JAPANLNG 105)	
V. Additional Courses		25
Three JAPANGEN or JAPANLIT courses at the 100 level with one in each of the following areas: pre-modern Japan, modern Japan, and Japanese linguistics, as approved by the undergraduate adviser. Four other content courses dealing with Japan primarily at the 100 level, as approved by the undergraduate adviser.		
The following courses are offered in 2014-15:		
JAPANGEN 82N	Joys and Pains of Growing Up and Older in Japan	
JAPANGEN 121	Translating Japan, Translating the West	
JAPANGEN 127	JAPANimals: Fauna in the Cultural History of Japan	
JAPANGEN 133	Japanese Media Culture	
JAPANGEN 138	Introduction to Modern Japanese Literature and Culture (Required WIM course for Japanese major.)	
JAPANGEN 142	Gender, Sex, and Text in Early Modern Japan	
JAPANGEN 152	Art Animation	
JAPANLIT 157	Points in Japanese Grammar	
JAPANLIT 181	Japanese Pragmatics	
JAPANGEN 184	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	
JAPANGEN 186	Theme and Style in Japanese Art	
JAPANGEN 187	Romance, Desire, and Sexuality in Modern Japanese Literature	
JAPANGEN 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	

VI. Capstone

JAPANGEN 198	Senior Colloquium in Japanese Studies (Completion of a capstone essay of approximately 7,500 words, written either in a directed reading course or one of the non-language courses above. Must have an adviser for the capstone essay by the beginning of Autumn Quarter, senior year.)	1
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Total Units	76
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- Students must also complete of a capstone essay of approximately 7,500 words, written either in a directed reading course or for one of the courses listed above.
- JAPANGEN 51 Japanese Business Culture and Systems/ JAPANGEN 251 Japanese Business Culture and Systems can not be counted toward the major.
- Students who complete third-year Japanese at KCJS satisfy the language requirement but are required to take a placement test if they wish to enroll in:
 - JAPANLNG 211 Fourth-Year Japanese, First Quarter
 - JAPANLNG 212 Fourth-Year Japanese, Second Quarter
 - JAPANLNG 213 Fourth-Year Japanese, Third Quarter

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses.

Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Chinese or Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved:

- research begins in spring quarter of the junior year, or by autumn quarter of the senior year at the latest, when the student enrolls in JAPANLIT 189A Honors Research
- In winter quarter of the senior year, students enroll for five units in independent study JAPANLIT 189B Honors Research with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year.
- Students enroll in the Senior Colloquium in the senior year to polish and present their theses (instead of writing a capstone essay). JAPANGEN 198 Senior Colloquium in Japanese Studies
- Eight to eleven units of credit are granted for honors course work and the finished thesis.

Bachelor of Arts in East Asian Studies

Majors in East Asian Studies begin or continue the mastery of Chinese, Japanese, or Korean. Within the humanities or social sciences, they may focus on a particular sub-region, for example, Japan; South China, Hong Kong, and Taiwan; or western China and Central Asia; or a substantive issue involving the region as a whole, such as environmental protection, public health, rural development, historiography, cultural expression, or religious beliefs. The major seeks to reduce the complexity of a region to intellectually manageable proportions and illuminate the interrelationships among the various facets of a society.

Potential majors must submit a Student Proposal for a Major in East Asian Studies form not later than the end of the first quarter of the junior year. Majors must complete at least 75 units of course work on China, Japan, and/or Korea in addition to a one unit Senior Colloquium. Courses to be

credited toward major requirements must be completed with a grade of 'C' or better. Requirements are:

1. Language: proficiency in Chinese, Japanese, or Korean language at the second-year level or above, to be met either by course work or examination. Students who meet the requirement through examination are still expected to take an additional 15 units of language at a higher level, or literature courses taught in the language, or the first year in an additional Asian language. No more than 30 units of language courses are counted toward the major.
2. Area Courses: a minimum of three area courses, one in each category below (courses listed are examples and by no means exhaustive; if uncertain whether a particular course fits into one of these categories, contact the department to check.

a. Humanities

		Units
ARTHIST 188A	The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism	4
ARTHIST 188B	From Shanghai Modern to Global Contemporary: Frontiers of Modern Chinese Art	4
CHINGEN 70N	Animal Planet and the Romance of the Species	3-4
CHINGEN 91	Introduction to China	5
CHINGEN 101	How to Be Modern in China: A Gateway to the World Course	3
CHINGEN 118	Constructing National History in East Asian Archaeology	3-5
CHINGEN 132	Chinese Fiction and Drama in Translation	4
CHINGEN 133	Literature in 20th-Century China	4-5
CHINGEN 141	Emergence of Chinese Civilization from Caves to Palaces	3-4
CHINGEN 194	The History and Culture of Peking Opera	3-4
CHINGEN 198	Senior Colloquium in Chinese Studies	1
JAPANGEN 82N	Joys and Pains of Growing Up and Older in Japan	3
JAPANGEN 92	Introduction to Japan	5
JAPANGEN 127	JAPANimals: Fauna in the Cultural History of Japan	3-5
JAPANGEN 138	Introduction to Modern Japanese Literature and Culture	3-4
JAPANGEN 152	Art Animation	2-4
JAPANGEN 184	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
JAPANGEN 187	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
KORGEN 101N	Kangnam Style: Korean Media and Pop Culture	4
KORGEN 120	Narratives of Modern and Contemporary Korea	4
KORGEN 121	Doing the Right Thing: Ethical Dilemmas in Korean Film and Literature	3-4
KORLIT 231	Topics in Korean Literature	4-5
MUSIC 13Q	Classical Music and Politics: Western Music in Modern China	3
RELIGST 31	The Religious Life of Things	3-5
RELIGST 256	Music and Religious Experience in the Contemporary World, The Brahma Net Sutra (Fanwang Jing)	4, 3-5

b. History

		Units
EASTASN 162	Seminar on the Evolution of the Modern Chinese State, 1550-Present	3-5
HISTORY 94B	Japan in the Age of the Samurai	5
HISTORY 95	Modern Korean History	3
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon	3
HISTORY 99S	Christianity in East Asia	5
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 195	Modern Korean History	5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 292F	Culture and Religions in Korean History	4-5
HISTORY 295J		5

c. Social Sciences

		Units
EASTASN 117	Health and Healthcare Systems in East Asia	3-5
HUMBIO 147		4
JAPANGEN 51	Japanese Business Culture and Systems	3-5
LAW 245	China Law and Business	3
IPS 244	U.S. Policy toward Northeast Asia	5
IPS 246	China on the World Stage	3-5
POLISCI 148	Chinese Politics: The Transformation and the Era of Reform	5
POLISCI 211	Political Economy of East Asia	3-5
SOC 116	Chinese Organizations and Management	5
SOC 117A	China Under Mao	5
SOC 167A	Asia-Pacific Transformation	5

3. Substantive Concentration: additional courses on East Asia, one of which must be a seminar above the 100 level. Majors are encouraged to distribute their course work among at least three disciplines and two subregions in Asia. The subregions need not be traditionally defined. Examples include China, Japan, or Korea; or, in recognition of the new subregions which are emerging, South China and Taiwan, or Central Asia. At least four courses must have a thematic coherence built around a topic. Examples include:

- East Asian religions and philosophies
- Culture and society of modern Japan
- Ethnic identities in East Asia
- Arts and literature in late imperial China
- Foreign policy in East Asia
- Social transformation of modern Korea
- China's political economy

See ExploreCourses under CHINGEN

(<https://explorecourses.stanford.edu/search?q=CHINGEN&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CHINGEN=on&filter-catalognumber-CHINGEN=on>),

CHINLIT (<https://explorecourses.stanford.edu/search?q=CHINLIT&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CHINLIT=on&filter-catalognumber-CHINLIT=on>),

CHINLIT (<https://explorecourses.stanford.edu/search?q=CHINLIT&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CHINLIT=on&filter-catalognumber-CHINLIT=on>),

EASTASN, JAPANGEN (<https://explorecourses.stanford.edu/search?q=EASTASN&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-EASTASN=on&filter-catalognumber-EASTASN=on>),

JAPANGEN (<https://explorecourses.stanford.edu/search?q=JAPANGEN&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-JAPANGEN=on&filter-catalognumber-JAPANGEN=on>),

IPS (<https://explorecourses.stanford.edu/search?q=IPS&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-IPS=on&filter-catalognumber-IPS=on>),

IPS (<https://explorecourses.stanford.edu/search?q=IPS&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-IPS=on&filter-catalognumber-IPS=on>),

POLISCI (<https://explorecourses.stanford.edu/search?q=POLISCI&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-POLISCI=on&filter-catalognumber-POLISCI=on>),

POLISCI (<https://explorecourses.stanford.edu/search?q=POLISCI&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-POLISCI=on&filter-catalognumber-POLISCI=on>),

SOC (<https://explorecourses.stanford.edu/search?q=SOC&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-SOC=on&filter-catalognumber-SOC=on>),

SOC (<https://explorecourses.stanford.edu/search?q=SOC&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-SOC=on&filter-catalognumber-SOC=on>),

q=JAPANGEN&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-JAPANGEN=on&filter-catalognumber-JAPANGEN=on), JAPANLIT (<https://explorecourses.stanford.edu/search?q=JAPANLIT&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-JAPANLIT=on&filter-catalognumber-JAPANLIT=on>), and KORGEN or other relevant departments (<https://explorecourses.stanford.edu/search?q=KORGEN&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-KORGEN=on&filter-catalognumber-KORGEN=on>).

4. Capstone Essay: completion of a paper of approximately 7,500 words, written either in a directed reading course or for one of the courses in item 3 above, which should be built upon the student's thematic interest. CHINGEN 198 Senior Colloquium in Chinese Studies, JAPANGEN 198 Senior Colloquium in Japanese Studies or KORGEN 198 Senior Colloquium in Japanese Studies (1 unit), is required of majors during their senior year to develop and present the capstone essay or honors paper. A faculty adviser for the capstone essay must be submitted by beginning of autumn quarter.
5. At least one quarter overseas in the country of focus.
6. An East Asian Studies course that satisfies the University Writing in the Major requirement (WIM) should be completed before beginning the senior essay. This year, CHINGEN 133 Literature in 20th-Century China, KORGEN 120 Narratives of Modern and Contemporary Korea and JAPANGEN 138 Introduction to Modern Japanese Literature and Culture satisfy the WIM requirement.
7. The courses for the major must add up to at least 76 units, comprised of the one-unit Senior Colloquium and at least 75 additional units, all taken for a letter grade. Courses must be at least three units to be counted towards the degree.

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses.

Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Chinese or Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved, research begins in Spring Quarter of the junior year, or by Autumn Quarter at the latest, when the student enrolls in 2-5 units of credit for independent study. In Winter Quarter, students enroll for five units in independent study with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year. Students enroll in the Senior Colloquium, CHINGEN 198 Senior Colloquium in Chinese Studies, KORGEN 198 Senior Colloquium in Japanese Studies, or JAPANGEN 198 Senior Colloquium in Japanese Studies, in the senior year to polish and present their theses (instead of writing a capstone essay). Eight to eleven units of credit are granted for honors course work and the finished thesis. One advanced level colloquium or seminar dealing with China, Japan, or Korea is required as well.

Overseas Studies

Courses approved for the East Asian Languages and Cultures majors which are taught overseas can be found in the "Overseas Studies

(p. 94)" section of this Bulletin, or in the Overseas Studies office, Sweet Hall. To find course offerings in ExploreCourses, click on OSPKYOTO (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPKYOTO&filter-catalognumber-OSPKYOTO=on>) or OSPBEIJ (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OSPBEIJ&filter-catalognumber-OSPBEIJ=on>).

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site. Students should consult with their faculty adviser for applicability of Overseas Studies courses to a major or minor program.

Minor in Chinese or Japanese

The undergraduate minors in Chinese and Japanese have been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Chinese or Japanese language, as well as an introduction to the culture and civilization of East Asia. The minors consist of a minimum of 20 units from the following requirements: One introductory core course, below. Three other departmental courses in the relevant field approved by the adviser, and language requirement as listed below.

1. Completion of language study through the second-year level for students with no previous training in Chinese or Japanese.

a. Units
9-15

Select one of the following Series:

Series A

CHINLANG Second-Year Modern Chinese, First Quarter
21

CHINLANG Second-Year Modern Chinese, Second
22 Quarter

CHINLANG Second-Year Modern Chinese, Third Quarter
23

Series B

CHINLANG Second-Year Modern Chinese for Bilingual
21B Students, First Quarter

CHINLANG Second-Year Chinese for Bilingual Students,
22B Second Quarter

CHINLANG Second-Year Chinese for Bilingual Students,
23B Third Quarter

CHINLANG Intensive Second-Year Modern Chinese
25

Series C

JAPANLNG Second-Year Japanese Language, Culture, and
21 Communication, First Quarter

JAPANLNG Second-Year Japanese Language, Culture, and
22 Communication, Second Quarter

JAPANLNG Second-Year Japanese Language, Culture, and
23 Communication, Third Quarter

JAPANLNG Intensive Second-Year Japanese
20

- b. Students who already have first-year competence in Chinese or Japanese must complete the third-year course.

Select one of the following Series:

Series A

CHINLANG Third-Year Modern Chinese, First Quarter
101

Units

9-15

CHINLANG Third-Year Modern Chinese, Second Quarter
102

CHINLANG Third-Year Modern Chinese, Third Quarter
103

Series B

CHINLANG Third-Year Modern Chinese for Bilingual
101B Students, First Quarter

CHINLANG Third-Year Modern Chinese for Bilingual
102B Students, Second Quarter

CHINLANG Third-Year Modern Chinese for Bilingual
103B Students, Third Quarter

Series C

JAPANLNG Third-Year Japanese Language, Culture, and
101 Communication, First Quarter

JAPANLNG Third-Year Japanese Language, Culture, and
102 Communication, Second Quarter

JAPANLNG Third-Year Japanese Language, Culture, and
103 Communication, Third Quarter

- c. Students who already have a competence at the second-year level may fulfill the language component of the minor by taking three courses in the department using materials in either Chinese or Japanese. These courses may be language courses such as the third-year sequence mentioned above, the fourth-year language sequence, or they may be advanced literature and linguistics courses, depending on the capabilities and interests of the student.

2. The core courses: CHINGEN 91 for Chinese minors or JAPANGEN 92 for Japanese minors.

	Units
CHINGEN 91 Introduction to China	5
JAPANGEN 92 Introduction to Japan	5

3. Three courses selected from among the department's other offerings in the literature, linguistics, and civilization of the relevant minor area (CHINGEN, CHINLIT, JAPANGEN, JAPANLIT). All courses for the minor must be taken for a letter grade and completed with a GPA of 2.0 or better. Consult with the Undergraduate Studies Adviser to potentially count one of the OSPKYOTO courses taught by a Stanford home campus faculty member toward the minor.

	Units
CHINGEN 73N Chinese Language, Culture, and Society	4
CHINGEN 101 How to Be Modern in China: A Gateway to the World Course	3
CHINGEN 118 Constructing National History in East Asian Archaeology	3-5
CHINGEN 119 Popular Culture and Casino Capitalism in China	3-4
CHINGEN 120 Soldiers and Bandits in Chinese Culture	3-5
CHINGEN 141 Emergence of Chinese Civilization from Caves to Palaces	3-4
CHINGEN 133 Literature in 20th-Century China	4-5
CHINGEN 143 Images of Women in Ancient China and Greece	3-5
CHINGEN 146 Gods, Ghosts, and Ancestors: Anthropology of Chinese Folk Religion	3-5
CHINGEN 152 Beijing: Microcosm of Modern China	3-4
CHINGEN 194 The History and Culture of Peking Opera	3-4
CHINLIT 125 Beginning Classical Chinese, First Quarter	2-5
JAPANGEN 82N Joys and Pains of Growing Up and Older in Japan	3
JAPANGEN 121 Translating Japan, Translating the West	3-4
JAPANGEN 127 JAPANimals: Fauna in the Cultural History of Japan	3-5
JAPANGEN 133 Japanese Media Culture	2-4

JAPANGEN 138 Introduction to Modern Japanese Literature and Culture 3-4

JAPANGEN 142 Gender, Sex, and Text in Early Modern Japan 3-4

JAPANGEN 152 Art Animation 2-4

JAPANLIT 157 Points in Japanese Grammar 2-4

JAPANGEN 184 Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting 4

JAPANGEN 185 Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868 4

JAPANGEN 186 Theme and Style in Japanese Art 4

JAPANGEN 187 Romance, Desire, and Sexuality in Modern Japanese Literature 3-4

JAPANGEN 287A The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime 5

JAPANLIT 181 Japanese Pragmatics 2-4

Minor in East Asian Studies

The goal of the minor in East Asian Studies is to provide the student with a broad background in East Asian culture as a whole, while allowing the student to focus on a geographical or temporal aspect of East Asia. The minor may be designed from the following, for a total of six courses and a minimum of 20 units. All courses should be taken for a letter grade.

1. Three area courses, one in each category (see East Asian Studies major for listing of area courses).
2. One undergraduate seminar above the 100 level and two other courses from among those listed as approved for East Asian Studies majors, including literature courses but excluding language courses. These courses are listed under the East Asian Studies major in this bulletin.

Applications for the minor should be submitted online through Axess and are due no later than the second quarter of the junior year.

Minors in Other Departments Minor in Translation Studies

Minor Adviser: Cintia Santana (csantana@stanford.edu)

The DLCL offers a "Minor in Translation Studies" which may be of interest to students in EALC. See the DLCL's "Minors (p. 412)" tab for the full requirements; go to the menu in the right hand column and click on the link to the "Minor in Translation Studies".

The Division of Literatures, Cultures, and Languages, in cooperation with East Asian Languages and Cultures and the English Department, teaches undergraduates to develop and apply their foreign language knowledge to the production and analysis of translations. The minor is designed to give students majoring in a variety of fields the tools to consider the practical and theoretical issues brought up by translation as an aesthetic, cultural, and ethical practice.

Master of Arts Programs in East Asian Languages and Cultures

1. The M.A. is granted in Chinese and in Japanese. The normal length of study for the degree is two years.
2. No financial aid is available for those applicants who wish to obtain the M.A. only.

- Students who wish to spend the first year of graduate study at the Beijing or Yokohama centers must obtain department approval first.
- Candidates for the degree must be in residence at Stanford in California during the final quarter of registration.
- A thesis or an annotated translation of a text of suitable literary or historical worth is required for the M.A. degree. Under special circumstances, a paper approved by the graduate adviser may be substituted.
- The University's basic requirements for the master's degree, including a 45-unit minimum requirement, are given in the "Graduate Degrees (p. 43)" section of this Bulletin. Department requirements are set forth below.

Master of Arts in Chinese

The M.A. program in Chinese is designed for students with strong academic records and an interest in pursuing postgraduate research in Chinese literature, philosophy, or linguistics, but who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. (Note: Students who wish to pursue advanced language training in preparation for post-graduate research in other fields of Chinese studies are referred to the interdisciplinary M.A. program in the Center for East Asian Studies.)

The candidate must finish third-year Chinese, and one course in advanced classical Chinese with a letter grade of 'B' or higher. Placement tests in modern and in classical Chinese will be given for incoming students during orientation week, Autumn Quarter. Those who fail to place into advanced level classical must take beginning classical Chinese. Qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations.

- Demonstrate proficiency in both modern and classical Chinese through completion of one of the tracks of third-year Chinese with a letter grade of 'B' or higher:

		Units
CHINLANG 103	Third-Year Modern Chinese, Third Quarter	5
CHINLANG 103B	Third-Year Modern Chinese for Bilingual Students, Third Quarter	3

- One of three advanced classical Chinese courses:

		Units
CHINLIT 221	Advanced Classical Chinese: Philosophical Texts	3-5
CHINLIT 222	Advanced Classical Chinese: Historical Narration	2-5
CHINLIT 223	Advanced Classical Chinese: Literary Essays	3-5

- Complete the following for a letter grade of 'B' or higher:

		Units
CHINLIT 201	Proseminar: Bibliographic and Research Methods in Chinese Studies	3-5

- Four courses in CHINGEN or CHINLIT numbered above 200:

		Units
The following courses are offered this year:		
CHINLIT 205	Beginning Classical Chinese, First Quarter	2-5
CHINLIT 206	Beginning Classical Chinese, Second Quarter	2-5
CHINLIT 207	Beginning Classical Chinese, Third Quarter	2-5
CHINGEN 218	Constructing National History in East Asian Archaeology	3-5
CHINGEN 219	Popular Culture and Casino Capitalism in China	3-4
CHINGEN 220	Soldiers and Bandits in Chinese Culture	3-5
CHINGEN 233	Literature in 20th-Century China	4-5

CHINLIT 221	Advanced Classical Chinese: Philosophical Texts	3-5
CHINLIT 223	Advanced Classical Chinese: Literary Essays	2-5
CHINGEN 243	Images of Women in Ancient China and Greece	3-5
CHINGEN 246	Gods, Ghosts, and Ancestors: Anthropology of Chinese Folk Religion	3-5
CHINGEN 250	Sex, Gender, and Power in Modern China	3-5
CHINLIT 255	Classical Poetry: Reading, Theory, Interpretation	4
CHINGEN 294	The History and Culture of Peking Opera	3-4
CHINGEN 252	Beijing: Microcosm of Modern China	3-4
CHINGEN 241	Emergence of Chinese Civilization from Caves to Palaces	3-4
CHINLIT 273	Readings in Chinese Drama	2-4
CHINLIT 295J		5
CHINLIT 371	Aesthetics, Politics, Modernity and China	2-5
CHINLIT 392B	Law and Society in Late Imperial China	4-5

- Two upper-division or graduate-level courses in fields such as Chinese anthropology, art history, history, philosophy, politics, religious studies, or another relevant field, as approved by the graduate adviser in consultation with the student's individual adviser
- A master's thesis

		Units
CHINLIT 299	Master's Thesis or Translation	1-5

Master of Arts in Chinese, Archaeology Subplan

The M.A. in Chinese, Archaeology subplan, is designed for students with an interest in pursuing postgraduate research in Chinese archaeology who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. The subplan is declared on Axess. Subplans are printed on the transcript and the diploma and are elected via the Declaration or Change to a Field of Study (<https://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>) form.

Degree Requirements

A candidate must:

- Demonstrate proficiency in both modern and classical Chinese by completing:
 - third-year Chinese through with a minimum grade of 'B+'.
 - one of three advanced classical Chinese courses:

		Units
CHINLIT 221	Advanced Classical Chinese: Philosophical Texts	3-5
CHINLIT 222	Advanced Classical Chinese: Historical Narration	2-5
CHINLIT 223	Advanced Classical Chinese: Literary Essays	3-5

- Qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations or presenting documentary evidence of attendance at a bachelor's institution in which Chinese is the language of instruction. Exemptions may also be granted to students who study prehistoric archaeology. Instead, these students should take required course work relating to archaeology which is offered in the Stanford Archaeology Center. For details students should consult with the supervisor or the graduate adviser.
- Complete 45 units, including the following four graduate level CHINGEN or ANTHRO subject code courses appropriate to the

Chinese Archaeology track. All courses must be passed with a minimum grade of 'B+'.

		Units
a.		
CHINGEN 241	Emergence of Chinese Civilization from Caves to Palaces	3-4
CHINGEN 218	Constructing National History in East Asian Archaeology	3-5
ANTHRO 303	Introduction to Archaeological Theory	5
ANTHRO 307	Archaeological Methods	5

3. Two upper-division or graduate-level courses in fields such as Chinese anthropology, archaeology, art history, history, philosophy, political science and religious studies, as approved by the graduate adviser in consultation with the student's individual adviser.

4. Master's thesis.

Master of Arts in Japanese

The M.A. program in Japanese is designed for students with strong academic records and an interest in pursuing postgraduate research in Japanese literature, cultural history, or linguistics, but who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. *Note:* Students who wish to pursue advanced language training in preparation for postgraduate research in other fields of Japanese studies are referred to the interdisciplinary M.A. program in the Center for East Asian Studies.

The candidate must:

1. Complete third-year:

		Units
JAPANLNG 101	Third-Year Japanese Language, Culture, and Communication, First Quarter	5
JAPANLNG 102	Third-Year Japanese Language, Culture, and Communication, Second Quarter	5
JAPANLNG 103	Third-Year Japanese Language, Culture, and Communication, Third Quarter	5

2. Complete fourth-year Japanese and classical Japanese with a letter grade of 'B' or higher:

		Units
Fourth-year Japanese		
JAPANLNG 211	Fourth-Year Japanese, First Quarter	9-15
JAPANLNG 212	Fourth-Year Japanese, Second Quarter	
JAPANLNG 213	Fourth-Year Japanese, Third Quarter	
Classical Japanese		
JAPANLIT 246	Introduction to Premodern Japanese	5-10
JAPANLIT 247	Readings in Premodern Japanese	

- *Note:* qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations.

3. Complete the following with a letter grade of 'B' or higher:

a. four adviser-approved courses in Japanese literature, culture, or linguistics from among the offerings of the Department of East Asian Languages and Cultures, not including courses taken to fulfill the language requirement.

		Units
JAPANGEN 221	Translating Japan, Translating the West	3-4

JAPANGEN 227	JAPANimals: Fauna in the Cultural History of Japan	3-5
JAPANGEN 233	Japanese Media Culture	3-5
JAPANGEN 238	Introduction to Modern Japanese Literature and Culture	3-4
JAPANGEN 286	Theme and Style in Japanese Art	4
JAPANGEN 287	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
JAPANGEN 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5
JAPANGEN 384	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
JAPANLIT 224	Dramatic Manga	2-4
JAPANLIT 257	Points in Japanese Grammar	2-4
JAPANLIT 276	Modern Japanese Short Stories	2-4
JAPANLIT 279	Research in Japanese Linguistics	2-4
JAPANLIT 281	Japanese Pragmatics	2-4
JAPANLIT 296	Modern Japanese Literature	2-5
JAPANLIT 298	The Theory and Practice of Japanese Literary Translation	2-5

b. Complete JAPANLIT 201 Proseminar: Introduction to Graduate Study in Japanese (2-5 units).

c. Two upper-division or graduate-level courses in fields such as Japanese anthropology, art history, history, philosophy, politics, and religion, as approved by the graduate adviser in consultation with the student's individual adviser.

d. A master's thesis; enroll in JAPANLIT 299 Master's Thesis or Translation (1-5 units).

Coterminal B.A. and M.A. Programs in East Asian Languages and Cultures

With department approval, students may be able to combine programs for the B.A. and M.A. degrees in Chinese or Japanese. Prospective applicants must consult with the graduate adviser.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

For those interested in a coterminal program with an M.A. in East Asian Studies, please contact the Center for East Asian Studies for application procedures and deadlines, or visit the CEAS (<http://ceas.stanford.edu>) web site and the "East Asian Studies (p. 427)" section of this bulletin.

Doctor of Philosophy Programs in East Asian Languages and Cultures

The Ph.D. degree is granted in Chinese and Japanese. Candidates for the degree are expected to acquire a thorough familiarity with Chinese or Japanese literature and linguistics, an adequate command of relevant languages, and a comprehensive knowledge of East Asian history, social institutions, and thought. The University's basic requirements for the

Ph.D. are given in the "Graduate Degrees (p. 43)" section of this bulletin. Department requirements are set forth below.

Admission to Candidacy

Students admitted with a B.A. only are evaluated by the graduate faculty during the Autumn Quarter of their second year at Stanford. The evaluation is based on a research paper of 25-30 pages documented and with a bibliography, written for an EALC major seminar above the 200 level. Students are also expected to have a GPA of at least 'A-' and demonstrate satisfactory work as a teaching assistant. If the faculty have serious doubts about a student's ability to work for the Ph.D., they convey this to the student. During the subsequent Spring Quarter, the faculty formally decide by vote whether a student should be admitted to candidacy for the Ph.D. or offered an extension. In cases of extension of pre-candidacy, a clear plan is developed for the student, and a reassessment completed within two academic quarters.

In the case of a student who already has an M.A. in Chinese or Japanese when admitted to the department, the evaluation takes place in the Spring Quarter of the student's first year. If a student goes to the Inter-University Program for Chinese Language Studies (IUP) at Tsinghua University or the Inter-University Center (IUC) for Japanese Language Studies in Yokohama during the first two years of study, the department may consider an extension for admission to candidacy. The timing of the evaluation of a student admitted with an M.A. in East Asian Studies is decided on an individual basis.

Candidacy is a milestone different from the comprehensive exams, which are regularly held in the third year. Mastery of the field exams is not to be equated with the potential for doing research. Admission to candidacy indicates that the department faculty consider the student qualified to pursue a program of study leading to the Ph.D.

Doctor of Philosophy in Chinese

The Ph.D. program in Chinese is designed to prepare students for a doctoral degree in Chinese literature, philosophy, or linguistics. Applicants must have a minimum of three years of Chinese language study at Stanford or the equivalent to be considered for admission. Ph.D. students will complete the M.A. as described above on the way to advancing to Ph.D. candidacy (see department guidelines for admission to candidacy above). The majority of required course work for Ph.D. students demands the ability to read primary and secondary materials in Chinese. Advanced standing may be considered for students entering the Ph.D. program who have already completed an M.A. in Chinese literature or linguistics elsewhere only in cases when the level of prior course work and research is deemed equivalent to departmental requirements for the Ph.D. All courses must be taken for a letter grade.

A candidate must fulfill the following requirements:

1. Complete the department's requirements for the M.A. in Chinese and two of three advanced classical Chinese Courses CHINLIT 221 Advanced Classical Chinese: Philosophical Texts. CHINLIT 222 Advanced Classical Chinese: Historical Narration. CHINLIT 223 Advanced Classical Chinese: Literary Essays. All incoming Ph.D. students must take a placement test in classical Chinese held during Orientation Week of fall quarter. Those who fail to place into the advanced level must take Beginning Classical Chinese.
2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required.

3. Complete two relevant seminars at the 300 level. These seminars must be in different subjects.

Units

The following course is offered this year:

CHINLIT 371	Aesthetics, Politics, Modernity and China	2-5
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4. Pass a set of three comprehensive written examinations, one of which tests the candidate's methodological competence in the relevant discipline. The remaining two fields are chosen, with the approval of the graduate adviser in consultation with the student's individual adviser, from the following: archaeology, anthropology, art, Chinese literature, history, Japanese literature, linguistics, philosophy, and religion. With the adviser's approval, a Ph.D. minor in a supporting field may be deemed equivalent to the completion of one of these three examinations.
5. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter, and taking DLCL 301 The Learning and Teaching of Second Languages.
6. Pass the University Oral Examination—General regulations governing the oral examination are found in the "Graduate Degrees (p. 43)" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
7. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Chinese.

Doctor of Philosophy in Chinese, Archaeology Subplan

Subplans are printed on the transcript and diploma and are elected via the "Declaration or Change to a Field of Study (<https://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>)" form.

1. Complete one of three advanced classical Chinese courses and the requirements for the M.A. Qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations or presenting documentary evidence. Exemptions may be granted to students who study prehistoric archaeology. Instead, these students should take coursework offered in the Stanford Archaeology Center. Consult with graduate adviser.

Units

CHINLIT 221	Advanced Classical Chinese: Philosophical Texts	3-5
CHINLIT 222	Advanced Classical Chinese: Historical Narration	2-5
CHINLIT 223	Advanced Classical Chinese: Literary Essays	2-5

2. Demonstrate proficiency in at least one supporting foreign language (in addition to Chinese and English), or in a laboratory skill, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Proficiency (in language(s) and/or laboratory skill must be certified through a written examination or an appropriate amount of coursework, to be determined on a case-by-case basis.

3. Six graduate level CHINGEN or ANTHRO courses appropriate to the Chinese Archaeology track, as approved by the adviser:

Units

The following courses are offered this year:

CHINGEN 218	Constructing National History in East Asian Archaeology	3-5
CHINGEN 241	Emergence of Chinese Civilization from Caves to Palaces	3-4
ANTHRO 303	Introduction to Archaeological Theory	5
ANTHRO 307	Archaeological Methods	5

ANTHRO 308	Proposal Writing Seminar in Cultural and Social Anthropology	5
ANTHRO 311G	Introduction to Culture and Society Graduate Studies in Anthropology	2
ANTHRO 310G	Introduction to Graduate Studies	2

4. Serve as a teaching assistant for two quarters and research assistant in an archaeology laboratory for two quarters.

5. Pass qualifying examinations in Chinese archaeology.

6. Carry out fieldwork related to dissertation research.

7. Pass University oral examination. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.

8. Submit a dissertation demonstrating ability to undertake original research based on primary materials in Chinese or data related to China.

Doctor of Philosophy in Japanese

The Ph.D. program in Japanese is designed to prepare students for a doctoral degree in Japanese literature, cultural history, or linguistics. Applicants must have a minimum of three years of Japanese language study at Stanford or the equivalent to be considered for admission. Ph.D. students will complete M.A. requirements on the way to advancing to Ph.D. candidacy (see department guidelines for admission to candidacy above). The majority of required course work for Ph.D. students demands the ability to read primary and secondary materials in Japanese. Advanced standing may be considered for students entering the Ph.D. program who have already completed an M.A. in Japanese literature or linguistics elsewhere only in cases when the level of prior course work and research is deemed equivalent to departmental requirements for the Ph.D. All courses must be taken for a letter grade.

A candidate must fulfill the following requirements:

1. Demonstrate proficiency in both modern and classical Japanese language by completing the following courses, or by demonstrating an equivalent level of linguistic attainment by passing the appropriate certifying examinations:

Fourth-Year Japanese:

JAPANLNG 213	Fourth-Year Japanese, Third Quarter	3-5
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Premodern Japanese:

JAPANLIT 246	Introduction to Premodern Japanese	3-5
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JAPANLIT 247	Readings in Premodern Japanese	2-5
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2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required. Students concentrating in classical Japanese literature are normally expected to fulfill this requirement by completing *kanbun*:

Classical Japanese

JAPANLIT 248	Readings in Classical Japanese	5
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JAPANLIT 249 (not offered this year) also fulfills this requirement

Or, First-year Classical Chinese; take the following three courses:

CHINLIT 205	Beginning Classical Chinese, First Quarter	2-5
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CHINLIT 206	Beginning Classical Chinese, Second Quarter	2-5
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CHINLIT 207	Beginning Classical Chinese, Third Quarter	2-5
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3. Complete eight adviser-approved courses numbered above 200 from among the offerings of the Department of East Asian Languages and Cultures. At least four of these eight courses must be advanced seminars numbered above 300. At least one of these eight courses must deal with Japanese linguistics. For students focusing on modern literature, at least two of these eight courses must deal with premodern material, and for students focusing on premodern literature, at least two of the eight courses must deal with modern material.

Units

JAPANGEN 221	Translating Japan, Translating the West	3-4
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JAPANLIT 224	Dramatic Manga	2-4
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JAPANGEN 252	Art Animation	2-4
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JAPANGEN 286	Theme and Style in Japanese Art	4
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JAPANGEN 287	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
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JAPANGEN 238	Introduction to Modern Japanese Literature and Culture	3-4
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JAPANLIT 257	Points in Japanese Grammar	2-4
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JAPANLIT 276	Modern Japanese Short Stories	2-4
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JAPANLIT 279	Research in Japanese Linguistics	2-4
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JAPANLIT 281	Japanese Pragmatics	2-4
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JAPANLIT 287	Pictures of the Floating World: Images from Japanese Popular Culture	5
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JAPANGEN 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5
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JAPANLIT 296	Modern Japanese Literature	2-5
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JAPANLIT 298	The Theory and Practice of Japanese Literary Translation	2-5
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JAPANGEN 384	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
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4. Complete two upper-division or graduate-level courses in two supporting fields, for a total of four courses outside of Japanese literature or linguistics. Supporting fields, to be determined in consultation with the student's primary adviser, may include Japanese anthropology, art, history, philosophy, politics, and religion, Chinese literature, comparative literature, etc.

5. Units

JAPANLIT 201	Proseminar: Introduction to Graduate Study in Japanese	2-5
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6. Pass a comprehensive qualifying examination that tests the candidate's breadth and depth in the primary field of research and methodological competence in the relevant discipline.
7. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter and taking DLCL 301 The Learning and Teaching of Second Languages (3 units).
8. Pass the University Oral Examination. General regulations governing the oral examination are found in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
9. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Japanese.

Doctor of Philosophy in Japanese, Linguistics Track

1. Demonstrate proficiency in both modern and classical Japanese language by completing the following courses, or by demonstrating an equivalent

level of linguistic attainment by passing the appropriate certifying examinations:

		Units
JAPANLNG 213	Fourth-Year Japanese, Third Quarter	3-5
JAPANLIT 246	Introduction to Premodern Japanese	3-5
JAPANLIT 247	Readings in Premodern Japanese	2-5

2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required.

3. Complete six adviser-approved courses numbered above 200 from among the offerings of the Department of East Asian Languages and Cultures. At least one of these six courses must be an advanced seminar numbered above 300. At least one of these six courses must deal with Japanese literature.

4. Complete five upper-division or graduate-level courses in linguistics and other supporting fields. To be determined in consultation with the student's primary adviser, these may include applied linguistics, Chinese linguistics, psychology, education, anthropology, sociology, etc.

5. Complete JAPANLIT 279 Research in Japanese Linguistics

6. Submit two qualifying papers presenting substantial research in two different subfields of Japanese linguistics.

7. Submit an annotated bibliography pertaining to the topic of dissertation.

8. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter and taking DLCL 301 The Learning and Teaching of Second Languages

9. Pass the University Oral Examination. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.

10. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Japanese.

Ph.D. Minor in East Asian Languages and Cultures

A student taking a Ph.D. minor in Chinese or Japanese must complete at least 30 units of work within the department at the 200 and 300 level, chosen in consultation with a department adviser. The student must take either CHINLIT 201 Proseminar: Bibliographic and Research Methods in Chinese Studies or JAPANLIT 201 Proseminar: Introduction to Graduate Study in Japanese unless the department is satisfied that work done elsewhere has provided similar training. The student must also pass a written examination in the Chinese or Japanese language.

Emeriti: (Professors) Albert E. Dien, David S. Nivison, Makoto Ueda, John Wang;

(Associate Professor) Susan Matisoff; (Senior Lecturer) Yin Chuang

Chair: Ronald Egan

Directors of Graduate Studies: James Reichert (Japanese), Li Liu (Chinese)

Directors of Undergraduate Studies: Yoshiko Matsumoto (Japanese), Yiqun Zhou (Chinese)

Professors: Steven D. Carter (on leave winter, spring), Ronald Egan, Li Liu, Yoshiko Matsumoto, Chao Fen Sun (on leave spring), Melinda Takeuchi (East Asian Languages and Cultures, Art and Art History), Ban Wang (East Asian Languages and Cultures, Comparative Literature)(on leave autumn, winter)

Acting Professors: Thomas Bartlett, Yanli Gao

Associate Professors: Haiyan Lee, Indra Levy, James Reichert, Yiqun Zhou

Assistant Professors: Dafna Zur

Consulting Professor: Richard Dasher

Lecturers: Paul Festa, Regina Llamas

Postdoctoral Fellows: Paul Roquet

Chinese-Japanese Area Studies Faculty:

Professors: Gordon Chang (History), Richard Dasher (Center for Integrated Systems), John Kieschnick (Religious Studies), Mark E. Lewis (History), Paul Harrison (Religious Studies), Jean Oi (Political Science), David Palumbo-Liu (Comparative Literature), Gi-Wook Shin (Sociology), Richard Vinograd (Art and Art History), Andrew Walder (Sociology), Kären Wigen (History) (on leave 2014-15), Arthur P. Wolf (Anthropology), Lee H. Yearley (Religious Studies), Xueguang Zhou (Sociology)

Associate Professors: Jindong Cai (Music), Matthew Sommer (History), Miyako Inoue (Anthropology), Matthew Kohrman (Anthropology), Thomas Mullaney (History), Jun Uchida (History)

Assistant Professors: Phillip Lipsy (Political Science), Jean Ma (Art and Art History), Yumi Moon (History)

East Asian Studies

Mission

The Center for East Asian Studies (CEAS) supports teaching and research on East Asia-related topics across all disciplines; disseminates knowledge about East Asia through projects of local, regional, national, and international scope; and serves as the intellectual gathering point for a collaborative and innovative community of scholars and students of East Asia. CEAS works with all schools, departments, research centers, and student groups to facilitate and enhance all aspects of East Asia-related research, teaching, outreach and exchange across the Stanford campus.

CEAS is part of Stanford Global Studies (<http://sgs.stanford.edu>) in the School of Humanities and Sciences (<http://humsci.stanford.edu>). As an East Asia National Resource Center (NRC), supported by the U.S. Department of Education, CEAS serves to strengthen access to and training in the major languages of East Asia, and to broaden East Asia area studies training across all disciplines.

Courses offered by the Center for East Asian Studies are listed under the subject code EASTASN (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EASTASN&filter-catalognumber-EASTASN=on>) on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site. The EASTASN courses listed on ExploreCourses deal primarily with China, Japan, and Korea. Literature courses are listed with the subject codes of CHINGEN (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-CHINGEN=on&filter-term-Summer=on&page=0&q=CHINGEN&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on>), CHINLIT (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-CHINLIT=on&filter-term-Summer=on&page=0&q=CHINLIT&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on>), JAPANGEN (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-JAPANGEN=on&filter-term-Summer=on&page=0&q=JAPANGEN&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on>), JAPANLIT (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-JAPANLIT=on&filter-term-Summer=on&page=0&q=JAPANLIT&filter-coursestatus->

Active=on&view=catalog&filter-term-Spring=on&filter-term-Winter=on), KORGEN (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-KORGEN=on&filter-term-Summer=on&page=0&q=KORGEN&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on>), and KORLIT (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-KORLIT=on&filter-term-Summer=on&page=0&q=KORLIT&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on>) on ExploreCourses.

Many other theoretical and methodological courses within various departments at Stanford are taught by faculty who are East Asian specialists; these courses often have a substantial East Asian component and a list of current applicable courses from outside departments may be found on the "Approved Courses" tab of this bulletin.

Courses in Chinese, Japanese, and Korean language instruction use the subject codes CHINLANG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHINLANG&filter-catalognumber-CHINLANG=on>), JAPANLNG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=JAPANLNG&filter-catalognumber-JAPANLNG=on>), and KORLANG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=KORLANG&filter-catalognumber-KORLANG=on>). Courses in Classical Chinese are listed under the subject code CHINLIT (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-CHINLIT=on&filter-term-Summer=on&page=0&q=CHINLIT&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on>).

Undergraduate Programs in East Asian Studies

Undergraduates interested in East Asia can become involved by attending CEAS events, taking courses in the subject codes listed above, or earning a Minor or Bachelor of Arts degree in East Asian Studies. These undergraduate degrees in East Asian Studies are now administered by the Department of East Asian Cultures and Languages (p. 414). Stanford Global Studies offers internship opportunities in East Asia, and the Bing Overseas Study Program (<http://bosp.stanford.edu>) offers study abroad opportunities in East Asia.

For language study, CEAS provides undergraduate fellowships for language study in China, Japan, or Korea; students must simultaneously apply to a pre-approved language program abroad. Applications are due in February each year. Deadlines and application information can be found on the CEAS web site (<http://ceas.stanford.edu/students/ceas-prizes-and-fellowships.php>). In addition, undergraduates can obtain a coterminal M.A. degree in East Asian Studies (<http://ceas.stanford.edu/students/how-to-apply.php>) while concurrently working on their undergraduate major by applying during the regular admissions cycle no later than their senior year.

Graduate Programs in East Asian Studies

Master's Program

Stanford's interdisciplinary M.A. program in East Asian Studies is designed both for students who plan to complete a Ph.D. but who have not yet decided on the particular discipline in which they prefer to work, and for students who wish to gain a background in East Asian Studies in connection with a career in nonacademic fields such as business, law, education, journalism, or government service. The program permits the student to construct a course of study suited to individual intellectual interests

and career needs, and may be completed within 1 to 3 years, depending on the course load taken and the amount of foreign language training required. Advanced language students or students who are native speakers of Chinese, Japanese, or Korean can potentially complete the program within one year. Students interested in pursuing professional careers are encouraged to plan for additional training through internships or additional graduate professional programs, in conjunction with obtaining an M.A. in East Asian Studies.

The M.A. program allows students a great deal of flexibility in combining language training, interdisciplinary area studies, and a disciplinary concentration. Students are required to demonstrate third year level proficiency in Chinese, Korean or Japanese, according to their research-area focus (either through coursework at Stanford or testing at the 4th year or higher in language-placement exams), to take the one-unit core course in East Asian Studies, and to complete at least nine area studies graduate courses, three of which must be in a single department or in the same thematic focus. An M.A. thesis, usually an expansion of a paper written for a graduate seminar or colloquium, is required.

Learning Outcomes

The purpose of the master's program is to further develop specialized knowledge and skills in East Asian Studies, and to prepare students for a professional career or doctoral studies. This is achieved through completion of East Asia content courses, language training as necessary, and experience with independent research.

Postdoctoral Programs

The Center for East Asian Studies offers postdoctoral fellowships in Chinese (<http://ceas.stanford.edu/resources/chinesePostdoctoral.php>) and Japanese (<http://ceas.stanford.edu/resources/japanesePostdoctoral.php>) Studies each year. Postdoctoral fellowships in other areas are also available from the Freeman-Spogli Institute for International Studies, the Walter H. Shorenstein Asia-Pacific Research Center, the Stanford Humanities Center, and various other campus units.

Financial Aid

CEAS offers various types of funding for new and continuing students. Please visit the fellowships page (<http://ceas.stanford.edu/students/ceas-prizes-and-fellowships.php>) of the CEAS web site for the most up-to-date offerings.

Master of Arts in East Asian Studies

University requirements for the master's degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The master's degree program allows a great deal of flexibility in combining language training, interdisciplinary area studies, and a disciplinary concentration. The director of the center assigns preliminary faculty advisers to all students. Members of the staff and faculty are available for academic and career planning. The M.A. program is normally completed in two academic years, but students can shorten this time by receiving credit for prior language work or by attending summer sessions. Students are urged to complete the degree requirements within one academic year (3 quarters) unless their goals and background dictate otherwise.

Applicants must submit scores for the General Test of the Graduate Record Examination, official transcripts and a writing sample along with their online application. Foreign applicants are also required to take the Test of English as a Foreign Language (TOEFL). Applications for admission and financial aid should be made online; see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. The deadline for submitting applications for the 2015-2016 academic year is December 9, 2014.

Coterminal Bachelor's and Master's Program in East Asian Studies

The center admits a limited number of Stanford undergraduates to work toward a coterminal M.A. degree in East Asian Studies. Applications are accepted once a year during the regular CEAS M.A. application cycle. The deadline for the 2015-16 academic year is December 9, 2014. Students may apply after completing 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. Applicants are expected to meet the same standards as those seeking admission to the M.A. program, and they must submit the following directly to the Center's office:

- a completed coterminal application form (<http://registrar.stanford.edu/pdf/CotermApplic.pdf>)
- a written statement of purpose (<http://studentaffairs.stanford.edu/gradadmissions/applying/statement>)
- an unofficial Stanford transcript
- three letters of recommendation, at least two of which should be from members of the department of concentration
- first 15 pages of a representative writing sample (seminar paper, term paper, honors thesis, journal article, etc.). Do not submit more than 15 pages.
- copy of scores from the General Test of the Graduate Record Exam (official score should be sent to Stanford's school code 4704)
- a list of courses the applicant intends to take to fulfill degree requirements.

Coterm applications are reviewed along with peer applications by the M.A. Admissions Committee of the Center for East Asian Studies (CEAS) (<http://ceas.stanford.edu/students/how-to-apply.php>).

Students must meet all requirements for both B.A. and M.A. degrees. They must complete a total of 15 full-time quarters or the equivalent, or three full quarters after completing 180 units for a total of 226 units. Coterminals are not eligible for University financial aid, but are eligible to apply for Foreign Language and Area Studies (FLAS) (<http://ceas.stanford.edu/students/ceas-prizes-and-fellowships.php>) and other fellowships administered by CEAS.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" (<http://exploreddegrees.stanford.edu/cotermdegrees>) section of this bulletin. For University coterminal degree program rules and University application forms, see the Registrar's (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Degree Requirements

Language Requirement

Students must complete the equivalent of Stanford's first three full years of language training in Chinese, Japanese, or Korean. Other East Asian languages may be accepted by petition. Students entering the program without any language preparation should complete first- and second-year Chinese, Japanese, or Korean within the first year of residence at Stanford if they intend to graduate within two years (this would necessitate completing a summer language program). All language courses taken at Stanford used towards fulfilling the language requirement must be for letter grades and completed with a grade of 'B' or higher. Conversation classes cannot be used for meeting this requirement, and units from the language courses numbered 1-99 do not count toward the 46 units required for the degree. Language courses numbered 100 and above can be used towards meeting the 46 units minimum for the degree, but cannot be used towards fulfilling the content courses requirement unless the language course is at the fourth-year level or above, and the student is specializing in literature.

The language requirement may be satisfied in part or in full by placing into an appropriate Stanford language class through the language proficiency exam given by the Language Center. Students who fulfill this minimum three-year language requirement before completing other requirements are encouraged to continue language study, or take courses in which Chinese, Japanese, or Korean are used, for as long as they are in the program.

The language used to meet the three-year language proficiency requirement should match the student's country/region of focus.

Students in the M.A. program are also eligible to apply for the Inter-University language programs in Beijing and Yokohama. Work completed in one of these programs may be counted toward the M.A. degree's language requirement if students take and pass the corresponding Stanford language proficiency exam after the program. Work completed in these overseas programs will not be counted towards the overall unit requirements.

Language courses are listed under the following subject codes on the Stanford Bulletin's ExploreCourses web site: CHINLANG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHINLANG&filter-catalognumber-CHINLANG=on>), JAPANLNG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=JAPANLNG&filter-catalognumber-JAPANLNG=on>), and KORLANG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=KORLANG&filter-catalognumber-KORLANG=on>).

M.A. Thesis Requirement

A master's thesis, representing a substantial piece of original research, should be filed with the center's program office as part of the graduation requirements. With the adviser's approval, the master's thesis requirement may be satisfied by expanding a research paper written for an advanced course, and should have a minimum of 10,000 words in the main body of the thesis (excluding references, citations, appendices, etc.). The M.A. thesis is due at noon on the last day of classes, of the quarter in which the student applies to graduate; see the Academic Calendar (p.) for specific dates.

Area Studies and Unit Requirements

Students must complete a minimum total of 46 units for the degree at Stanford, comprised of:

1. 1-unit core course, EASTASN 330 Core Seminar: Issues and Approaches in East Asian Studies
2. At least 9 approved content courses, at least 30 units of which must be at or above the 200 level (at or above 300 level for HISTORY courses) and meeting the following criteria:
 - a. Are on the approved East Asian Studies course list (see Approved Courses tab (p. 430)), or have been approved by petition (maximum 3 petitions)
 - b. Taken for a letter grade and completed with a 'B' or higher
 - c. Taken for 3 units or more
 - d. Do not count as part of the language requirement (language courses beyond third-year level are accepted for students specializing in literature)
 - e. At least 3 of the 9 course must be either in the same department or within the same thematic focus across several departments (see sample themes below).
3. Additional courses as necessary to reach the minimum 46 units for the degree meeting the following criteria:

- a. Taken for a letter grade
 - b. At least level 100 or above (above 200 for HISTORY courses)
 - c. Must be an academic content course - such as a lecture, seminar, or colloquium (no activity courses, EFS language classes, etc.). Language classes are okay if the course number is above level 100 and it is taken for a letter grade.
4. The cumulative grade point average (GPA) for all courses must be 3.0 or higher; grades for the 9 content courses must be a 'B' or higher.

Sample Theme 1

	Units
ANTHRO 253A Population and social trends in Japan	3-5
HISTORY 392D Japan in Asia, Asia in Japan	4-5
HISTORY 396D Modern Japan	4-5

Sample Theme 2

	Units
KORGEN 201 Kangnam Style: Korean Media and Pop Culture	4
EASTASN 289K The Political Transition for Economic Development in East Asian: Government or Market?	3
HISTORY 392G Modern Korea	4-5

Sample Theme 3

	Units
IPS 246 China on the World Stage	3-5
POLISCI 340L China in World Politics	5
POLISCI 348 Chinese Politics: The Transformation and the Era of Reform	5

Course Petitions and Directed Reading

Some theory-oriented or methodological courses may be used to meet part of the 9 courses requirements, provided that they are demonstrably useful for understanding East Asian problems. A course petition (<http://ceas.stanford.edu/students/forms.php>) and syllabus must be submitted no later than the end of the second week of the quarter in which the course is offered. Students are limited to 3 petitions total. Credit toward the area studies requirement is not given for courses taken before entering the M.A. program, however students may take courses for exchange credit at the University of California, Berkeley, with the approval of their adviser and the Office of the University Registrar.

Students may choose to do a directed reading course with a faculty member if the current course offerings do not meet a particular research or study need. Directed reading courses are independent study projects a student may undertake with a relevant Stanford faculty member. Once the student has found a faculty member to support his or her studies, the student must inform the Student Services Coordinator immediately so that the appropriate section can be added for EASTASN 300 Graduate Directed Reading. The limitations for directed reading units are:

1. A maximum of 5 units may apply towards the 46-unit degree requirement.
2. If applying the units to the 9 courses requirement, the student must submit a detailed syllabus approved by their directed reading instructor prior to enrolling in the course.
3. It must be taken for a letter grade.

Joint and Dual Degree Programs in East Asian Studies

East Asian Studies and Law

This joint degree program grants an M.A. degree in East Asian Studies and a Doctor of Jurisprudence (J.D.) degree. It is designed to train students interested in a career in teaching, research, or the practice of law related to East Asian legal affairs. Students must apply separately to the East Asian Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of training in Chinese, Japanese, or Korean. Up to 45 units of approved courses may be counted towards both degrees. For more information, see the "Joint Degree Programs (<http://web.stanford.edu/dept/registrar/bulletin1112/7376.htm>)" section of this bulletin and the Stanford Law School's web site (<http://www.law.stanford.edu/degrees/joint>). Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

East Asian Studies and Education

This dual degree program grants an M.A. degree in East Asian Studies and a secondary school teaching credential in social studies. To be eligible for this program, students should apply to the M.A. program in East Asian Studies and then apply to the Stanford Teacher Education Program during the first year at Stanford. Completing the dual program requires at least two years, including one summer session when beginning the education component of the program. Admissions processes for both programs are completely independent of each other and units from courses can only be applied to one degree or the other, not both.

East Asian Studies and Business

This dual degree program grants an M.A. degree in East Asian Studies and a Master of Business Administration degree. Students must apply separately to the East Asian Studies M.A. program and the Graduate School of Business and be accepted by both. Completing this combined course of study requires approximately three academic years (perhaps including summer sessions), depending on the student's background and level of training in Chinese, Japanese, or Korean language. Admissions processes for both programs are completely independent of each other and units from courses can only be applied to one degree or the other, not both.

Director: Gordon Chang

Affiliated Faculty and Staff:

Anthropology: Harumi Befu (emeritus), Lisa M. Curran, Miyako Inoue, Matthew Kohrman, Alma B. Kunanbaeva, Stephen Murphy-Shigematsu, Barbara Voss, Sylvia J. Yanagisako

Art and Art History: Jean Ma, Melinda Takeuchi, Richard Vinograd, Xiaoze Xie

Biology: Marcus W. Feldman

Business: Charles M. Lee, Hau Lee, William F. Miller (emeritus)

Center for International Security and Cooperation: Chaim Braun

Civil and Environmental Engineering: David Freyberg, Renate Fruchter, Leonard Ortolano

Communications: James Fishkin (on leave 2014-15)

Comparative Literature: David Palumbo-Liu

Earth Sciences: Stephan A. Graham

East Asian Languages and Cultures: Thomas Bartlett, Steven Carter (on leave Winter & Spring), Albert E. Dien (emeritus), Ronald Egan, Paul Festa, Yanli Gao, Haiyan Lee, Indra Levy, Li Liu, Regina Llamas, Yoshiko Matsumoto, Barbara Mittler, James Reichert, Paul Roquet, Chao Fen Sun (on leave Spring), Melinda Takeuchi, Ban Wang (on leave Autumn & Winter), John C. Y. Wang (emeritus), Yiqun Zhou, Dafna Zur

East Asian Studies: Rebecca Corbett (postdoctoral fellow), Karen Eggleston, Cyrus Chen (postdoctoral fellow), Scott Rozelle

Economics: Kalina Manova

Education: Anthony L. Antonio, Martin Carnoy, Francisco O. Ramirez, Christine M. Wotipka

Electrical Engineering: Richard Dasher

Environmental Earth System Science: Eric F. B. Lambin

Freeman Spogli Institute for International Studies: Karl W. Eikenberry, Thomas Fingar, Takeo Hoshi, John W. Lewis, David Straub, Li-Tai Xue

History: Gordon Chang, Mark E. Lewis, Martin Lewis, Yumi Moon, Thomas Mullaney, Matthew Sommer, Jun Uchida, Lyman P. Van Slyke (emeritus), Kären Wigen (on leave 2014-15), Mikael D. Wolfe

Ho Center for Buddhist Studies: John Kieschnick, Irene H. Lin, Tenzin Tethong

Hoover Institution: Larry Diamond, Thomas Henriksen, Tai-Chun Kuo, Hsiao-ting Lin, Alice L. Miller, Toshio Nishi, William Ratliff, Charles Wolf Jr.

Human Biology: Arthur P. Wolf

Iris and B. Gerald Cantor: Xiaoneng Yang

Law: Jeffrey Ball, Thomas Heller, Erik Jenson, Mei Gechlik

Linguistics: Daniel Jurafsky

Management Science and Engineering: Siegfried S. Hecker, Pamela Hinds, William J. Perry, Edison Tse, Yinyu Ye

Music: Jingdong Cai, Jaroslaw Kapuscinski (on leave Spring), Stephen Sano, Linda Uyechi, Hui Daisy You

Political Science: Phillip Lipsy, Jean C. Oi

Religious Studies: Carl W. Bielefeldt (emeritus), Paul M. Harrison, Lee H. Yearley

Shorenstein APARC: Michael Armacost, Rafiq Dossani, Karen N. Eggleston, Donald K. Emmerson, Kenji E. Kushida, Scott Rozelle, Daniel C. Sneider

Sociology: Gi-Wook Shin, Andrew Walder (on leave Autumn), Xueguang Zhou

Stanford Institute for Economic Policy Research (SIEPR): Nicholas Charles Hope

Stanford Language Center: Marina Chung, Robert Clark, Sik Lee Dennig, Michelle DiBello, Hee-sun Kim, Nina Yushin Lin, Momoyo Kubo Lowdermilk, Emiko Yasumoto Magnani, Emi Mukai, Chie Muramatsu, Yuhwa Liao Rozelle, Momoe Saito Fu, Le Tang, Yoshiko Tomiyama, Huazhi Wang, Hannah Yoon, Hong Zeng, Youping Zhang

Approved Content Courses

Because East Asian Studies is an interdisciplinary major, the majority of the courses that apply toward the degree are listed under other departments. In addition to courses listed under the EASTASN subject code, students should check the list below, as well as on the Stanford Bulletin's ExploreCourses site (<http://explorecourses.stanford.edu>) for courses in other departments that will meet the degree requirements for East Asian Studies;

such departments include (but are not limited to) Anthropology, East Asian Languages and Cultures, History, Political Science, Religious Studies, and Sociology. Not all courses offered by other departments that have East Asia content may be listed below or on the CEAS web site. If there is a course not listed below that has East Asia content, check with the Center for East Asian Studies to verify whether or not it can be used to fulfill the degree requirements.

The following course list represents courses that may, with the adviser's approval, be used to fulfill degree requirements (please see the Law School (<http://www.law.stanford.edu/organizations/offices/office-of-the-registrar/stanford-non-law-student-course-registration>) or GSB (<http://www.gsb.stanford.edu/nongsbreg>) web sites for instructions on how to enroll in their courses):

China

		Units
AMSTUD 256	America- China Relations	4-5
ANTHRO 243	Title Social Change in Contemporary China: Modernity and the Middle Kingdom	4-5
ANTHRO 248	Health, Politics, and Culture of Modern China	4-5
ANTHRO 251A	Contemporary Chinese Society Through Independent Documentary Film	3-5
ARCHLGY 304C	The Archaeology of Ancient China	5
ARTHIST 188B	From Shanghai Modern to Global Contemporary: Frontiers of Modern Chinese Art	4
ARTHIST 288B	The Enduring Passion for Ink: Contemporary Chinese Ink Painting	5
ARTHIST 289A	Making the Masterpiece in Song Dynasty China	5
ARTHIST 388A	The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism	4
ARTHIST 489	Connoisseurship Studies of Chinese Painting, Calligraphy, and Seals	5
ARTHIST 489A	Making the Masterpiece in Song Dynasty China	5
CHINGEN 173	Chinese Language, Culture, and Society	4
CHINGEN 219	Popular Culture and Casino Capitalism in China	3-4
CHINGEN 220	Soldiers and Bandits in Chinese Culture	3-5
CHINGEN 233	Literature in 20th-Century China	4-5
CHINGEN 234	Early Chinese Mythology	3-5
CHINGEN 235	Chinese Bodies, Chinese Selves	3-5
CHINGEN 236	The Chinese Family	3-5
CHINGEN 237	Tiananmen Square: History, Literature, Iconography	3-5
CHINGEN 239	Cultural Revolution as Literature	4
CHINGEN 240	Chinese Justice: Law, Morality, and Literature	3-5
CHINGEN 241	Emergence of Chinese Civilization from Caves to Palaces	3-4
CHINGEN 243	Images of Women in Ancient China and Greece	3-5
CHINGEN 246	Gods, Ghosts, and Ancestors: Anthropology of Chinese Folk Religion	3-5
CHINGEN 250	Sex, Gender, and Power in Modern China	3-5
CHINGEN 251	Manuscripts, Circulation of Texts, Printing	3-4
CHINGEN 252	Beijing: Microcosm of Modern China	3-4
CHINGEN 255	Cultural Images in China-US Relations	3-5
CHINGEN 260	New Directions in the Study of Poetry and Literary Culture	3-4
CHINGEN 269	What is Chinese Theater? The Formation of a Tradition	3-4
CHINGEN 294	The History and Culture of Peking Opera	3-4
CHINGEN 393E	Female Divinities in China	3-5
CHINLIT 205	Beginning Classical Chinese, First Quarter	2-5

CHINLIT 206	Beginning Classical Chinese, Second Quarter	2-5
CHINLIT 207	Beginning Classical Chinese, Third Quarter	2-5
CHINLIT 221	Advanced Classical Chinese: Philosophical Texts	3-5
CHINLIT 222	Advanced Classical Chinese: Historical Narration	2-5
CHINLIT 223	Advanced Classical Chinese: Literary Essays	2-5
CHINLIT 230	Lyrical and Local Prose	3-5
CHINLIT 232	Chinese Biographies of Women	2-5
CHINLIT 235	Ghost Stories and Other Strange Tales	3-4
CHINLIT 255	Classical Poetry: Reading, Theory, Interpretation	4
CHINLIT 266	Chinese Ci Poetry (Song Lyrics)	3-4
CHINLIT 273	Readings in Chinese Drama	2-4
CHINLIT 292	The History of Chinese	4
CHINLIT 369	Late Imperial Chinese Fiction	2-5
CHINLIT 371	Aesthetics, Politics, Modernity and China	2-5
CHINLIT 379	For Love of Country: National Narratives in Chinese Literature and Film	3-5
CHINLIT 392B	Law and Society in Late Imperial China	4-5
COMPLIT 371	Aesthetics, Politics, Modernity and China	2-5
EASTASN 262	Seminar on the Evolution of the Modern Chinese State, 1550-Present	3-5
EASTASN 294	The Rise of China in World Affairs	3-5
EDUC 306B	The Politics of International Cooperation in Education	3-5
FEMGEN 250	Sex, Gender, and Power in Modern China	3-5
FILMSTUD 333	Contemporary Chinese Auteurs	4
FILMSTUD 336	Gender and Sexuality in Chinese Cinema	4
FILMSTUD 436	Chinese Cinema	5
GSBGEN 336	Energy Markets and Policy	4
HISTORY 356	America- China Relations	4-5
HISTORY 391B	The City in Imperial China	5
HISTORY 392B	Law and Society in Late Imperial China	4-5
HISTORY 393B	Queer History in Comparative Perspective	4-5
HISTORY 393C	Late Imperial China	4-5
HISTORY 393E	Female Divinities in China	4-5
HISTORY 395J	Gender and Sexuality in Chinese History	4-5
HISTORY 398	Major Topics in Modern Chinese History	4-5
HISTORY 495A	Qing Legal Documents	4-5
HISTORY 495B	Qing Legal Documents	4-5
IPS 246	China on the World Stage	3-5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
LAW 245	China Law and Business	3
LAW 4130	Policy Practicum: China's Solar Industry and its Global Implications	2-3
MSE 244	Economic Growth and Development	3
PEDS 226	Famine in the Modern World	3
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 340L	China in World Politics	5
POLISCI 348	Chinese Politics: The Transformation and the Era of Reform	3-5
POLISCI 443S	Political Economy of Reform in China	5
POLISCI 443T	Approaches to Chinese Politics	3-5
RELIGST 150	The Lotus Sutra: Story of a Buddhist Book	4
RELIGST 212	Chuang Tzu	5
RELIGST 315	Third Bhavanakrama & the Writings of Héshang Moheyan: Scripture in Buddhist Scholastic Polemics	3-5
RELIGST 315A	Chinese Buddhism	3-5

RELIGST 347	Chinese Buddhist Texts	3-5
RELIGST 352A	The Story of a Buddhist Megascripture: Readings in the Avatamsaka	3-5
RELIGST 356	The Brahma Net Sutra (Fanwang Jing)	4
SOC 207	China After Mao	5
SOC 216	Chinese Organizations and Management	5
SOC 217A	China Under Mao	5
STRAMGT 583	The Challenges in/with China	2
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5

Japan

		Units
ANTHRO 253A	Population and social trends in Japan	3-5
ARTHIST 287	Pictures of the Floating World: Images from Japanese Popular Culture	5
ARTHIST 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5
ARTHIST 384	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
ARTHIST 386	Theme and Style in Japanese Art	4
ARTHIST 387	Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868	4
ARTHIST 388A	The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism	4
ARTHIST 485	The Situation of the Artist in Traditional Japan	5
EASTASN 251	Innovation-Based Economic Growth: Silicon Valley and Japan	4
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 302G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 393B	Queer History in Comparative Perspective	4-5
HISTORY 396D	Modern Japan	4-5
HISTORY 498C	Japanese Imperial Archives, Part 1	4-5
HISTORY 498D	Japanese Imperial Archives, Part 2	4-5
JAPANGEN 124	Manga as Literature	3-5
JAPANGEN 179	Japanese Ghosts: The Supernatural in Japanese Art and Entertainment	4
JAPANGEN 184	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
JAPANGEN 220	The Situation of the Artist in Traditional Japan	5
JAPANGEN 221	Translating Japan, Translating the West	3-4
JAPANGEN 227	JAPANimals: Fauna in the Cultural History of Japan	3-5
JAPANGEN 229	Topophilia: Place in Japanese Visual Culture through 19th Century	5
JAPANGEN 233	Japanese Media Culture	2-4
JAPANGEN 237	Classical Japanese Literature in Translation	4
JAPANGEN 238	Introduction to Modern Japanese Literature and Culture	3-4
JAPANGEN 241	Japanese Performance Traditions	3-4
JAPANGEN 242	Gender, Sex, and Text in Early Modern Japan	3-4
JAPANGEN 248	Modern Japanese Narratives: Literature and Film	3-5
JAPANGEN 249	Screening Japan: Issues in Crosscultural Interpretation	3-4
JAPANGEN 251	Japanese Business Culture and Systems	3-5
JAPANGEN 252	Art Animation	2-4

JAPANGEN 260	Early Modern Japan: The Floating World of Chikamatsu	4
JAPANGEN 286	Theme and Style in Japanese Art	4
JAPANGEN 287	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
JAPANGEN 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5
JAPANGEN 384	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
JAPANLIT 201	Proseminar: Introduction to Graduate Study in Japanese	2-5
JAPANLIT 236	Academic Readings in Japanese II	2-4
JAPANLIT 246	Introduction to Premodern Japanese	3-5
JAPANLIT 247	Readings in Premodern Japanese	2-5
JAPANLIT 248	Readings in Classical Japanese	5
JAPANLIT 257	Points in Japanese Grammar	2-4
JAPANLIT 260	Japanese Poetry and Poetics	2-4
JAPANLIT 266	Introduction to Sino-Japanese	3-5
JAPANLIT 270	The Tale of Genji and Its Historical Reception	4
JAPANLIT 276	Modern Japanese Short Stories	2-4
JAPANLIT 279	Research in Japanese Linguistics	2-4
JAPANLIT 281	Japanese Pragmatics	2-4
JAPANLIT 287	Pictures of the Floating World: Images from Japanese Popular Culture	5
JAPANLIT 296	Modern Japanese Literature	2-5
JAPANLIT 298	The Theory and Practice of Japanese Literary Translation	2-5
JAPANLIT 395	Early Modern Japanese Literature	2-4
JAPANLIT 396	Modern Japanese Literature Seminar	2-5
MATSCI 159Q	Japanese Companies and Japanese Society	3
POLISCI 218J	Japanese Politics and International Relations	5
RELIGST 113B	Japanese Religion Through Film	4
RELIGST 115	Women and Pilgrimage in Japan	4
RELIGST 150	The Lotus Sutra: Story of a Buddhist Book	4
RELIGST 358	Japanese Buddhist Texts	3-5
TAPS 153S	Japanese Theater: Noh to Contemporary Performance	4

Korea

		Units
EASTASN 289K	The Political Transition for Economic Development in East Asian: Government or Market?	3
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 392F	Culture and Religions in Korean History	4-5
HISTORY 392G	Modern Korea	4-5
HISTORY 395	Modern Korean History	5
HISTORY 498C	Japanese Imperial Archives, Part 1	4-5
HISTORY 498D	Japanese Imperial Archives, Part 2	4-5
KORGEN 201	Kangnam Style: Korean Media and Pop Culture	4
KORGEN 220	Narratives of Modern and Contemporary Korea	4-5
KORGEN 221	Doing the Right Thing: Ethical Dilemmas in Korean Film and Literature	3-4
KORGEN 240	Childhood and Children: Culture in East Asia	3-5
KORLIT 231	Topics in Korean Literature	4-5
KORLIT 330	Intimate Encounters: Reading and Translating Korean Literature	4-5
SOC 211	State and Society in Korea	4

East Asia

		Units
ARCHLGY 235	Constructing National History in East Asian Archaeology	3-5
ARTHIST 485A	Exhibiting East Asian Art	1-5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CHINGEN 218	Constructing National History in East Asian Archaeology	3-5
COMM 277Y	Specialized Writing and Reporting: Foreign Correspondence in the Middle East and Asia	4-5
EASTASN 217	Health and Healthcare Systems in East Asia	3-5
EASTASN 220E	East Asian Internets	4
EASTASN 297	The International Relations of Asia since World War II	3-5
EDUC 202	Introduction to Comparative and International Education	4-5
EDUC 306D	World, Societal, and Educational Change: Comparative Perspectives	4-5
FILMSTUD 316	International Documentary	4
HISTORY 391	East Asia in the Early Buddhist Age	4-5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 394D	Manchuria: Cradle of Conflict, Cockpit of Asia	4-5
HISTORY 395F	Race and Ethnicity in East Asia	4-5
HISTORY 397	The Cold War and East Asia	5
IPS 224	Economic Growth, Development, and Challenges of East Asia	3-5
IPS 230	Democracy, Development, and the Rule of Law	5
IPS 244	U.S. Policy toward Northeast Asia	5
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
LAW 407	International Deal Making	2
LINGUIST 284A	Writing Systems in a Digital Age	2-3
MSE 293	Technology and National Security	3
POLISCI 211	Political Economy of East Asia	3-5
POLISCI 315A	The Rise of Asia	3-5
RELIGST 136	Buddhist Yoga	4
RELIGST 352A	The Story of a Buddhist Megascripture: Readings in the Avatamsaka	3-5
RELIGST 381	Asian Religions in America; Asian American Religions	4
SOC 267A	Asia-Pacific Transformation	4
SOC 309	Nations and Nationalism	4-5
SOC 315	Topics in Economic Sociology	5
TAPS 251A	Theater of the Asia-Pacific Region	4

Overseas Studies Courses in East Asian Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBEIJ 24	China's Economic Development	5
OSPBEIJ 42	Chinese Media Studies	4
OSPBEIJ 48	Chinese Literature: Tradition in Transformation	4
OSPBEIJ 67	China-Africa and Middle East Relations	4
OSPKYOTO 11	Experiencing Ma: Time & Space in Japanese Arts	4
OSPKYOTO 27	Japanese Popular Culture	4-5
OSPKYOTO 67	Kyoto in the Literature of Japan	4-5

Economics

Courses offered by the Department of Economics (<http://economics.stanford.edu>) are listed under the subject code ECON on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ECON&filter-catalognumber-ECON=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ECON&filter-catalognumber-ECON=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ECON&filter-catalognumber-ECON=on>).

The department's purpose is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. There is training for the general student as well as for those who plan careers as economists in civil service, private enterprise, teaching, or research.

The department's curriculum is an integral part of Stanford's programs in International Relations, Public Policy, and Urban Studies.

The faculty interests and research cover a wide spectrum of topics in most fields of economics, including behavioral economics, comparative institutional analysis, econometrics, economic development, economic history, experimental economics, industrial organization, international trade, labor, macro- and microeconomic theory, mathematical economics, environmental economics, and public finance.

Mission of the Undergraduate Program in Economics

The mission of the undergraduate program in Economics is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. The program introduces students to macro- and microeconomic theory, teaches them to think and write clearly about economic problems and policy issues and to apply the basic tools of economic analysis. The undergraduate major provides an excellent background for those who plan careers in government and private enterprise as well as those pursuing graduate degrees in professional schools or in the field of economics.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. understanding of core knowledge within Economics.
2. ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively and communicate ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

Graduate Programs in Economics

The primary objective of the graduate program is to educate students as research economists. In the process, students also acquire the background and skills necessary for careers as university teachers and as practitioners of economics. The curriculum includes a comprehensive treatment of modern theory and empirical techniques. Currently, 20 to 25 students are admitted each year.

Graduate programs in economics are designed to ensure that students receive a thorough grounding in the methodology of theoretical and empirical economics, while at the same time providing specialized training in a wide variety of subfields and a broad understanding of associated institutional structures. Toward these ends, the program is arranged so that the student has little choice in the curriculum at the outset but considerable latitude later on.

Students admitted to graduate standing in the department are expected to have a strong background in college-level economics, mathematics, and statistics. Preparation ordinarily consists of a college major in economics, a year-long calculus sequence that includes multivariate analysis, a course in linear algebra, and a rigorous course in probability and statistics.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Economics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Economics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Economics and to interpret and present the results of such research.

Graduate Fields

A. Economic Development

To receive credit for this field, students must complete two courses from:

		Units
ECON 215	Economic Development II	2-5
ECON 216	Development Economics III	2-5
ECON 217	Topics in International Macroeconomics: Theory and Evidence for Latin America:	2-5

and submit a paper from one of these courses

Students wishing to do research in the field are advised to take courses in international economics, such as ECON 266 International Economics II, and in comparative institutional analysis.

B. Economic History/Institutions

The requirement for the field is one research paper on a subject approved by one of the faculty teaching any of the following courses:

		Units
ECON 225	Economics of Technology and Innovation	2-5
ECON 226	U.S. Economic History	2-5
ECON 227	European Economic History	2-5
ECON 228	Institutions and Organizations in Historical Perspective	2-5

C. Monetary Theory and Advanced Macroeconomics

Requirements for this field are completion of two courses from:

		Units
ECON 233	Advanced Macroeconomics I	2-5
ECON 235	Advanced Macroeconomics III	2-5
ECON 236	Financial Economics I	2-5
ECON 237	Financial Economics II	2-5

D. Public Economics

To receive credit for the field, students must complete ECON 241 Public Finance and Taxation I and ECON 242 Public Finance and Taxation II by passing the final examinations, and submit an acceptable research paper on a topic approved by the instructor for either course.

E. Finance

To receive credit for the field, students must complete two courses from:

		Units
ECON 236	Financial Economics I	2-5
ECON 237	Financial Economics II	2-5
FINANCE 622	Dynamic Asset Pricing Theory	4
FINANCE 624	Corporate Finance Theory	4
FINANCE 625	Empirical Asset Pricing	4

F. Economics of Labor

To receive credit for this field, students must complete two courses from:

		Units
ECON 246	Labor Economics I	2-5
ECON 247	Labor Economics II	2-5
ECON 248	Labor Economics III	2-5
ECON 249	Topics in Health Economics	2-5

G. Economics of Industry

To receive credit for the field, students must complete ECON 257 Industrial Organization I and ECON 258 Industrial Organization IIA and submit one research paper, the subject of which has been approved in advance by one of the faculty teaching:

		Units
ECON 257	Industrial Organization I	2-5
ECON 258	Industrial Organization IIA	2-5
ECON 259	Industrial Organization II B	2-5
ECON 260	Industrial Organization III	2-5

H. International Economics

To receive credit for this field, students must complete two courses from:

		Units
ECON 265	International Economics I	2-5

ECON 266	International Economics II	2-5
ECON 267	Topics in International Trade (recommended)	2-5

A research paper from any of these courses must also be submitted.

I. Econometrics

A student may satisfy the requirements for the econometrics field by completing two courses from the following:

		Units
ECON 273	Advanced Econometrics I	2-5
ECON 275	Time Series Econometrics	2-5
ECON 276	Limited Dependent Variables	2-5

J. Microeconomic Theory

To receive credit for this field, students must complete two courses from the following:

		Units
ECON 282	Contracts, Information, and Incentives	2-5
ECON 283	Theory and Practice of Auction Market Design	2-5
ECON 289	Advanced Topics in Game Theory and Information Economics	2-5
ECON 291	Social and Economic Networks	2-5

K. Environmental Economics

To receive credit for this field, students must complete:

		Units
ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5

Students can petition to substitute another environment/natural resource course for either of these.

Other Programs

Other programs leading to dual degrees may be arranged. For example, the Ph.D. in Economics combines with one or two years of study in the School of Law, leading to the nonprofessional Master of Legal Studies (M.L.S.) degree. A dual degree program does not permit counting any courses toward both the Economics and the Law degrees. For more information, see the Degrees & Joint Degrees (<http://www.law.stanford.edu/program/degrees>) web site.

Fellowships and Assistantships

The department awards a number of fellowships for graduate study. Many first-year and a few second- or third-year students are typically awarded full fellowships, including a stipend and tuition. All students whose records justify continuation in the program may be assured support for the second through fourth years in the form of employment as a teaching or research assistant. These half-time appointments provide a stipend and tuition allowance. Entering students are not normally eligible for research or teaching assistantships.

Joint Degree Programs in Economics with the School of Law

J.D./M.A. AND J.D./PH.D.

The Department of Economics and the School of Law offer a joint program leading to either a J.D. degree combined with an M.A. degree in Economics, or to a J.D. degree combined with a Ph.D. in Economics.

The J.D./M.A. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves for careers in areas relating to both law and economics. Students interested in either joint degree program must apply and gain entrance separately to the School of Law and the Department of Economics and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Economics department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Economics. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Economics program regardless of whether enrollment at that time is in the Law School or in the Department of Economics. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.A. or Ph.D. degrees as specified in this bulletin or by the School of Law.

The Law School approves courses from the Economics Department that may count toward the J.D. degree, and the Economics department approves courses from the Law School that may count toward the M.A. or Ph.D. degree in Economics. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The list may differ depending on whether the student is pursuing an M.A. or a Ph.D. in Economics.

In the case of a J.D./M.A. program, no more than 45 quarter hours of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 quarter hours of approved courses may be counted toward both degrees. In either case, no more than 36 quarter hours of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may be counted toward the M.A. or the Ph.D. in Economics is the greater of: (a) 5 quarter hours in the case of the M.A. and 10 quarter hours in the case of the Ph.D.; or (b) the maximum number of hours from courses outside of the department that M.A. or Ph.D. candidates in Economics are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program.

Tuition and financial aid arrangements are normally made through the school in which the student is then enrolled.

For more information, see the Degrees & Joint Degrees (<http://www.law.stanford.edu/program/degrees>) web site.

Bachelor of Arts in Economics

The total number of units required for the major is 80. Students are encouraged to complete the core courses 1-6 below, as early as possible. Ideally, students should complete the core during the sophomore year, before taking upper division courses. Courses may not be taken before the prerequisites are completed. The required number of field courses is four. There is great flexibility in the choice of electives, including upper-division math and statistics.

Of the 80 units required for the major, at least 55 must be taken at Stanford in California. Students cannot declare Economics as their major or minor until they have completed ECON 50 Economic Analysis I with a grade of 'B' or better. All courses required for the economics major must be taken for a letter grade.

Requirements for the Economics Major (80 Units) Core Courses; 30 units

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (Prerequisites: ECON 1 and MATH 51 (letter grade required))	5
ECON 51	Economic Analysis II (Prerequisite: ECON 50)	5
ECON 52	Economic Analysis III (Prerequisites: ECON 50)	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists (Prerequisite: MATH 41 or equivalent) ¹	5
ECON 102B	Applied Econometrics (Prerequisites: ECON 50 and 102A) ²	5

¹ It is recommended that students satisfy this basic statistics requirement before proceeding with the rest of the program.

² Material in ECON 102B Applied Econometrics is used in a number of field courses. Students are advised to design their program of study so that ECON 102B Applied Econometrics is not taken in their senior year but early in their program.

Field Courses; 25 units

Must be taken at Stanford in California. Select five of the following courses.

		Units
Select four of the following:		25
ECON 102C	Advanced Topics in Econometrics	
ECON 107	Causal Inference and Program Evaluation	
(waiting for this course to load from PS)		
ECON 111	Money and Banking	
ECON 112	Financial Markets and Institutions: Recent Developments	
ECON 113	(not offered this year)	
ECON 118	Development Economics	
ECON 125	Economic Development, Microfinance, and Social Networks	
ECON 126	Economics of Health and Medical Care	
ECON 128	Economic Development: A Historical Perspective	
ECON 135	Finance for Non-MBAs ²	
ECON 136	(not offered this year) ¹	
ECON 137	Decision Modeling and Information	

ECON 140	Introduction to Financial Economics ²
ECON 141	Public Finance and Fiscal Policy
ECON 145	Labor Economics
ECON 146	Economics of Education
ECON 149	The Modern Firm in Theory and Practice
ECON 153	Economics of the Internet
ECON 155	Environmental Economics and Policy
ECON 157	Imperfect Competition
ECON 158	Regulatory Economics
ECON 160	Game Theory and Economic Applications ³
ECON 164	(not offered this year)
ECON 165	International Finance (not offered this year)
ECON 166	International Trade
ECON 179	(not offered this year)
ECON 180	Honors Game Theory ³
ECON 182	Honors Market Design ¹
ECON 198	Junior Honors Seminar
ECON 199D	Honors Thesis Research

- Students may not count units from both ECON 136 and ECON 182 Honors Market Design towards their field course requirements as the courses cover similar subject matter.
- Students may not count units from both ECON 135 Finance for Non-MBAs and ECON 140 Introduction to Financial Economics towards their major as the courses are too similar in content.
- Students may not count units from both ECON 160 Game Theory and Economic Applications and ECON 180 Honors Game Theory towards their field course requirements as the courses cover similar subject matter.

Writing in the Major Course; 5 units

Must be taken at Stanford in California. This course should be taken only after completing ECON 51 Economic Analysis II and ECON 52 Economic Analysis III, ECON 102B Applied Econometrics, and at least two field courses.

ECON 101	Economic Policy Seminar
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Units
5

Electives; 20 units

20 units in addition to the field courses taken; choose from ECON 1B and ECON courses numbered from 100 through 198 (excluding Econ 152).

Up to 10 units may be satisfied by:

	Units	
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 136	Stochastic Processes	3
MATH 151	Introduction to Probability Theory	3
MATH 171	Fundamental Concepts of Analysis	3
MATH 175	Elementary Functional Analysis	3
STATS 200	Introduction to Statistical Inference	3
STATS 206	Applied Multivariate Analysis	3
STATS 207	Introduction to Time Series Analysis	3
STATS 217	Introduction to Stochastic Processes	3
STATS 218	Introduction to Stochastic Processes	3
STATS 237	Theory of Investment Portfolios and Derivative Securities	3

A maximum of 10 units of transfer credit OR of ECON 139D Directed Reading, may be taken under this section. Suitable transfer credit must be approved in writing by the Associate Director of Undergraduate Studies. Advanced undergraduate majors with strong quantitative preparation may enroll in graduate (200-level) courses with permission of the Director of Undergraduate Studies and the course instructor. Some courses offered by Overseas Studies may be counted towards this requirement. The department does not give credit for internships.

Other Requirements

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit, and 55 of the 80 units required for the major must be taken at Stanford in California.

Students scoring a 5 on both the advanced placement microeconomics and advanced placement macroeconomics exam may petition the Director of Undergraduate Studies to have the ECON 1 Principles of Economics course requirement waived. Students do not receive units credit for placing out of ECON 1 Principles of Economics.

A grade point average (GPA) of 2.0 (C) or better must be received for all units applied toward the preceding requirements.

To use transfer credit in partial satisfaction of the requirements, the student must obtain written consent from the department's Associate Director of Undergraduate Study, who establishes the amount of credit to be granted toward the department requirements (see the Information Book for Economics Majors). Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics major.

Course prerequisites are enforced. Students taking courses to satisfy prerequisites in another department or institution must petition for Stanford course substitution or transfer credit approval in order to satisfy course prerequisites.

The time limit for satisfactory completion of a course is one year from the date an incomplete is given, although instructors may set a shorter time limit. Students are responsible for seeing that all grades of 'incomplete' are cleared within the time limit.

Flexible Tracks

Flexible Tracks listings of upper-division economics courses are provided to emphasize the diverse interests of Economics majors. Flexible Tracks do not add major requirements. Flexible Tracks may be examined in the department's Information Book for Economics Majors (<http://economics.stanford.edu/undergraduate>). Flexible Tracks are provided for the following areas of emphasis (field courses are in bold):

- Finance (Econ **111, 112, 138, 140 (or 135), 141, 165**, 110, 143, 183, 190)
- Policy (Econ **107, 113, 126, 141, 145, 146, 155, 158**, 150, 154, 159)
- Research (Econ **107, 102C, 136 (or 182), 137 (or 181), 160 (or 180), 198, 199D, 202, 210**)
- Strategy (Econ **136 (or 182), 137 (or 181), 149, 153, 157, 158, 160 (or 180)**, 191)
- International & Development (Econ **107, 113, 118, 125, 128, 165, 166, 164**, 116, 106, 114, 127)
- Behavioral (Econ **178, 179, 136 (or 182), 137, 160 (or 180)**)

Honors Program

The honors program offers an opportunity for independent research, creativity, and achievement. It is designed to encourage a more intensive study of economics than is required for the normal major, with course and research work of exceptional quality. Honors students submit their theses in writing and present them during the Honors Research Symposium during Spring Quarter. The honors program requires:

1. Completing all requirements for the major; plus five additional units, bringing the total to 85 units.
2. Achieving a grade point average (GPA) of at least 3.5 for the required courses of the Economics major (excluding ECON 139D Directed Reading and ECON 199D Honors Thesis Research). See details in the Information Book for Economics Majors.
3. Complete ECON 102B Applied Econometrics and at least two lecture courses most relevant for the proposed topic of the honors thesis by the end of the junior year. (These can be included in the basic 80 units.)
4. Candidates must write an honors thesis in their senior year for at least one unit and up to 10 units of credit (ECON 199D Honors Thesis Research). The thesis must be of very high quality and written under the direction of a member of the department or its affiliated faculty. Units of ECON 199D Honors Thesis Research do not count toward the course work requirements for the basic economics major, or in the computation of the GPA requirement for honors. Students may apply 5 units of ECON 199D Honors Thesis Research to the Writing in the Major requirement (WIM). The WIM requirement (ECON 101 Economic Policy Seminar or ECON 199D Honors Thesis Research) must be completed in order for the degree to be conferred.

Juniors interested in the honors program should contact the honors program director for more information. Prospective candidates for the honors program should submit an application to the director no later than the end of the first month of the third quarter before graduation (typically Autumn Quarter of the senior year). Also required, in the same quarter, is a three-page thesis proposal that must be approved by the thesis adviser.

Minor in Economics (35 Units)

The minor in Economics has two main goals: to acquaint students with the rudiments of micro- and macroeconomic theory that are required of all majors; and to allow students to build competence in the application of this theory to two fields of economics of their choosing, and the opportunity to specialize further in any one of these fields by taking one additional advanced course in the Department of Economics.

Course Work

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (Prerequisites: ECON 1 and MATH 51 (letter grade required))	5
ECON 51	Economic Analysis II (Prerequisite: ECON 50)	5
ECON 52	Economic Analysis III (Prerequisites: ECON 50 and 1)	5
Select two of the following: ¹		10
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	
ECON 102B	Applied Econometrics	
ECON 102C	Advanced Topics in Econometrics	
ECON 107	Causal Inference and Program Evaluation	
ECON 111	Money and Banking	
ECON 112	Financial Markets and Institutions: Recent Developments	
ECON 113		
ECON 118	Development Economics	
ECON 125	Economic Development, Microfinance, and Social Networks	
ECON 126	Economics of Health and Medical Care	
ECON 128	Economic Development: A Historical Perspective	
ECON 135	Finance for Non-MBAs ³	
ECON 136	²	

ECON 137	Decision Modeling and Information
ECON 140	Introduction to Financial Economics ³
ECON 141	Public Finance and Fiscal Policy
ECON 145	Labor Economics
ECON 149	The Modern Firm in Theory and Practice
ECON 153	Economics of the Internet
ECON 155	Environmental Economics and Policy
ECON 157	Imperfect Competition
ECON 158	Regulatory Economics
ECON 160	Game Theory and Economic Applications ⁴
ECON 164	
ECON 165	International Finance (not offered this year)
ECON 166	International Trade
ECON 178	
ECON 179	
ECON 180	Honors Game Theory ⁴
ECON 182	Honors Market Design ²
ECON 198	Junior Honors Seminar
ECON 202	Microeconomics I ⁵
ECON 210	Macroeconomics I ⁵

¹ Must be taken at Stanford in California

² Students may not count units from both ECON 136 and ECON 182 towards their major as the courses cover similar subject matter.

³ Students may not count units from both ECON 135 Finance for Non-MBAs and ECON 140 Introduction to Financial Economics towards their minor as the courses are too similar in content.

⁴ Student may not count units from both ECON 160 Game Theory and Economic Applications and ECON 180 Honors Game Theory towards their major as the courses cover similar subject matter.

⁵ Students may enroll with permission of the Director of Undergraduate Studies and the course instructor.

Other Requirements

At least 20 out of the 35 units for the minor must be taken at Stanford. Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics minor.

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit.* The combined total of all units for the minor must equate to the grade point average (GPA) of 2.0 (C) or better.

Students must complete their declaration of the minor no later than the last day of the preceding quarter before their degree conferral.

*Students cannot declare an Economics Minor until they complete Econ 50 with a grade of B or better.

Master of Arts in Economics

University requirements for the master's degree are described in the "Graduate Degrees" (p. 43) section of this bulletin.

The department does not admit students who plan to terminate their graduate study with the M.A. degree. Economics students may, but need not, elect to add this degree in addition to their current Ph.D. degree. A master's option is also available to currently enrolled Ph.D. candidates from other departments.

Admission

Prospective students must have completed the Stanford requirements for a B.A. in Economics or approximately equivalent training. Since students are required to take some of the same courses as Ph.D. candidates, similar preparation in mathematics and statistics generally is expected. Prospective applicants should submit their credentials together with a plan of study to the Director of Graduate Study for approval.

Degree Requirements

A master's program must satisfy these criteria:

1. Completing, at Stanford, at least 45 units of credit beyond those required for the bachelor's degree, of which at least 40 units must be in the Department of Economics. Students must complete ECON 202 Microeconomics I and at least three other 200-level courses. They must receive a grade of 'B-' or better in ECON 202 Microeconomics I. Undergraduate courses must be numbered 105 or higher (with the exception of the ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, ECON 102C Advanced Topics in Econometrics sequence listed below). No seminar courses numbered 300 or above can be counted.
2. Demonstrating competence in empirical methodology by receiving a grade of 'B-' or better in both ECON 270 Intermediate Econometrics I and ECON 271 Intermediate Econometrics II, or by receiving a grade of 'B-' or above in each of ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, and ECON 102C Advanced Topics in Econometrics.
3. Submitting two term papers (or a thesis of sufficient quality). At least one of these papers must be deemed to represent graduate-level work. Normally, this means that it is written in connection with a 200-level course. A maximum of 10 units of credit can be earned for a thesis toward the 45-unit degree requirement. In lieu of this paper requirement, students may elect to take two additional 200+ level Economics courses.
4. A grade point average (GPA) of 3.0 must be maintained for all master's level work. All courses must be taken for a letter grade.

Doctor of Philosophy in Economics

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Admitted students must be adequately prepared in calculus, linear algebra, and statistics (see above). When deemed appropriate, a student may be required to complete the necessary background preparation at Stanford. All students take a common core curriculum at the outset and later branch out into the desired fields of specialization. Well-prepared students should anticipate spending, with some overlap, approximately two years in course work and another two years in seminars, independent study, and dissertation research. A minimum of 135 completed units is required for the degree. The goal is to complete the program in four years, although some types of research programs may require at least five years to complete. The department has a strong commitment to guiding students through the program expeditiously.

Questions and petitions concerning the program and the admissions process should be addressed to the Director of Graduate Study, who has responsibility for administering the graduate program.

Specific requirements are best discussed in two stages, the first consisting of requirements for admission to candidacy and the second involving further requirements for earning the degree.

Admission to Candidacy for Ph.D.

A student may apply for admission to candidacy when the following minimal requirements are met:

1. Successful results on comprehensive examinations in both of:

A. Core Economics. The examination is based on material from:

		Units
ECON 202	Microeconomics I	2-5
ECON 203	Core Economics: Modules 5 and 6	2-5
ECON 204	Microeconomics III	2-5
ECON 210	Macroeconomics I	2-5
ECON 211	Core Economics: Modules 11 and 12	2-5
ECON 212	Macroeconomics III	2-5

B. Econometrics. The examination is based on material from:

		Units
ECON 270	Intermediate Econometrics I	2-5
ECON 271	Intermediate Econometrics II	2-5
ECON 272	Intermediate Econometrics III	2-5

2. Completing the requirements in two additional advanced fields of specialization from the list below or, if approved in advance by the Director of Graduate Study, in one such field together with a substantial amount of work toward a second field taught in a related department (e.g. GSB Finance). Students may request permission from the Director of Graduate Study to create a field not listed as an advanced field below (e.g. Behavioral/Experimental). Each field listed below can be satisfied by completing two courses and a paper, although students in some fields may be advised to add a third course, which can then be counted toward the distribution requirement discussed later. All courses (or comprehensive exams, when offered) must be passed with a grade of 'B' or better.

Development

ECON 215	Economic Development II
ECON 216	Development Economics III (not offered this year)
ECON 217	Topics in International Macroeconomics: Theory and Evidence for Latin America:

History

ECON 225	Economics of Technology and Innovation (not offered this year)
ECON 226	U.S. Economic History
ECON 227	European Economic History
ECON 228	Institutions and Organizations in Historical Perspective

Macroeconomics

ECON 233	Advanced Macroeconomics I
ECON 235	Advanced Macroeconomics III
ECON 236	Financial Economics I
ECON 237	Financial Economics II

Finance

FINANCE 622	Dynamic Asset Pricing Theory
FINANCE 624	Corporate Finance Theory
FINANCE 625	Empirical Asset Pricing

Public Economics

ECON 241	Public Finance and Taxation I
ECON 242	Public Finance and Taxation II

Labor

ECON 246	Labor Economics I
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ECON 247	Labor Economics II
ECON 248	Labor Economics III
ECON 249	Topics in Health Economics
Environmental	
ECON 250	Environmental Economics
ECON 251	Natural Resource and Energy Economics
Industrial Organization	
ECON 257	Industrial Organization I
ECON 258	Industrial Organization IIA
ECON 259	Industrial Organization II B
ECON 260	Industrial Organization III
International	
ECON 265	International Economics I
ECON 266	International Economics II
ECON 267	Topics in International Trade (not offered this year)
Econometrics	
ECON 273	Advanced Econometrics I
ECON 275	Time Series Econometrics (not offered this year)
ECON 276	Limited Dependent Variables
Behavioral/Experimental	
ECON 277	Behavioral and Experimental Economics III
ECON 278	Behavioral and Experimental Economics I
ECON 279	Behavioral and Experimental Economics II
Microeconomic Theory	
ECON 282	Contracts, Information, and Incentives
ECON 283	Theory and Practice of Auction Market Design
ECON 285	Matching and Market Design
ECON 289	Advanced Topics in Game Theory and Information Economics
ECON 291	Social and Economic Networks

3. Completing a candidacy paper, normally written in conjunction with one of the advanced specialty fields selected above. Satisfactory presentation of this paper or another research paper is required in Autumn Quarter of the third year. It is expected that the student meet, and indeed exceed, the above standards by the end of the first quarter in the third year of residency. When this is not possible for any reason, the Director of Graduate Study should be consulted as early as possible during the third year.

Once it is deemed that the above standards have been met, the student should complete the Application for Candidacy for Degree of Doctor of Philosophy. After a student fulfills the department prerequisites for applying for candidacy and submits their candidacy application form, the faculty will vote to determine whether the student has the potential to successfully complete the requirements of the degree program. If approved, candidacy remains valid for five years (although it can be terminated earlier by the department if progress is deficient); it can be renewed or extended beyond this period only under unusual circumstances. Failure to advance to candidacy results in dismissal from the program.

Further Requirements for the Ph.D. Degree

1. *Third Year Seminar*: presentation of an expanded research paper in Spring Quarter of the third year.
2. *Distribution Requirement*: Students must complete four other graduate-level courses meeting the following requirements:
 - a. at least one course from the area of economic history, unless history is one of the two fields of specialization.

- b. courses in at least two fields other than the two fields of specialization. Distribution courses cannot be crosslisted in those fields.
 - c. with advance approval of the Director of Graduate Study, some of these distribution courses may be drawn from related fields taught in other departments. However, including courses taken to meet either the specialization or distribution requirements, no more than two courses in total may be taken outside the Economics department.
3. *Teaching Experience*: Each student must serve as a teaching assistant for at least one quarter. It is strongly recommended that this requirement be satisfied before the final year of residence.
 4. *Seminar Participation*: Each student is expected to participate in at least two all-year research seminars by the end of the fourth year of residence. Normally, participation in a seminar requires one or more oral presentations and the submission of a research paper (which, however, need not be completely separate from dissertation research).
 5. *Ph.D. Dissertation*: The process involves selecting a topic, choosing an appropriate adviser, submitting a prospectus (signed by the adviser) outlining the proposed research, selecting a three-member reading committee (usually all from the Department of Economics, although exceptions can be made under certain circumstances), passing the University oral examination at which these three faculty (and two other members of the Academic Council) ask questions about the completed research, and submitting a final draft of the work signed by all members of the reading committee. The student is advised to initiate this process as early as possible.

Ph.D. Minor in Economics

To be recommended for the Ph.D. degree with Economics as a minor subject, a student must qualify in three fields of economics, at least one of which must be in the core economics sequence. The standard of achievement in these fields is the same for minor as for major candidates, including the department's comprehensive examinations where appropriate.

Joint Degree Program in Ph.D. in Economics and Master of Public Policy

The Ph.D./M.P.P. joint degree is designed for students who wish to prepare themselves for careers in areas relating to both policy and economics. Students interested in this degree first apply to the Economics Department, indicating an interest in the joint program. There is one admissions application and one fee. If the decision is made by the department to admit the applicant, the file is then forwarded to the M.P.P. program. An admission decision, based on the information in the Ph.D. application, is made promptly, and the department informs the student of the decision.

Students may also apply to the M.P.P. after having commenced study in the Economics Department at Stanford, by first receiving the consent of the Director of Graduate Studies in Economics and then applying to the Public Policy program.

Students must have a faculty adviser from the Economics Department to assist with the planning and supervising of the joint program. The adviser is usually chosen from among the department's Public Policy-affiliated faculty.

Tuition and financial aid arrangements are made through the Economics Department.

Requirements for the M.P.P./Ph.D. in Economics

Core M.P.P. curriculum of 45 units

	Units
PUBLPOL 301B Cost-Benefit Analysis and Evaluation	4-5
PUBLPOL 302A Introduction to American Law	3-5
PUBLPOL 302B Economic Analysis of Law	4
PUBLPOL 304A Collective Action Problems: Ethics, Politics, & Culture	3-5
PUBLPOL 305A Problem Solving and Decision Making for Public Policy and Social Change	4
PUBLPOL 305B Public Policy and Social Psychology: Implications and Applications	4
PUBLPOL 306 Writing and Rhetoric for Policy Audiences	4
PUBLPOL 307 Justice	4-5
PUBLPOL 309 Practicum	1-10
PUBLPOL 311 Public Policy Colloquium	1
Total Units	32-47

Emeriti: (Professors) Takeshi Amemiya, Theodore Anderson, Masahiko Aoki, Kenneth J. Arrow, Paul A. David, Victor R. Fuchs, John G. Gurley, Peter J. Hammond, Donald Harris, Bert G. Hickman, Mordecai Kurz, Lawrence J. Lau, Ronald I. McKinnon, Roger G. Noll, Nathan Rosenberg, Thomas Sargent, David A. Starrett, Joseph E. Stiglitz, Gavin Wright

Honorary Emerita: (Professor) Anne O. Krueger

Chair: B. Douglas Bernheim

Professors: Kyle Bagwell, B. Douglas Bernheim, Nicholas A. Bloom, Michael J. Boskin, Timothy F. Bresnahan, Mark Duggan, Liran Einav, Lawrence Goulder, Avner Greif, Robert E. Hall, Han Hong, Caroline Hoxby, Matthew O. Jackson, Peter Klenow, Jonathan Levin, Thomas E. MaCurdy, Paul R. Milgrom, Muriel Niederle, John H. Pencavel, Monika Piazzesi, Luigi Pistaferri, Joseph Romano, Alvin Roth, K. Martin Schneider, Ilya Segal, John B. Shoven, John B. Taylor, Frank Wolak

Associate Professors: Ran Abramitzky, Dave Donaldson, Pascaline Dupas, Fuhito Kojima

Assistant Professors: Gabriel Carroll, Arun Chandrasekhar, Michael Dickstein, Pablo Kurlat, Bradley Larsen, Kalina Manova, Melanie Morten, Petra Moser, Petra Persson, Florian Scheuer, Charles Sprenger

Lecturers: Michael Best, Lorenzo Casaburi, Marcelo Clerici-Arias, Gopi Shah Goda, Alexander Gould, Ward Hansen, Hamilton Helmer, Ro Khanna, Chris Makler, Lilia Maliar, Scott M. McKeon, Cristian Santesteban, Orié Shelef, Thomas Shanahan, F. Victor Stanton, Mark Tendall

Courtesy Professors: Anat Admati, Susan Athey, Jay Bhattacharya, Jeremy Bulow, Darrell Duffie, Marcel Fafchamps, James Fearon, Stephen Haber, Guido Imbens, Charles Kolstad, David Kreps, Edward Lazear, N. Grant Miller, Rosamond Naylor, Bruce Owen, Peter C. Reiss, D. John Roberts, Gregory Rosston, Kenneth Singleton

Courtesy Assistant Professor: Mar Reguant

Visiting Assistant Professor: Pai Ling Yin

Overseas Studies Courses in Economics

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students

should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBEIJ 24	China's Economic Development	5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPFLOR 98	Origins and Consequences of the European Financial Crisis	5
OSPOXFRD 45	British Economic Policy since World War II	5
OSPOXFRD 90	Economic Policy in Advanced Economies	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5

English

Courses offered by the Department of English are listed under the subject code ENGLISH on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ENGLISH&filter-catalognumber-ENGLISH=on>) web site.

Mission of the Department of English

To study English at Stanford is to explore -- deeply and rewardingly -- the rich legacy of literature written in English, past and present. We offer a wealth of courses on individual authors, the history of literary genres, literary theory, new media, and creative writing. Given the emphasis on critical thinking and interpretation, the English major is in turn an excellent preparation for many professional fields, including teaching, journalism, law, publishing, medicine, and business. The graduate program features rigorous training in the research and analysis of British, American, and Anglophone literary histories and texts, preparing students to produce scholarship of originality and importance, and to teach literature at the highest levels.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of major theories, methods, and concepts of literary study and critical analysis.
2. an awareness of how authors and texts develop in relation to their historical contexts.

- a comprehension of the formal qualities of key literary genres, forms, and styles.
- an effective style of writing and a powerful use of language.

Bachelor of Arts in English

In the undergraduate program, students explore the traditions of literature in English. Courses emphasize interpretive thinking and creative writing, examining the dynamics of literary and cultural history, the structures of literary form and genre, and the practices of reading, writing, and critical analysis.

Graduate Program in English

The graduate program features rigorous training in the research and analysis of British, American and Anglophone literary histories and texts, preparing students to produce scholarship of originality and importance, and to teach literature at advanced levels.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in English and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in English. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of English and to interpret and present the results of such research.

Other Programs in English

Ph.D. in Modern Thought and Literature

Stanford also offers a Ph.D. degree in Modern Thought and Literature. Under this program, students devote approximately half of their time to a modern literature from the Enlightenment to the present, and the other half to interdisciplinary studies. Interested students should see the "Modern Thought and Literature" section of this bulletin and consult the director of the program.

Creative Writing Fellowships

The Creative Writing Program each year offers five two-year fellowships in poetry and five two-year fellowships in fiction. These are not degree-granting fellowships. Information is available in the Creative Writing office, (650) 725-1208.

Bachelor of Arts in English

The English major is designed to provide students with both an understanding of the development of literatures in English and an appreciation of the variety and richness of literary texts. It offers a rigorous training in interpretive thinking and precise expression.

Suggested Preparation for the Major

Prospective English majors are advised to consider Thinking Matters courses that relate to literature to satisfy this requirement. Also

recommended is any introductory seminar taught by English department faculty through Stanford Introductory Studies.

Units

Thinking Matters Courses

ESF 1	Education as Self-Fashioning: The Active, Inquiring, Beautiful Life	7
THINK 7	Journeys	4
THINK 31	Reimagining America	4
THINK 49	Stories Everywhere	4

Introductory Seminars

ENGLISH 47N	Sports and Culture	3
ENGLISH 48N	The American Songbook and Love Poetry	3
ENGLISH 65N	Contemporary Women Fiction Writers	3
ENGLISH 79N	The Renaissance: Culture as Conflict	3

Degree Requirements

Students interested in majoring in English are encouraged to declare during their sophomore year, but no later than the beginning of their junior year. They are urged to discuss their plans with the undergraduate student services specialist as early as possible, and to take recommended preparatory courses for the major in their freshman and sophomore years. To declare the major, a student must fill out the Declaration of Major in Axess; choose a faculty adviser (<https://english.stanford.edu/people/faculty>); and submit a completed program proposal (<https://stanford.box.com/shared/static/u9o01adubni95hkk9d7m.pdf>) form approved by the adviser. It is recommended that a student meet with the adviser at least once per quarter to discuss progress towards degree completion. Students who declared prior to September 2012 should refer to previous guidelines and requirements for the major.

With the exception of the required courses listed below, which must be taken for a letter grade, any two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor. Students may apply as many as four literature courses taken at approved universities towards the English major electives. Approval of such courses towards the major is at the discretion of the Director of Undergraduate Studies. Requests for transfer credit, including course syllabi and official transcript, should be submitted to the undergraduate student services specialist, and to the Office of the University Registrar's external credit evaluation section.

The total number of units required to graduate for each degree option is specified in the relevant section following. All courses should be taken for 5 units. Irrespective of field of study or degree option, all English majors must complete the following requirements:

Required Courses (40 units)

Units

Historical courses

ENGLISH 100A	Literary History I	5
ENGLISH 100B	Literary History II	5
ENGLISH 100C	Literary History III	5

Methodology courses

ENGLISH 160	Poetry and Poetics	5
ENGLISH 161	Narrative and Narrative Theory	5
One course in Critical Methods ¹		5

Also Required

ENGLISH 164	Senior Seminar (WIM) ¹	5
or ENGLISH 164C	Senior Capstone Seminar	

One additional history of literature course ^{2,3}	5
Total Units	40

- In 2014-15, the following courses satisfy the Critical Methods requirement:
 - ENGLISH 115C Hamlet and the Critics
 - ENGLISH 162W Writing Intensive Seminar in English
 - ENGLISH 183F Introduction to Critical Theory
- For those students accepted into the Honors program this can be fulfilled with ENGLISH 196A Honors Seminar: Critical Approaches to Literature.
- In 2014-15 the following courses satisfy the history of literature requirement:
 - ENGLISH 102 Chaucer
 - ENGLISH 106E Dante and Aristotle
 - ENGLISH 111B Medieval Romance
 - ENGLISH 115A Shakespeare and Modern Critical Developments
 - ENGLISH 115C Hamlet and the Critics
 - ENGLISH 163D Shakespeare: The Ethical Challenge
 - ENGLISH 184H Text Technologies: A History
 - ENGLISH 201 The Bible and Literature
- This requirement may also be fulfilled with the following Thinking Matters or SLE courses:
 - ESF 1 Education as Self-Fashioning: The Active, Inquiring, Beautiful Life
 - THINK 7 Journeys
 - THINK 49 Stories Everywhere
 - SLE 91 Structured Liberal Education, SLE 92 Structured Liberal Education, and SLE 93 Structured Liberal Education.

Rules that apply to all English majors irrespective of field of study or degree option

- Courses can only be counted once, i.e., can only satisfy one requirement.
- Two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor.

Fields of Study

Because the Department of English recognizes that the needs and interests of literature students vary, it has approved several major programs of study. Each of these has different objectives and requirements; students should consider carefully which program of study corresponds most closely to their personal and intellectual objectives. The department offers the following fields of study for degrees in English:

- Literature
- Literature with Creative Writing Emphasis
- Literature and Interdisciplinary Studies
- Literature and Foreign Language Literature
- Literature and Philosophy

I. Literature

This field of study is not declared in Axxess. It does not appear on either the official transcript or the diploma. This program provides for the interests of students who wish to understand the range and historical development of British, American and Anglophone literatures and a variety of critical methods by which their texts can be interpreted. The major emphasizes the study of literary forms and genres and theories of textual analysis. In addition to the degree requirements required of all majors and listed above, students must complete at least 30 additional units of courses consisting of:

- Six to eight additional approved elective courses, only one of which may be a creative writing course, chosen from among those offered by the Department of English. In place of one of these six to eight elective

courses, students may choose one upper-division course in a foreign literature read in the original language.

II. Literature with Creative Writing Emphasis

This subplan is printed on the transcript and diploma and is elected in Axxess. This program is designed for students who want a sound basic knowledge of the English literary tradition as a whole and at the same time want to develop skills in writing poetry or prose. In addition to the degree requirements required of all majors and listed above, students must complete at least 35 additional units of approved courses, in either the prose or poetry concentration:

Prose Concentration

	Units
ENGLISH 90 Fiction Writing or ENGLISH 91 Creative Nonfiction	5
ENGLISH 92 Reading and Writing Poetry (Can be fulfilled with a poetry literature seminar)	5
ENGLISH 146 Development of the Short Story: Continuity and Innovation	5
ENGLISH 190 Intermediate Fiction Writing (or any 190 series or 191 series) or ENGLISH 191 Intermediate Creative Nonfiction	5
3 elective literature courses (One of the courses may be fulfilled with a creative writing workshop).	15
Total Units	35

Poetry Concentration

	Units
ENGLISH 90 Fiction Writing (Can be fulfilled with a prose literature seminar) or ENGLISH 91 Creative Nonfiction	5
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 192 Intermediate Poetry Writing (or any 192 series)	5
One literature course in poetry approved by a Creative Writing Professor	5
Three elective literature courses (One of the courses may be fulfilled with a creative writing workshop)	15
Total Units	35

III. Literature and Interdisciplinary Studies

This subplan is printed on the transcript and diploma and is elected in Axxess. This program is intended for students who wish to combine the study of one broadly defined literary topic, period, genre, theme or problem with an interdisciplinary program of courses (generally chosen from one other discipline) relevant to that inquiry. In addition to the degree requirements required of all majors and listed above, students must complete at least 35 additional units of approved courses including:

- Four elective literature courses chosen from among those offered by the Department of English. Students must select two of these courses in relation to their interdisciplinary focus.
- Three courses related to the area of inquiry. These courses may be chosen from another department or interdisciplinary program within the School of Humanities and Sciences including (but not limited to) such as African American Studies (<http://www.stanford.edu/dept/AAAS>), Anthropology (<https://www.stanford.edu/dept/anthropology/cgi-bin/web>), Art and Art History ([442 Stanford Bulletin, 2014-15](http://

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art.stanford.edu), Classics (<http://www.stanford.edu/dept/classics/cgi-bin/web>), Comparative Literature (<http://www.stanford.edu/dept/DLCL/cgi-bin/web/dept/complit>), Comparative Studies in Race and Ethnicity (<http://ccsr.stanford.edu>), Feminist Studies (<http://www.stanford.edu/dept/femstudies>), Human Biology (<https://humbio.stanford.edu>), Music (<http://music.stanford.edu/Home>), Philosophy (<http://philosophy.stanford.edu>), Political Science (<http://politicalscience.stanford.edu>), Psychology (<http://psychology.stanford.edu>), Religious Studies (<http://www.stanford.edu/dept/relstud>), Science, Technology, and Society (<http://sts.stanford.edu>), and Sociology (<http://sociology.stanford.edu>). These courses should form a coherent program and must be relevant to the focus of the courses chosen by the student to meet the requirement. Each of these courses must be approved in advance by the interdisciplinary program director.

- In addition, students in this program must write at least one interdisciplinary paper. This may be completed with ENGLISH 194 Individual Research, ENGLISH 197 Seniors Honors Essay, ENGLISH 198 Individual Work, ENGLISH 199 Senior Independent Essay, or a paper integrating the material in two courses the student is taking in two different disciplines.

The final course plan and interdisciplinary paper must be approved by the faculty adviser and the interdisciplinary adviser by the time the student applies to graduate.

IV. Literature and Foreign Language Literature

This subplan is printed on the transcript and diploma and is elected in Axxess. This track provides a focus in British and American literature with additional work in French literature; German literature; Italian literature; or Spanish literature. These subplans appear on the diploma as follows: English & French Literature, English & German Literature, English & Italian Literature, and English & Spanish Literature. In addition to the degree requirements required of all majors and listed above, students must complete at least 35 additional units of approved courses including:

- Three elective courses chosen from among those offered by the Department of English, one of which may be a creative writing course.
- A coherent program of four courses in the foreign language literature, read in the original language, approved by the Director of Undergraduate Studies in English and by the relevant foreign language department.

V. Literature and Philosophy

This subplan is printed on the transcript and diploma and is elected in Axxess. Students should meet with the undergraduate director concerning the Literature and Philosophy focus. This track is for students who wish to explore interdisciplinary studies at the intersection of literature and philosophy while acquiring knowledge of the English language literary tradition as a whole. In addition to the degree requirements required of all majors and listed above, students must complete at least 35-45 additional units of approved courses including:

- PHIL 80 Mind, Matter, and Meaning (WIM): Prerequisite: introductory philosophy course.
- Gateway course: ENGLISH 81 Philosophy and Literature. This course should be taken as early as possible in the student's career, normally in the sophomore year.
- Aesthetics, Ethics, Political Philosophy: one course from PHIL 170 Ethical Theory series.
- Language, Mind, Metaphysics, and Epistemology: one course from PHIL 180 Metaphysics series.
- History of Philosophy: one course in the history of Philosophy, numbered above PHIL 100 Greek Philosophy.

- Two upper division courses of special relevance to the study of Philosophy and Literature. Both of these courses must be in the English department. A list of approved courses (<http://philit.stanford.edu/programs/relevance.html>) is available on the Philosophy and Literature web site.
- One additional elective course in the English department.
- One capstone seminar (<http://philit.stanford.edu/programs/capstone.html>) of relevance to the study of Philosophy and Literature.

Honors Program

Students wishing to undertake a formal program of advanced literary criticism and scholarship, including the honors seminar and independent research, are invited to apply for the honors program in the Winter Quarter of the junior year. Any outstanding student is encouraged to engage in an honors thesis project.

Admission is selective. Provisional admission is announced in March. Permission to continue in the program is contingent upon submission, by May 15 of the junior year, of a senior honors essay proposal with a bibliography. Honors students are encouraged to complete before the start of their senior year the three methodology courses that are English major requirements:

		Units
ENGLISH 160	Poetry and Poetics	5
ENGLISH 161	Narrative and Narrative Theory	5
ENGLISH 115C	Hamlet and the Critics	5
or ENGLISH 162W	Writing Intensive Seminar in English	

In September before the senior year, students are encouraged to participate in the Bing Honors College. In Autumn Quarter of the senior year, students take a 3-unit honors seminar on critical approaches to literature. The senior-year seminar is designed to introduce students to the analysis and production of advanced literary scholarship. In addition, in Autumn Quarter of the senior year, honors students take a 2-unit essay workshop focused on the process of researching and writing the essay. Students who are studying at Oxford or at other institutions may be exempted from these requirements on request and with the approval of the director of the honors program.

In Winter and Spring quarters of the senior year, honors students complete the senior honors essay for 10 units under supervision of a faculty adviser.

The deadline for submitting the honors essay is May 15. Essays that receive a grade of 'A-' or above are awarded honors.

Students in the honors program complete the requirements of the major and the following:

		Units
ENGLISH 196A	Honors Seminar: Critical Approaches to Literature	5
ENGLISH 197	Seniors Honors Essay	1-10

Advanced Research Options Individual Research

Students taking 100- or 200-level courses may, with the consent of the instructor, write a follow-up 5-unit paper based on the course material and due no later than the end of the succeeding quarter (register for ENGLISH 194 Individual Research). The research paper is written under the direct supervision of the professor; it must be submitted first in a preliminary draft and subsequently in a final version.

Senior Independent Essay

The senior independent essay gives senior English majors the opportunity to work throughout the year on a sustained piece of critical or scholarly work

of around 10,000 words on a topic of their choice, with the close guidance of a faculty adviser. Each student is responsible for finding an adviser, who must approve the proposed topic before the end of the third quarter prior to expected graduation. The senior essay is read and graded by the adviser and one other member of the English faculty. Senior independent essay students register for ENGLISH 199 Senior Independent Essay.

Overseas Studies or Study Abroad

The flexibility of the English major permits students to attend an overseas campus in any quarter, but it is advisable, and in some cases essential, that students spend their senior year at Stanford if they wish to participate in the honors program or in a special in-depth reading course. For more information on Stanford overseas programs, see the "Overseas Studies (p. 94)" section of this bulletin.

Students should consult their advisers and the undergraduate program officer to make sure that they can fulfill the requirements before graduation. The Stanford Program in Oxford usually offers courses which apply toward both University requirements and area requirements for the English major. In either case, students should save the syllabi from their courses if they wish to apply to use them to fulfill an English major requirement.

Overseas Studies Courses in English

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 43	Culture Clashes: Race, Ethnicity and Migration in Germany and the U.S.	3
OSPOXFRD 50	Approaches to Shakespeare	5
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
OSPPARIS 17	Engaged Intellectual	5

Joint Major Program: English and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

English Major Requirements in the Joint Major Program

The joint major is structured to let students thoughtfully explore the intersection of Computer Science and literary studies. Students would ideally declare the program during the sophomore year. Students are required to complete requirements in English and Computer Science. See the "Computer Science Joint Major Progra (p. 229)m (p. 229)" section of this bulletin for details on Computer Science requirements.

The requirements for English are adapted from the English major and are stated in full below. Students in the CS+English JMP are required to complete 63 total units in English compared to 68-80 units which is typically required by the English major. Students in CS+English are not required to take a Critical Methods course nor an English senior seminar. Additionally, students in CS+English only have to fulfill five electives. The University Writing in the Major requirement for students in the CS+English JMP is fulfilled by the Computer Science Writing in the Major requirement. To declare the CS+English JMP, students must complete a program proposal (<https://stanford.box.com/shared/static/tc16uhimfgc1fexzd7km.pdf>).

Integrative Experience

CS+English students are required to engage in two integrative experiences:

- the ePortfolio course, and
- an integrative capstone project.

Students are required to complete three quarters of ENGLISH 198A CS +English ePortfolio in the junior year for a total of 5 units during which students compile an ePortfolio of reflections, ideas, and work on the interplay between humanities and computer science. In the first and second quarters, students must enroll for 1 unit; in the third quarter, students must enroll for 3 units.

In the senior year, students undertake a capstone project which involves both programming and literary research, and could include work on digital editions, analyses of corpora, the creation of electronic literature, digital representations of literary venues, studies of natural language processing as applied to literary analysis, or any other project that draws integrally on both disciplines. All capstone projects must be approved by both the student's Computer Science adviser and English adviser. This project normally takes one quarter, and should be taken concurrently with the Computer Science capstone requirement. In English, students are required to complete 3 units of ENGLISH 198 Individual Work with a faculty adviser in English as part of the integrative project. In preparation for the Independent Study in English, students must secure an adviser, complete the CS+English Capstone form (<https://stanford.box.com/shared/static/h10zna48liez8u10ulqs.pdf>), and submit a written proposal of the project.

Required Core Courses (30 Units)

	Units
Historical courses	
ENGLISH 100A Literary History I	5
ENGLISH 100B Literary History II	5
ENGLISH 100C Literary History III	5
One additional history of literature course ^{1,2}	5
Methodology courses	
ENGLISH 160 Poetry and Poetics	5
ENGLISH 161 Narrative and Narrative Theory	5
Total Units	30

¹ In 2014-15 the following courses satisfy the history of literature requirement:

- ENGLISH 102 Chaucer
- ENGLISH 106E Dante and Aristotle
- ENGLISH 111B Medieval Romance
- ENGLISH 115A Shakespeare and Modern Critical Developments
- ENGLISH 115C Hamlet and the Critics
- ENGLISH 163D Shakespeare: The Ethical Challenge
- ENGLISH 184H Text Technologies: A History
- ENGLISH 201 The Bible and Literature

² This requirement may also be fulfilled with the following Thinking Matters or SLE courses:

- ESF 1 Education as Self-Fashioning: The Active, Inquiring, Beautiful Life
- THINK 7 Journeys
- THINK 49 Stories Everywhere
- SLE 91 Structured Liberal Education, SLE 92 Structured Liberal Education, and SLE 93 Structured Liberal Education.

Rules that apply to all English majors irrespective of field of study or degree option

1. Courses can only be counted once, i.e. can only satisfy one requirement.
2. Two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor.

Field of Study Electives (25 Units)

Because the Department of English recognizes that the needs and interests of CS+English students vary, it has approved two major programs of study: Literature and Literature with Creative Writing. Each of these has different objectives and requirements; students should consider carefully which program of study corresponds most closely to their personal and intellectual objectives.

I. Literature

This field of study is not declared in Axess. It does not appear on either the official transcript or the diploma. This program provides for the interests of students who wish to understand the range and historical development of British, American and Anglophone literatures and a variety of critical methods by which their texts can be interpreted. The major emphasizes the study of literary forms and genres and theories of textual analysis. In addition to the degree requirements required of all joint majors and listed above, students must complete at least 25 additional units of courses consisting of five additional approved elective courses, only one of which may be a creative writing course, chosen from among those offered by the Department of English. In place of one of these five elective courses, students may choose one upper-division course in a foreign literature read in the original language.

II. Literature with Creative Writing Emphasis

This subplan is printed on the transcript and diploma and is elected in Axess. This program is designed for students who want a sound basic knowledge of the English literary tradition as a whole and at the same time want to develop skills in writing poetry or prose. In addition to the degree requirements required of all joint majors and listed above, students must complete at least 25 additional units of approved courses, in either the prose or poetry concentration:

Prose Concentration –

ENGLISH 90	Fiction Writing	
or ENGLISH 91	Creative Nonfiction	

ENGLISH 92	Reading and Writing Poetry	5
ENGLISH 146	Development of the Short Story: Continuity and Innovation	5
ENGLISH 190	Intermediate Fiction Writing (or any 190 series or 191 series)	5
or ENGLISH 191	Intermediate Creative Nonfiction	
One elective literature course		5
Total Units		25

Poetry Concentration –

		Units
ENGLISH 92	Reading and Writing Poetry	5
ENGLISH 90	Fiction Writing	5
or ENGLISH 91	Creative Nonfiction	
ENGLISH 192	Intermediate Poetry Writing (or any 192 series)	5
One literature course in poetry		5
One elective literature course		5
Total Units		25

Integrative Experience (8 Units)

		Units
ENGLISH 198A	CS+English ePortfolio ¹	5
ENGLISH 198	Individual Work ²	3
Total Units		8

¹ Students in the CS+English JMP must complete three quarters of ENGLISH 198A CS+English ePortfolio. In the first and second quarters of this course, students must enroll in one unit. In the third quarter, students must enroll in three units. In total, students must complete 5 units of ENGLISH 198A CS+English ePortfolio.

² Students in the CS+English JMP are required to enroll for three units of ENGLISH 198 Individual Work with a faculty adviser in English as part of the integrative project. These units should be completed concurrently with the Computer Science capstone requirement.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentervicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Units
5

Minor in English or in Creative Writing

Both the Department of English and the Creative Writing program offer a distinct minor.

Minor in English Literature

The minor in English Literature offers some flexibility for those students who want to pursue specific interests within British and American literature, while still requiring certain courses that ensure coverage of a variety of periods, genres, and methods of studying literature.

Degree Requirements

In order to graduate with a minor in English, students must complete the following program of seven 5-unit courses, at least one of which must be a seminar, for a total of 35 units:

Required Courses for the Minor

	Units
Historical courses	
Select two of the following:	10
ENGLISH 100A Literary History I	
ENGLISH 100B Literary History II	
ENGLISH 100C Literary History III	
Methodology courses	
Select two of the following:	10
ENGLISH 160 Poetry and Poetics	
ENGLISH 161 Narrative and Narrative Theory	
One course in Critical Methods ¹	
Elective courses	
Three elective courses from those offered in the English department (only one of which may be a course in Creative Writing).	15
Total Units	35

¹ In 2014-15, the following courses count towards the Critical Methods requirement:

- ENGLISH 115C Hamlet and the Critics
- ENGLISH 162W Writing Intensive Seminar in English
- ENGLISH 183F Introduction to Critical Theory

Minor in Creative Writing

The minor in Creative Writing offers a structured environment in which students interested in writing prose or poetry develop their skills while receiving an introduction to literary forms. Students choose a concentration in either prose or poetry.

Degree Requirements

In order to graduate with a minor in Creative Writing, students must complete the following program of six 5-unit courses for a total of 30 units. All courses must be taken for a letter grade. Courses taken abroad or at other institutions may not be counted towards the minor.

Required Courses for the Minor

Students must complete at least 30 units of approved courses, in either the prose or poetry concentration:

Prose concentration

	Units
ENGLISH 90 Fiction Writing	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 146 Development of the Short Story: Continuity and Innovation	5
Select two of the following intermediate or advanced prose classes:	10
any ENGLISH 190 series	
any ENGLISH 191 series	
ENGLISH 198L Individual Work: Levinthal Tutorial	
One course in pre-1800 literature ¹	5
Total Units	30

- ¹ In 2014-15, pre-1800 courses include:
- ENGLISH 100A Literary History I
 - ENGLISH 102 Chaucer
 - ENGLISH 106E Dante and Aristotle
 - ENGLISH 111B Medieval Romance
 - ENGLISH 115A Shakespeare and Modern Critical Developments
 - ENGLISH 115C Hamlet and the Critics
 - ENGLISH 163D Shakespeare: The Ethical Challenge
 - ENGLISH 184H Text Technologies: A History
 - ENGLISH 201 The Bible and Literature

Poetry concentration

	Units
ENGLISH 90 Fiction Writing	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 160 Poetry and Poetics	5
Select two of the following intermediate or advanced poetry classes:	10
any ENGLISH 192 series	
ENGLISH 198L Individual Work: Levinthal Tutorial	
ENGLISH 292 Advanced Poetry Writing	
One course in pre-1800 literature ¹	5
Total Units	30

- ¹ In 2014-15, pre-1800 courses include:
- ENGLISH 100A Literary History I
 - ENGLISH 102 Chaucer
 - ENGLISH 106E Dante and Aristotle
 - ENGLISH 111B Medieval Romance
 - ENGLISH 115A Shakespeare and Modern Critical Developments
 - ENGLISH 115C Hamlet and the Critics
 - ENGLISH 163D Shakespeare: The Ethical Challenge
 - ENGLISH 184H Text Technologies: A History
 - ENGLISH 201 The Bible and Literature

Master of Arts in English

University requirements for the M.A. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Coterminal Bachelor's and Master's Degrees in English Literature

Students in the major who are interested in further postgraduate work in English may apply for Stanford's coterminal master's program. Candidates for a coterminal master's degree must fulfill all requirements for the M.A. in English (including the graduate language requirement), as well as general and major requirements for the B.A. in English.

A minimum GPA of 3.7 in the major is required of those applying for the coterminal master's degree. Students must also take the general GRE exam in the year in which they apply.

No courses used to satisfy the B.A. requirements (either as General Education Requirements or department requirements) may be applied toward the M.A. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Degree Requirements

- M.A. candidates must complete with a 3.0 (B) grade point average (GPA) at least nine courses (a minimum of 45 units), at least two of which must be 300-level courses.
- Ordinarily, graduate students enroll in courses numbered 200 and above. They may take no more than two 100-level courses without the consent of the Director of Graduate Studies, and no more than two courses outside the department.
- The master's student may take no more than 10 units of directed reading and research (ENGLISH 398 Research Course).
- No creative writing courses may be used to fulfill the requirements.
- M.A. candidates must also demonstrate a reading knowledge of one foreign language, which may be fulfilled in any of the following ways:
 1. A reading examination given each quarter by the various language departments, except for Latin and Greek.
 2. For Latin and Greek, an examination given by one of the Department of English faculty.
 3. Passage with a grade of 'B' or higher of a course in literature numbered 100 or higher in a foreign language department at Stanford. As an alternative for Latin, French, Italian, German, and Spanish, passage of the following, respectively, with a grade of 'B' or higher:

	Units
FRENLANG 250 Reading French	4
FRENLANG 250S Reading French	2-4
GERLANG 250 Reading German	4
ITALLANG 250 Reading Italian	4
SPANLANG 250 Reading Spanish	3

Required Courses

1. Two courses in literature before 1800 (5 units each)
2. Two courses in literature after 1800 (5 units each)

Elective Courses

Five courses (5 units each) which should represent a mixture of survey and specialized courses chosen to guarantee familiarity with a majority of the works on the qualifying exam reading list for doctoral candidates. Candidates who can demonstrate unusually strong preparation in the history of English literature may undertake a 40 to 60 page master's thesis. Each student is responsible for finding an adviser, who must approve the proposed topic before the end of Autumn Quarter prior to anticipated graduation. Candidates register for up to 10 units of ENGLISH 399 Thesis with the faculty member who supervises the thesis work. The thesis is read and graded by the adviser and one other member of the English faculty.

Candidates who write a master's thesis may petition to be excused from up to 10 units of the electives described above. The additional 35 units normally consist of the four required courses and three elective courses. These courses are chosen by the student and approved by the adviser and the Director of Graduate Studies.

Coterminal Program with School of Education

Students interested in becoming middle school and high school teachers of English may apply for admission to the coterminal teaching program (CTP) of the Stanford Teacher Education Program (STEP) in the School of Education.

CTP students complete a special curriculum in English language, composition, and literature that combines a full English major with supplemental course work in subjects commonly taught in California public schools and a core program of foundational courses in educational theory and practice. They are then admitted to STEP for a fifth year of pedagogical study and practice teaching. Students who complete the curriculum requirements are able to enter STEP without the necessity of taking either the GRE or the usual subject matter assessment tests.

At the end of five years, CTP students receive a B.A. in English, an M.A. in Education, and a California Secondary Teaching Credential.

Students normally apply to the coterminal teaching program at the end of their sophomore year or at the beginning of their junior year. For complete program details and for information on how to apply, consult the Director of Undergraduate Studies in English or the CTP coordinator in the School of Education.

Doctor of Philosophy in English Admission

Students with a bachelor's degree in English or a closely related field may apply to pursue graduate work toward an advanced degree in English at Stanford. Applicants for admission to graduate work must take the General Test of the Graduate Record Examination and the Subject Test in Literature. International students whose first language is not English are also required to take the TOEFL examination (with certain exceptions: see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site).

University Degree Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Department Degree Requirements

The following department degree requirements, which apply to students entering the program in Autumn Quarter 2013, deal with such matters as residence, dissertation, and examinations, and are in addition to the University's basic requirements for the doctorate. Students should also consult the most recent edition of the English Ph.D. Handbook.

A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the bachelor's degree. Candidates are required to complete at least 135 units of graduate work in addition to the doctoral dissertation. At least three consecutive quarters of graduate work, and the final course work in the doctoral program, must be taken at Stanford.

A student may count no more than 65 units of non-graded courses toward the 135 course units required for the Ph.D., without the written consent of the Director of Graduate Studies. A student takes at least 70 graded units (normally fourteen courses) of the 135 required total units. 5 of these 70 units may be fulfilled with ENGLISH 398 Research Course or ENGLISH 398R Revision and Development of a Paper. ENGLISH 396L Pedagogy Seminar I, do not count toward the 70 graded units. No more than 10 units (normally two courses) may come from 100-level courses.

This program is designed to be completed in five years.

One pedagogical seminar and four quarters of supervised teaching constitute the teaching requirement for the Ph.D. Typically a student teaches three times as a teaching assistant in a literature course. For the fourth course, students have the option of applying to design and teach ENGLISH 162W. Writing Intensive Seminar in English (WISE) for undergraduate English majors or teaching a fourth quarter as a T.A..

- 1st year: One quarter as T.A. (leading 1-2 discussion sections of undergraduate literature)
- 2nd year: One quarter as T.A. (leading 1-2 discussion sections of undergraduate literature)
- 4th/5th years: Two quarters of teaching, including the possibility of TA'ing or teaching an undergraduate tutorial.

I. English and American Literature

Students are expected to do course work across the full range of English and American literature. Students are required to fulfill the following requirements. Note: fulfillment of requirements 1, 2, and 3 must be through Stanford courses; students are not excused from these three requirements or granted credit for course work done elsewhere.

- | | Units |
|--|-------|
| 1. | |
| Required Courses: | |
| ENGLISH 396 Introduction to Graduate Study for Ph.D. Students | 5 |
| ENGLISH 396L Pedagogy Seminar I | 2 |
| 2. Graduate-level (at least 200-level) course work in English literature before 1700, and English and American literature after 1700 (at least 5 units of each). | |
| 3. Graduate-level (at least 200-level) course work in some aspect of literary theory such as courses in literary theory itself, narrative theory, poetics, rhetoric, cultural studies, gender studies (at least 5 units). | |
| 4. Students concentrating in British literature are expected to take at least one course (5 units) in American literature; students concentrating in American literature are expected to take at least one course (5 units) in British literature. | |

5. Of all courses taken, a minimum of six courses for a letter grade must be graduate colloquia and seminars, of which at least three must be graduate seminars. The colloquia and seminars should be from different genres and periods, as approved by the adviser.
6. The remaining units of graded, graduate-level courses and seminars should be distributed according to the adviser's judgment and the candidate's needs. A student may receive graduate credit for no more than two 100-level courses in the Department of English.
7. Consent of the adviser if courses taken outside the Department of English are to count toward the requirement of 70 graded units of course work.
8. An oral qualifying examination based on a reading guide, to be taken at the end of the summer after the first year of graduate work. The final decision as to qualification is made by the graduate studies committee in consideration of the student's overall record for the first year's work in conjunction with performance on the examination. Note: A student coming to the doctoral program who has done graduate work at another university must petition in the first year at Stanford for transfer credit for course work completed elsewhere. The petition should list the courses and grades, and describe the nature and scope of course work, as well as the content, contact hours, and writing requirements. A syllabus must be included. The Director of Graduate Studies considers the petition in conjunction with the student's overall performance.
9. *University Oral Examination*—A University oral examination covering the field of concentration (as defined by the student and the student's adviser). Students take 10 units of an Orals Preparation workshop led by the Director of Graduate Studies in Spring quarter of the second year. The oral examination, based on a reading list established by the candidate in consultation with his or her adviser, is taken no later than the Autumn Quarter of the third year of graduate study.
10. *Dissertation*—As early as possible during graduate study, a Ph.D. candidate is expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work. After the dissertation topic has been approved, the candidate should file a formal reading committee form as prescribed by the University. Once a first chapter has been drafted, the student meets with the full reading committee for a one hour colloquium. The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four weeks before the University deadline in the quarter during which the candidate expects to receive the Ph.D. degree.
11. *Closing Colloquium*—Prior to the submission of the dissertation the student and the dissertation committee holds a closing colloquium designed to look forward toward the next steps; identify the major accomplishments of the dissertation and the major questions/issues/problems that remain; consider possibilities for revision, book or article publication, etc. and to provide some intellectual closure to the dissertation.

II. English and Comparative Literature

The Ph.D. program in English and Comparative Literature is designed for students wishing an extensive knowledge of the literature, thought, and history of England and of at least one foreign country, for one period. Approximately half of the student's course work and reading is devoted to this period, with the remainder of the time given to other periods of English and American literature since 1350.

This degree, administered by the Department of English, is to be distinguished from the Ph.D. in Comparative Literature. The latter program is intended for students unusually well prepared in foreign languages and

involves advanced work in three literatures, one of which may be English. Interested students should consult a Department of English adviser, but faculty from Comparative Literature may also provide useful supplementary information.

The requirements are as follows:

1. Knowledge of the basic structure of the English language and of Chaucer. This requirement may be met by examination, or by taking 10 units of courses chosen from among those offered in linguistics, English philology, and early and middle English literature including Chaucer. No particular courses are required of all students.
2.

Required Courses:	Units
ENGLISH 396 Introduction to Graduate Study for Ph.D. Students	5
ENGLISH 396L Pedagogy Seminar I	2
3. A knowledge of one foreign language sufficient to take graduate-level literature courses in a foreign-language department and an advanced reading knowledge of a second language.
4. A minimum of 45 units in the history, thought, and literature of one period, in two or more languages, one of which must be English and one foreign. Students normally include at least two courses in a foreign literature read in the original language and two courses listed under Comparative Literature or Modern Thought and Literature. As many as 20 units of this requirement may be satisfied through courses in reading and research. A student may receive graduate credit for no more than two 100-level courses in the Department of English.
5. A minimum of six courses for a letter grade from graduate colloquia and graduate seminars, of which three must be graduate seminars and of which at least four must be in the Department of English. Among these courses, students should take one in literary theory or criticism. These colloquia and seminars should be in different genres and periods as approved by the adviser.
6. An oral qualifying examination: see item 8 under requirements of the Ph.D. program in English Literature. For qualifications in the doctoral program in English and Comparative Literature, candidates are not held responsible for literature before 1350, but instead include on their reading list a selection of works from a foreign literature read in the original language.
7. *University Oral Examination*—A University oral examination covering the field of concentration (as defined by the student and the student's adviser). Students take 10 units of an Orals Preparation workshop led by the Director of Graduate Studies in Spring quarter of the second year. The oral examination, based on a reading list established by the candidate in consultation with his or her adviser, is taken no later than the Autumn Quarter of the third year of graduate study.
8. *Dissertation*—As early as possible during graduate study, a Ph.D. candidate is expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work. After the dissertation topic has been approved, the candidate should file a formal reading committee form as prescribed by the University. Once a first chapter has been drafted, the student meets with the full reading committee for a one hour colloquium. The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four weeks before the University deadline in the quarter during which the candidate expects to receive the Ph.D. degree.
9. *Closing Colloquium*—Prior to the submission of the dissertation the student and the dissertation committee hold a closing colloquium designed to look forward toward the next steps; identify the major

accomplishments of the dissertation and the major questions/issues/problems that remain; consider possibilities for revision, book or article publication, etc. and to provide some intellectual closure to the dissertation.

Language Requirements

Candidates for the Ph.D. degree (except those in English and Comparative Literature, for whom special language requirements prevail) must demonstrate a reading knowledge of two foreign languages. Candidates in the earlier periods must offer Latin and one of the following languages: French, German, Greek, Italian, or Spanish. In some instances, they may be required to offer a third language. Candidates in the later period (that is, after the Renaissance) must offer either French, German, or Latin as one language and may choose the second language from the following: Greek, Latin, French, German, Italian, Spanish, Russian, or another language relevant to the student's field of study. In all cases, the choice of languages offered must have the approval of the candidate's adviser. Any substitution of another language must be approved by the Director of Graduate Studies.

The graduate studies committee does not accept courses taken as an undergraduate in satisfaction of the language requirement for doctoral candidates. For students coming to doctoral work at Stanford from graduate work done elsewhere, satisfaction of a foreign language requirement is determined by the Director of Graduate Studies based on the contact hours, syllabus, reading list, etc. Transfer is not automatic.

The candidate must satisfy one language requirement by the end of the first year (that is, before the qualifying examination), and the other by the end of the third year.

Foreign language requirements for the Ph.D. may be fulfilled in any of the following ways:

1. A reading examination given each quarter by the various language departments, except for Latin and Greek.
2. For Latin and Greek, an examination given by one of the Department of English faculty.
3. Passage with a grade of 'B' or higher of a course in literature numbered 100 or higher in a foreign language department at Stanford. As an alternative for Latin, French, Italian, German, and Spanish, passage of the following, respectively, with a grade of 'B' or higher:

	Units
FRENLANG 250 Reading French	4
FRENLANG 250S Reading French	2-4
GERLANG 250 Reading German	4
ITALLANG 250 Reading Italian	4
SPANLANG 250 Reading Spanish	3

Emeriti: (Professors) George H. Brown, W. B. Carnochan, W. S. Di Piero, John Felstiner, Albert J. Gelpi, Barbara C. Gelpi, Shirley Heath, John L'Heureux, Herbert Lindenberger, Andrea A. Lunsford, Thomas C. Moser, Nancy H. Packer, Marjorie G. Perloff, Robert M. Polhemus, Arnold Rampersad, David R. Riggs, Lawrence V. Ryan, Wilfred H. Stone, Elizabeth C. Traugott; (*Associate Professor*) Sandra Drake; (*Professor, Teaching*) Larry Friedlander; (*Senior Lecturer*) Helen B. Brooks; (*Lecturer*) David MacDonald

Chair: Gavin Jones

Director of Creative Writing Program: Eavan Boland

Professors: John B. Bender (English, Comparative Literature, on leave spring), Eavan Boland, Terry Castle (on leave spring), Margaret Cohen (English, Comparative Literature), Michele Elam, Kenneth W. Fields, Shelley Fisher Fishkin, Denise Gigante, Roland Greene (English, Comparative Literature), Gavin Jones, Mark McGurl (on leave), Franco Moretti (English, Comparative Literature), Sianne Ngai (on leave), Stephen

Orgel, Patricia A. Parker (English, Comparative Literature), Peggy Phelan (English, Drama, on leave), Nancy Ruttenburg (on leave), Ramón Saldivar (English, Comparative Literature), Elizabeth Tallent, Elaine Treharne, Blakey Vermeule, Tobias Wolff

Associate Professors: Blair Hoxby, Nicholas Jenkins (on leave), Adam Johnson, Paula Moya, Alex Woloch

Assistant Professors: Mark Algee-Hewitt, Claire Jarvis, Michelle Karnes, Ivan Lupi#, Saikat Majumdar, G. Vaughn Rasberry

Senior Lecturer: Judith Richardson

Courtesy Professors: Joshua Landy, David Palumbo-Liu, Kathryn Starkey, Bryan Wolf

Lecturers: Molly Antopol-Johnson, Jasper Bernes, Kai Carlson-Wee, Harriet Clark, Keith Ekiss, John Evans, Sarah Frisch, Kimberly Grey, Maria Hummel, Scott Hutchins, Tom Kealey, Dana Kletter, Anthony Marra, Brittany Perham, Shannon Pufahl, Rebecca Richardson, Nina Schloesser, Solmaz Sharif, Austin Smith, Stephanie Soileau, Adena Spingarn, Alice Staveley, Shimon Tanaka, Elizabeth Tshela, Greg Wrenn

Consulting Professor: Valerie Miner

Visiting Professors: Louise Gluck, Joyce Carol Oates

Overseas Studies Courses in English

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 43	Culture Clashes: Race, Ethnicity and Migration in Germany and the U.S.	3
OSPOXFRD 50	Approaches to Shakespeare	5
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
OSPPARIS 17	Engaged Intellectual	5

Ethics in Society Program

Courses offered by the Program in Ethics in Society are listed under the subject code ETHICSOC on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-catalognumber-ETHICSOC=on>) web site. There are many course offerings at Stanford that address moral and political questions only some of which are crosslisted by the Program in Ethics in Society.

The Program in Ethics in Society, which operates under the umbrella of the Bowen H. McCoy Family Center for Ethics in Society, is designed to foster scholarship, teaching, and moral reflection on fundamental issues in

personal and public life. The program is grounded in moral and political philosophy, but it extends its concerns across a broad range of traditional disciplinary domains. The program is guided by the idea that ethical thought has application to current social questions and conflicts, and it seeks to encourage moral reflection and practice in areas such as business, international relations, law, medicine, politics, science, and public service.

The Program in Ethics in Society is an interdisciplinary honors program that is open to undergraduate students in all majors and a minor.

Honors in Ethics in Society

The Program in Ethics in Society offers undergraduates the opportunity to write a senior honors thesis within a community of interdisciplinary scholars. The course of study combines the analytical rigor of moral and political philosophy with the subject matter of each student's self-chosen major to develop a sophisticated understanding of problems of social concern. Such problems include: the nature and implications of treating people with equal dignity and respect; the scope of liberty; the legitimacy of government; and the meaning of responsibility. The program poses these issues and others in the context of debates which arise in our common public life. It thus extends moral concern and reflection across disciplines such as medicine, law, economics, political science, sociology, international relations, and public policy.

Students in the program write honors theses on topics which use moral and political philosophy to address practical problems. Previous theses have considered questions such as the just distribution of health care, obligations to future generations, the role of moral values in education, the moral implications of genetic engineering, and the relationship between gender inequality and the structures of work and family. Students in the program have won scholarships to graduate study including Marshall, Rhodes, and Fulbright fellowships. Others have taken the step from moral analysis to moral commitment, pursuing careers of public service.

The honors program in Ethics in Society is open to majors in every field and must be taken in addition to a department major. Applicants should have a grade of B+ or higher in all courses taken to fulfill program requirement. Required courses must be taken for a letter grade.

Students interested in pursuing honors in Ethics in Society can apply for early acceptance in June of their sophomore year or the regular deadline in mid November of their junior year. Students should contact the program coordinator for more information and to begin the application process.

Requirements

		Units
ETHICSOC 20	Introduction to Moral Philosophy	4-5
or ETHICSOC 170	Ethical Theory	
ETHICSOC 171	Justice	4-5
ETHICSOC 190	Ethics in Society Honors Seminar	3
Two 4- or 5-unit undergraduate courses on a subject approved by the faculty director, designed to support research conducted for or connected to the honors thesis.		8-10
ETHICSOC 200A	Ethics in Society Honors Thesis	5
ETHICSOC 200B	Ethics in Society Honors Thesis	5

Thesis subject must be approved by the honors adviser and students must receive a grade of 'B+' or higher on their thesis to receive honors in Ethics in Society.

Typically, ETHICSOC 20 or ETHICSOC 170 and ETHICSOC 171 are completed before the Winter Quarter of the junior year. ETHICSOC 190 is offered only in Winter Quarter and should be taken in the junior year. Specialization courses can be completed at any time and courses taken prior to acceptance in the Program can be used to fulfill this requirement.

The honors thesis is written during Autumn and Winter quarters of the senior year and is generally due the first Monday in May. Students also complete preliminary and final thesis presentations in the senior year and an oral examination after submission of the thesis. To receive honors in Ethics in Society, students must fulfill all requirements and receive a grade of 'B +' or higher on their thesis. Courses taken to fulfill the Ethics in Society honors requirements may be double-counted for any major. Exceptions to this must be approved by the faculty director.

Minor in Ethics in Society

The Ethics in Society minor is open to students in any department who wish to explore moral issues in personal and public life.

Students must declare the minor in Axxess no later than the last day of Autumn Quarter of their senior year, although they are advised to declare sooner. The student should discuss the minor with an adviser and prepare a proposal that includes a list of courses planned to fulfill the requirements, theme of minor study, and the name of the faculty adviser. The faculty director approves this proposal. Students interested in pursuing a minor in Ethics in Society should contact the program coordinator for more information and to begin the planning process.

A minor in Ethics in Society requires six courses for a minimum of 25 and a maximum of 30 units and courses must be taken for a letter grade.

Requirements

	Units
ETHICSOC 20 Introduction to Moral Philosophy or ETHICSOC Ethical Theory 170	4-5
ETHICSOC 171 Justice	4-5
Three courses at the 100-level or above that addresses some dimensions of moral or political problems, in either theory or practice, relating to theme of minor.	14-15
One course at the 200-level or above that addresses some dimensions of moral or political problems, in either theory or practice, relating to theme of minor.	3-5

The 100- and 200-level courses should be focused around a central theme such as biomedical ethics, ethics and economics, ethics and politics, or environmental ethics (or a theme approved by the faculty director). The courses at the 100 and 200 level are normally taken after completion of the core courses.

See the course list in the "Related Courses (p. 451)" section of this bulletin for approved 100- and 200-level courses taken by students in recent years. The faculty director may approve additional courses.

Courses credited to the Ethics in Society minor may not be double-counted toward major requirements.

Faculty Director: Rob Reich

Affiliated Faculty: Kenneth Arrow (Economics, emeritus), Donald Barr (Pediatrics), Michael Bratman (Philosophy), Eamonn Callan (Education), Joshua Cohen (Philosophy, Political Science, Law), Jorah Dannenberg (Philosophy), Barbara Fried (Law), Leah Gordon (Education), Nadeem Hussain (Philosophy), Allyson Hobbs (History), Pam Karlan (Law), Alison McQueen (Political Science), Benoît Monin (Psychology, Graduate School of Business), Josiah Ober (Classics, Political Science), Eric Roberts (Computer Science), Debra Satz (Philosophy), Tamar Schapiro (Philosophy), Brent Sockness (Religious Studies), David K. Stevenson (Pediatrics), Allen Wood (Philosophy, emeritus), Lee Yearley (Religious Studies)

Related Courses

This is a partial list of courses that have been counted as specialization courses (honors requirement) or 100- and 200-level courses (minor requirement) in recent years. Courses not on this list may be submitted to the faculty director for approval.

	Units
ANTHRO 90B Theory of Cultural and Social Anthropology	5
ANTHRO 179 Cultures of Disease: Cancer and HIV/AIDS	5
ANTHRO 282 Medical Anthropology	3-5
ARTHIST 203 Greek Art In and Out of Context	4-5
COMM 131 Media Ethics and Responsibility	4-5
COMM 182 Social Media Issues	4-5
CS 181 Computers, Ethics, and Public Policy	4
ECON 118 Development Economics	5
EDUC 165/265 History of Higher Education in the U.S.	3-5
EDUC 201 History of Education in the United States	3-5
EDUC 220C Education and Society	4-5
EDUC 247 Moral and Character Education	3
ETHICSOC Introduction to Environmental Ethics 178M	4-5
HUMBIO 122S Social Class, Race, Ethnicity, and Health	4
HUMBIO 129 Critical Issues in International Women's Health	4
HUMBIO 170 Justice, Policy, and Science	5
HUMBIO 172B Children, Youth, and the Law	5
HUMBIO 174 Foundations of Bioethics	3
IPS 241 International Security in a Changing World	5
INTNLREL 140A International Law and International Relations	5
MSE 254 The Ethical Analyst	1-3
PHIL 187 Philosophy of Action	4
PHIL 194T Practical Reason	4
POLISCI 1 Introduction to International Relations	5
POLISCI 122 Introduction to American Law	3-5
POLISCI 123 Politics and Public Policy	4-5
POLISCI 125P The First Amendment: Freedom of Speech and Press	4-5
POLISCI 226 Race and Racism in American Politics	5
PUBLPOL 106 Law and Economics	4-5
PUBLPOL 183 Philanthropy and Social Innovation	4
SOC 135 Poverty, Inequality, and Social Policy in the United States	3

Ethics in Society (ETHICSOC) courses given this year are listed here by quarter offered. Each quarter is linked to ExploreCourses where you can find times and locations.

Autumn Quarter

ExploreCourses: ETHICSOC courses offered Autumn Quarter (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=20142015&filter-term-Autumn=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-coursestatus-Active=on&filter-catalognumber-ETHICSOC=on>)

	Units
ETHICSOC 171 Justice	4-5
ETHICSOC Contemporary Moral Problems 185M	4-5
ETHICSOC 201R The Ethics of Storytelling: The Autobiographical Monologue in Theory, in Practice, and in the World	4

ETHICSOC 303R Ethics, Economics and the Market	4
ETHICSOC 200A Ethics in Society Honors Thesis	5

Winter Quarter

ExploreCourses: ETHICSOC courses offered Winter Quarter (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=20142015&filter-term-Winter=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-coursestatus-Active=on&filter-catalognumber-ETHICSOC=on>)

	Units
ETHICSOC 20 Introduction to Moral Philosophy	5
ETHICSOC 170 Ethical Theory	4
ETHICSOC 178M/278M Introduction to Environmental Ethics	5
ETHICSOC 190 Ethics in Society Honors Seminar	3
ETHICSOC 202 EMOTIONS: MORALITY AND LAW	2
ETHICSOC 205R JUST AND UNJUST WARS	2
ETHICSOC 233R The Ethics of Religious Politics	5
ETHICSOC 304 Moral Minds: What Can Moral Psychology Tell Us About Ethics	2
ETHICSOC 200B Ethics in Society Honors Thesis	5

Spring Quarter

ExploreCourses: ETHICSOC courses offered Spring Quarter (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=20142015&filter-term-Spring=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-coursestatus-Active=on&filter-catalognumber-ETHICSOC=on>)

	Units
ETHICSOC 136R Introduction to Global Justice	4
ETHICSOC 180M Collective Action Problems: Ethics, Politics, & Culture	3-4
ETHICSOC 232T Theories of Civil Society, Philanthropy, and the Nonprofit Sector	5
ETHICSOC 234R Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
ETHICSOC 280 Transitional Justice, Human Rights, and International Criminal Tribunals	3-5

Feminist, Gender, and Sexuality Studies

Courses offered by the Program in Feminist, Gender, and Sexuality Studies are listed under the subject code FEMGEN on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FEMST&filter-catalognumber-FEMST=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FEMST&filter-catalognumber-FEMST=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FEMST&filter-catalognumber-FEMST=on>).

The Program in Feminist, Gender, and Sexuality Studies offers an undergraduate major and minor, and an interdisciplinary honors program

that is open to students in all majors. Each Feminist, Gender, and Sexuality Studies student builds an individual program of study around a self-defined thematic focus, integrating courses from multiple departments. The program encourages work in the arts and supports creative honors theses. Feminist, Gender, and Sexuality Studies majors may declare Arts & Culture, Global Studies, Health, or LGBT/Queer Studies as a subplan, or may design their own thematic focus. Subplans are printed on the diploma; individual thematic foci are not printed on the diploma. See the "Bachelor's" (p. 452) tab of this section of the bulletin for descriptions of the subplans.

Curriculum guidelines and forms for the undergraduate major, minor, and honors programs are available on the program web site (<https://feminist.stanford.edu/undergraduates>). See the program web site for additional contact information (<https://feminist.stanford.edu/about>).

The Program in Feminist, Gender, and Sexuality Studies offers the option of a Ph.D. minor to graduate students already enrolled in a Ph.D. program at Stanford University. The Ph.D. minor in Feminist, Gender, and Sexuality Studies provides graduate students pursuing Ph.D.s broad interdisciplinary knowledge in the field and prepares them to teach courses in the subject. The goal of the program is to bring together graduate students and faculty from different departments, programs, and schools who use feminist and queer perspectives in their research.

Mission of the Undergraduate Program in Feminist, Gender, and Sexuality Studies

The interdepartmental Program in Feminist, Gender, and Sexuality Studies provides students with knowledge and skills to investigate the significance of gender and sexuality in all areas of human life. Feminist, Gender, and Sexuality Studies examines how societies structure gender roles, relations, and identities, and how these intersect with other hierarchies of power, such as class, race, nationality, ethnicity, sexuality, ability, and age. The program coordinates courses offered across the University in feminist and lesbian, gay, bisexual, transgender, and queer studies. Students learn to employ critical gender and sexuality studies methodologies to analyze the assumptions about gender and sexuality that inform the study of individuals, cultures, social institutions, policy, and areas of scholarly inquiry. The program prepares majors for graduate study in humanities and social sciences and for professional schools.

Learning Outcomes (Undergraduate)

The program expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the undergraduate program. Students are expected to demonstrate:

1. understanding of how social hierarchies related to gender, sexuality, race and ethnicity have developed historically, cross-culturally, and transnationally.
2. knowledge of the histories of feminist, gender, sexuality, and/or LGBT/queer social movements and their intersections with other social movements.
3. knowledge and comprehension of feminist, gender, sexuality, and/or LGBT/queer theories and methods for social, historical, literary and cultural analysis.
4. skill in making and communicating feminist, gender, sexuality, and/or LGBT/queer analyses of data, texts, and arguments.
5. competence in applying theory to practical experience for social transformation and citizenship.

Bachelor of Arts in Feminist, Gender, and Sexuality Studies

The major in Feminist, Gender, and Sexuality Studies requires 63 units and may be taken as a single major, as one of multiple majors, or as a secondary major. FEMGEN core courses must be taken for a letter grade. A student wishing to major in Feminist, Gender, and Sexuality Studies should declare the major via Axess, by Autumn Quarter of the junior year. The student then selects a subplan or develop an individualized proposal describing a thematic focus and outlining a course of study, approved by a prospective adviser from the list of affiliated faculty. The proposal is then submitted to the Program Office (Bldg. 460, Room 216) for approval by the Director.

A maximum of 10 of the 63 units for the major may be taken on a credit/no credit or satisfactory/no credit basis; a maximum of 10 units may be taken as independent study or directed reading.

If taken as one of multiple majors, none of the 63 units counted toward the major in Feminist, Gender, and Sexuality Studies may overlap with units counted toward the major in another department or program. If taken as a secondary major, up to 30 of the units counted toward the Feminist, Gender, and Sexuality Studies major may also be counted as fulfilling the major requirements in another department or program if that department or program consents.

Curriculum

The major in Feminist, Gender, and Sexuality Studies includes a total of at least 12 approved courses for a minimum of 63 units. The courses are divided among the core, the focus, and electives to reach the total course requirement. Not all courses are offered every year; consult ExploreCourses for current course offerings. Courses not listed below that relate to the themes of Feminist, Gender, and Sexuality Studies may potentially be counted towards the major as well; contact the academic services administrator, (rmeisels@stanford.edu) for more information.

The Core

1. Introductory Course

FEMGEN 101	Introduction to Feminist Studies	5
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2. Feminist Theories and Method

FEMGEN 103	Feminist Theories and Methods Across the Disciplines	2-5
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3. Junior and Senior Seminars and Practica

FEMGEN 104A	Junior Seminar and Practicum	1
FEMGEN 104B	Senior Seminar and Practicum	2

4. One feminist, gender, or sexuality theory course from approved course list below.

FEMGEN 138	Violence Against Women: Theory, Issues, and Prevention	
FEMGEN 144	History of Women and Gender in Science, Medicine and Engineering	
FEMGEN 154	Black Feminist Theory	
FEMGEN 155	The Changing American Family	
FEMGEN 157	Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements	
FEMGEN 314	Performing Identities	
FEMGEN 389E	Queer of Color Critique: Race, Sex, Gender in Cultural Representations	
ANTHRO 90B	Theory of Cultural and Social Anthropology	
COMPLIT 133	Gender and Modernism	
COMPLIT 250	Literature, History and Memory	

5. One Feminist, Gender, and Sexuality Studies or a related course in the social sciences 3-5

Subjects include Anthropology, Communication, Education, History, Human Biology, Law, Medicine, Political Science, Psychology, or Sociology

6. One Feminist, Gender, and Sexuality Studies or a related course in the humanities 3-5

Subjects include English, Linguistics, Philosophy, Religious Studies, the arts, and languages

Total Units	19-28
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Writing in the Major (WIM)

Majors in Feminist, Gender, and Sexuality Studies may satisfy the Writing in the Major (WIM) requirement by taking one of the approved WIM courses in the list below. Honors students satisfy the WIM requirement through their honors work.

WIM Courses for Majors	Units
FEMGEN 157 Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements	4-5
AMSTUD 160 Perspectives on American Identity	
ANTHRO 90B Theory of Cultural and Social Anthropology	
LINGUIST 150 Language in Society	
Total Units	4-5

Practicum

The practicum courses (FEMGEN 104A Junior Seminar and Practicum, FEMGEN 104B Senior Seminar and Practicum) bring together theory and practical experience. The practicum involves field research, community service, or other relevant experience such as a public service internship. Students plan their practicum during Winter Quarter of the junior year in FEMGEN 104A Junior Seminar and Practicum (1 unit). The practicum is normally done over the summer between junior and senior year and may be taken for additional units. It is followed by FEMGEN 104B Senior Seminar and Practicum (2 units), in Autumn Quarter of the senior year.

The Focus

All Feminist, Gender, and Sexuality Studies majors must complete the Feminist, Gender, and Sexuality Studies major core requirements (7 courses) and an additional 5 courses constituting an area of focus. Those 5 courses should be chosen in consultation with the student's adviser and the Associate Director.

FGSS majors have the option of declaring a formal subplan *or* of designing an individualized thematic focus. Subplans are noted on student transcripts and diplomas; individually designed thematic foci are not noted on the transcript or diploma. The following are the four formal subplans:

Arts & Culture Subplan

The Arts & Culture subplan is appropriate for fields of study focusing on interpretation, production, and consumption of messages of feminism, gender, and sexuality through arts, media, literature and performance. Courses that may fulfill requirements include but are not limited to:

	Units
LINGUIST 52N Spoken Sexuality: Language and the Social Construction of Sexuality	3
FEMGEN 94S Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
FEMGEN 109 Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports	3

FEMGEN 157	Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements	3-5
FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5
FEMGEN 236	Literature and Transgression	3-5
FEMGEN 314	Performing Identities	4

Health Subplan

The Health subplan is appropriate for fields of study focusing on feminist perspectives of science and technologies, gender justice and human rights, gender health and medicine, access/disparities/needs regarding health and sexuality, and women's roles as practitioners and researchers. Courses that may fulfill requirements include but are not limited to:

		Units
HUMBIO 125	Current Controversies in Women's Health	2-3
HUMBIO 129	Critical Issues in International Women's Health	4
FEMGEN 144	History of Women and Gender in Science, Medicine and Engineering	5
FEMGEN 193G	Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities	1
FEMGEN 260	Disability, Gender, & Identity	5

Global Studies Subplan

The Global Studies subplan is appropriate for fields of study focusing cross-cultural perspectives on gender, gender justice and human rights, race/class/gender intersections, gender/spirituality/religion, geopolitical contexts of feminism and LGBTQ activism, and gender and education. Courses that may fulfill requirements include but are not limited to:

		Units
FEMGEN 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5
FEMGEN 111	Transnational Reproductive Politics	3-5
FEMGEN 144X	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
FEMGEN 206	Global Medical Issues Affecting Women	1
FEMGEN 297	Education, Gender, and Development	4

LGBT/Queer Studies subplan

The LGBT/Queer Studies subplan is appropriate for fields of study focusing on history and theories of lesbian, gay, bisexual, transgender, and queer identities, communities, cultural practices, politics, and legal and medical issues. Courses that may fulfill requirements include but are not limited to:

		Units
FEMGEN 24	Sexuality, Gender, and Religion	2
LINGUIST 52N	Spoken Sexuality: Language and the Social Construction of Sexuality	3
FEMGEN 120	Queer Raza	3-5
FEMGEN 124	Challenging Sex and Gender Dichotomies in Medicine	2
FEMGEN 140D	LGBT/Queer Life in the United States	4-5
FEMGEN 389E	Queer of Color Critique: Race, Sex, Gender in Cultural Representations	3-5
SOC 155	The Changing American Family	4

Overseas Studies Courses in Feminist, Gender, and Sexuality Studies

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>)

web site or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site. Students should consult the Associate Director for applicability of Overseas Studies courses to a major or minor program.

Honors Program in Feminist, Gender, and Sexuality Studies For Majors in Feminist, Gender, and Sexuality Studies

Admission—The honors program offers an opportunity to do independent research for a senior thesis. It is open to students with a grade point average (GPA) of 3.5 or better in course work in Feminist, Gender, and Sexuality Studies, or demonstrated academic competence. Students should begin the application process by consulting with the Program Director or the Associate Director as early as possible in the junior year, preferably by the end of Winter Quarter.

During the application process, students design a project in consultation with their proposed thesis advisers and the Associate Director. A proposal describing the project and the number of units to be taken toward the honors directed project must be submitted to the program office for final approval. All projects must have a primary focus on gender or sexuality. See the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>) for additional details.

Requirements

1. Students enroll for 2-3 units per quarter in FEMGEN 199A, FEMGEN 199B, and FEMGEN 199C Feminist, Gender, and Sexuality Studies Honors Workshop.
2. Students in the honors program also enroll for FEMGEN 105 Honors Work with their respective advisers, for an additional 2-3 units each quarter. The combined number of units in 199 and 105 must be 5 per quarter, unless permission is granted by the Director or Associate Director for a different formulation.
3. A semifinal draft of the thesis is due early in Spring Quarter of the senior year.
4. The final thesis must be submitted by May 15 (or the following Monday should May 15 fall on a weekend). The completed thesis must be submitted with the Thesis Completion Form, which requires the adviser's signature of approval. Creative projects must include a section of critical analysis. For guidelines, see the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>).

For Majors in Other Departments

Interdisciplinary Honors in Feminist, Gender, and Sexuality Studies for majors in other departments or programs, as distinguished from honors for students pursuing a major in Feminist, Gender, and Sexuality Studies, is intended to complement study in any major. Feminist, Gender, and Sexuality Studies minors who wish to pursue honors in Feminist, Gender, and Sexuality Studies should apply through the process for non-majors.

Admission

The Feminist, Gender, and Sexuality Studies honors program is open to students majoring in any field with an overall GPA of 3.5 or better or demonstrated academic competence.

Students must complete the following with a grade of 'B+' or better:

1. Either FEMGEN 101 Introduction to Feminist Studies *or* FEMGEN 103 Feminist Theories and Methods Across the Disciplines, *and* one other designated feminist theory course, *or*
2. Three Feminist, Gender, and Sexuality Studies courses and/or approved courses relevant to the proposed honors research.

Students should begin the application process by consulting with the Program Director or the Associate Director as early as possible in the junior year, preferably by the end of Winter Quarter. During the application process, students design a project in consultation with their proposed thesis advisers and the Associate Director. A proposal describing the project and the number of units to be taken toward the honors directed project must be submitted to the program office for final approval. All projects must have a primary focus on gender or sexuality. See the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>) for additional details.

Requirements

1. Students enroll for 2-3 units per quarter in FEMGEN 199A, FEMGEN 199B, and FEMGEN 199C Feminist, Gender, and Sexuality Studies Honors Workshop.
2. Students in the honors program also enroll for FEMGEN 105 Honors Work with their respective advisers, for an additional 2-3 units each quarter. The combined number of units in 199 and 105 must be 5 per quarter unless permission is granted by the Director or Associate Director for a different formulation.
3. A semifinal draft of the thesis is due early in Spring Quarter of the senior year.
4. The final thesis must be submitted by May 15 (or the following Monday should May 15 fall on a weekend). The completed thesis must be submitted with the Thesis Completion Form, which requires the adviser's signature of approval. Creative projects must include a section of critical analysis. For guidelines, see the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>).

Minor in Feminist, Gender, and Sexuality Studies

A student wishing to minor in Feminist, Gender, and Sexuality Studies should apply to the minor via Axxess, preferably by Winter Quarter of the junior year. The student then develops an individualized proposal describing a thematic focus and outlining a course of study, approved by a prospective adviser from the list of affiliated faculty. The proposal is then submitted to the Program Office (Bldg. 460, Room 216) for approval by the Director.

The minor in Feminist, Gender, and Sexuality Studies consists of at least six courses of 3 or more units each at the 100 level or above for a maximum of 36 units. None of the units for the minor may count towards the student's major.

Requirements

1. Introductory Course

FEMGEN 101	Introduction to Feminist Studies	5
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2. One of the feminist, gender, or sexuality theory courses from the approved course list below

FEMGEN 103	(FEMGEN 101 is a prerequisite of FEMGEN 103)
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FEMGEN 120	Queer Raza
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FEMGEN 138	Violence Against Women: Theory, Issues, and Prevention
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FEMGEN 144	History of Women and Gender in Science, Medicine and Engineering
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FEMGEN 154	Black Feminist Theory
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FEMGEN 155	The Changing American Family
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FEMGEN 157	Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements
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FEMGEN 314	Performing Identities
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FEMGEN 389E	Queer of Color Critique: Race, Sex, Gender in Cultural Representations
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ANTHRO 90B	Theory of Cultural and Social Anthropology
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COMPLIT 133	Gender and Modernism
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COMPLIT 250	Literature, History and Memory
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Focus Courses	12
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At least 4 courses or 3 or more units each at the 100 level or higher; see "The Focus" section following below.

Total Units	20-22
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The Focus

At least 4 of the courses for the minor should relate to a thematic focus defined by the student and faculty adviser. See the suggested clusters listed in the "Bachelor of Arts in Feminist, Gender, and Sexuality Studies (p. 452)" section of this bulletin. At least one course within the thematic focus should address race/ethnicity and/or global perspectives on feminist, gender, and sexuality.

Ph.D Minor in Feminist, Gender, and Sexuality Studies

The Ph.D. minor in Feminist, Gender, and Sexuality Studies provides graduate students pursuing Ph.D.s broad interdisciplinary knowledge in the field and prepares them to teach courses in the subject. The goal of the program is to bring together graduate students and faculty from different departments, programs, and schools who use feminist and queer perspectives in their research.

Application and Acceptance

Prospective students submit a Ph.D. minor application form outlining an academic plan with courses and quarters to satisfy the minor requirements. The form must be signed by the student's home department faculty adviser.

This formal application to the minor must be submitted before advancement to candidacy at the end of the second year of graduate study. Prior to that time, students are expected to have been working with an adviser from the affiliated faculty in Feminist, Gender, and Sexuality Studies to ensure that all the requirements can be met without delaying progress to degree or to TGR status. Students are encouraged to consult with the Director or Associate Director as soon as they have developed an interest in pursuing the minor. A student who is planning to apply for a master's degree on the way to the Ph.D. should plan out the course of study carefully, since units for the minor may not also be counted toward a Stanford master's degree.

An accepted student selects a Feminist, Gender, and Sexuality Studies faculty adviser with assistance from the program director. The adviser meets with the student to discuss and sign the academic plan outlined on the Application for Ph.D. Minor form. The plan represents a student's best estimate of courses planned to meet the minor requirements. Students who wish to enroll in the minor after the Winter Quarter of their first year must demonstrate that their participation will not delay their time to degree or their time to TGR.

Students must remain in good academic standing in their home departments.

Units

Requirements

To receive the Ph.D. Minor in Feminist, Gender, and Sexuality Studies, students fulfill the following requirements, for a minimum of 20 units at the graduate level (typically 200-level or higher).

		Units
FEMGEN 203	Feminist Theories and Methods Across the Disciplines	3-5
A feminist theory course such as:		4-5
ANTHRO 201	Introduction to Cultural and Social Anthropology	
FEMGEN 238	Violence Against Women: Theory, Issues, and Prevention	
ILAC 287	Queer Raza	
ILAC 382	Latin@ Literature	
SOC 242	Sociology of Gender	
SOC 252	The Social Determinants of Health	
SOC 255	The Changing American Family	
TAPS 314	Performing Identities	
FEMGEN 363D	Feminist Theory: Thinking Through/With/About the Gendered Body	
10 units of elective graduate-level courses or related courses (a minimum of 2 courses, but 3 courses if necessary in order to achieve 10 units): graduate-level courses or related courses in Feminist, Gender, and Sexuality Studies, one of which may be from the student's home department. The following are examples of appropriate elective courses. Check ExploreCourses for scheduling information.		10
AMSTUD 258	Topics in the History of Sexuality: Sexual Violence in America	
ANTHRO 282	Medical Anthropology	
ANTHRO 349	Anthropology of Capitalism	
ARTHIST 376	Feminism and Contemporary Art	
CHILATST 201C	Critical Concepts in Chican@ Literature	
CHINGEN 235	Chinese Bodies, Chinese Selves	
CHINGEN 250	Sex, Gender, and Power in Modern China	
COMPLIT 226A	Queer Literature and Film	
COMPLIT 236	Literature and Transgression	
COMPLIT 312	Oscar Wilde and the French Decadents	
CSRE 279G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	
EDUC 273	Gender and Higher Education: National and International Perspectives	
FAMMED 245	Women and Health Care	
FEMGEN 238	Violence Against Women: Theory, Issues, and Prevention	
FEMGEN 255	The Changing American Family	
FEMGEN 299	Graduate Workshop: Feminist, Gender, and Sexuality Studies	
FEMGEN 358	Topics in the History of Sexuality: Sexual Violence in America	
FEMGEN 360	Disability, Gender, & Identity	
HISTORY 221B	The 'Woman Question' in Modern Russia	
HISTORY 358	Topics in the History of Sexuality: Sexual Violence in America	
HISTORY 366B	Immigration Debates in America, Past and Present	

HISTORY 395J	Gender and Sexuality in Chinese History	
ILAC 287	Queer Raza	
ILAC 380E	Critical Concepts in Chican@ Literature	
ILAC 382	Latin@ Literature	
ILAC 389E	Queer of Color Critique: Race, Sex, Gender in Cultural Representations	
ILAC 393	The Cinema of Pedro Almodovar	
INDE 215	Queer Health and Medicine	
INDE 260	Journeys in Women's Health and Sex and Gender in Medicine	
JAPANGEN 287	Romance, Desire, and Sexuality in Modern Japanese Literature	
LAW 255	Constitutional Law: The Fourteenth Amendment	
LAW 307	Gender, Law, and Public Policy	
MED 205	Health and Human Rights Speaker Series	
MED 242	Physicians and Human Rights	
OBGYN 216	Current Issues in Reproductive Health	
PEDS 223	Human Rights and Global Health	
SOC 218	Social Movements and Collective Action	
SOC 220	Interpersonal Relations	
Feminist, Gender and Sexuality Studies Colloquium, 3 quarters		
FEMGEN 299	Graduate Workshop: Feminist, Gender, and Sexuality Studies (must be taken for three quarters)	3
Total Units		20-23

Academic Progress

Students submit an annual progress report listing the courses completed towards the minor and courses planned in future quarters. This form is approved by both the main faculty adviser and the Feminist, Gender, and Sexuality Studies faculty adviser. Students meet with their Feminist, Gender, and Sexuality Studies faculty adviser to discuss their progress report.

Notation

Students who complete all the requirements receive the following notation on their transcript and diploma: "Ph.D. Minor in Feminist, Gender, and Sexuality Studies."

Sponsorship

The Ph.D. minor in Feminist, Gender, and Sexuality Studies is sponsored by the Program in Modern Thought and Literature. The minor is administered by the Program in Feminist, Gender, and Sexuality Studies.

Program Director

Christine Min Wotipka (Education)

Associate Director

Patti Hanlon-Baker

Faculty Affiliates

American Studies: Shelley Fisher Fishkin

Anthropology: Paulla Ebron, Miyako Inoue, S. Lochlann Jain, Matthew Kohrman, Barbara Voss, Sylvia Yanagisako

Art and Art History: Terry Berlier, Pamela Lee, Jean Ma, Richard Meyer

Comparative Literature: Petra Dierkes-Thrun, Patricia Parker

Developmental Biology: Ellen Porzig

East Asian Languages and Cultures: Haiyan Lee, Yoshiko Matsumoto, James Reichert, Melinda Takeuchi

Education: Myra Strober (emerita), Christine Min Wotipka

English: Eavan Boland, Helen Brooks, Terry Castle, Michele Elam, Shelly Fisher Fishkin, Barbara Gelpi (emerita), Claire Jarvis, Andrea Lunsford, Paula Moya, Stephen Orgel, Ramón Saldívar, Jennifer Summit, Elizabeth Tallent

Feminist, Gender, and Sexuality Studies: Nicole Baran, Andrea Rees Davies, Susan Krieger, Valerie Miner, Rabbi Patricia Karlin-Neumann

French and Italian: Cecile Alduy, Marisa Galvez, Carolyn Springer

German Studies: Russell Berman, Adrian Daub, Kathryn Strachota

History: Philippe Buc, Carolyn Lougee Chappell, Paula Findlen, Estelle Freedman, Allyson Hobbs, Katherine Jolluck, Nancy Kollmann, Ana Minian, Paul Robinson (emeritus), Londa Schiebinger, Matthew Sommer, Laura Stokes, Kären Wigen

Human Biology: Anne Firth Murray

Iberian and Latin American Cultures: Yvonne Yarbro-Bejarano

Law: Deborah Rhode, Jane Schacter

Linguistics: Penelope Eckert, Rob Podesva

Medical School: Ann Arvin, Helen Blau, Gabriel Garcia, Cheryl Gore-Felton, Roy King, Cheryl Koopman, Iris Litt (emerita), Leah Millheiser, Marcia Stefanick

Music: Heather Hadlock

Philosophy: Helen Longino, Debra Satz

Political Science: Lisa Blaydes, Terry Karl

Psychology: Laura Carstensen, Hazel Markus

Religious Studies: Charlotte Fonrobert, Hester Gelber, Linda Hess

Slavic Languages and Literatures: Monika Greenleaf

Sociology: Shelley Correll, Cecilia Ridgeway

Theatre and Performance Studies: Jennifer Brody, Harry J. Elam, Leslie Hill, Jisha Menon, Cherríe Moraga, Helen Paris, Peggy Phelan

Overseas Studies Courses in Feminist, Gender, and Sexuality Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5
OSPFLOR 34	The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art	4

OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4
OSPMADRD 45	Women in Art: Case Study in the Madrid Museums	4
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5
OSPPARIS 60	Representations of Women in Christian Art: Boldness and Virtue	4
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5

Related Courses

The following is a partial list of related courses for Feminist, Gender, and Sexuality Studies. See ExploreCourses for course descriptions and General Education Requirements (GER) information. See degree requirements above or check with the program associate director for applicability of these courses toward specific major or minor program requirements.

		Units
AMSTUD 139B	American Women Writers, 1850-1920	5
AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors	5
AMSTUD 161	Women in Modern America	4-5
AMSTUD 183	Re- Imagining American Borders	5
AMSTUD 214	The American 1960s: Thought, Protest, and Culture	5
AMSTUD 258	Topics in the History of Sexuality: Sexual Violence in America	4-5
ANTHRO 201	Introduction to Cultural and Social Anthropology	5
ARTHIST 176	Feminism and Contemporary Art	4
CHILATST 53J	Love Notes: Queers of Color on Politics of the Heart	3
CHINGEN 135	Chinese Bodies, Chinese Selves	3-5
CHINGEN 136	The Chinese Family	3-5
COMPLIT 11Q	Shakespeare, Playing, Gender	3
COMPLIT 112	Oscar Wilde and the French Decadents	3-5
COMPLIT 190	Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought	3-5
COMPLIT 226A	Queer Literature and Film	3-5
COMPLIT 236	Literature and Transgression	3-5
COMPLIT 312	Oscar Wilde and the French Decadents	3-5
CSRE 53J	Love Notes: Queers of Color on Politics of the Heart	3
CSRE 103S	Native American Women, Gender Roles, and Status	5
CSRE 162	Women in Modern America	4-5
CSRE 177	Writing for Performance: The Fundamentals	5
CSRE 179G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
CSRE 183	Re- Imagining American Borders	5
CSRE 192E	Topics in the History of Sexuality: Sexual Violence in America	4-5
CSRE 200	Latin@ Literature	3-5
DANCE 160	Rethinking the Ballerina	4
EDUC 100A	EAST House Seminar: Current Issues and Debates in Education	1
EDUC 100B	EAST House Seminar: Current Issues and Debates in Education	1
EDUC 193G	Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities	1
ENGLISH 65N	Contemporary Women Fiction Writers	3
ENGLISH 150D	Women Poets	5

ENGLISH 160	Poetry and Poetics	5
FEMGEN 205	Songs of Love and War: Gender, Crusade, Politics	3-5
FILMSTUD 102	Theories of the Moving Image	4
HISTORY 36N	Gay Autobiography	4
HISTORY 44	History of Women and Gender in Science, Medicine and Engineering	3
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering	5
HISTORY 161	Women in Modern America	4-5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 221B	The 'Woman Question' in Modern Russia	5
HISTORY 258	Topics in the History of Sexuality: Sexual Violence in America	4-5
HUMBIO 129	Critical Issues in International Women's Health	4
HUMBIO 140	Sex and Gender in Human Physiology and Disease	2-3
HUMBIO 143	Adolescent Sexuality	4
HUMBIO 144	Boys' Psychosocial Development	3
ILAC 193	The Cinema of Pedro Almodovar	3-5
ILAC 280	Latin@ Literature	3-5
ILAC 287	Queer Raza	3-5
ILAC 382	Latin@ Literature	3-5
ILAC 393	The Cinema of Pedro Almodovar	3-5
INDE 215	Queer Health and Medicine	1
JAPANGEN 187	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
JAPANGEN 287	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
LAW 255	Constitutional Law: The Fourteenth Amendment	3
LAW 307	Gender, Law, and Public Policy	3
LINGUIST 150	Language in Society	4-5
LINGUIST 156	Language and Gender	4
MED 205	Health and Human Rights Speaker Series	1
MED 242	Physicians and Human Rights	1
MUSIC 14N	Women Making Music	3
NATIVEAM 103S	Native American Women, Gender Roles, and Status	5
OBGYN 216	Current Issues in Reproductive Health	1
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
PEDS 223	Human Rights and Global Health	3
PHIL 153	Feminist Theories and Methods Across the Disciplines	2-5
PHIL 253	Feminist Theories and Methods Across the Disciplines	2-5
PSYCH 29N	Growing Up in America	3
RELIGST 24	Sexuality, Gender, and Religion	2
SOC 118	Social Movements and Collective Action	4
SOC 120	Interpersonal Relations	4
SOC 134	Education, Gender, and Development	4
SOC 140	Introduction to Social Stratification	3
SOC 142	Sociology of Gender	5
SOC 152	The Social Determinants of Health	4
SOC 155	The Changing American Family	4
TAPS 314	Performing Identities	4

Financial Mathematics

The departments of Mathematics (p. 549) and Statistics (<http://www-stat.stanford.edu>), in close cooperation with the departments of Economics (p. 433) and Management Science and Engineering (p. 259), and the Graduate School of Business (p. 101), offer an interdisciplinary Master of Science degree in Financial Mathematics. The Financial Mathematics program provides a master's-level education in applied and computational mathematics, statistics, and financial applications.

Graduate Program in Financial Mathematics

The Financial Mathematics M.S. degree program is no longer offered through the School of Humanities and Sciences. The Institute for Computational and Mathematical Engineering (ICME (<https://icme.stanford.edu>)) now offers a master's degree track in Mathematical and Computational Finance (p. 251).

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Financial Mathematics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

Master of Science in Financial Mathematics Admission

New students as well as cotermin students are no longer being accepted into the Financial Mathematics Program. All currently-enrolled students have the option to complete the degree within the time limits established when they were accepted into the program as detailed in the then applicable *Stanford Bulletin*.

Degree Prerequisites

		Units
Linear algebra at the level of:		
MATH 104	Applied Matrix Theory	3
Real analysis (Advanced Calculus) at the level of:		
MATH 115	Functions of a Real Variable	3
Probability at the level of:		
STATS 116	Theory of Probability	3-5
Theory of statistics at the level of:		
STATS 200	Introduction to Statistical Inference	3
Stochastic processes at the level of:		
STATS 217	Introduction to Stochastic Processes	3
or MATH 136	Stochastic Processes	
Computer programming at the level of:		
CS 106A	Programming Methodology	3-5
CS 106B	Programming Abstractions	3-5

Some of these courses (e.g., STATS 116 Theory of Probability, STATS 217 Introduction to Stochastic Processes) are usually offered during the Summer

Quarter so candidates lacking the required background may consider taking them then.

Degree Requirements

The program requires completion of 45 units of course work. With the advice of the faculty adviser and of peer students, each student selects his or her own set of electives and pace of study. All requirements for the Financial Mathematics master's degree must be completed within three years after the student's first term of enrollment in the master's program. Units for a given course may not be counted to meet the requirements of more than one degree, that is, no units may be double-counted. Students pursuing a coterminal master's degree must complete their requirements within three years of their first quarter of graduate standing.

No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree. Students who do not complete all requirements within three years of admission have their program terminated. Ordinarily, four or five quarters are needed to complete all requirements. Students must fulfill the following requirements for the M.S. degree:

1. Six courses must be taken from the list of required courses (<http://finmath.stanford.edu/academics/required.html>) and six must be taken from the list of elective courses (<http://finmath.stanford.edu/academics/electives.html>), available below. These courses must be taken for a letter grade, but students may elect to take one of the 12 courses for credit/no credit. An overall grade point average (GPA) of 2.75 is required. There is no thesis requirement.

2. Any remaining units required to complete the 45 total must be taken from the following options, and may be taken for a letter grade or CR/NC:

a. Choose from the approved list of electives (<http://finmath.stanford.edu/academics/electives.html>) with emphasis on computation, information technology or finance.

b. Choose from the following courses:

		Units
STATS 200	Introduction to Statistical Inference	3
STATS 217	Introduction to Stochastic Processes	3
STATS 218	Introduction to Stochastic Processes	3
MATH 131P	Partial Differential Equations I	3
MATH 132	Partial Differential Equations II	3
ECON 140	Introduction to Financial Economics	5

c. Choose from CS (practical) courses; must be approved by the Program Director.

d. In the form of an industrial internship in the Bay Area or elsewhere, with the approval and supervision of a faculty member. A written report must be submitted upon completion of the internship. Students who choose to take credit for practical training must sign up for STATS 297 Practical Training (1-3 units).

3. Submission of approved Masters Program Proposal (http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/financialmathematics/FM-MS_Program_Proposal_Form_2012.pdf) by the Program Director to the Student Services Officer by the end of the first quarter of the master's degree program.

Required Courses

In partial fulfillment of the M.S. degree in Financial Mathematics, students must fulfill six required courses, with two from each of the following three core areas:

1. Statistical Methods and Models
2. Modeling, Simulation and Computing
3. Finance

The selection of these courses is to be done in consultation with the Program Director. The following courses can be counted toward the six required courses:

Mathematics:

		Units
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
MATH 239	Computation and Simulation in Finance	3

Statistics:

STATS 240	Statistical Methods in Finance	3-4
STATS 241	Data-driven financial and risk econometrics *	3-4
STATS 242	Algorithmic Trading and Quantitative Strategies	3
STATS 243	Financial Models and Statistical Methods in Active Risk Management	3-4
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3
STATS 362	Topic: Monte Carlo	2-3

Management Science & Engineering:

		Units
MSE 347	Credit Risk: Modeling and Management	3

Graduate School of Business:

		Units
FINANCE 622	Dynamic Asset Pricing Theory	4

At the Program Director's discretion, courses taken previously that are equivalent to the above may be waived; in which case they must be replaced by elective courses in the same subject area.

Elective Courses

Each candidate must take at least six approved elective courses from the list below, with two from each of the three core areas:

1. Statistical Methods and Models
2. Modeling, Simulation and Computing
3. Finance

Other elective courses may be authorized by the Program Director if they provide skills relevant to financial mathematics and do not overlap with courses in the candidate's program.

Mathematics:

		Units
MATH 136	Stochastic Processes	3
MATH 205A/205B	Real Analysis	3
MATH 227	Partial Differential Equations and Diffusion Processes	3
MATH 256A	Partial Differential Equations	3
MATH 261A	Functional Analysis	3
MATH 266	Computational Signal Processing and Wavelets	3

Statistics:

		Units
STATS 202	Data Mining and Analysis	3

STATS 206	Applied Multivariate Analysis	3
STATS 207	Introduction to Time Series Analysis	3
STATS 212	Applied Statistics with SAS	3
STATS 219	Stochastic Processes	3
STATS 237	Theory of Investment Portfolios and Derivative Securities	3
STATS 238	The Future of Finance	2
STATS 240	Statistical Methods in Finance	3-4
STATS 242	Algorithmic Trading and Quantitative Strategies	3
STATS 243	Financial Models and Statistical Methods in Active Risk Management	3-4
STATS 305	Introduction to Statistical Modeling	3
STATS 306A	Methods for Applied Statistics	2-4
STATS 310A/310B/310C	Theory of Probability	2-4
STATS 315A/315B	Modern Applied Statistics: Learning	2-3
STATS 317	Stochastic Processes	3
STATS 318	Modern Markov Chains	3
STATS 322	Function Estimation in White Noise	3
STATS 362	Topic: Monte Carlo	2-3
STATS 376A	Information Theory	3

Computer Science:*

CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 224M	Multi-Agent Systems	3
CS 295	Software Engineering	2-3
CS 229	Machine Learning	3-4
CS 249A	Object-Oriented Programming from a Modeling and Simulation Perspective	3
CS 261	Optimization and Algorithmic Paradigms	3

* CS 339 may be used to fulfill this requirement; this course is offered occasionally.

Economics:

ECON 190	Introduction to Financial Accounting	5
ECON 202N/203N	Microeconomics I For Non-Economics PhDs	2-5
ECON 210	Macroeconomics I	2-5
ECON 211	Core Economics: Modules 11 and 12	2-5
ECON 275	Time Series Econometrics	2-5

Management Science & Engineering:

MSE 242H		
MSE 247S		3
MSE 310	Linear Programming	3
MSE 311	Optimization	3
MSE 312	Advanced Methods in Numerical Optimization	3
MSE 313		
MSE 322	Stochastic Calculus and Control	3
MSE 342		
MSE 348	Optimization of Uncertainty and Applications in Finance	3

MSE 349		
MSE 351	Dynamic Programming and Stochastic Control	3
MSE 444		
MSE 445	Projects in Wealth Management	3-4

Graduate School of Business (GSB), Finance:

FINANCE 320	Debt Markets ¹	4
FINANCE 326	Derivative Securities ¹	4
FINANCE 327	Financial Markets	4
FINANCE 620	Financial Markets I ¹	3
FINANCE 621	Financial Markets II ¹	4
FINANCE 622	Dynamic Asset Pricing Theory ¹	4
FINANCE 625	Empirical Asset Pricing	4

Graduate School of Business (GSB), Economic Analysis and Policy:

MGTECON 600	Microeconomic Analysis I ¹	4
MGTECON 604	Econometric Methods II ¹	4
MGTECON 609	Applied Econometrics and Economic Research ¹	4

¹ Indicates courses of limited enrollment and/or that instructor consent is required for registration.

For additional information about the Financial Mathematics master's degree program requirements, see the department web site (<http://finmath.stanford.edu/academics/requirements.html>).

Director: Tze Leung Lai

Steering Committee

Amir Dembo, Kay Giesecke, Tze Leung Lai, George Papanicolaou, Bala Rajaratnam, Kenneth Singleton

Core Faculty

Business: Darrell Duffie, J. Michael Harrison, Kenneth Singleton

Economics: Monika Piazzesi, Martin Schneider, John Shoven

Electrical Engineering: Stephen Boyd, Benjamin Van Roy

Institute of Computational and Mathematical Engineering: Margot Gerritsen

Management Science and Engineering: Kay Giesecke, Peter Glynn, David Luenberger, Benjamin Van Roy

Mathematics: Simon Brendle, Amir Dembo, George Papanicolaou

Statistics: Amir Dembo, David Donoho, Tze Leung Lai, Art Owen, Bala Rajaratnam

French and Italian

Courses offered by the Department of French and Italian are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes FRENCH (French General and Literature) and ITALIAN (Italian General and Literature). For courses in French or Italian language instruction with the subject code FRENLANG or ITALLANG, see the "Language Center (p. 532)" section of this bulletin.

The department is a part of the Division of Literatures, Cultures, and Languages (p. 411).

French Section

The French section provides students with the opportunity to pursue course work at all levels in French language, literature, cultural and intellectual history, theory, film, and Francophone studies. It understands the domain of French Studies as encompassing the complex of cultural, political, social, scientific, commercial, and intellectual phenomena associated with French-speaking parts of the world, from France and Belgium to Canada, Africa, and the Caribbean.

Three degree programs are available in French: a B.A., a terminal M.A., and a Ph.D. A Ph.D. in French and Italian is also available.

Visiting faculty and instructors contribute regularly to the life of the French section. The section maintains contacts with the Ecole Normale Supérieure, the Institut d'Etudes Politiques, and the Ecole Polytechnique.

A curator for Romance languages oversees the extensive French collection at Green Library. The Hoover Institute on War, Revolution, and Peace also includes materials on 20th-century France and French social and political movements.

Stanford Center for Interdisciplinary Studies

The center, founded in partnership with the French Ministry of Foreign Affairs, aims to bridge the disciplines of the humanities, social sciences, sciences, engineering, business, and law, to address historical and contemporary issues. Its programs bring faculty and students from across Stanford's departments and schools in contact with colleagues in France to explore issues of common intellectual concern. The center invites French-speaking scholars to offer courses or give lectures or seminars on campus. It facilitates internships for Stanford students in computer science and engineering in Sophia-Antipolis, France's new high-tech center near Nice.

Stanford in Paris

The Bing Overseas Studies Program in Paris offers undergraduates the opportunity to study in France during Autumn, Winter, and Spring quarters. It provides a wide range of academic options, including course work at the Stanford center and at the University of Paris, independent study projects, and internships. In addition, the program promotes interaction with the local community through volunteer employment, homestays, and internships. The minimum language requirement for admission into Stanford in Paris is one year of French at the college level.

Courses offered in Paris may count toward fulfillment of the requirements of the French major or minor. Students should consult with the Chair of Undergraduate Studies before and after attending the program, in order to ensure that course work and skills acquired abroad can be coordinated appropriately with their degree program. Detailed information, including program requirements and curricular offerings, may be obtained from the "Overseas Studies" section of this bulletin, the Stanford in Paris (<http://osp.stanford.edu/program/paris>) web site, or the Overseas Studies Program Office in Sweet Hall.

La Maison Française

La Maison Française, 610 Mayfield, is an undergraduate residence that serves as a campus French cultural center, hosting in-house seminars as well as social events, film series, readings, and lectures by distinguished representatives of French and Francophone intellectual, artistic, and political life. Assignment is made through the regular housing draw.

Mission of the Undergraduate Program in French

The mission of the undergraduate program in French is to expose students to a variety of perspectives in French language, culture, and history by providing majors with training in writing and communication as well as cultural, textual, and historical analysis in order to develop students into critical and global thinkers prepared for careers in business, social service, and government, or for graduate study in French.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in French beyond the interpersonal level with presentational language abilities.
2. writing proficiency in French beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in French.
4. the ability to develop effective and nuanced lines of interpretation.

Italian Section

The Italian section offers graduate and undergraduate programs in Italian language, literature, culture, and intellectual history. Course offerings range from small, specialized graduate seminars to general courses open to all students on authors such as Dante, Boccaccio, and Machiavelli.

Two degree programs are available in Italian: a B.A., and a Ph.D. A Ph.D. in French and Italian is also available.

Collections in Green Research Library are strong in the medieval, Renaissance, and contemporary periods; the Italian section is one of the larger constituents of the western European collection at the Hoover Institution for the Study of War, Revolution, and Peace; and the Music Library has excellent holdings in Italian opera.

La Casa Italiana

La Casa Italiana, 562 Mayfield, is an undergraduate residence devoted to developing an awareness of Italian language and culture. It works closely with the Italian Cultural Institute in San Francisco and with other local cultural organizations. It hosts visiting representatives of Italian intellectual, artistic, and political life. A number of departmental courses are taught at the Casa, which also offers in-house seminars. Assignment is made through the regular undergraduate housing draw.

Stanford in Florence

The Bing Overseas Studies Program in Florence affords undergraduates with at least three quarters of Italian language the opportunity to take advantage of the unique intellectual and visual resources of the city and to focus on two areas: Renaissance history and art, and contemporary Italian and European studies. The program is structured to help integrate students into Italian culture through homestays, Florence University courses, the Language Partners Program, research, internship and public service opportunities, and by conducting some of the program's classes in Italian. Many courses offered in Florence may count toward the fulfillment of requirements for the Italian major or minor. Students are encouraged to consult with the Italian undergraduate adviser before and after a sojourn in Florence to ensure that their course selections meet Italian section requirements. Information on the Florence program is available in the "Overseas Studies" section of this bulletin, the Stanford in Florence (<http://>

osp.stanford.edu/program/florence) web site, or at the Overseas Studies office in Sweet Hall.

Mission of the Undergraduate Program in Italian

The mission of the undergraduate program in Italian is to expose students to a variety of perspectives in Italian language, culture, and history by providing majors with training in writing and communication as well as cultural, textual, and historical analysis in order to develop students into critical and global thinkers prepared for careers in business, social service, and government, or for graduate study in Italian.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in Italian beyond the interpersonal level with presentational language abilities.
2. writing proficiency in Italian beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in Italian.
4. the ability to develop effective and nuanced lines of interpretation.

Graduate Programs in French and Italian

The department offers a Ph.D. and terminal M.A. in French, a Ph.D. in Italian, and a Ph.D. in French and Italian.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in French or Italian and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in French, Italian, or French and Italian. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of French, Italian, or French and Italian and to interpret and present the results of such research.

Bachelor of Arts in French

The French section offers a major and a minor in French. Students are encouraged to pursue a course of study tailored to their individual needs and interests. A degree in French serves as a stepping stone to entering international business, law, translation, and teaching, or as preparation for graduate studies in French, history, or comparative literature.

The French major allows students to combine their work in French with work from another field such as African studies, linguistics, art history, music, economics, history, education, medicine, international relations, political science, or other foreign languages and literatures. The literature and philosophy specialization offers students the opportunity to pursue interdisciplinary studies at the intersection of literature and philosophy in a structured manner and alongside similarly interested students from a variety of humanistic disciplines.

To graduate with a major in French, students must complete a minimum of 56 units of course work in the major. These units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major with the prior consent of the Chair of Undergraduate Studies. To enroll in all French literature courses, students must have successfully completed FRENLANG 124 Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture, or successfully tested above this level through the Language Center.

1. *Gateway Courses.* Students are recommended to take two courses in the FRENCH 120 series.

		Units
FRENCH 126	Fiction, Economics and the Postcolonial	3-5
FRENCH 127	Fatal Attractions: A Brief History of Passion in the French Tradition	4
FRENCH 128	Revolutionary Moments in French Thought	3-5

2. *Introductory Culture and Literature Courses.* Students must take a minimum of three of the following courses. Any one of these courses fulfills the Writing in the Major (WIM) requirement (except FRENCH 131 Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France).

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

3. *Medieval/Early Modern Courses.* Students must take one course that concerns the period before 1800. Courses from the department must be at or above the 140 level. Courses chosen from outside the department must be pre-approved by the Chair of Undergraduate Studies.

4. *Capstone Course.* Students must take at least one 200 level FRENCH culture or literature course.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

5. *Electives.* Students must complete a total of 56 units towards the major. A maximum of 28 units can be elective courses. Elective Courses can be taken within the following parameters.

- Course work within the department. Additional French literature or general courses at the 100- or 200- level taught by French faculty.
- Language Course work. Up to three language courses in French at or above FRENLANG 21C for a maximum of 15 units.
- Coursework in other departments relevant to the degree, with approval by the Chair of Undergraduate Studies.
- Bing Overseas program. Courses taken at the Bing Overseas Studies in Paris program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters courses taught at least partially by a faculty member of the French and Italian Department. Maximum of 10 units.
- Structured Liberal Education. Students may count 10 units of SLE towards the major electives. Maximum of 10 units.

French and Philosophy Option

The French and Philosophy option requires a total of 65 units as described below. This option is not declared in Axess and does not appear on the transcript nor the diploma. Substitutions and transfer credit are not normally permitted. Up to 10 units of courses taken in the Philosophy department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade. Students interested in this option should review the Philosophy and Literature web site (<http://philit.stanford.edu>).

Required French Coursework

1. *Advanced Language*. FRENLANG 124 Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture

2. *Introductory Culture and Literature Courses*. Students must take three of the following core courses.

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

3. *Upper division French Courses*. At least three courses numbered FRENCH 140 or higher.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

Required Philosophy Coursework

1. *Philosophy Writing in the Major*.

		Units
PHIL 80	Mind, Matter, and Meaning	5

2. *Philosophy and Literature Gateway Course*. This course should be taken as early as possible in the student's career, normally in the sophomore year.

		Units
FRENCH 181	Philosophy and Literature	5

Aesthetics, Ethics, Political Philosophy. One course from the PHIL 170 Ethical Theory series.

Language, Mind Metaphysics, and Epistemology. One course from the PHIL 180 series.

History of Philosophy. Two courses in the history of Philosophy, numbered above PHIL 100.

Two additional elective courses of special relevance to the study of philosophy and literature. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.

3. *Capstone*. One of the courses must be taken in the student's senior year.

		Units
COMPLIT 217	The Poetry of Friedrich Holderlin	3-5
FRENCH 228E	Getting Through Proust	3-5
PHIL 193D	Dante and Aristotle	5
PHIL 194L	Montaigne	4

Honors Program

French majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) web site.

Enrollment. A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course focuses on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus is on writing under guidance of primary adviser. The letter grade determines if honors is granted or not.
4. Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and student services officer no later than 5:00 p.m. on May 15th of the terminal year.
 - Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

Bachelor of Arts in Italian

To graduate with a major in Italian, students must complete a minimum of 56 units of course work in the major. These 56 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major with the prior consent of the Chair of Undergraduate Studies. To enroll in all ITALIAN or ITALLANG courses taught in Italian at or above the 100 level, students must have successfully completed ITALLANG 22A or the equivalent.

1. *Gateway Courses.* Students are recommended to take two courses in the Italian gateway series, taught in translation (8 units maximum).

		Units
ITALIAN 100	Masterpieces: Dante	3-5
ITALIAN 101	Italy: The Good, the Bad and the Ugly	3-5

2. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units).

		Units
ITALLANG 21	Second Year Italian, First Quarter	3-4
ITALLANG 22	Second-Year Italian, Second Quarter	3-4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

		Units
ITALLANG 21A	Accelerated Second-Year Italian, Part 1	4-5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	4-5

3. *Bridge Courses.* Students must enroll in at least one bridge course taught in Italian, either in language or culture (minimum 4 units).

		Units
ITALLANG 113	Italian Cultural Studies	3
ITALLANG 114	Advanced Stylistics and Composition	3-4
ITALLANG 115	Academic and Creative Writing	3-4

4. *Core Culture Courses.* Students must take all three of the following core courses at Stanford (12 units). Any one of these courses fulfills the Writing in the Major (WIM) requirement.

		Units
ITALIAN 127	Inventing Italian Literature	4
ITALIAN 128	The Italian Renaissance: Power and Perspective	4
ITALIAN 129	Modern Italian Culture: Literary Landscapes	4

Advanced Studies in Italian Culture. Students must complete a minimum of 10 units (2-3 courses) in advanced ITALIAN coursework (numbered 200 or above).

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

5. *Electives.* A maximum of 22 elective units in courses dealing with Italy at or above the 100 level may be applied to the major. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

- Course work within the department. Additional ITALIAN literature or general courses at the 100- or 200-level taught by Italian faculty.
- Bing Overseas program. Courses taken at the Bing Overseas Studies in Florence program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters or Education as Self-Fashioning courses taught at least partially by a faculty member of the French and Italian Department. Maximum of 10 units.
- Structured Liberal Education. Students may count 10 units of SLE towards the major electives. Maximum of 10 units.
- Digital Humanities Course. Student work must reflect Italian interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

Italian and Philosophy Option Required Italian Course Work

The Italian and Philosophy option requires a total of 72 units as described below. This option is not declared in Axxess and does not appear on the transcript or diploma. Substitutions and transfer credit are not normally permitted. Up to 10 units of courses taken in the Philosophy department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade. Students interested in this option should review the Philosophy and Literature web site (<http://philil.stanford.edu>).

1. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units).

		Units
ITALLANG 21	Second Year Italian, First Quarter	3-4
ITALLANG 22	Second-Year Italian, Second Quarter	3-4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

		Units
ITALLANG 21A	Accelerated Second-Year Italian, Part 1	4-5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	4-5

2. *Bridge Courses.* Students must enroll in at least one bridge courses taught in Italian, either in language or culture (minimum 4 units).

		Units
ITALLANG 113	Italian Cultural Studies	3
ITALLANG 114	Advanced Stylistics and Composition	3-4
ITALLANG 115	Academic and Creative Writing	3-4

3. *Core Culture Courses.* Students must take all three of the following core courses at Stanford (12 units) Any one of these courses fulfills the Writing in the Major (WIM) requirement.

		Units
ITALIAN 127	Inventing Italian Literature	4
ITALIAN 128	The Italian Renaissance: Power and Perspective	4
ITALIAN 129	Modern Italian Culture: Literary Landscapes	4

Advanced Studies in Italian Culture. Students must complete a minimum of 10 units (2-3 courses) in advanced ITALIAN coursework (numbered 200 or above).

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

Required Philosophy Coursework

1. *Philosophy Writing in the Major.*

		Units
PHIL 80	Mind, Matter, and Meaning	5

2. *Philosophy and Literature Gateway Course.* This course should be taken as early as possible in the student's career, normally in the sophomore year:

		Units
ITALIAN 181	Philosophy and Literature	5

Aesthetics, Ethics, Political Philosophy. One course from the PHIL 170 Ethical Theory series.

Language, Mind, Metaphysics, and Epistemology. One course from the PHIL 180 Metaphysics series.

History of Philosophy. Two courses in the history of philosophy, numbered above PHIL 100.

Two additional elective courses of special relevance to the study of philosophy and literature. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.

3. *Capstone Seminar* (at least 4 units): One of these courses must be taken in the student's senior year.

		Units
COMPLIT 217	The Poetry of Friedrich Holderlin	3-5
FRENCH 228E	Getting Through Proust	3-5
PHIL 193D	Dante and Aristotle	5
PHIL 194L	Montaigne	4

Honors Program

Italian majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.

Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course will focus on researching and writing the honors thesis.

Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.

Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and

Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.

Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

Joint Major Programs in French and Computer Science and in Italian and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

French Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 229)m (p. 223)" section of this bulletin for details on Computer Science requirements.

To graduate with a joint major in Computer Science and French, students must complete a minimum of 46 units of coursework in French in addition to the Computer Science requirements for the joint major. These 46 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major with the prior consent of the Chair of Undergraduate Studies. To enroll in all FRENCH courses taught in French at or above the 130-level, students must have successfully completed FRENLANG 124, Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture, or successfully tested above this level through the Language Center.

1. *Gateway Courses.* Students are recommended to take two courses in the FRENCH 120 series.

		Units
FRENCH 126	Fiction, Economics and the Postcolonial	3-5
FRENCH 127	Fatal Attractions: A Brief History of Passion in the French Tradition	4
FRENCH 128	Revolutionary Moments in French Thought	3-5

2. *Introductory Culture and Literature Courses.* Students must take a minimum of three of the following courses. Any one of these courses fulfills the Writing in the Major (WIM) requirement (except, in 2014-15, FRENCH 131 (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/frenchanditalian>)).

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4

FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

3. *Medieval/Early Modern Courses.* Students must take one course that concerns the period before 1800. Courses from the department must be at or above the 140 level. Courses chosen from outside the department must be pre-approved by the Chair of Undergraduate Studies.

4. *Two Capstone Courses.* Students must take at least one 200 level FRENCH culture or literature course and a blended capstone project. Senior year the student enrolls in a 2 unit independent study FRENCH 199 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone French and Computer Science project, the student must submit a description of their project to the Chair of Undergraduate Studies in French.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the undergraduate student services officer for the major to begin the process.

5. *Electives.* Students must complete a total of 46 units towards the major. A maximum of 18 units can be elective courses. Elective courses can be taken within the following parameters.

- Course work within the department. Additional French literature or general courses at the 100- or 200- level taught by French faculty.
- Language Course work. Up to three language courses in French at or above FRENLANG 21C for a maximum of 15 units.
- Coursework in other departments relevant to the degree, with approval by the Chair of Undergraduate Studies.
- Bing Overseas program. Courses taken at the Bing Overseas Studies in Paris program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters courses taught at least partially by a faculty member of the French and Italian Department. Maximum of 10 units.
- Structured Liberal Education. Students may count 10 units of SLE towards the major electives. Maximum of 10 units.
- Digital Humanities Course. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

Honors Program

Students have the option to complete the Honors Program for Computer Science and French, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and honors requirements for this degree. Students also have the option to complete the honors program for French only; such a thesis would not fulfill the capstone requirement for this degree.

French majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. See the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (<http://www.stanford.edu/dept/undergrad/cgi-bin/>

[drupal_ual/OO_honors_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) web site.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

Italian Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 229)" section of this bulletin for details on Computer Science requirements.

To graduate with a joint major in Computer Science and Italian Studies, students must complete a minimum of 50 units of course work in Italian in addition to the Computer Science requirements for the dual major. These 50 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major with the prior consent of the Chair of Undergraduate Studies. To enroll in all ITALIAN or ITALLANG courses taught in Italian at or above the 100-level, students must have successfully completed ITALLANG 22A or the equivalent.

1. *Gateway Courses.* Students are recommended to take two courses in the Italian gateway series (8 units maximum towards the degree).

		Units
ITALIAN 100	Masterpieces: Dante	3-5
ITALIAN 101	Italy: The Good, the Bad and the Ugly	3-5

2. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units)

		Units
ITALLANG 21	Second Year Italian, First Quarter	3-4
ITALLANG 22	Second-Year Italian, Second Quarter	3-4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

		Units
ITALLANG 21A	Accelerated Second-Year Italian, Part 1	4-5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	4-5

3. *Bridge Courses.* Students must enroll in at least one bridge course taught in Italian, either in language or culture (minimum 4 units).

		Units
ITALLANG 113	Italian Cultural Studies	3
ITALLANG 114	Advanced Stylistics and Composition	3-4
ITALLANG 115	Academic and Creative Writing	3-4

4. *Core Culture Courses.* Students must take all three of the following core courses at Stanford (12 units). Any one of these courses fulfills the Writing in the Major (WIM) requirement

		Units
ITALIAN 127	Inventing Italian Literature	4
ITALIAN 128	The Italian Renaissance: Power and Perspective	4
ITALIAN 129	Modern Italian Culture: Literary Landscapes	4

Advanced Studies in Italian Culture. Students must complete a minimum of 10 units (2-3 courses) in advanced ITALIAN coursework (numbered 200 or above).

5. *Capstone Course.* Senior year the student will enroll in a 2 unit independent study ITALIAN 199 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Italian and Computer Science project the student will need to submit a description of their project to the Chair of Undergraduate Studies in Italian.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

6. *Electives.* A maximum of 14 elective units dealing with Italy at or above the 100-level may be applied to the major. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

Course work within the department. Additional ITALIAN courses at the 100- or 200-level taught by Italian faculty.

- Bing Overseas program. Courses taken at the Bing Overseas Studies in Florence program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters or Education as Self-Fashioning courses taught at least partially by a faculty member of the French and Italian Department. Maximum of 10 units.
- Structured Liberal Education. Students may count 10 units of SLE towards the major electives. Maximum of 10 units.
- Digital Humanities Course. Student work must reflect Italian interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

Honors Program

Students have the option to complete the honors program for Computer Science and Italian, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and Honors requirements for this degree. Students also have the option to complete the honors program for Italian only; such a thesis would not fulfill the capstone requirement for this degree.

Italian majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1.

During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. See the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For

more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentservicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in French

To earn a minor in French, students must complete a minimum of 24 units of course work in the department. These 24 units may not be used towards any other major or minor. Courses applied to the minor must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. To enroll in all French literature courses, students must have successfully completed FRENLANG 124 Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture or successfully tested above this level through the Language Center.

1. *Introductory Culture and Literature Courses:* Students must take a minimum of three French Literature courses. Two must be from the FRENCH 130 sequence (8 units):

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

2. *Electives.* A maximum of 12 elective units may be applied to the minor. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

		Units
FRENLANG 21C	Second-Year French: Cultural Emphasis, First Quarter	4-5

FRELANG 22C	Second-Year French: Cultural Emphasis, Second Quarter	4-5
FRELANG 23C	Second-Year French: Cultural Emphasis, Third Quarter	4-5
FRELANG 120	Advanced French Oral Communication	3
FRELANG 124	Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture	4-5

OSPPARIS courses. Courses taken at the Bing Overseas Studies in Paris program with prior approval of the Chair of Undergraduate Studies (language of instruction must be French)

IHUM, Thinking Matters, and SLE. A maximum of 5 units from select IHUM or Thinking Matters courses, or SLE.

Minor in Italian

To earn a minor in Italian, students must complete a minimum of 24 units of coursework in Italian language and culture. These 24 units may not be used towards any other major or minor. Courses applied to the minor must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. To enroll in all ITALIAN or ITALLANG courses taught in Italian at or above the 100 level, students must have successfully completed ITALLANG 22A or the equivalent.

1. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units)

		Units
ITALLANG 21	Second Year Italian, First Quarter	3-4
ITALLANG 22	Second-Year Italian, Second Quarter	3-4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

ITALLANG 21A	Accelerated Second-Year Italian, Part 1	4-5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	4-5

2. *Bridge Courses and Core Culture Courses.* Students must take at least two of the following courses taught in Italian at Stanford (minimum 8 units):

ITALLANG 113	Italian Cultural Studies	3
ITALLANG 114	Advanced Stylistics and Composition	3-4
ITALLANG 115	Academic and Creative Writing	3-4
ITALIAN 127	Inventing Italian Literature	4
ITALIAN 128	The Italian Renaissance: Power and Perspective	4
ITALIAN 129	Modern Italian Culture: Literary Landscapes	4

3. *Electives.* A maximum of 8 elective units may be applied to the minor. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

- Coursework within the department. Additional ITALIAN courses at the 100- or 200-level taught by Italian faculty.
- Bing Overseas program. Courses taken at the Bing Overseas Studies in Florence program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters or Education as Self-Fashioning courses taught at least partially by a faculty member in Italian. Maximum of 5 units.
- Structured Liberal Education. Students may count 5 units of SLE towards the major electives. Maximum of 5 units.
- Digital Humanities Course. Student work must reflect Italian interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Division of Literatures, Cultures, and Languages (p.)" section of this bulletin for further details about the minor and its requirements.

Coterminal Bachelor's and Master's Program in French or Italian

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Each year the department admits a small number of undergraduates to the coterminal B.A. and M.A. degree in French or in Italian. Applications for Autumn quarter must be submitted by January 31 of the senior year to the Director of the Department and must include:

- a written statement of purpose
- two letters of recommendation from faculty at Stanford
- a transcript.

Students accepted into the coterminal program must have been undergraduate majors in the relevant language and must meet all requirements both for the B.A. and the M.A.

Master of Arts in French

University regulations pertaining to the M.A. are listed in the "Graduate Degrees (p. 43)" section of this bulletin.

The terminal M.A. in French provides a flexible combination of language, literature, cultural history, and methodology course work designed to enhance the preparation of secondary school, junior college, or college teachers.

Candidates must complete a minimum of 45 units of graduate work, all courses being taken for a letter grade, with a minimum grade point average (GPA) of 3.3, as well as pass the master's examination at the end of their studies. To fulfill the requirements in a single year, enrollment must be for an average of 15 units per quarter.

Candidates must take one cultural history course (to be taken either inside or outside the Department of French and Italian). All remaining units are to be taken in advanced French literature courses (200 level or above), three of which must be concerned with the pre-revolutionary period of French cultural history.

Applicants should consult Graduate Admissions (<http://gradadmissions.stanford.edu>) for information related to the application process. Candidates for this degree are not eligible for financial aid or for teaching assistantships.

Examination

The terminal M.A. examination is administered between the third and fifth week of Spring Quarter by a three-member committee, selected each year by the Chair of Graduate Studies. It consists of two parts:

1. Written Exam

The two-hour written exam tests the candidate's general knowledge of French literature and is based on the French Ph.D. reading list which may be obtained from the chair of Graduate Studies, Student Affairs

Officer, or by referencing the French and Italian Graduate Student Handbook.

The exam requires that the candidate answer two questions (out of three) in a manner that demonstrates his/her ability to synthesize and draw parallels between periods, genres, and systems of representation on the basis of the standard reading list. One question must be answered in French. Use of a dictionary is allowed.

If the student's performance on the exam is deemed a 'pass' by two out of three of the members of the examining committee, the student is then permitted to go on to the oral examination (taken later the same week). Should the candidate fail the M.A. written exam, he/she is given a second chance at the end of Spring Quarter.

2. Oral Exam

The 90-minute oral exam is based upon the student's answers on the written exam. It examines the candidate's knowledge and understanding of French literary history on the basis of the standard reading list.

At the conclusion of the oral exam, the examination committee meets in closed session and discusses the student's performance on the written and the oral portions of the examination. If it is judged adequate, the M.A. degree is granted. In no event may the master's written and oral exams be taken more than twice.

Doctor of Philosophy in French

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees (p. 43)" section of this bulletin.

Degree Requirements

1. Course Work

A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All course work should be selected in consultation with the Chair of Graduate Studies.

Required Courses—

		Units
FRENCH 369	Introduction to Graduate Studies: Criticism as Profession (must be taken in first year of studies)	3
DLCL 301	The Learning and Teaching of Second Languages (must be taken in the first year of studies)	3

A minimum of five literature courses taught in French at the graduate level. Three of the required five courses must be taken within the first year. 15-25

Elective Courses— Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the French and Italian department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

2. Examinations

Successful completion of all department and University examinations. Students may not take any department or University exam while course work is incomplete.

3. Dissertation

Submission and approval of a dissertation.

4. Teaching

Ph.D. students are required to teach a minimum of five courses within their five years of funding.

5. Language Requirements

Attaining a native or near-native fluency in French is a requirement to qualify for the Ph.D. degree. Upon entering the program, candidates must contact the Language Center and arrange to take the OPI (Oral Proficiency Interview) to determine their fluency in French. An advanced level or above must have been reached by the time candidates take their qualifying exam in Autumn Quarter of the second year of study. If a student fails to score in the advanced bracket of the OPI test upon entering, he/she is tested again at the beginning of the second year. It is the responsibility of the candidates to design a course of study to improve his or her proficiency in French. Candidates who do not meet the minimum language requirement must discuss their plans to meet this requirement with the Chair of Graduate Studies. In addition, candidates are required to achieve a high level of proficiency in one additional foreign language, with the language in question to be determined by the student and adviser as a function of the student's area of specialization. Such proficiency may be demonstrated either by completing a graduate seminar in the language in question, or by passing an exam that establishes a third-year or above level of competence in writing, reading, and speaking. In the case of ancient Greek and Latin, a high level of proficiency means a level superior to a second-year collegiate level of proficiency in reading and writing. The second foreign language requirement must be completed by the end of the third year.

6. Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, coursework, performance on the Qualifying Exam (or Field Exam for those with a waiver of the Qualifying Exam), and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of French and Italian conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 45) and GAP (<http://gap.stanford.edu/4-6.html>).

7. TGR Status

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in FRENCH 802 TGR Dissertation for zero units, in the appropriate section for their adviser.

Grading

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

Examinations

There are three examinations: the Qualifying Examination, the Field Examination, and the University Oral Examination. Students may not take any department or University exam while coursework is incomplete.

Qualifying Examination

The first oral examination, which takes place in the week prior to autumn quarter of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

The exam is based on a standard reading list covering major works from all periods of literature in the language(s) of study, from the Middle Ages to present day. The list may be expanded to reflect a student's particular interests, but not abridged. The reading list may be obtained from the Chair of Graduate Studies, the Graduate Student Affairs Officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggestive and not exhaustive, so as to provoke further discussion. You may bring a single letter-sized page of notes, printed in 12-point font, with no full sentences except for quotations; you must hand it in at the end of the exam.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the language(s) of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the Qualifying Exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. Should the student not pass the retake exam, his or her studies in the Ph.D. program will be concluded.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies by the end of autumn quarter of the first year. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

Field Examination

The second oral examination takes place in week prior to autumn quarter of the third year of study. Students waived from the Qualifying Exam will take the Field Exam in the week prior to autumn quarter of the second year of study. The exam is 100 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the focus of an article or a seminar he/she might teach. The student should discuss the proposed topic with the Chair of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of three faculty members with interests close to the proposed topic. In most cases, one of these committee members is the student's adviser. This presentation is followed by a 20-minute discussion.
2. A 60-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chair of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

The University Oral Examination

This examination takes the form of a dissertation proposal defense. It is to be taken no later than Spring Quarter of the student's third year. Students must have completed all course work and language requirements before the quarter in which they take the University Oral examination. One quarter prior to the University Oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal, which must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable, (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

Advising

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

Doctor of Philosophy in Italian

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

Degree Requirements

1. Course Work

A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All course work should be selected in consultation with the Chair of Graduate Studies.

Required Courses—

	Units
ITALIAN 369 Introduction to Graduate Studies: Criticism as Profession (must be taken in the first year of studies)	3

A minimum of five literature courses taught in Italian at the graduate level. Three of the required five courses must be taken within the first year. 15-25

DLCL 301 The Learning and Teaching of Second Languages 3
(must be taken in the first year of studies)

Elective Courses— Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the French and Italian department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

2. Examinations

Successful completion of all department and University examinations. Students may not take any department or University exam while coursework is incomplete.

3. Dissertation

Submission and approval of a dissertation.

4. Teaching

Ph.D. students are required to teach a minimum of five courses within their five years of funding.

5. Language Requirements

Attaining a native or near-native fluency in Italian is a requirement to qualify for the Ph.D. degree. Upon entering the program, candidates must contact the Language Center and arrange to take the OPI (Oral Proficiency Interview) to determine their fluency in Italian. An advanced level or above must have been reached by the time candidates take their qualifying exam in the Autumn Quarter of the second year of study. If a student fails to score in the advanced bracket of the OPI test upon entering, he/she is tested again at the beginning of the second year. It is the responsibility of the candidates to design a course of study to improve their proficiency in Italian. Candidates who do not meet the minimum language requirement must discuss their plans to meet this requirement with the Chair of Graduate Studies. By the end of the third year, students must have passed reading examinations in two additional foreign languages. If the candidate's period of concentration is earlier than the Romantic period, one of these must be Latin; if Romantic or later, French.

6. Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, coursework, performance on the Qualifying Exam, and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of Italian Studies conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program.

Additional information about University candidacy policy is available in the Bulletin (p. 45) and GAP (<http://gap.stanford.edu/4-6.html>).

7. TGR Status

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in ITALIAN 802 TGR Dissertation for zero units, in the appropriate section for their adviser.

Grading

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

Examinations

There are three examinations: the Qualifying Examination, the Field Examination, and the University Oral Examination. Students may not take any department or University exam while coursework is incomplete.

Qualifying Examination

The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

The exam is based on a standard reading list covering major works from all periods of literature in the language(s) of study, from the Middle Ages to present day. The list may be expanded to reflect a student's particular interests, but not abridged. The reading list may be obtained from the Chair of Graduate Studies, the Graduate Student Affairs Officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the language(s) of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the Qualifying Exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. Should the student not pass the retake exam, his/her studies in the Ph.D. program will be concluded.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies upon arrival at Stanford. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases

where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

Field Examination

The second oral examination takes place in the Autumn Quarter of the third year of study. The exam is 100 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the focus of an article or a seminar he/she might teach. The student should discuss the proposed topic with the Chair of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of two faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) In addition to these two members, the examination committee includes the Chair of Graduate Studies, who serves in an ex officio capacity as the third member of the examination committee. This presentation is followed by a 20-minute discussion.
2. A 60-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chair of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

The University Oral Examination

This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University Oral examination. One quarter prior to the University Oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal, which must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable, (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

Advising

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

Doctor of Philosophy in French and Italian

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

Degree Requirements

1. Course work—

A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All course work should be selected in consultation with the Chair of Graduate Studies. Required courses—

		Units
FRENCH/ ITALIAN 369	Introduction to Graduate Studies: Criticism as Profession (must be taken in first year of studies)	3
DLCL 301	The Learning and Teaching of Second Languages (must be taken in first year of studies)	3

A minimum of four advanced courses on French literature and culture, and four advanced courses on Italian literature and culture. Four of the required eight courses must be taken within the first year.

Elective Courses— Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the French and Italian department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different historical periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

2. Examinations

Successful completion of all department and University examinations. Students may not take any department or University exam while coursework is incomplete.

3. Dissertation

Submission and approval of a dissertation. The dissertation topic must include a substantial quotient of material from both the French and Italian tradition, and the dissertation must include either (1) at least one chapter on French materials and one chapter on Italian materials, or (2) at least two chapters focusing on a comparison between French and Italian materials.

4. Teaching

Ph.D. students are required to teach a minimum of five courses within their five years of funding. Of these five courses the student is required to teach at least one French language course and one Italian language course.

5. Language Requirements

Attaining a native or near-native fluency in both French and Italian is the individual responsibility of all candidates in the Ph.D. program, and remedial course work needed to achieve such fluency cannot count towards the Ph.D. degree.

For students specializing in areas (a) medieval and renaissance and (b) renaissance and early modern, proficiency in Latin equivalent to a second year collegiate level of proficiency (the equivalent of CLASSICS 11L Intermediate Latin: Introduction to Literature, CLASSICS 12L Intermediate Latin: Plautus, and CLASSICS 13L Intermediate Latin: Cicero and Catullus) in reading is also required. Such proficiency may be demonstrated by successfully completing a course in the language in question (at least second-year level, but preferably a graduate seminar); or by passing an exam that establishes a second-year or above level of competence. In no case is passage of a standard reading competence exam considered sufficient.

For students specializing in area (c) modern and contemporary, proficiency in a third language (beyond French and Italian) is not required; students are, however, encouraged to acquire competency in a third language or area that is relevant to their research (e.g. German).

The language requirements should be completed as soon as possible, but in any case not later than the end of the third year.

6. Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete

the PhD program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, coursework, performance on the Qualifying Exam (or Field Exam for those with a waiver of the Qualifying Exam), and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of French Studies conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (<http://exploreddegrees.stanford.edu/graduatedegrees/#doctoraltext>) and GAP (<http://gap.stanford.edu/4-6.html>).

7. TGR Status

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in FRENCH 802 TGR Dissertation or ITALIAN 802 TGR Dissertation for zero units, in the appropriate section for their adviser.

Grading

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

Examinations

There are three examinations: the Qualifying Examination, the Field Examination, and the University Oral Examination. Students may not take any department or University exam while coursework is incomplete.

Qualifying Examination

The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

Students may take either two qualifying exams, one in French and one in Italian, or a single qualifying exam in French and Italian. The combined French and Italian qualifying exam covers one of three periods, (a) medieval and renaissance, (b) renaissance and early modern, or (c) modern and contemporary. For each period it is based on a standard reading list. The list may be expanded to reflect a student's particular interests, but not abridged. One third of the combined exam takes place in English, one third in French, and one third in Italian (with the student free to choose which portion transpires in which language). The reading lists may be obtained from the Chairs of Graduate Studies, the Graduate Student Affairs Officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the languages of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit, and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the Qualifying Exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. If the student does not pass the second exam, his/her studies in the Ph.D. program will be concluded.

If, at the qualifying exam stage, a student's work is judged insufficient for admission to candidacy for the Ph.D., the student may petition to continue in French only or Italian only. This petition is reviewed by the qualifying exam committee, the relevant Chair of Graduate Studies, and the Director of the Department of French and Italian.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies upon arrival at Stanford. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

Field Examination

The second oral examination takes place in the Autumn quarter of the third year of study. The exam is 100 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the focus of an article or a seminar he/she might teach. The student should discuss the proposed topic with the Chairs of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of two faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) In addition to these two members, the examination committee includes the Chair of Graduate Studies, who serves in an ex officio capacity as the third member of the examination committee. This presentation is followed by a 20-minute discussion.
2. A 60-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chairs of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks

preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

The University Oral Examination

This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University Oral examination. One quarter prior to the University Oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal. This proposal must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The reading list should include works in both French and Italian in all genres relevant to the period covered. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

Advising

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Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

Ph.D. Minor in French or Italian

The Ph.D. may be combined with a minor in a related field, including Comparative Literature, Linguistics, Modern Thought and Literature, Art History, History, Music, Philosophy, and Spanish. Ph.D. candidates in French may minor in Italian, and vice versa. Students interested in a minor should design their course of study with their adviser(s).

Ph.D. Minor in French Literature

The department offers a minor in French Literature. The requirement for a minor in French is completion of 24 units of graduate course work in the French section. Interested students should consult the graduate adviser.

Ph.D. Minor in Italian Literature

The department offers a minor in Italian Literature. The requirement for a minor in Italian is a minimum of 24 units of graduate course work in Italian literature. Interested students should consult the graduate adviser.

Emeriti: (Professors) John G. Barson, Marc Bertrand, Robert G. Cohn, John Freccero, René Girard, Ralph M. Hester, Elisabeth Mudimbe-Boyi, Michel Serres

Director: Robert Harrison

Chairs of Graduate Studies: Robert Harrison (Italian), Joshua Landy (French)

Chairs of Undergraduate Studies: Marisa Galvez (French), David Lummus (Italian)

Professors: Jean-Marie Apostolidès, Jean-Pierre Dupuy, Dan Edelstein (on leave), Hans U. Gumbrecht, Joshua Landy, Robert Harrison, Carolyn Springer (on leave)

Associate Professors: Cécile Alduy (on leave), Laura Wittman (on leave)

Assistant Professors: Marisa Galvez, David Lummus

Courtesy Professors: Keith Baker, Margaret Cohen, Paula Findlen, Michael Marrinan

Lecturers: Giorgio Alberti (Autumn), Inga Pierson (Winter, Spring), Marie-Pierre Ulloa (Autumn)

Visiting Associate Professor: Ewa Domanska (Spring)

Mellon Fellow: Anton Matytsin

Overseas Studies Courses in French

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater	4
OSPPARIS 32	French Politics in Cross-National Perspective	5
OSPPARIS 54	The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France	4
OSPPARIS 60	Representations of Women in Christian Art: Boldness and Virtue	4
OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPPARIS 186F	Contemporary African Literature in French	4

Overseas Studies Courses in Italian

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPFLOR 34	The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art	4
OSPFLOR 41	The Florentine Sketchbook: A Visual Arts Practicum	3-5
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution	5
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 54	High Renaissance and Mannerism: the Great Italian Masters of the 15th and 16th Centuries	5
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	4

OSPFLOR 75	Florence in the Renaissance: Family, Youth and Marriage in the Fourteenth and Fifteenth Centuries	5
OSPFLOR 111Y	From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4

German Studies

Courses offered by the Department of German Studies are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject code GERMAN. For courses in German language instruction with the subject code GERLANG, see the "Language Center" section of this bulletin.

The department is a part of the Division of Literatures, Cultures, and Languages (p. 411).

The department provides students with the linguistic and analytic ability to explore the significance of the cultural traditions and political histories of the German-speaking countries of Central Europe. At the same time, the interdisciplinary study of German culture, which can include art, economics, history, literature, media theory, philosophy, political science, and other fields, encourages students to evaluate broader and contradictory legacies of the German past, the history of rapid modernization and the status of Germany, Austria, and Switzerland today.

The German experience of national identity, political unification, and integration into the European Union sheds light on wider issues of cultural cohesion and difference, as well as on the causes and meaning of phenomena such as racial prejudice, anti-Semitism, and the Holocaust. In general, an education in German Studies not only encourages the student to consider the impact of German-speaking thinkers and artists, but also provides a lens through which the contours of the present and past, in Europe and elsewhere, can be evaluated.

The department offers students the opportunity to pursue course work at all levels in the languages, cultures, literatures, and societies of the German-language traditions. Whether interested in German literature, the influence of German philosophy on other fields in the humanities, or the character of German society and politics, students find a broad range of courses covering language acquisition and refinement, literary history and criticism, cultural history and theory, history of thought, continental philosophy, and linguistics.

By carefully planning their programs, students may fulfill the B.A. requirements for a double major in German Studies and another subject. A coterminous program is offered for the B.A. and M.A. degrees in German Studies. Doctoral students may elect Ph.D. minors in Comparative Literature, Humanities, Linguistics, and Modern Thought and Literature.

Special collections and facilities at Stanford offer possibilities for extensive research in German Studies and related fields pertaining to Central Europe. Facilities include the Stanford University Libraries and the Hoover Institution on War, Revolution, and Peace. Special collections include the Hildebrand Collection (texts and early editions from the 16th to the 19th century), the Austrian Collection (with emphasis on source material to the time of Maria Theresa and Joseph II, the Napoleonic wars, and the Revolution of 1848), and the Stanford Collection of German, Austrian, and Swiss Culture. New collections emphasize culture and cultural politics in the former German Democratic Republic. The Hoover Institution has a unique collection of historical and political documents pertaining to Germany and Central Europe from 1870 to the present. The department also has its own reference library.

Haus Mitteleuropa, the German theme house at 620 Mayfield, is an undergraduate residence devoted to developing an awareness of the culture of Central Europe. A number of department courses are regularly taught

at the house, and there are in-house seminars and conversation courses. Assignment is made through the regular undergraduate housing draw.

Mission of the Undergraduate Program in German Studies

The mission of the undergraduate program in German Studies is to provide students with the German language skills, the ability to interpret literature and other cultural material, and the capacity to analyze the societies of the German-speaking countries of Central Europe. In addition, its interdisciplinary component prepares students to understand other cultures from the perspectives of multiple disciplines. The program prepares students for careers in business, social service, and government, and for graduate work in German Studies.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in German beyond the interpersonal level with presentational language abilities.
2. writing proficiency in German beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in German.
4. the ability to develop effective and nuanced lines of interpretation.

Graduate Programs in German Studies

The University requirements for the M.A. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in German Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in German Studies. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of German Studies and to pursue career tracks in higher education and in other sectors.

German Studies and a Minor Field

Students may work toward a Ph.D. in German Studies with minors in such areas as Comparative Literature, History, Humanities, Linguistics, or Modern Thought and Literature. Students obtaining a Ph.D. in such combinations may require additional training.

Bachelor of Arts in German Studies

Majors must demonstrate basic language skills, either by completing GERLANG 1,2,3, First-Year German, or the equivalent such as an

appropriate course of study at the Stanford in Berlin Center. Students also enroll in intermediate and advanced courses on literature, culture, thought, or language. A maximum of 10 Advance Placement (AP) units may be counted towards the major with the approval of the Chair of Undergraduate Studies. No more than ten units may be taken on a credit/no credit basis. Courses listed below are highly recommended. Substitutes are permitted with the approval of the Chair of Undergraduate Studies. Students can combine a major in German Studies with a major in any other field. Relevant courses in other fields can count towards the German Studies major.

Degree Requirements

1. Completion of 60 units. Units earned towards the Bachelor of Arts in German Studies with Honors degree may be applied to the 60 unit total.
2. Completion of three GERMAN courses at the 120-level or approved substitutes.

		Units
GERMAN 124	Introduction to German Poetry	3
GERMAN 126	Old Stories, New Media: Great German Tales and their Adaptations	3-5
GERMAN 127	Modernity, Memory, Mourning: 20th Century German Short Fiction	3-5

3. Completion of German Studies Core series:

		Units
GERMAN 131	What is German Literature?	3-5
GERMAN 132	Dynasties, Dictators and Democrats: History and Politics in Germany	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5

4. Senior Capstone Project:

GERMAN 191	German Capstone Project	1
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5. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

6. Remaining units should be completed through elective courses approved in consultation with the Chair of Undergraduate Studies. Structured Liberal Education courses and all courses taken at the Berlin Overseas campus may count toward the major electives. Thinking Matters courses approved by the Chair of Undergraduate Studies may also be counted toward the electives. Subject to approval by the Chair of Undergraduate Studies, courses from other fields may count if they contribute to the student's language skills, the ability to interpret literature and other cultural material, or the capacity to analyze societies.

German and Philosophy

The German and Philosophy major option offers students the opportunity to combine studies in literature and philosophy. Students take most of their courses from departments specializing in the intersection of literature and philosophy. This option is not declared in Axxss; it does not appear on the transcript or diploma. This option requires a minimum of 16 courses, for a minimum total of 65 units.

Degree Requirements

German Studies:

1. Completion of two GERMAN courses at the 120-level or approved substitutes:

		Units
GERMAN 124	Introduction to German Poetry	3
GERMAN 126	Old Stories, New Media: Great German Tales and their Adaptations	3-5

GERMAN 127 Modernity, Memory, Mourning: 20th Century German Short Fiction 3-5

2. Completion of three GERMAN courses at the 130-level or approved substitutes:

		Units
GERMAN 131	What is German Literature?	3-5
GERMAN 132	Dynasties, Dictators and Democrats: History and Politics in Germany	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5

3. German Studies Senior Capstone Project:

		Units
GERMAN 191	German Capstone Project	1

1. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

Philosophy:

1. PHIL 80 Mind, Matter, and Meaning
2. GERMAN 181 Philosophy and Literature
3. Aesthetics, Ethics, Political Philosophy: one course from PHIL 170 series.
4. Language, Mind Metaphysics, and Epistemology: one course from PHIL 180 series.
5. History of Philosophy: one course in the history of Philosophy, numbered above PHIL 100.
6. Two additional elective courses of special relevance to the study of philosophy and literature as identified by the committee in charge of the program. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.
7. Capstone: One of the courses must be taken in the student's senior year. When choosing courses, students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought:

		Units
COMPLIT 217	The Poetry of Friedrich Holderlin	3-5
FRENCH 228E	Getting Through Proust	3-5
PHIL 193D	Dante and Aristotle	5
PHIL 194L	Montaigne	4

Units devoted to meeting the department's language requirements are not counted toward the 65-unit requirement.

The capstone seminar and the two related courses must be approved by both the German Studies Chair of Undergraduate Studies and the undergraduate adviser of the program in philosophical and literary thought administered through the DLCL. Substitutions, including transfer credit, are not normally permitted for items 3b, 3c, and 3d, and are not permitted under any circumstances for items 2, 3a, and 5. Up to 10 units taken in the Philosophy Department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade.

Honors

German majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their

home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course will focus on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
4. Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
5. Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

Overseas Studies and Internships in German Studies

All students who are planning to study at Stanford in Berlin or engage in an internship are encouraged to consult with the Chair of Undergraduate Studies and the Overseas Studies office about integrating work done abroad into their degree program. Through the Center, students with at least two years of college-level German can also take courses at the Freie Universität, Technische Universität, or Humboldt Universität. All credits earned in Berlin can be applied to the undergraduate major in German Studies. For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses (<http://explorecourses.stanford.edu>) web site, or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site.

Internships in Germany are arranged through the Bing Overseas Studies Program. In addition, students may consult with the department to arrange local internships involving German language use or issues pertaining to Germany or Central Europe. Returning interns who wish to develop a

paper based on their experience should enroll in GERMAN 298 Writing Workshop.

Joint Major Program: German Studies and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

German Studies Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 229)m (p. 229)" section of this bulletin for details on Computer Science requirements.

To graduate with a joint major in Computer Science and German Studies, students must complete a minimum of 50 units. Majors must demonstrate basic language skills, either by completing GERLANG 1,2,3, First-Year German, or the equivalent such as an appropriate course of study at the Stanford in Berlin Center. Students also enroll in intermediate and advanced courses on literature, culture, thought, or language. A maximum of 10 Advance Placement (AP) units may be counted towards the major with the approval of the Chair of Undergraduate Studies. No more than 10 units may be taken on a credit/no credit basis. Courses listed below are recommended. Substitutes are permitted with the approval of the Chair of Undergraduate Studies. Relevant courses in other fields can count towards the German Studies major.

Degree Requirements

1. Completion of 50 units.
2. Completion of three GERMAN courses at the 120-level or approved substitutes.

		Units
GERMAN 124	Introduction to German Poetry	3
GERMAN 126	Old Stories, New Media: Great German Tales and their Adaptations	3-5
GERMAN 127	Modernity, Memory, Mourning: 20th Century German Short Fiction	3-5

3. Completion of German Studies Core series:

		Units
GERMAN 131	What is German Literature?	3-5
GERMAN 132	Dynasties, Dictators and Democrats: History and Politics in Germany	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5

4. Senior Capstone Project:

		Units
GERMAN 191	German Capstone Project	1
GERMAN 199	Individual Work (Enroll in two units GERMAN 199 and preferably take concurrently with the Computer Science capstone requirement.)	1-12

Senior year, the student enrolls in a 2 unit independent study GERMAN 199 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone German Studies and Computer Science project, the student must submit a description of their project to the Chair of Undergraduate Studies in German.

5. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.
6. The remaining units needed to reach 50 units could be completed through elective courses taken in German Studies, at the BOSP Berlin Center, or in other departments, as approved by the Chair of Undergraduate Studies.
 - Structured Liberal Education courses.
 - All courses taken at the Berlin Overseas campus may count toward the major electives.
 - Thinking Matters courses approved by the Chair of Undergraduate Studies may also be counted toward the electives.
 - Subject to approval by the Chair of Undergraduate Studies, courses from other fields may count if they contribute to the student's language skills, the ability to interpret literature and other cultural material, or the capacity to analyze societies.

Honors Program

Students have the option to complete the honors program for Computer Science and German Studies, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and honors requirements for this degree. Students also have the option to complete the honors program for German Studies only; such a thesis would not fulfill the capstone requirement for this degree.

German Studies majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, see the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentsservicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in German Language and Culture

Students may choose to minor in German Language and Culture if they are particularly interested in developing a strong ability in the German language, or in pursuing linguistic issues pertinent to German. Students satisfy the requirements for the minor in German Language and Culture by completing 35 units of course work, including at least three courses at the GERMAN 100-139 level, with coursework taught in German. Study at the Stanford in Berlin Center for at least one quarter is highly recommended.

Minor in German Cultural Studies

Students who wish to study German literature, culture, or thought, without necessarily acquiring facility in the German language, may pursue a minor in German Cultural Studies. Students meet the requirements for the minor in German Cultural Studies by completing 35 units of course work in German literature, culture, and thought in translation, including at least three courses at the GERMAN 130- or 140- level.

Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Literatures, Cultures, and Languages" section of this bulletin for further details about this minor and its requirements.

Master of Arts in German Studies

This program is designed for those who do not intend to continue studies through the Ph.D. degree. Students desiring the M.A. degree must complete a minimum of 45 units of graduate work. If students enroll for three quarters for a minimum of 15 units per quarter, they will be able to fulfill the M.A. requirements in one year. The program requires M.A. students

to take the three graduate core courses (German 320, 321, and 322) for 5 units each. These courses cover core reading lists in three areas of German Studies: pre-1700, 1700-1900, and post-1900. The remaining courses may be selected by the student but they must be graduate-level courses in German and/or approved courses in related fields such as art history, comparative literature, linguistics, history, or philosophy.

M.A. candidates must take an oral examination toward the end of their last quarter, normally on or before the last day of classes. In preparation for the oral exam students are to submit a reading list comprised of 15 items from each of the three core reading lists and 10 additional items of their own choice for a total of 55 items. This M.A. reading list must be compiled in consultation with the advisor.

Coterminal Programs

Students may apply to combine programs for the B.A. and M.A. degrees in German Studies.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Doctor of Philosophy in German Studies

The requirements for the Ph.D. in German Studies include:

1. *Required Courses.* A total of 135 units is required for the Ph.D.; doctoral candidates must complete at least one course with each member of the department. During each quarter in year one and year two, enrollment in and completion of at least two graduate courses taught by German Studies faculty are required. In every quarter prior to TGR, all students must enroll in the German Graduate Colloquium (1 unit per quarter). Students at dissertation stage are expected to continue to participate in the colloquium.
 - a. *First Year.* Students must enroll in a minimum of 54 graduate units during their first year of graduate study as well as 10 units during the first summer. During the first year of work, the student should select courses that provide an introduction to the major areas of the discipline. During the summer after the first year, students prepare a draft of an article on a topic from their presumed area of specialization. First year required coursework:

		Units
GERMAN 320	German Literature 1: How Stories are Told (ca. 1170-1600)	8
GERMAN 321	German Literature 2: Selfhood and History	3-5
GERMAN 322	German Literature 3: Myth and Modernity	8
GERMAN 399	Individual Work (summer quarter)	1-12
DLCL 301	The Learning and Teaching of Second Languages	3
GERMAN 397	Graduate Studies Colloquium	1

- b. *Second Year.* Students must enroll in a minimum of 30 units during their second year of graduate study as well as 10 units during their second summer. In the writing workshop, students refine their draft article, to be completed by the end of autumn quarter. Students prepare a prospectus for their dissertation, which is presented to a faculty committee by the end of spring quarter. Second year required coursework:

		Units
GERMAN 397	Graduate Studies Colloquium	1
GERMAN 399	Individual Work (autumn and summer quarters)	1-12

- c. *Third Year.* Students who have not reached TGR status must complete a minimum of 30 units during their third year of graduate study. Third year required coursework:

	Units
GERMAN 397 Graduate Studies Colloquium	1
GERMAN 399 Individual Work (winter and spring quarters)	1-12

2. *Qualifying Examination.* On June 5 of Spring Quarter, all first year Ph.D. students must take their qualifying examination. This examination is designed to cover the full range of German literary history and builds on the readings in GERMAN 320 German Literature 1: How Stories are Told (ca. 1170-1600), GERMAN 321 German Literature 2: Selfhood and History, and GERMAN 322 German Literature 3: Myth and Modernity. Students who fail this examination may request to retake it once before October 15. A second fail of the Qualifying Exam will result in dismissal from the Ph.D. program.
3. *Language Requirement.* A reading knowledge of one language other than English and German is required. Students in Medieval Studies must also have a reading knowledge of Latin. Reading knowledge will be assessed by an examination administered by the Language Center.
4. *Qualifying Article Submission.* Based upon summer independent study and progress in GERMAN 399 Individual Work, the Ph.D. student will submit an article in autumn quarter of their second year. The article must be submitted by December 1 and will be reviewed by two faculty members who must approve it. An article that does not meet approval may be revised and resubmitted by February 15. A second failure to submit an article meeting approval of the faculty readers will result in dismissal from the program.
5. *Dissertation Prospectus.* Based upon work in winter and spring quarters of the students second year, a twenty-page preliminary dissertation prospectus must be completed by the end of spring quarter of the second year. It must be discussed in a one-hour session of the reading committee before the end of spring quarter. The reading committee must be comprised of three faculty members. At least two members of the reading committee must have primary appointments in German Studies. Members of the reading committee are selected by the student in consultation with his or her primary adviser.
6. After completion of the dissertation prospectus, all students are strongly encouraged to spend at least one quarter abroad in a German-speaking country, while remaining in regular contact with their advisers.
7. *The University Oral Examination.* The University Oral Examination in the Department of German Studies involves a defense of at least three chapters of the dissertation, no later than the end of Autumn Quarter of the fifth year. It must be distributed to the four university oral examination committee members and the outside chair at least four weeks before the formal University Oral examination. This committee consists of three members of the reading committee, one additional member, plus an outside chair, selected in consultation with the primary adviser. The examination lasts no longer than two hours. It begins with a brief statement by the candidate (no longer than 15 minutes) followed by questions from the four examiners, each of whom is limited to 20 minutes. The minutes are reserved for optional questions from the chair of the examination. Students who fail the University Oral Exam are allowed an opportunity to retake the exam. A second fail of the University Oral Exam results in dismissal from the Ph.D. program.
8. Submission and approval of a dissertation.
9. *Teaching Assistant.* The teaching requirement includes four quarters of language teaching during the second and third years of study and is mandatory for continued enrollment or support in the program. Students must also teach a fifth course which may be a language course, but they may alternatively request to teach or co-teach a literature course at a later time in the course of study, normally once their dissertation has reached an advanced stage, contingent upon department need and subject to approval of the Director of German Studies. Such teaching does not extend the length or scope of support. Graduate students are advised to develop skills in the teaching of literature by participating in the teaching of undergraduate courses beyond language courses. Students may enroll in independent studies with faculty members to gain experience as apprentices in undergraduate teaching.
10. *Research Assistant.* The department expects candidates to demonstrate research skills appropriate to their special areas of study.
11. *Graduate Studies Colloquium.* Enrollment and/or participation in is mandatory for all students (students conducting research abroad are exempt). The Colloquium meets every two weeks throughout the year and involves presentation of student work.
12. *German Studies Lecture Series.* Regular attendance at lectures sponsored by the Department is required.
13. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of University, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective measures which may include a written warning, academic probation, and/or the possible release from the program
14. *Candidacy.* Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the Qualifying Exam, qualifying article, and dissertation prospectus, and successful completion of teaching/research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of German Studies conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 45) and GAP (<http://gap.stanford.edu/4-6.html>).
15. *Annual Review.* In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough; each student's performance during the first year is reviewed and discussed. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strength and potential weakness. At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student. Possible outcomes of the spring review include: continuation of the student in good standing, or placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: restoration to good standing; continued

probation, with guidelines for necessary remedial steps; or termination from the program.

16. *Grading.* Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course offered by the DLCL. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty and the following actions may be taken: the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; the grade stands and the student is required to revise and resubmit the work associated with that course; or the student may be required to retake the course.

Ph.D. Minor in German Studies

The department offers a Ph.D. Minor in German Studies. The requirement for the Ph.D. minor is completion of 25 units of graduate course work in German Studies classes. Interested students should consult the Director of Graduate Studies.

Emeriti: (Professors) Theodore M. Andersson, Gerald Gillespie, Katharina Mommsen, Kurt Müller-Vollmer, Orrin W. Robinson III

Director: Kathryn Starkey

Chair of Graduate Studies: Kathryn Starkey

Chair of Undergraduate Studies: Matthew Wilson Smith

Professors: Russell A. Berman, Elizabeth Bernhardt, Amir Eshel, Kathryn Starkey

Associate Professor: Adrian Daub, Matthew Wilson Smith

Assistant Professors: Márton Dornbach

Courtesy Professors: Michael Friedman, Hester G. Gelber, Thomas S. Gray, Hans Ulrich Gumbrecht, Stephen Hinton, Thomas Sheehan, Elaine Treharne

Courtesy Associate Professors: R. Lanier Anderson, Charlotte Fonrobert, Nadeem Hussain

Courtesy Assistant Professors: Marisa Galvez, Edith Sheffer, Laura Stokes,

Senior Lecturer: William E. Petig

Visiting Professor: Nicole Schwindt (Winter)

Visiting Lecturers: Wolf-Dietrich Junghanns (Autumn), Martin Trembl (Autumn)

Overseas Studies Courses in German Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 15	Shifting Alliances? The European Union and the U.S.	4-5
OSPBER 17	Split Images: A Century of Cinema	3-4

OSPBER 66	Theory from the Bleachers: Reading German Sports and Culture	3
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPBER 101A	Contemporary Theater	5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5

History and Philosophy of Science

Courses offered by the Program in History and Philosophy of Science are listed under the subject code HPS on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HPS&filter-catalognumber-HPS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HPS&filter-catalognumber-HPS=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HPS&filter-catalognumber-HPS=on>).

The Program in History and Philosophy of Science (HPS) teaches students to examine the sciences, medicine and technology from a number of perspectives, conceptual, historical and social. The community of scholars includes core faculty and students in History and Philosophy and affiliated members in Classics, Anthropology, English, Political Science, Communication, and other disciplines. Together, they draw upon the multiple methods of their disciplines to study the development, functioning, applications, and social and cultural engagements of the sciences.

Stanford's Program in History and Philosophy of Science is a collaborative enterprise of the departments of History and Philosophy. Each department has its own undergraduate and graduate degree programs in this area, but these overlap and interact through the structure of requirements, advising, team-taught courses, an active graduate student community and a shared colloquium series (<http://HPS.stanford.edu/colloquia.html>).

The program's courses span from antiquity to the late 20th century, with emphasis on:

- ancient science
- Renaissance science
- the Scientific Revolution
- Enlightenment and transatlantic science
- history of medicine and the body
- history and philosophy of biology
- history and philosophy of modern physics
- history of the philosophy of science from the early modern period to the present
- central issues in contemporary philosophy of science
- gender, science, and technology

Undergraduate Degrees

HPS offers undergraduates the opportunity to study science, medicine and technology by combining scientific and humanistic perspectives in a single program. Students can pursue HPS through the two departments (History and Philosophy) that coordinate this interdisciplinary program. The HPS Program offers students an in-depth understanding of the nature and evolution of scientific ideas, practices, and institutions; their contemporary significance to intellectual life; and their material transformation of the modern world.

The Department of History offers an interdisciplinary track in History of Science, and Medicine (p. 486). This track is especially well suited to students who wish to combine history and science, or who are interested in studying the history of science and medicine in combination with premed science requirements in preparation for a future career in medicine and public health.

The Department of Philosophy offers a special program in History and Philosophy of Science (p. 568). This program is especially well suited to students who want to combine their concentration in Philosophy with the study of science and its history.

Students interested in HPS should contact the faculty advisors (in 2014-15 Paula Findlen for History and Michael Friedman for Philosophy) to discuss the undergraduate program.

Graduate Degrees

Graduate students in the Program in History and Philosophy of Science can pursue a Ph.D. either in History, through its Ph.D. concentration in History of Science, Medicine, and Technology, or in Philosophy, through its Ph.D. subplan in History and Philosophy of Science. Diplomas will be issued by the respective departments, but the HPS study will not be noted on the transcript nor on the diploma. Ph.D. students completing the requirements of the HPS program will receive a certificate issued by the Program.

Graduate students in the Program in History and Philosophy of Science that wish to pursue a Ph.D. in Philosophy must fulfill Departmental degree requirements (p. 574) and the following requirements:

1. HPS colloquium series attendance
2. One of the following graduate level Philosophy of Science courses: 263, 264, 264A, 265, 265C, 266, 267A or 267B
3. One elective seminar in the history of science
4. One elective seminar (in addition to the course satisfying requirement 2) in philosophy of science

Philosophy Ph.D. students declaring the HPS subplan in Access will have it appear on the official transcript but is not printed on the diploma.

The Program in History and Philosophy of Science degree requirements for the Ph.D. in History of Science, Medicine and Technology, in addition to the general History Department Ph.D. degree requirements (p. 497), are:

1. HPS colloquium series attendance
2. the History Department core seminar in History of Science, Medicine and Technology
3. Four other courses in the history of science, technology and/or medicine
4. One course in the philosophy of science
5. Four additional courses in a given geographical or national field of research, one of which must be a core course

The courses described above must include two research seminars, at least one of which must be in the history of science, technology and/or medicine. Students are expected to write papers on substantially different topics for each seminar. You should also aim to present your research at the annual meeting of a professional society associated with the history of science, technology and/or medicine sometime during your third or fourth year. For more information, see the program's (<http://hps.stanford.edu/grad.html>) web site.

Bachelor of Arts Programs

HPS offers undergraduates the opportunity to study science, medicine and technology by combining scientific and humanistic perspectives in a single program. Students can pursue HPS through the two departments (History and Philosophy) that coordinate this interdisciplinary program. The HPS Program offers students an in-depth understanding of the nature and evolution of scientific ideas, practices, and institutions; their contemporary significance to intellectual life; and their material transformation of the modern world.

The Department of History offers an interdisciplinary track in History of Science, and Medicine (p. 486). This track is especially well suited to students who wish to combine history and science, or who are interested in studying the history of science and medicine in combination with premed science requirements in preparation for a future career in medicine and public health.

The Department of Philosophy offers a special program in History and Philosophy of Science (p. 568). This program is especially well suited to students who want to combine their concentration in Philosophy with the study of science and its history.

Students interested in HPS should contact the faculty advisors (in 2014-15 Paula Findlen for History and Michael Friedman for Philosophy) to discuss the undergraduate program.

Last year was the first of the freshman residential program, Science in the Making: Integrated Learning Environment (SIMILE), which presents a select community of Stanford freshmen with a one-of-a-kind residential learning experience in which they explore the great thinkers and practitioners of science, medicine, and technology from antiquity to the present. Lectures and discussions take place in Burbank dorm and are complemented by hands-on tutorials, field trips, and guest speakers as well as informal conversations among faculty and students. See SIMILE (<https://undergrad.stanford.edu/programs/residential-programs/science-making-integrated-learning-environment-simile>) for more information on this program.

Course Sequences

The following courses are offered in 2014-15 in the area of History and Philosophy of Science.

Introductory

		Units
HPS/PHIL 60	Introduction to Philosophy of Science	5
PHIL 15N	Freedom, Community, and Morality	3
HPS 61	Science, Religion, and the Birth of Modern Philosophy	5

Science in History

This sequence is designed to introduce students to the history of Science from antiquity to the 20th century. Students are advised to take most or all of this sequence as a core foundation.

		Units
HISTORY 40/140	World History of Science	3
HISTORY 44	History of Women and Gender in Science, Medicine and Engineering	3
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering	5
HISTORY 344	Narrative Knowing	1-2
HISTORY 46N	Science and Magic in History	4-5
HISTORY 240	The History of Evolution	4-5

HISTORY 340	The History of Evolution	4-5
HISTORY 232B	Heretics, Prostitutes and Merchants: The Venetian Empire	5
HISTORY 332B	Heretics, Prostitutes and Merchants: The Venetian Empire	4-5
HISTORY 203C	History of Ignorance	5
HISTORY 303C	History of Ignorance	4-5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 232F	The Scientific Revolution	5
HISTORY 332G	When Worlds Collide: The Trial of Galileo	4-5
HISTORY 342	Darwin in the History of Life	4-5
HISTORY 431	Early Modern Things	4-5
MATH 163	The Greek Invention of Mathematics	3-5
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution	5
HISTORY 343G	Tobacco and Health in World History	4-5

Medicine in History

This sequence is designed to introduce students to the history of medicine from antiquity to the 20th century.

		Units
HISTORY 40	World History of Science	3
HISTORY 41Q	Mad Women: Women and Mental Illness in U.S. History	3
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors	5
HUMBIO 175	Health Care as Seen Through Medical History, Literature, and the Arts	3
HISTORY 243G/343G	Tobacco and Health in World History	4-5
HISTORY 244C	The History of the Body in Science, Medicine, and Culture	4-5
HISTORY 264G	Madness in American Society: The Social History of Mental Illness in the United States	5

Philosophical Perspectives on Science, Medicine, and Technology

This sequence is designed to introduce students to the philosophy of science. Students are advised to take HPS 60 Introduction to Philosophy of Science above as a starting point, and combine a number of the electives listed below in conjunction with courses in the other concentrations that address their specific interests.

		Units
PHIL 153	Feminist Theories and Methods Across the Disciplines	2-5
PHIL 163/263	Significant Figures in Philosophy of Science	4
PHIL 164/264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 165	Philosophy of Physics	4
PHIL 167A/267A	Philosophy of Biology	2-4
PHIL 167B/267B	Philosophy, Biology, and Behavior	4
PHIL 224	Kant's Philosophy of Physical Science	2-4
PHIL 224A	Mathematics in Kant's Philosophy	4
PHIL 227B	Kant's Anthropology and Philosophy of History	4

PHIL 253	Feminist Theories and Methods Across the Disciplines	2-5
PHIL 263	Significant Figures in Philosophy of Science	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 265	Philosophy of Physics	4
PHIL 265C	Philosophy of Physics: Probability and Relativity	4
PHIL 267A	Philosophy of Biology	2-4
PHIL 267B	Philosophy, Biology, and Behavior	4
PHIL 324	Kant's System of Nature and Freedom	4
PHIL 348	Evolution of Signalling	2-4
PHIL 360	Core Seminar in Philosophy of Science	4
PHIL 361	Social Dimensions of Scientific Knowledge	4
PHIL 365	Seminar in Philosophy of Physics	4

Advanced Course Sequences Contemporary Perspectives on Science, Medicine and Technology

The following courses focus on contemporary cultural and social science approaches to science, technology, and medicine.

		Units
HPS 199	Directed Reading	1-15
HPS 299	Graduate Individual Work	1-15
ANTHRO 180	Science, Technology, and Gender	3-5
HISTORY 243S/443A	Human Origins: History, Evidence, and Controversy	4-5

Graduate Degrees

Graduate students in the Program in History and Philosophy of Science can pursue a Ph.D. either in History, through its Ph.D. concentration in History of Science, Medicine, and Technology, or in Philosophy, through its Ph.D. subplan in History and Philosophy of Science. Diplomas will be issued by the respective departments, but the HPS study will not be noted on the transcript nor on the diploma. Ph.D. students completing the requirements of the HPS program will receive a certificate issued by the Program.

Graduate students in the Program in History and Philosophy of Science that wish to pursue a Ph.D. in Philosophy must fulfill Departmental degree requirements (p.) and the following requirements:

1. HPS colloquium series attendance
2. One of the following graduate level Philosophy of Science courses: 263, 264, 264A, or 266
3. One elective seminar in the history of science
4. One elective seminar (in addition to the course satisfying requirement 2) in philosophy of science

Philosophy Ph.D. students declaring the HPS subplan via the Declaration or Change to a Field of Study form (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>) will have it appear on the official transcript but is not printed on the diploma.

The Program in History and Philosophy of Science degree requirements for the Ph.D. in History of Science, Medicine and Technology, in addition to the general History Department Ph.D. degree requirements (p.), are:

1. HPS colloquium series attendance
2. the History Department core seminar in History of Science, Medicine and Technology
3. Four other courses in the history of science, technology and/or medicine

4. One course in the philosophy of science
5. Four additional courses in a given geographical or national field of research, one of which must be a core course

The courses described above must include two research seminars, at least one of which must be in the history of science, technology and/or medicine. Students are expected to write papers on substantially different topics for each seminar. You should also aim to present your research at the annual meeting of a professional society associated with the history of science, technology and/or medicine sometime during your third or fourth year. For more information, see the program's (<http://HPST.stanford.edu/grad.html>) web site.

Course Sequences

See the Bachelors tab for all History and Philosophy of Science courses offered in 2014-2015.

Co-chairs: Paula Findlen (History), Michael Friedman (Philosophy)

Committee-in-Charge: Paula Findlen (History), Michael Friedman (Philosophy), Helen Longino (Philosophy), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History), Thomas Ryckman (Philosophy)

Program Committee: Paula Findlen (History), Michael Friedman (Philosophy), Helen Longino (Philosophy), Tom Mullaney (History), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History), Thomas Ryckman (Philosophy), Londa Schiebinger (History)

Professors: Keith Baker (History), Paula Findlen (History), Michael Friedman (Philosophy), David Holloway (History, Institute for International Studies, Political Science), Helen Longino (Philosophy), Reviel Netz (Classics), Robert Proctor (History), Londa Schiebinger (History), Richard White (History), Caroline Winterer (History)

Associate Professors: Thomas Mullaney (History), Jessica Riskin (History), Fred Turner (Communication), Sarah Jain (Anthropology), Priya Satia (History)

Professor (Teaching): Thomas Ryckman (Philosophy)

Professor (Research): Rega Wood (Philosophy, emerita)

Lecturer: Margo Horn, Norton Wise

Other Affiliation: Henry Lowood (Stanford University Libraries), Larry Lagerstrom (UAR)

SIMILE (<https://undergrad.stanford.edu/programs/residential-programs/science-making-integrated-learning-environment-simile>) (*Science in the Making Integrated Learning Environment*) Program: Kristen Haring (Assistant Director and Lecturer); Marcelo Aranda (Lecturer); and Katherine McDonough (PWR Lecturer)

Visiting Scholar: Adrienne Mayor (Classics)

Overseas Studies Courses in History and Philosophy of Science

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

OSPFLOR 44 Galileo: Genius, Innovation and the Scientific Revolution

Units

5

History

Courses offered by the Department of History are listed under the subject code History on the Stanford Bulletin's ExploreCourses web site. (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=HISTORY&filter-catalognumber-HISTORY=on&filter-coursestatus-Active=on&filter-term-Summer=on>)

Mission of the Department of History

History courses teach the analytical, interpretive, and writing knowledge and skills necessary for understanding the connections between past and present. History is a pragmatic discipline in which the analysis of change over time involves sifting the influences and perspectives that affect the course of events, and evaluating the different forms of evidence historians exploit to make sense of them. Teaching students how to weigh these sources and convert the findings into persuasive analysis lies at the heart of the department's teaching. Graduates with a History major pursue careers and graduate study in law, public service, business, writing, education, and journalism.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of what it means to think historically: locating subjects in time and place and being sensitive to the contingencies of context and to change over time.
2. critical and interpretive thinking skills using course's primary source materials.
3. the ability to identify different types of sources of historical knowledge.
4. analytical writing skills and close reading skills.
5. effective oral communication skills.

Degrees Offered

The Department of History offers the following degree programs: Bachelor of Arts, Bachelor of Arts and Sciences, Master of Arts, and Doctor of Philosophy.

Graduate Programs in History

The primary goal of the Stanford Department of History's graduate program is the training of scholars. Most students who receive doctorates in the program go on to teach at colleges or universities. Other students have obtained positions in university administration and research.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in History and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in History. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of History and to interpret and present the results of such research.

History Course Catalog Numbering System

Location	Introductor Sources	Lectures	Colloquia	Research Seminars and Workshops	
International Global, Thematic	4N, 44Q, 95N	3S	1B, 64, 102, 103D,F, 105C, 106A,B, 107	201A, 202A,B,G, 203,B,C, 204,C,E,G, 206,206A, 207C, 208C, 243G, 301A, 302A,B,G, 303,303B,C,F, 304,C,G, 305, 306A, D, 307C,E, 308C, 343G, 399A	306K, 401A
Ancient and Medieval Europe	11N	101	207F, 215K, 307F		
Early Modern and Modern Europe		33S, 38S	110B, C, 131A, 133A, 134A	230C, 231G, 232A, 233, 331G, 332A, 333	326A, 430, 433A, B, 438
Eastern Europe, Russia, Eurasia	20N	20S	125	221B, 224A, 228, 321A, 328	424A, B
History of Science	41Q, 44Q	42S	130A, 140, 144	208A, 232F, 308A, 332F	
Africa	48N, 48Q		145B, 147		445A, B
United States	36N, 41Q, 50K, 60N	71S, 74S, 76S	64, 130A, 150A, B, C, 151, 158C, 159, 161, 166, B, 167A	201, 203C, 251G, 252B, 253D, 256, G, 257C, 258, E, 260, 261G, 262A, E, 269, 301, 303C, 351B, C, E, 356, 358, 369	460
Latin America	78N		174	277D	471A, B

Middle East		181B, 182C, 187	281B, 284, 481 F, 288, 381, B, 384, F
Jewish History		185B	486A
Asia	98N	191B, 192, 195, C, 196, 198	290E, 292, D, 297, 390E, 391B, 392, D, 396D, 397
			491A, B, 494C

Bachelor of Arts in History Prerequisites for the Major

Before declaring the History major, students must take one lecture course. They must take a second lecture course within one year of declaring. Fulfilling this requirement are courses numbered HISTORY 1-199 (with the exception of Freshman (xxN) and Sophomore (xxQ) Introductory Seminars).

The choices for 2014-15 are:

		Units
HISTORY 1A	Global History: The Ancient World	3-5
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 13	The Historical and Geographical Background of Current Global Events	3
HISTORY 102	History of the International System	5
HISTORY 103D	Human Society and Environmental Change	4
HISTORY 103E	The International History of Nuclear Weapons	5
HISTORY 103F	Introduction to Military History	5
HISTORY 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 110B	Survey of Early Modern Europe	5
HISTORY 112	Medicine and Disease in the Ancient World	5
HISTORY 114	Origins of History in Greece and Rome	4-5
HISTORY 115D	The Civilization and Culture of the Middle Ages	3-5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 137	The Holocaust	4-5
HISTORY 138A	Germany and the World Wars	5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 140	World History of Science	5
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	5
HISTORY 147	History of South Africa	5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 150B	19th-Century America	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 152	History of American Law	5

HISTORY 154	American Intellectual and Cultural History to the Civil War	5
HISTORY 156	American Economic History	5
HISTORY 157	The Constitution: A Brief History	5
HISTORY 161	Women in Modern America	4-5
HISTORY 165D	The Pacific World	5
HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	3-5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 182C	Making of the Islamic World, 600-1500	5
HISTORY 184	Zionism	5
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 193	Late Imperial China	5
HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 195	Modern Korean History	5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 196	Worlds of Gandhi	5
HISTORY 197	Southeast Asia: From Antiquity to the Modern Era	5
HISTORY 198	History of Modern China	5

HISTORY 110B	Survey of Early Modern Europe
Or, or a United States survey course such as:	
HISTORY 150A	Colonial and Revolutionary America
HISTORY 150B	19th-Century America
HISTORY 150C	The United States in the Twentieth Century

The second must be a lecture course in African, Asian, Middle East, or Latin American History.

5. Completion of the Writing in the Major (WIM) requirement⁴

HISTORY 209S	Research Seminar for Majors	5
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6. At least 6 additional courses to total a minimum of 63 units. 28

- 1 Sources and Methods seminars constitute the department's "skills" class and should be taken as early as possible in a student's course of study. They are designed for freshmen and sophomores considering or beginning the History major. This requirement must be completed prior to enrolling in HISTORY 209S Research Seminar for Majors.
- 2 ExploreCourses lists all colloquia offered this year (<https://explorecourses.stanford.edu/search?filter-term-Summer=on&filter-component-COL=on&filter-coursestatus-Active=on&filter-term-Spring=on&filter-term-Winter=on&filter-term-Autumn=on&filter-academiclevel-UG=on&page=0&q=HISTORY&view=catalog&filter-catalognumber-HISTORY=on&collapse=%2c6%2c7%2c&academicYear=20142015>).
- 3 Students may count courses they took as prerequisites to the major for this requirement.
- 4 In completing this course, students must write a 20-25 page essay based on original research and including at least two drafts. HISTORY 209S Research Seminar for Majors may be taken in either the junior or the senior year. Students must complete the Sources and Methods seminar before enrolling in the Research Seminar.

Bachelor of Arts Requirements

Completion of the major requires planning. History majors should plan to meet with their faculty advisers twice yearly, once in the Autumn and once in the Winter or Spring quarters. These meetings should take place within the first three weeks of the quarter, before the final study list deadline.

History majors are required to complete a minimum of 63 units (i.e. a minimum of 13 courses) to include:

	Units
1. One Sources and Methods Seminar (HISTORY 1S-99S)¹	5
Sources and Methods courses offered this year are:	
HISTORY 29S	The Animal Other: Humans and Animals in Western History 5
HISTORY 39S	Brave New World: Berlin in the Twenties 5
HISTORY 40S	Magic and Occult Science in Early Modern Europe 5
HISTORY 64S	Debtor Nation: 20th Century American Capitalism 5
HISTORY 65S	Intimate Frontiers: Race, Gender, and Colonialism in the American West 5
HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad 5
HISTORY 72S	Family and Law in American History 5
HISTORY 93S	Bandits, Merchants, and Saints: The Sino-Tibetan Frontier, 1700-2000 5
HISTORY 94S	Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History 5
HISTORY 99S	Christianity in East Asia 5
2. Two 200-level undergraduate colloquia (HISTORY 200-298)²	10
3. At least one other small group course	5
To be chosen among the department's undergraduate colloquia, research seminars, or Stanford Introductory Seminars	
4. Two lecture courses³	10
One of which must be either	
A Europe survey course such as:	

Additional Requirements

1. Courses comprising the 63 units must be taken for a letter grade, and the student must maintain a grade point average (GPA) in History courses of 2.0 or higher.
2. At least nine courses must be taken from within the Stanford Department of History. Transfer students and those who study abroad may be granted exemptions from this requirement at the discretion of the Director of Undergraduate Studies.
3. At least six quarters of enrollment in the major. Each candidate for the B.A. in History should declare the major by the Autumn Quarter of the third year of study or earlier, if possible.
4. One HISTORY 299S Undergraduate Directed Research and Writing taken for 3-5 units and for a letter grade may be applied toward the thirteen courses required for the B.A. in History.
5. *Capstone*: The History department organizes a series of luncheon workshops quarterly, at which students present their research essays and honors theses.
6. The department encourages students to acquire proficiency in foreign languages and study at one of Stanford's overseas programs. Such studies are not only valuable in themselves; they can provide an opportunity for independent research and a foundation for honors essays and graduate study.
7. Advanced Placement credits do not fulfill any major requirements.

For further information on History courses' satisfaction of major requirements, see the Department of History (<http://history.stanford.edu/programs/undergraduate>) web site.

Writing in the Major (WIM) Requirement

History's Writing in the Major requirement is satisfied by completing HISTORY 209S Research Seminar for Majors.

This course may be taken in either the junior or senior year, but not before completing the sources and methods seminar requirement. Students write a 20-25 page research essay. Original research and revision are important parts of the research essay. Students must conduct substantial research in the libraries and must submit at least two drafts (a rough draft and a final draft) of the essay. Students who wish to write an honors thesis should take HISTORY 209S Research Seminar for Majors in the junior year. Where appropriate, a student can use the research seminar to begin working on the honors thesis.

HISTORY 209S Research Seminar for Majors fulfills the WIM requirement only. It does not fulfill geographical requirements or small group course requirements.

Students select their research topics based on the general topics of each quarter's offerings.

- HISTORY 209S Research Seminar for Majors
 - Autumn: Modern Times; History of Science/Honors
 - Winter: Gender, Sexuality and Race in U.S. History; Comparative Colonialism
 - Spring: Early Modern European Travel Accounts; Politics/Culture in Europe Since 1650

Honors Program

For a limited number of majors, the department offers a special program leading to Departmental Honors in History. Students accepted for this program, in addition to fulfilling the general requirements stated above, begin work as early as Spring Quarter of the junior year and complete the essay by mid-May of the senior year. In addition to HISTORY 299H Junior Honors Colloquium, students must enroll in 11-15 units of Senior Research in the senior year, to be distributed as best fits their specific project. For students in the Honors program, Senior Research units (HISTORY 299A Senior Research I, HISTORY 299B Senior Research II, HISTORY 299C Senior Research III) are taken in addition to the thirteen required courses in History.

To enter this program, the student must be accepted by a member of the department who agrees to advise the research and writing of the essay, and must complete the Junior Honors Colloquium (299H) offered in Winter Quarter. An exception to the latter requirement may be made for those studying overseas Winter Quarter of the junior year, but such students should consult with the director of the honors program, if possible, prior to going overseas. Students who study abroad for the entire junior year and want to write an honors thesis should plan to take the Research Seminar for Majors in the first quarter following completion of the study abroad program. Under exceptional circumstances, students are admitted to the program in Autumn Quarter of the senior year. Such students must not enroll in any HISTORY 299A Senior Research I, HISTORY 299B Senior Research II, HISTORY 299C Senior Research III, units until HISTORY 209S Research Seminar for Majors, has been completed.

In considering an applicant for such a project, the adviser and director of the honors program take into account general preparation in the field of the project and expect a GPA of at least 3.5 in the student's previous work in History and a 3.3 in overall University work. Students completing the thesis with a grade of 'B+' or higher are eligible for Departmental Honors in History. To enter the Honors program, apply at the Department of History office.

Outstanding honors essays may be considered for the University's Robert M. Golden Medals, as well as for departmental James Birdsall Weter prizes.

Honors Program Requirements—To graduate with departmental honors in History, students must:

1. complete HISTORY 299H Junior Honors Colloquium in the junior year
2. maintain a GPA of at least 3.3 in overall University work and a 3.5 in the History major during the final 5 quarters of enrollment/thesis preparation, or obtain the consent of the Director of the Honors Program.
3. select both a primary thesis adviser (who is a member of the Stanford History faculty) and a secondary adviser (who is a Stanford University faculty member) no later than Autumn Quarter of the senior year
4. submit on May 11, 2015 by noon a 16,250- 30,000 words honors thesis including bibliography that receives a grade of 'B+' or better
5. enroll in the 11-15 units of Senior Research as specified below
6. participate in mandatory Honors Program activities throughout senior year (including, but not limited to, writing workshops and the annual Honors Day oral presentations) as specified in the Honors Program Handbook.

HISTORY 299A Senior Research I, HISTORY 299B Senior Research II, HISTORY 299C Senior Research III do not fulfill any history major requirements other than honors, but the units do count towards the 180 required for B.A. degree conferral.

Required Course—To be taken in the junior year:

	Units
HISTORY 299H Junior Honors Colloquium	1

Required Course—Recommended to be taken in junior year:

	Units
HISTORY 209S Research Seminar for Majors	5

An exception (for HISTORY 299H Junior Honors Colloquium) may be made for those studying overseas Winter Quarter of the junior year, but such students should consult with the Director of the Honors Program prior to going overseas.

To be taken in the senior year:

	Units
HISTORY 299A Senior Research I	1-5
HISTORY 299B Senior Research II	1-5
HISTORY 299C Senior Research III	1-5

Overseas Studies or Study Abroad

Courses offered by Stanford's Bing Overseas Studies Program and appearing on the History department's cognate course list automatically receive credit towards the major or minor in History. Course work completed in non-Stanford Study Abroad programs is evaluated for major/minor credit by designated History department faculty on a case-by-case basis. Students in non-Stanford Study Abroad programs are advised to take classes with reading and writing components comparable to History department course loads.

History Fields of Study or Degree Options

The Department of History offers the following tracks to the B.A. in History. These tracks are not declared on Axxess; they do not appear on the transcript or on the diploma. The tracks are:

- General History
- Global Affairs and World History
- History, Philosophy, and the Arts

- History of Science and Medicine
- History and the Law
- Public History/Public Service

The General History track emphasizes breadth of study among historical areas and periods as well as concentration in one selected field. The Global Affairs and World History track emphasizes an understanding of today's world through a historical examination of its evolution, from the early modern to the contemporary era. The four tracks with interdisciplinary emphasis (History, Philosophy, and the Arts; History of Science and Medicine; History and the Law; and Public History/Public Service) combine the study of history with the methods and approaches of other disciplines, and involve substantial course work outside of History.

General History Track

In addition to completing the requirements for all History majors, the student in the General History track is required to satisfy breadth and concentration requirements.

- Breadth Requirements:** to ensure chronological and geographical breadth, at least two courses must be completed in a premodern chronological period and in each of three geographical fields:
 - Field I (Africa, Asia, and Middle East)
 - Field II (the Americas)
 - Field III (Europe, including Western Europe, Eastern Europe, and Russia).
 - Courses fulfilling the pre-modern chronological period (Field IV) may also count for Fields I-III.
- Courses for 2014-15 follow below.
- Concentration:** to develop some measure of expertise, students must complete four courses in a single area (including one undergraduate colloquium or research seminar). The proposed concentration must be approved by the major adviser; a proposal for a thematic concentration must be approved by both the adviser and the department's director of undergraduate studies. Areas of concentration are:
 - Africa
 - Asia
 - Eastern Europe and Russia
 - Europe before 1700
 - Europe since 1700
 - Jewish History
 - Latin America
 - Science and Medicine
 - The United States
 - The Middle East
 - International History
 - Comparative Empires and Cultures
 - or a thematic subject treated comparatively, such as war and revolution, work, gender, family history, popular culture, or high culture.
- Required course:** HISTORY 102 History of the International System is a required course for students who select the International History concentration. This course is offered in Spring Quarter.

Field I: Africa/Asia/Middle East

	Units
HISTORY 45B Africa in the Twentieth Century	3
HISTORY 47 History of South Africa	3
HISTORY 48Q South Africa: Contested Transitions	3
HISTORY 82C Making of the Islamic World, 600-1500	3
HISTORY 84 Zionism	3

HISTORY 84N The American Empire in the Middle East	4-5
HISTORY 87 The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	3
HISTORY 93 Late Imperial China	3
HISTORY 93S Bandits, Merchants, and Saints: The Sino-Tibetan Frontier, 1700-2000	5
HISTORY 94B Japan in the Age of the Samurai	3
HISTORY 94S Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
HISTORY 95 Modern Korean History	3
HISTORY 95C Modern Japanese History: From Samurai to Pokemon	3
HISTORY 96 Worlds of Gandhi	3
HISTORY 98 The History of Modern China	3
HISTORY 98N Beijing, Shanghai, and the Structure of Modern China	3
HISTORY 106A Global Human Geography: Asia and Africa	5
HISTORY 145B Africa in the 20th Century	5
HISTORY 146 History of Humanitarian Aid in sub-Saharan Africa	5
HISTORY 147 History of South Africa	5
HISTORY 182C Making of the Islamic World, 600-1500	5
HISTORY 184 Zionism	5
HISTORY 187 The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 193 Late Imperial China	5
HISTORY 194B Japan in the Age of the Samurai	5
HISTORY 195 Modern Korean History	5
HISTORY 195C Modern Japanese History: From Samurai to Pokemon	5
HISTORY 196 Worlds of Gandhi	5
HISTORY 197 Southeast Asia: From Antiquity to the Modern Era	5
HISTORY 198 History of Modern China	5
HISTORY 244 Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years	5
HISTORY 245 Violence and Identity in the African Great Lakes Region	5
HISTORY 248S Colonial States and African Societies, Part I	4-5
HISTORY 282F History of Modern Turkey	5
HISTORY 283 The New Global Economy, Oil and Origins of the Arab Spring	4-5
HISTORY 284F Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 286 Jews Among Muslims in Modern Times	4-5
HISTORY 292D Japan in Asia, Asia in Japan	4-5
HISTORY 292F Culture and Religions in Korean History	4-5
HISTORY 293E Female Divinities in China	4-5
HISTORY 295F Race and Ethnicity in East Asia	4-5
HISTORY 295J	5

Field II: The Americas

	Units
HISTORY 41Q Mad Women: Women and Mental Illness in U.S. History	3
HISTORY 44 History of Women and Gender in Science, Medicine and Engineering	3
HISTORY 50A Colonial and Revolutionary America	3
HISTORY 50B 19th Century America	3
HISTORY 50C The United States in the Twentieth Century	3

HISTORY 54	American Intellectual and Cultural History to the Civil War	3
HISTORY 54N	African American Women's Lives	3-4
HISTORY 55Q	The Origins of the Modern American City, 1865-1920	3
HISTORY 64S	Debtor Nation: 20th Century American Capitalism	5
HISTORY 65S	Intimate Frontiers: Race, Gender, and Colonialism in the American West	5
HISTORY 72S	Family and Law in American History	5
HISTORY 78N	Film and History of Latin American Revolutions	3
HISTORY 94S	Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 116N	Howard Zinn and the Quest for Historical Truth	3
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering	5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 150B	19th-Century America	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 152	History of American Law	5
HISTORY 154	American Intellectual and Cultural History to the Civil War	5
HISTORY 157	The Constitution: A Brief History	5
HISTORY 161	Women in Modern America	4-5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 201	Introduction to Public History and Public Service	4-5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 250E	Taxing America: From the Puritans to Prop. 13	5
HISTORY 254	Popular Culture and American Nature	5
HISTORY 254G	The Causes and Consequences of the American Revolution	5
HISTORY 256	America- China Relations	4-5
HISTORY 258	Topics in the History of Sexuality: Sexual Violence in America	4-5
HISTORY 258E	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5
HISTORY 260	California's Minority-Majority Cities	4-5
HISTORY 264G	Madness in American Society: The Social History of Mental Illness in the United States	5
HISTORY 271	Mexicans in the United States	5
HISTORY 272E	Theories of Citizenship and Sovereignty in a Transnational Context	4-5
HISTORY 274E	Urban Poverty and Inequality in Latin America	5
HISTORY 279	Latin American Development: Economy and Society, 1800-2014	4-5

Field III: Europe, Eastern Europe, and Russia

		Units
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 10B	Survey of Early Modern Europe	3
HISTORY 20A	The Russian Empire, 1450-1800	3
HISTORY 29S	The Animal Other: Humans and Animals in Western History	5

HISTORY 31	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 38A	Germany and the World Wars	3
HISTORY 39	Modern Britain and the British Empire	3
HISTORY 39S	Brave New World: Berlin in the Twenties	5
HISTORY 40S	Magic and Occult Science in Early Modern Europe	5
HISTORY 84	Zionism	3
HISTORY 101	The Greeks	4-5
HISTORY 102A	The Romans	3-5
HISTORY 110B	Survey of Early Modern Europe	5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 138A	Germany and the World Wars	5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 184	Zionism	5
HISTORY 204E	Totalitarianism	4-5
HISTORY 207C	The Global Early Modern	4-5
HISTORY 221B	The 'Woman Question' in Modern Russia	5
HISTORY 222	Crime and Punishment in Early Modern Europe and Russia	5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 228	Circles of Hell: Poland in World War II	5
HISTORY 231E	Paper, Printing, and Digital Revolutions: Transformations of the Book	4-5
HISTORY 232B	Heretics, Prostitutes and Merchants: The Venetian Empire	5
HISTORY 232F	The Scientific Revolution	5
HISTORY 233C	Two British Revolutions	4-5
HISTORY 234	The Enlightenment	3-5
HISTORY 234G	Narrating the British Empire	4-5
HISTORY 235	The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy	5
HISTORY 235C	Readings in the Supernatural	4-5
HISTORY 236F	The End of the World As They Knew It: Culture, Cafés, and Crisis in Europe, 1880-1918	4-5
HISTORY 238G	Ethnography of the Late Middle Ages: Social history and popular culture in the age of the plague	4-5
HISTORY 239E	Paris: The Making of a Modern Icon	3-5

Field IV: Pre-1700

		Units
HISTORY 1A	Global History: The Ancient World	3-5
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 10B	Survey of Early Modern Europe	3
HISTORY 12	Medicine and Disease in the Ancient World	3
HISTORY 20A	The Russian Empire, 1450-1800	3
HISTORY 29S	The Animal Other: Humans and Animals in Western History	5
HISTORY 31	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 40	World History of Science	3
HISTORY 40S	Magic and Occult Science in Early Modern Europe	5
HISTORY 82C	Making of the Islamic World, 600-1500	3
HISTORY 93	Late Imperial China	3
HISTORY 94B	Japan in the Age of the Samurai	3
HISTORY 101	The Greeks	4-5

HISTORY 102A	The Romans	3-5
HISTORY 110B	Survey of Early Modern Europe	5
HISTORY 112	Medicine and Disease in the Ancient World	5
HISTORY 114	Origins of History in Greece and Rome	4-5
HISTORY 115D	The Civilization and Culture of the Middle Ages	3-5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 140	World History of Science	5
HISTORY 182C	Making of the Islamic World, 600-1500	5
HISTORY 193	Late Imperial China	5
HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 203E	Global Catholicism	5
HISTORY 207C	The Global Early Modern	4-5
HISTORY 212	Knights, Monks, and Nobles: Masculinity in the Middle Ages	4-5
HISTORY 216	Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century	4-5
HISTORY 217S	Minorities In Medieval Europe	5
HISTORY 222	Crime and Punishment in Early Modern Europe and Russia	5
HISTORY 231E	Paper, Printing, and Digital Revolutions: Transformations of the Book	4-5
HISTORY 232B	Heretics, Prostitutes and Merchants: The Venetian Empire	5
HISTORY 232F	The Scientific Revolution	5
HISTORY 233C	Two British Revolutions	4-5
HISTORY 235	The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy	5
HISTORY 235C	Readings in the Supernatural	4-5
HISTORY 238G	Ethnography of the Late Middle Ages: Social history and popular culture in the age of the plague	4-5
HISTORY 244	Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years	5
HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5

Global Affairs and World History Track

The Global Affairs and World History track is designed to offer an empirically rich curriculum for Stanford students interested in international affairs. The goal is to impart an understanding of today's world through a historical examination of its evolution, from the early modern to the contemporary era. This track appeals to students who are aiming for a career in the international arena, and who seek to inform themselves about the complexities of cultural diversity and spatial differentiation on the ground. Deploying both connective and comparative modes of analysis, majors who choose this track will acquire a robust understanding of the relevance of the past to current events.

The Global Affairs and World History track features gateway courses in Global Human Geography, a recommended skills component, a geographical concentration, and a core cluster of global and comparative offerings. Students choosing this track also develop proficiency in a foreign language at the second-year level or above. Incorporating primary sources in a language other than English into the capstone seminar or honors thesis is encouraged.

Gateway Courses (two courses): Students must complete two of the following courses:

		Units
HISTORY 1A	Global History: The Ancient World	3-5
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 13	The Historical and Geographical Background of Current Global Events	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5

Note: If a student wishes to do more than two of these courses, the course is applied to the methodological cluster.

Geographical Cluster (four courses): Students select four History courses in one geographic area, such as Europe, Latin America, Asia, Middle East, or Africa. The faculty coordinator must pre-approve all courses in this cluster.

Global and Comparative Courses (Methodological Cluster) (six courses): Majors selecting this track take at least 6 thematic history courses of global scope. Courses offered in 2014-15 are:

		Units
HISTORY 1A	Global History: The Ancient World	3-5
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 4N	A World History of Genocide	3-5
HISTORY 5C	Human Trafficking: Historical, Legal, and Medical Perspectives	3
HISTORY 13	The Historical and Geographical Background of Current Global Events	3
HISTORY 30N	Eighteen-Year-Olds Go to War: Global Experiences of World War I	4
HISTORY 39	Modern Britain and the British Empire	3
HISTORY 40	World History of Science	3
HISTORY 40S	Magic and Occult Science in Early Modern Europe	5
HISTORY 44	History of Women and Gender in Science, Medicine and Engineering	3
HISTORY 63N	The Feminist Critique: The History and Politics of Gender Equality	3-4
HISTORY 65D	The Pacific World	3
HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad	5
HISTORY 82C	Making of the Islamic World, 600-1500	3
HISTORY 84	Zionism	3
HISTORY 84N	The American Empire in the Middle East	4-5
HISTORY 87	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	3
HISTORY 93S	Bandits, Merchants, and Saints: The Sino-Tibetan Frontier, 1700-2000	5
HISTORY 94S	Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon	3
HISTORY 95N	Mapping the World: Cartography and the Modern Imagination	4-5
HISTORY 96	Worlds of Gandhi	3
HISTORY 102	History of the International System	5
HISTORY 103D	Human Society and Environmental Change	4
HISTORY 103E	The International History of Nuclear Weapons	5
HISTORY 103F	Introduction to Military History	5
HISTORY 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5

HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 140	World History of Science	5
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering	5
HISTORY 165D	The Pacific World	5
HISTORY 182C	Making of the Islamic World, 600-1500	5
HISTORY 184	Zionism	5
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 196	Worlds of Gandhi	5
HISTORY 201A	The Global Drug Wars	4-5
HISTORY 202	International History and International Relations Theory	5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 203C	History of Ignorance	5
HISTORY 203E	Global Catholicism	5
HISTORY 204	What is History?	5
HISTORY 204E	Totalitarianism	4-5
HISTORY 204G	War and Society	5
HISTORY 207C	The Global Early Modern	4-5
HISTORY 209C	Liberalism and Violence	5
HISTORY 221B	The 'Woman Question' in Modern Russia	5
HISTORY 222	Crime and Punishment in Early Modern Europe and Russia	5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 224C	Genocide and Humanitarian Intervention	3
HISTORY 226E	Famine in the Modern World	3
HISTORY 234G	Narrating the British Empire	4-5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 244	Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years	5
HISTORY 246E	Refugees and the Making of the Modern World: 1945-Present	4-5
HISTORY 248S	Colonial States and African Societies, Part I	4-5
HISTORY 252K	America as a World Power: U.S. Foreign Relations, 1914 to Present	5
HISTORY 256	America- China Relations	4-5
HISTORY 266C	The Cold War: An International History	5
HISTORY 271	Mexicans in the United States	5
HISTORY 272E	Theories of Citizenship and Sovereignty in a Transnational Context	4-5
HISTORY 274E	Urban Poverty and Inequality in Latin America	5
HISTORY 278S	The Ethical Challenges of Climate Change	4-5
HISTORY 279	Latin American Development: Economy and Society, 1800-2014	4-5
HISTORY 282F	History of Modern Turkey	5
HISTORY 283	The New Global Economy, Oil and Origins of the Arab Spring	4-5
HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 286	Jews Among Muslims in Modern Times	4-5
HISTORY 292D	Japan in Asia, Asia in Japan	4-5

HISTORY 293B	Queer History in Comparative Perspective	4-5
HISTORY 293D	Global Intellectual History	4-5

Proficiency in a foreign language: Students electing the Global Affairs and World History track must acquire proficiency in a foreign language through two years of college-level course work (second-year, third-quarter) or by passing a proficiency exam. Language courses do not count toward the 13 required courses in the major; students may, however, be interested in pairing this track in the History major with a foreign language minor.

Skills Training: Students in the Global Affairs and World History track are encouraged to acquire technical proficiencies relevant for geo-historical analysis and fieldwork abroad. Please see the Undergraduate Student Services Coordinator for further information on these courses.

Those planning to pursue research overseas are also advised to enroll in the one-credit workshop, HISTORY 299X Preparing for International Field Work: Public Service or Research in Spring Quarter.

Overseas Study Experience: Students electing this track are encouraged to study abroad, with a Stanford BOSP program or another program approved by the directors of the track. Course work taken overseas may be accepted for credit in the track on a case by case basis, in consultation with a faculty coordinator.

Research Seminar for Majors: HISTORY 209S Research Seminar for Majors fulfills Writing in the Major requirement.

General Requirements:

As for all History majors, students in this track must complete two lecture courses (one Europe or U.S., and one Africa, Asia, Middle East, or Latin America), two 200-level courses, a Sources and Methods seminar, and HISTORY 209S (p. 485) Research Seminar for Majors.

History Tracks with Interdisciplinary Emphasis (HMIE)

There are four History Tracks with Interdisciplinary Emphasis:

- History, Philosophy, and the Arts
- History of Science and Medicine
- History and the Law
- Public History/Public Service

These tracks are designed for students who are interested in other disciplines who want to focus on the historical aspects of the subject matter covered by that discipline, who want to understand how interdisciplinary approaches can deepen their understanding of history, or who are primarily interested in developing interdisciplinary approaches to historical scholarship by combining the careful attention to evidence and context that motivates historical research with the analytic and methodological tools of science and the humanities.

In pursuing the designated requirements for all History majors, students in HMIE are required to complete their thirteen courses for the major as follows:

Gateway Course: Students are required to take the appropriate gateway course for their interdisciplinary track. This course introduces students to the application of particular interdisciplinary methods to the study of history. See the section on each HMIE for the gateway course appropriate to that major track. *Note:* The History and the Law track has no gateway course requirement.

Methodological Cluster: This cluster is designed to acquaint students with the ways in which interdisciplinary methods are employed in historical scholarship, by practicing historians and scholars in other disciplines whose work is historical. This program of study must provide methodological

coherence and must be approved in advanced by the student's adviser. See the section on each HMIE for the appropriate historical methods courses.

Geographic Cluster: History is embedded in time and place. This cluster is designed to emphasize that the purpose of studying methodology is to more fully understand the history of a particular region of the world. Students select a particular geographic region, as specified in the History major, and complete four courses in that area.

Interdisciplinary Cluster: These courses, taken outside the Department of History, acquaint students with the methods and approaches of another discipline appropriate for the interdisciplinary study of history. This program of study must provide methodological coherence and must be approved in advance by the student's adviser. See the section on each HMIE for appropriate interdisciplinary courses.

Research Seminar for Majors: HISTORY 209S Research Seminar for Majors fulfills Writing in the Major Requirement.

HMIE tracks do not mandate the breadth or concentration requirements of the General History track. IHUM courses taught by History faculty may apply to HMIE tracks only insofar as their content is specifically appropriate to the particular methodological or geographic cluster; IHUM courses are no longer offered.

History, Philosophy, and the Arts

The History, Philosophy, and the Arts (HPA) track is designed for the student who wishes to complement his or her work in History with study in literature and philosophy, particularly in a foreign language. For the purposes of this track, Arts are defined broadly, including fine art and art history, drama, films, memoirs and autobiography, poetry and novels, as well as canonical works in philosophy, political science, and history of political thought. It appeals to students who are interested in studying the humanities and its conceptual and linguistic worlds in their historical context, or who want to focus on both the literature and history of a specific geographical area while also learning the language of that area.

Gateway Courses (two courses): Students must take HISTORY 234 The Enlightenment and one of the following courses:

- HISTORY 36N Gay Autobiography
- HISTORY 187 The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan
- HISTORY 209C Liberalism and Violence .

Methodological Cluster (two courses): This two-course cluster teaches students how historians, in particular, analyze literary texts and philosophical works as documentary sources for writing cultural and intellectual history. Students choose two courses from among the pre-approved HLA methodology curriculum. These courses need not be in the student's geographic concentration. For 2014-15, these courses are:

		Units
HISTORY 29S	The Animal Other: Humans and Animals in Western History	5
HISTORY 30N	Eighteen-Year-Olds Go to War: Global Experiences of World War I	4
HISTORY 31	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 36N	Gay Autobiography	4
HISTORY 39S	Brave New World: Berlin in the Twenties	5
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 54N	African American Women's Lives	3-4
HISTORY 65S	Intimate Frontiers: Race, Gender, and Colonialism in the American West	5

HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad	5
HISTORY 84	Zionism	3
HISTORY 87	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	3
HISTORY 93	Late Imperial China	3
HISTORY 94S	Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
HISTORY 96	Worlds of Gandhi	3
HISTORY 99S	Christianity in East Asia	5
HISTORY 115D	The Civilization and Culture of the Middle Ages	3-5
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	3-5
HISTORY 184	Zionism	5
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 193	Late Imperial China	5
HISTORY 196	Worlds of Gandhi	5
HISTORY 204G	War and Society	5
HISTORY 209C	Liberalism and Violence	5
HISTORY 216	Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century	4-5
HISTORY 231E	Paper, Printing, and Digital Revolutions: Transformations of the Book	4-5
HISTORY 232B	Heretics, Prostitutes and Merchants: The Venetian Empire	5
HISTORY 234	The Enlightenment	3-5
HISTORY 234G	Narrating the British Empire	4-5
HISTORY 236F	The End of the World As They Knew It: Culture, Cafés, and Crisis in Europe, 1880-1918	4-5
HISTORY 237K	Speed and Power in Twentieth-Century Europe	4-5
HISTORY 254	Popular Culture and American Nature	5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
HISTORY 293D	Global Intellectual History	4-5

Note: HISTORY 187 The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan is a non-Western lectures that students in the the History, Literature, and the Arts (HLA) track can use towards both an HLA methodology course and as the non-Western lecture requirement.

Geographical Cluster (four courses): Students select four History courses in one geographic area. These are: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the two methodological courses required above.

Interdisciplinary Cluster (four courses): Four courses, taken outside the Department of History, must address the literature and arts, broadly defined, of the area chosen for the geographic concentration. The student's adviser must pre-approve all courses in this cluster; these courses may not be double-counted towards a minor or major other than History.

Research Seminar for Majors: HISTORY 209S Research Seminar for Majors fulfills Writing in the Major requirement.

General Requirements: Like all History majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S, one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

History of Science and Medicine

The History of Science and Medicine (HS&M) track is a collaborative program of the Department of History and the Program in the History and Philosophy of Science. The major is designed for students interested in both sciences and humanities, and in the interactions between the two. It is also especially useful for students contemplating medical school, since it allows them to study the history of medicine, biology, and allied sciences in conjunction with fulfilling the premed science requirements.

Gateway Course (one course): HISTORY 140 World History of Science

Methodological Cluster (three courses): These History courses focus on the history of science and medicine. For 2014-15, these courses are:

		Units
HISTORY 5C	Human Trafficking: Historical, Legal, and Medical Perspectives	3
HISTORY 12	Medicine and Disease in the Ancient World	3
HISTORY 29S	The Animal Other: Humans and Animals in Western History	5
HISTORY 31	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 40	World History of Science	3
HISTORY 40S	Magic and Occult Science in Early Modern Europe	5
HISTORY 41Q	Mad Women: Women and Mental Illness in U.S. History	3
HISTORY 44	History of Women and Gender in Science, Medicine and Engineering	3
HISTORY 46N	Science and Magic in History	4-5
HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad	5
HISTORY 94S	Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
HISTORY 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5
HISTORY 112	Medicine and Disease in the Ancient World	5
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance	3-5
HISTORY 140	World History of Science	5
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering	5
HISTORY 203C	History of Ignorance	5
HISTORY 232F	The Scientific Revolution	5
HISTORY 234	The Enlightenment	3-5
HISTORY 240	The History of Evolution	4-5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 264G	Madness in American Society: The Social History of Mental Illness in the United States	5
HISTORY 278S	The Ethical Challenges of Climate Change	4-5

Geographical Cluster (four courses): Students select four History courses in one geographic area. Examples include: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the three methodological cluster courses. Courses in the history of science, technology, and medicine that have a geographic focus may be used to fulfill this requirement, but cannot be double-counted in the methodological cluster.

Interdisciplinary Cluster (four courses): Students select four courses in scientific disciplines and/or in philosophy of science, anthropology of science, or sociology of science. These courses require faculty adviser pre-approval.

Research Seminar for Majors: HISTORY 209S Research Seminar for Majors fulfills the Writing in the Major requirement.

General Requirements: As with all History majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

History and Law

The History and Law (HL) interdisciplinary track is for students who want to explore the intersections between historical and legal studies.

The HL curriculum focuses on the role of legal institutions, policies, and structures in various societies. HL track majors enroll in at least four History department courses that focus on issues of law in civil societies and four courses that provide a geographic concentration. In addition, students enroll in four courses outside History that provide disciplinary or interdisciplinary perspectives on the role of law in shaping societies and a Research Seminar for Majors.

Gateway Course: There is no gateway course for this track. Instead, students take an extra course in the Methodological cluster.

Methodological Cluster (four courses): Students enroll in at least four History department courses, including courses outside History taught by faculty affiliated with the department, that focus on how law, policies, constitutions, and legal structures affect the development of various societies. *Note:* The Methodological Cluster for this HIP contains one extra course since there is no Gateway course.

For 2014-15, these courses are:

		Units
HISTORY 5C	Human Trafficking: Historical, Legal, and Medical Perspectives	3
HISTORY 50N	Who Killed Jane Stanford?	4
HISTORY 63N	The Feminist Critique: The History and Politics of Gender Equality	3-4
HISTORY 64S	Debtor Nation: 20th Century American Capitalism	5
HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad	5
HISTORY 72S	Family and Law in American History	5
HISTORY 87	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	3
HISTORY 94S	Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History	5
HISTORY 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 201A	The Global Drug Wars	4-5
HISTORY 203C	History of Ignorance	5
HISTORY 204G	War and Society	5
HISTORY 209C	Liberalism and Violence	5
HISTORY 222	Crime and Punishment in Early Modern Europe and Russia	5
HISTORY 234	The Enlightenment	3-5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 250E	Taxing America: From the Puritans to Prop. 13	5

HISTORY 254G	The Causes and Consequences of the American Revolution	5
HISTORY 258	Topics in the History of Sexuality: Sexual Violence in America	4-5
HISTORY 293B	Queer History in Comparative Perspective	4-5
HISTORY 307A	Legal History Workshop	4-5
HISTORY 352B	History of American Law	5

Note: HISTORY 187 The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan is a non-Western lecture that students in the History and Law track can use towards both a Law methodology course and as the non-Western lecture requirement.

Geographical Cluster (four courses): Students select four History courses in one geographic area. These are: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the three methodological courses required above.

Interdisciplinary Cluster (four courses): Students may select from courses offered in the School of Law, School of Education, and others as appropriate. *Note:* Courses in the School of Law and School of Education require the permission of the instructor before undergraduate students can enroll, since these are graduate-level courses.

Research Seminar for Majors: HISTORY 209S Research Seminar for Majors fulfills the Writing in the Major requirement.

General Requirements: Like all history majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

Public History/Public Service

The Public History/Public Service (PH/PS) interdisciplinary history track is designed for students who wish to include in their course of studies the application of historical study in (1) public settings such as museums and heritage sites, national and state parks, public agencies, and private foundations, and (2) public service settings in non-profit organizations, public agencies, and educational institutions.

PH/PS majors enroll in a gateway course on public history and public service and in four History department courses that provide a geographic concentration as well as completing a two-course methodological requirement. In addition, students, in consultation with the PH/PS faculty coordinator, complete four courses from outside the History department drawn from the annual listing of service-learning courses provided by the Haas Center for Public Service; these courses provide interdisciplinary and methodological perspectives on public service. PH/PS majors must also complete an internship through a regularly offered service-learning course or through a summer internship or fellowship.

Gateway Course (one course): HISTORY 201 Introduction to Public History and Public Service, provides grounding in the theory and practice of public service and exposure to the types of public history practiced in venues such as museums, historical sites, parks, and non-profit organizations, including local historical societies.

Geographical Cluster (four courses): Students select four History courses in one geographic area, such as the United States, Europe, Latin America, Asia, Middle East, or Africa. The faculty coordinator must pre-approve all courses in this cluster.

Interdisciplinary Cluster (four courses): Students select four courses from outside the History department drawn from the annual listing of service-learning and theory/practice courses provided by the Haas Center for

Public Service. The faculty coordinator must pre-approve all courses in this cluster.

Methodological Cluster (two courses): Students must enroll in one Sources and Methods seminar course and one additional 200-level History course. The Writing in the Major (WIM) requirement must be completed in a Research Seminar for Majors.

Public Service/Service Learning Internship (one course): Students must engage in at least a one quarter internship through a service learning course or through a full-time public service or public history summer internship or fellowship. This internship must be pre-approved by the faculty coordinator.

Students who complete a paid summer internship in lieu of one for academic credit have two options: they can complete an additional history course, or they can enroll in 3 units of HISTORY 299S Undergraduate Directed Research and Writing with the faculty coordinator of the PH/PS track and write a 20-page research paper related to their internship work. This research paper is in addition to that required for the Research Seminar for Majors.)

The following History service-learning courses are offered in 2014-15:

		Units
HISTORY 5C	Human Trafficking: Historical, Legal, and Medical Perspectives	3
HISTORY 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 201	Introduction to Public History and Public Service	4-5
HISTORY 201A	The Global Drug Wars	4-5
HISTORY 209C	Liberalism and Violence	5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 260	California's Minority-Majority Cities	4-5

If students elect to fulfill the internship requirement through a History Department service-learning course, they must enroll in an additional course in either the geographical cluster or the Interdisciplinary cluster in order to complete the 13 courses required for the major.

Research Seminar for Majors: HISTORY 209S Research Seminar for Majors fulfills Writing in the Major requirement.

General Requirements: As with all history majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or US, one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

History Secondary Teacher's Credential

Applicants for the Single Subject Teaching Credential (Secondary) in the social studies may obtain information regarding this program from the Credential Administrator, School of Education.

Joint Major Program in History and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

History Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 229)m" section of this bulletin for details on Computer Science requirements.

Students majoring in the History and Computer Science joint major program fulfill all of the breadth, focus, and WIM requirements of the standard History major. Students in the JMP are excused from completing one elective course, reducing the required unit count of the History major from 63 to 59 units (i.e., from a minimum of 13 courses to 12 courses). All courses comprising the major must be taken for a letter grade.

For details on the requirements of the History major, see the Bachelor's tab (p. 486) of this section of this bulletin.

Integrative Capstone Experience

One of the highlights of the JMP is an integrative capstone experience, which enables students to work with faculty mentors in the two departments to devise and complete original projects that bring together the different fields. Some students may choose to complete capstone projects under the auspices of HISTORY 209S Research Seminar for Majors which is the required Writing in the Major requirement for all History majors including those in the JMP. Others may choose to complete their capstones under the auspices of other courses in Computer Science or History, or in the context of senior honors projects in one or the other or both departments. In keeping with University policy, units obtained from a capstone course taken within a particular department can be applied to only that department's requirements.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentsservicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in History

Students must declare the minor in History no later than Autumn Quarter of the senior year via Axess. Minor declarations are approved by the Department of History and confirmation is sent via email to the student.

Candidates for the minor in History must complete six courses, at least three of which must have a field or thematic focus. Students completing the minor may choose to concentrate in such fields as African, American, Asian, British, European (medieval, early modern, or modern), Russian and East European history, comparative empires and cultures, or such thematic topics as the history of gender, the family, religion, technology, or revolution. Students may also petition to have a concentration of their own design count toward the minor.

Degree Requirements

All six courses must be of at least 3 units each and must be taken for a letter grade. The student must maintain a grade point average (GPA) in History courses of 2.0 (C) or higher. Two of the six courses must be small-group in format (Stanford Introductory Seminars, Sources and Methods Seminars, departmental colloquia, and research seminars). History courses taken at Stanford overseas campuses may count toward the minor, but at least three of the six courses must be taken from Stanford History faculty.

Advanced Placement credits do not fulfill any minor requirements.

Optional Courses for the Minor

History courses taken at non-Stanford Study Abroad programs may count toward the minor (provided the History Department approves them), but at least three of the six courses must be taken from Stanford History faculty. One course from certain Introduction to the Humanities courses and Thinking Matters courses (those taught by History faculty) may count toward the six-course requirement, but not for the three-course field of concentration. One Undergraduate Directed Research and Writing HISTORY 299S) course may count toward the minor, if taken for 3-5 units and for a letter grade. A maximum of three transfer courses may be used toward the minor.

Coterminal B.A. and M.A. Program in History

The department each year admits a limited number of undergraduates for coterminal B.A. and M.A. degrees in History. Coterminal applications are accepted during Autumn Quarter for admission in Spring Quarter; check with the History office for the application deadline. Applicants are responsible for checking their compliance with University coterminal requirements listed in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin.

Admission

Applicants must meet the same general standards as those seeking admission to the M.A. program; they must submit a written statement of purpose, a transcript, GRE test scores, and three letters of recommendation, at least two of which should be from members of the Department of History faculty. To be competitive, coterminal applicants should have a 3.75 GPA in their undergraduate history major (or equivalent if they are entering without a History major.) The decision on admission rests with the department faculty upon recommendation by the Graduate Admissions Committee. Students must meet all requirements for both degrees. They must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 225 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three courses that fall within a single Ph.D. field.

The application filing deadline is December 2, 2014.

The coterminal B.A. and M.A. program is not declarable on Axess.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Master of Arts in History

University requirements for the M.A. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The department requires the completion of nine courses (totaling not less than 45 units) of graduate work; seven courses of this work must be Department of History courses. Of the seven, one must be a seminar and four must be either graduate colloquia or graduate seminars. Directed reading may be counted for a maximum of 10 units. A candidate whose undergraduate training in history is deemed inadequate must complete nine courses of graduate work in the department. The department does not recognize for credit toward the M.A. degree any work that has not received the grade of 'A' or 'B.'

Terminal M.A. Program

Applicants who do not wish to continue beyond the M.A. degree are admitted to this program at the discretion of the faculty in individual fields (U.S., modern Europe, and so on). Students admitted may not apply to enter the Ph.D. program in History during the course of work for the M.A. degree.

M.A. in Teaching (History)

The department cooperates with the School of Education in offering the Master of Arts in Teaching degree. For the general requirements, see the "School of Education (p.)" section of this bulletin. For certain additional requirements made by the Department of History, contact the department office. Candidates must possess a teaching credential or relevant teaching experience.

Admission

Applicants for admission to graduate work must take the General Test of the Graduate Record Examination. It may be taken at most American colleges and in nearly all foreign countries. For details, see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Students admitted to graduate standing do not automatically become candidates for a graduate degree. With the exception of students in the terminal M.A. program, they are admitted with the expectation that they will be working toward the Ph.D. degree and may become candidates to receive the M.A. degree after completing three quarters of work.

The application filing deadline is December 2, 2014.

Doctor of Philosophy in History

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Students planning to work for the doctorate in history should be familiar with the general degree requirements of the University outlined in the "Graduate Degrees (p. 43)" section of this bulletin. Those interested in applying for admission to the M.A. and Ph.D. programs should contact the graduate program coordinator in the History department. Online applications are available in September of the year prior to intended enrollment. The application filing deadline is December 2, 2014. Applicants must file a report of their general scores on the Graduate Record Examination and submit a writing sample of 10-25 pages on a historical

topic. Successful applicants for the M.A. and Ph.D. programs may enter only in Autumn Quarter.

Upon enrollment in the graduate program in History, the student has a member of the department designated as an adviser with whom to plan the Ph.D. program. Much of the first two years of graduate study is spent taking courses, and, from the outset, the student should be aware that the ultimate objective is not merely the completion of courses but preparation for general examinations and for writing a dissertation.

Admission to the Department of History in the graduate division does not establish any rights respecting candidacy for an advanced degree. At the end of the first year of graduate study, students are evaluated by the faculty and given a progress report. A decision as to whether the student is admitted to candidacy for the Ph.D. is normally made by the start of the student's third year.

After the completion of certain further requirements, students must apply for acceptance for candidacy for the doctorate in the graduate division of the University.

Admission

Applicants for admission to graduate work must take the General Test of the Graduate Record Examination. It may be taken at most American colleges and in nearly all foreign countries. For details, see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Students admitted to graduate standing do not automatically become candidates for a graduate degree. With the exception of students in the terminal M.A. program, they are admitted with the expectation that they will be working toward the Ph.D. degree and may become candidates to receive the M.A. degree after completing three quarters of work.

The application filing deadline is December 2, 2014.

Degree Requirements Required Courses

	Units
For all first-year Ph.D. students	
HISTORY 304 Approaches to History	5
HISTORY 305 Graduate Pedagogy Workshop	1
For first-year and second-year Ph.D. students in American History	
HISTORY 351A	
HISTORY 351B Core in American History, Part II	4-5
HISTORY 351C Core in American History, Part III	4-5
HISTORY 351D Core in American History, Part IV	4-5
HISTORY 351E Core in American History, Part V	4-5
HISTORY 351F Core in American History, Part VI	4-5

Other Graduate Core Colloquia required for Ph.D. students studying in fields other than the above are listed in the Department of History's Graduate Handbook.

University Oral Examinations

The student is expected to take the University oral examination in the major concentration in the third graduate year.

Dissertation

The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

Dissertation Committee

The reading committee consists of the principal dissertation adviser (first reader), and two additional members of the Department (second and third readers) agreed upon by the adviser and the student.

Financial Support

Students who are admitted with financial support are provided multiple years of support through fellowships, teaching and research assistantships, and tuition grants. Applicants should indicate on the admissions application whether they wish to be considered for such support. No separate application for financial aid is required.

U.S. citizens and permanent resident aliens who are interested in area language studies in East Asia, Africa, and the republics of the former Soviet Union may request a Foreign Language and Area Studies (FLAS) fellowship application from the FLAS coordinator of the respective programs offering the FLAS (CEAS, CAS, CREEES). The FLAS application deadlines are in January and February (CAS).

Resources

The degree requirements section relates to formal requirements, but the success of a student's graduate program depends in large part on the quality of the guidance received from faculty and on the library resources available. Prospective graduate applicants are advised to study the list of History faculty and the courses this faculty offers. As to library resources, no detailed statement is possible in this bulletin, but areas in which library resources are unusually strong are described following.

The University Library maintains strong general collections in almost all fields of history. It has a very large microtext collection, including, for instance, all items listed in Charles Evans' *American Bibliography*, and in the Short-Title Catalogues of English publications, 1474-1700, and virtually complete microfilmed documents of the Department of State to 1906. It also has a number of valuable special collections including the Borel Collection on the History of California; many rare items on early American and early modern European history; the Brasch Collection on Sir Isaac Newton and scientific thought during his time; the Gimon Collection on French political economy, and other such materials.

The rich collection of the Hoover Institution on the causes, conduct, and results of WW I and WW II are being augmented for the post-1945 period. The materials include government documents, newspaper and serial files, and organization and party publications (especially the British and German Socialist parties). There are also important manuscript collections, including unpublished records of the Paris Peace Conference of 1919 and the Herbert Hoover archives, which contain the records of the Commission for Relief in Belgium, the American Relief Administration, the various technical commissions established at the close of WW I for reconstruction in Central and Eastern Europe, the personal papers of Herbert Hoover as United States Food Administrator, and other important personal papers. Other materials for the period since 1914 relate to revolutions and political ideologies of international importance; colonial and minority problems; propaganda and public opinion; military occupation; peace plans and movements; international relations; international organizations and administration including the publications of the United Nations, as well as principal international conferences. The Hoover Institution also possesses some of the richest collections available anywhere on the British labor movement; Eastern Europe, including the Soviet Union; East Asia (runs of important newspapers and serials and extensive documentary collections, especially for the period of WW II); and Africa since 1860, especially French-speaking Africa, the former British colonies, and South Africa.

Requirements

1. In consultation with the adviser, students select an area of study from the list below in which to concentrate their study and later take the University oral examination. The major concentrations are:

- Europe, 300-1500
- Europe, 1400-1800
- Europe since 1700
- Jewish History
- Russia
- Eastern Europe
- Middle East and Central Asia
- South Asia
- East Asia before 1600
- China since 1600
- Japan since 1600
- Korea since 1800
- Africa
- Britain and the British Empire since 1460
- Latin America
- The United States (including colonial America)
- The History of Science and Medicine
- Transnational, International, and Global

2. The department seeks to provide a core colloquium in every major concentration. Students normally enroll in this colloquium during the first year of graduate study.
3. Students are required to take two research seminars, at least one in the major concentration. Normally, research seminars are taken in the first and second years.
4. Each student, in consultation with the adviser, defines a secondary concentration. This concentration should represent a total of four graduate courses or their equivalents, and it may be fulfilled by working in a historical concentration or an interdisciplinary concentration. The historical concentrations include:
 - a. One of the concentrations listed above (other than the student's major concentration).
 - b. One of the concentrations listed below, which falls largely outside the student's major concentration:
 - The Ancient Greek World
 - The Roman World
 - Europe, 300-1000
 - Europe, 1000-1400
 - Europe, 1400-1600
 - Europe, 1600-1789
 - Europe, 1700-1871
 - Europe since 1848
 - England, 450-1460
 - Britain and the British Empire, 1460-1714
 - Britain and the British Empire since 1714
 - Russia to 1800
 - Russia since 1800
 - Eastern Europe to 1800
 - Eastern Europe since 1800
 - Jewish History
 - Middle East and Central Asia to 1800
 - Middle East and Central Asia since 1800
 - Africa
 - South Asia
 - China before 1600
 - China since 1600
 - Japan before 1600
 - Japan since 1600
 - Latin America to 1825

- Latin America since 1810
 - The United States (including Colonial America) to 1865
 - The United States since 1850
 - The History of Science and Medicine
 - Transnational, International, and Global
- c. Work in a national history of sufficiently long time to span chronologically two or more major concentrations. For example, a student with Europe since 1700 as a major concentration may take France from 1000 to the present as a secondary concentration.
 - d. A comparative study of a substantial subject across countries or periods. The secondary concentration requirement may also be satisfied in an interdisciplinary concentration. Students plan these concentrations in consultation with their advisers. Interconcentrations require course work outside the Department of History which is related to the student's training as a historian. Interdisciplinary course work can either add to a student's technical competence or broaden his or her approach to the problems of the research concentration.
5. Each student, before conferral of the Ph.D., is required to satisfy the department's teaching requirement.
 6. There is no University or department foreign language requirement for the Ph.D. degree. A reading knowledge of one or more foreign languages is required in concentrations where appropriate. The faculty in the major concentration prescribes the necessary languages. In no concentration is a student required to take examinations in more than two foreign languages. Certification of competence in commonly taught languages (that is, French, German, Italian, Portuguese, Russian, and Spanish) for candidates seeking to fulfill the language requirement in this fashion is done by the appropriate language department of the University. Certification of competence in other languages is determined in a manner decided on by faculty in the major concentration. In either case, certification of language competence must be accomplished before a student takes the University oral examination.
 7. The student is expected to take the University oral examination in the major concentration in the third graduate year.
 8. The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

Ph.D. in History and Humanities

The department of History participated in the Graduate Program in Humanities leading to a Ph.D. degree in History and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact DLCL Student Affairs at 650-724-1333 or dcl@stanford.edu for further information. Courses are listed under the subject code HUMNTIES (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HUMNTIES&filter-catalognumber-HUMNTIES=on>) and may be viewed on the Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HUMNTIES&filter-catalognumber-HUMNTIES=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HUMNTIES&filter-catalognumber-HUMNTIES=on>).

Ph.D. Minor in History

Students pursuing a Ph.D. other than in History may apply for the Ph.D. Minor in History. Ph.D. students cannot pursue a minor in their own program. The minimum University requirement for a Ph.D. minor is 20 units of History course work at the graduate level (courses numbered 300 and above) at Stanford. All units should be in a single field. Units taken for the minor can be counted as part of the overall requirement for the Ph.D. of 135 units taken at Stanford. Courses used for a minor may not be used to meet the requirements for a master's degree.

Degree Requirements

20 units of History course work at the graduate level (HISTORY 300-399W and 400-499X) at Stanford. All units should be in a single field.

Optional Courses for the Minor

A Ph.D. minor form outlining the program of study must be approved by the major and minor departments.

Emeriti: (Professors) Barton J. Bernstein, Carl N. Degler, Peter Duus, Terence Emmons, Harold L. Kahn, David M. Kennedy, George H. Knoles, Carolyn Lougee Chappell, Mark Mancall, Peter Paret, Paul A. Robinson, Paul Seaver, James J. Sheehan, Peter Stansky, David B. Tyack, Lyman P. Van Slyke; (Senior Lecturer) Joseph J. Corn

Chair: Paula Findlen

Professors: Keith M. Baker, Joel Beinin, Albert Camarillo, James T. Campbell, Clayborne Carson, Gordon Chang, Paula Findlen, Estelle Freedman, Stephen Haber, David Holloway, Nancy S. Kollmann, Mark E. Lewis, Norman M. Naimark, Robert Proctor, Jack N. Rakove, Richard L. Roberts, Aron Rodrigue, Richard P. Saller, Walter Scheidel, Londa Schiebinger, Richard White, Kären E. Wigen, Caroline Winterer, Steven J. Zipperstein

Associate Professors: David R. Como, Robert Crews, James P. Daughton, Zephyr Frank, Yumi Moon, Thomas S. Mullaney, Jessica Riskin, Priya Satia, Matthew H. Sommer, Laura Stokes, Jun Uchida, Amir Weiner

Assistant Professors: Jennifer Burns, Allyson V. Hobbs, Aishwary Kumar, Ana Raquel Minian, Edith Sheffer, Mikael D. Wolfe, Ali Yaycioglu

Courtesy Professors: Giovanna Ceserani, Daniel Edelstein, Lawrence Friedman, Leah Gordon, Avner Greif, Amalia Kessler, David F. Labaree, Kathryn Gin Lum, Reviel Netz, Sam Wineburg, Gavin Wright

Senior Lecturers: Katherine Jolluck, Martin W. Lewis

Acting Assistant Professor: Justin duRivage, Jill Rosenthal

Lecturers: Anne Austin, Frederic Clark, Margo Horn, Carol McKibben

Overseas Studies Courses in History

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 40	Australian Studies	3
OSPBELJ 67	China-Africa and Middle East Relations	4
OSPBBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 58	Racism, Colonialism and Genocide	3-5
OSPFLOR 25	Italian Food: A Cultural History	5
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution	5
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 75	Florence in the Renaissance: Family, Youth and Marriage in the Fourteenth and Fifteenth Centuries	5
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPISTAN 61	State and Society in the Middle East	4
OSPISTAN 64	Travels in the Ottoman History with Evliya Çelebi	4
OSPISTAN 67	Istanbul, the Fabric of its "Cities"	4
OSPISTAN 68	Istanbul: Space, Memory, and Protest	5
OSPMADRD 25	Politics of "Culture/s" in the Iberian's World: the Multicultural Debate	4
OSPMADRD 62	Spanish California: Historical Issues	4
OSPOXFRD 89	Archaeology: Independent Study	5
OSPOXFRD 221Y	Art and Society in Britain	4-5
OSPPARIS 26	France: Present and Future	2
OSPPARIS 27	Paris and Politics	5
OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5

Human Biology

Courses offered by the Program in Human Biology are listed under the subject code HUMBIO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HUMBIO&filter-catalognumber-HUMBIO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HUMBIO&filter-catalognumber-HUMBIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HUMBIO&filter-catalognumber-HUMBIO=on>).

The program offers a Bachelor of Arts in Human Biology (<http://www.stanford.edu/dept/registrar/bulletin/5917.htm>), as well as a minor and an honors program.

Mission of the Undergraduate Program in Human Biology

The mission of the undergraduate program in Human Biology is to provide students with an interdisciplinary approach to understanding human beings

from biological, behavioral, social, and cultural perspectives. Courses in the major allow students to see connections and parallels with other fields as they learn to formulate and evaluate health, environmental, and other public policy issues that influence human welfare. The program prepares majors to pursue advanced training in professional or graduate programs.

To achieve these goals, all students complete a 30-unit core sequence, normally in the sophomore year, which provides the foundation for the major. Also during the sophomore year, students consult with student advisers to choose a faculty adviser and complete the declaration process. Together they plan a road map of course work designed to help each student focus on an area of interest within Human Biology. Early planning and subsequent refining of an individualized course of study, in consultation with student and faculty advisers, is a strength and requirement of the program. The curriculum draws on faculty from across the University. To complete a B.A. in Human Biology, students must take courses from within the program and from other University departments. Most Human Biology majors go on to advanced training in professional schools, or graduate programs in the behavioral, natural, and social sciences, including coterminal master's degree programs in other University departments. Additional information about the major may be obtained from the program's offices or at the Program in Human Biology (<http://humbio.stanford.edu>) web site.

Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Human Biology. Students are expected to demonstrate:

1. ability to acquire and synthesize scientific information from a variety of sources.
2. ability to apply analytical tools to evaluate policy.
3. ability to interpret knowledge in meaningful and appropriate ways as they draw conclusions about the significance of their findings.
4. ability to communicate their scientific ideas clearly and persuasively.

Student Advisers

Human Biology has an advising program comprising faculty and student advisers. Before declaring Human Biology as the undergraduate major, each student must meet with one of six student advisers who assist in developing a coherent study plan based on an individualized area of concentration, and the selection of foundation, concentration, and upper-division courses. The student advisers also assist students in selecting an appropriate faculty adviser and a suitable internship for their area of concentration and career goals. Student advisers offer drop-in services during scheduled office hours every weekday and some evenings. The student advisers also sponsor events including the Internship Faire, Beyond HumBio, and declaration workshops. To maintain high standards of advising that respond to the needs of individual students, student advisers meet weekly with the program's faculty advising chairs and the student services coordinator to review the program's policies and specific student inquiries and petitions concerning the program.

Storey House

Storey House, 544 Lasuen Mall, is an undergraduate resident theme house for Human Biology, devoted to developing an intellectual community among Human Biology majors at Stanford, and allowing faculty and students to become acquainted and share their Human Biology interests and research. Its goals are to foster intellectual discussion in the residential lives of the students living in Storey House, mentoring relationships between upperclassmen and core students in the house, and stimulating events

for all Human Biology majors facilitated by academic theme associates. Assignment is made through the regular undergraduate housing draw.

Bachelor of Arts in Human Biology

Declaring the Major

A prospective major must consult with the student and faculty advisers to obtain detailed information about the program and guidance in the development of an individual course of study.

At the time the major is declared, the student must submit a written statement (3-5 pages) of academic and long-term goals and the proposed list of courses satisfying the requirements for the major. The proposal is then reviewed by the student advisers who help identify an appropriate faculty adviser. Final approval of the proposed course of study rests with the faculty adviser.

It is important to declare early, preferably in early spring as soon as students have passed both Autumn and Winter Quarter core courses (HUMBIO 2A Genetics, Evolution, and Ecology, HUMBIO 2B Culture, Evolution, and Society, HUMBIO 3A Cell and Developmental Biology, HUMBIO 3B Behavior, Health, and Development). The University requires students to declare a major by the end of Spring Quarter of the sophomore year. Under special circumstances students may declare as late as Autumn Quarter of the junior year. Petitions to declare late require additional documentation and are less likely to be approved.

Students who plan to pursue graduate work should be aware of the admission requirements of the schools to which they intend to apply. Early planning is advisable to guarantee completion of major and graduate school requirements.

Degree Requirements

The B.A. in Human Biology (HUMBIO) requires a minimum of 87 units in the major divided among four levels of courses:

1. Fundamental Program: at least 38 units, to include
 - a. Human Biology Core (30 units); see "Human Biology Core" below for more information. The Human Biology Core refers to:

		Units
HUMBIO 2A	Genetics, Evolution, and Ecology	5
HUMBIO 2B	Culture, Evolution, and Society	5
HUMBIO 3A	Cell and Developmental Biology	5
HUMBIO 3B	Behavior, Health, and Development	5
HUMBIO 4A	The Human Organism	5
HUMBIO 4B	Environmental and Health Policy Analysis	5

- b. Statistics (3-5 units). The core and statistics courses must be taken for a letter grade by majors. The minimum grade requirement is "C-". (*Note:* Students who are not declared before Monday, September 21, 2015, may not use STATS 60 to fulfill the statistics requirement.) Statistics may be chosen from courses such as:

		Units
BIO 141	Biostatistics	3-5
CS 109	Introduction to Probability for Computer Scientists	3-5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
EDUC 200C	Introduction to Statistical Methods in Education	3-4
HUMBIO 85A	Essential Statistics for Human Biology	4
HUMBIO 88	Introduction to Statistics for the Health Sciences	3

HUMBIO 89	Statistics in the Health Sciences	3
SOC 181B	Sociological Methods: Statistics	5

- c. Internship: HUMBIO 197 Human Biology Internship, 4 units, a mentored non-classroom project, is graded satisfactory/no credit only.
 2. Foundation Courses: 20-unit minimum. Total units vary, depending on the focus of study chosen by the student for the area of concentration. They may include introductory-level courses from across the University and lab courses. The minimum grade requirement for foundation courses is 'C-.'
 3. Area of Concentration: a minimum of five courses totaling at least 20 units. This in-depth area of study enables the student to focus on educational and post-baccalaureate goals. Courses are non-introductory, theory-based, and are usually numbered over 100. Three or more departments must be represented in the concentration. Each course must be taken for a minimum of 3 units. The area of concentration is individually designed by the student in consultation with the student advisers and faculty adviser. Final approval of the concentration rests with the student advisers and faculty adviser. All area of concentration courses must be taken for a letter grade. The minimum grade requirement for area of concentration courses is 'C-'. The area of concentration generally has an emphasis in one, and sometimes more than one, of the following eight areas:

Area 1: Environment and Environmental Policy

- Environment
- Environmental Policy
- Culture/Demography/Human Ecology

Area 2: Health and Health Policy

- Health Policy
- Public Health
- International Health

Area 3: Human Performance

Area 4: Human Development

- Biological Development
- Psychological Development
- Education

Area 5: Biomedical Science

- Genetics
- Molecular Biology
- Human Physiology
- Infectious Diseases

Area 6: Brain and Behavior

Area 7: Ethics and Medical Humanities

Area 8: Evolution

A non-exclusive list of possible courses for each emphasis is available at the student advisers' office or at the Area of Concentration Course List (<https://humbio.stanford.edu/courses/aoc>) web site.

4. Upper-Division Courses: students must take three Human Biology upper-division courses numbered 100 to 189. These courses should be used to explore subjects outside the area of concentration. One upper-division course may be taken satisfactory/no credit. Each course must be taken for a minimum of 3 units. Minimum grade requirement for Upper Division courses is "C-". All non-laboratory advanced HUMBIO courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement. A list of Human Biology overseas courses can be found at the Related Courses (<http://www.stanford.edu/dept/humbio/cgi-bin/?q=node/1382>) web site.

Human Biology Core

Required core sequences (HUMBIO 2A Genetics, Evolution, and Ecology, HUMBIO 2B Culture, Evolution, and Society, HUMBIO 3A Cell and Developmental Biology, HUMBIO 3B Behavior, Health, and Development, and HUMBIO 4A The Human Organism, HUMBIO 4B Environmental and Health Policy Analysis) introduce the biological and social sciences, and most importantly, relationships between the two. Classes meet throughout the academic year. Students must register concurrently for the A and B series. Students should initiate the core in Autumn Quarter of the sophomore year. Freshmen are not permitted to enroll. Majors must earn a minimum letter grade of 'C-' in core courses. The Human Biology core consists of the following courses:

		Units
HUMBIO 2A	Genetics, Evolution, and Ecology	5
HUMBIO 2B	Culture, Evolution, and Society	5
HUMBIO 3A	Cell and Developmental Biology	5
HUMBIO 3B	Behavior, Health, and Development	5
HUMBIO 4A	The Human Organism	5
HUMBIO 4B	Environmental and Health Policy Analysis	5

Honors Program

The honors program in Human Biology provides qualified majors the opportunity to work closely with faculty on an individual research project, culminating in an honors thesis. Students may begin honors research from a number of starting points including topics introduced in the core or upper-division courses; independent interests stemming from an internship experience; or collaborating with faculty from the natural, social, or behavioral sciences.

Students may apply to the honors program if they have completed the Human Biology core with a minimum GPA of 3.0, have an overall Stanford GPA of 3.2, and meet other requirements detailed in the honors handbook. Interested students should consult the Human Biology Honors Handbook (<https://humbio.stanford.edu/node/152>) and meet with the Human Biology Associate Director or student services officer.

Most honors projects involve a total of 10-15 units of course work in HUMBIO 193 and 194:

		Units
HUMBIO 193	Research in Human Biology	1-5
HUMBIO 194	Honors	1-10

Admission to the honors program is by submission of an intention to undertake honors research in early February, followed by the application in early March of the junior year. Students planning to undertake honors begin research or preparation as early as completion of the sophomore year.

The honors thesis is normally completed by the middle of Spring Quarter of the senior year. Honors students then present summaries of their research at the Human Biology Honors Poster Symposium in May.

Human Biology also holds a Summer Honors College just prior to Autumn Quarter each year for students who have applied to the honors program. Students apply to Summer Honors College in April of the junior year. For applications, contact the program office.

Minor in Human Biology

A minor in Human Biology provides an introductory background to the relationship between the biological and social aspects of humanity's origin, development, and prospects. Many of the major problems facing human civilization today involve both biological and social aspects. Scientific approaches to these problems are essential, but they must be broadly conceived, integrating what is known of the biological with

an understanding of the social and cultural setting in which they exist. Students with a minor in Human Biology are expected to develop a strong background in the integration between the biological and social aspects of human beings.

Students declaring a minor in Human Biology must do so no later than two quarters prior to their intended quarter of degree conferral (for example, a student must declare a minor before the end of Autumn Quarter to graduate the following Spring Quarter).

To minor in Human Biology, students must take the Human Biology Core:

- HUMBIO 2A Genetics, Evolution, and Ecology
- HUMBIO 2B Culture, Evolution, and Society
- HUMBIO 3A Cell and Developmental Biology
- HUMBIO 3B Behavior, Health, and Development
- HUMBIO 4A The Human Organism
- HUMBIO 4B Environmental and Health Policy Analysis
- and one additional upper-division course (for example, any HUMBIO course numbered 100-189).

The student must earn a minimum letter grade of 'C-'. Courses that count towards the fulfillment of major requirements may not be counted towards the minor.

Emeriti: (Professors) Doug Brutlag (Biochemistry), Carl Djerassi (Chemistry), Sanford Dornbusch (Sociology), Stanley Falkow (Microbiology/Immunology), A. Dale Kaiser (Biochemistry), Herant Katchadourian (Human Biology), Donald Kennedy (Biology), Ellen FitzSimmons Porzig (Developmental Biology), Carol Winograd (Medicine)

Director: Paul Fisher (Neurology)

Associate Director: Katherine Preston

Professors: Laurence Baker (Health Research and Policy), Ben Barres (Neurobiology), Donna Bouley (Comparative Medicine), Martha Cyert (Biology), William H. Durham (Anthropology), Heidi Feldman (Pediatrics: Neonatology), Dean Felsher (Medicine: Oncology), Russell D. Fernald (Biology), Paul Fisher (Neurology), Margaret Fuller (Developmental Biology), Garry Gold (Diagnostic Radiology), Lawrence H. Goulder (Economics), James J. Gross (Psychology), H. Craig Heller (Biology), Jill Helms (Surgery), Paula Hillard (Obstetrics and Gynecology), Patricia P. Jones (Biology), Richard Klein (Anthropology), Joseph S. Lipsick (Pathology), Tanya Luhrmann (Anthropology), Sean Mackey (Anesthesia), Yvonne Maldonado (Pediatrics: Infectious Diseases), Michael Marmor (Ophthalmology), Gordon Matheson (Orthopaedic Surgery), Jose Montoya (Infectious Diseases), Rosamond Naylor (Environmental Earth System Science), Robert Negrin (Medicine: Blood and Marrow Transplantation), Roeland Nusse (Developmental Biology), Julie Parsonnet (Medicine: Infectious Diseases), Allan Reiss (Interdisciplinary Brain Science Research), Thomas Robinson (Pediatrics), Robert Sapolsky (Biology), Walter Scheidel (Classics), Kenneth Schultz (Political Science), Matthew Scott (Developmental Biology), Randall Stafford (Stanford Prevention Research Center), William Talbot (Developmental Biology), Lucy Tompkins (Infectious Diseases), Shripad Tuljapurkar (Biology), Anthony Wagner (Psychology), Jeffrey Wine (Psychology), Paul Wise (Pediatrics), Arthur P. Wolf (Anthropological Sciences)

Associate Professors: Jayanta Bhattacharya (Medicine/PCOR), M. Kate Bundorf (Health Research and Policy), Firdaus Dhabhar (Psychiatry and Behavioral Sciences), Anne Fernald (Psychology), Brenda Golianu (Anesthesia), Joachim Hallmayer (Psychiatry and Behavioral Sciences - Child and Adolescent Psychiatry and Child Development), James Jones (Anthropology), Peter Kao (Med/Pulmonary and Critical Care Medicine), Brian Knutson (Psychology), Norman G. Miller (Medicine/PCOR), Denise Monack (Microbiology and Immunology), Rob Reich (Political Science), John Rick (Anthropology), Matthew Smith (German)

Assistant Professors: Sanjay Basu (Medicine: Stanford Prevention Research Center), Eran Bendavid (General Internal Medicine), Jeremy Goldhaber-

Fiebert (Medicine/PCOR), Samuel McClure (Psychology), Michelle Monje-Deisseroth (Neurology), Jelena Obradovic (Education), Jamie Zeitzer (Psychiatry and Behavioral Sciences)

Professor (Research): Christopher Gardner (Stanford Prevention Research Center), David Lyons (Psychiatry and Behavioral Sciences), Marcia Stefanick (Stanford Prevention Research Center)

Assistant Professors (Research): Karen Parker (Psychiatry and Behavioral Sciences)

Professors (Teaching): Donald Barr (Pediatrics), David Magnus (Pediatrics/SCBE), Robert Siegel (Microbiology and Immunology)

Associate Professors (Teaching): Catherine Heaney (Psychology), Lianne Kurina (Med/General Internal Medicine), Eunice Rodriguez (Pediatrics), Kristin Sainani (Health Research and Policy – Epidemiology)

Clinical Associate Professors: Mary Therese Jacobson (Obstetrics and Gynecology), Daryn Reicherter (Psychiatry and Behavioral Sciences), Katherine Williams (Psychiatry and Behavioral Sciences)

Clinical Assistant Professors: Cynthia Nguyen (Psychiatry and Behavioral Sciences), Rita Popat (Health Research and Policy, Epidemiology)

Senior Research Scholar: Wesley F. Alles (Med/HIP/BeWell)

Other Teaching Faculty and Staff: William Abrams, Maya Adam (Pediatrics - Infectious Diseases), Aaron Bernstein, Judy Chu, Sophia Colamarino (Psychiatry and Behavioral Sciences), Anne Firth-Murray, Anne Friedlander, Ronald Garcia (Center for Excellence), Renu Heller (Biology), Lisa Medoff, Joe Nation (Public Policy), Katherine Preston, Lisa Goldman Rosas (Medicine: Stanford Prevention Research Center), Annette Salmeen, Darwin Scott Smith (Microbiology and Immunology), Jennifer Wolf (Education), Nathan Wolfe, Lawrence Zaroff (Anesthesia and Biomedical Ethics)

Course Associates: Anne Marie Barber, Hanna Burch, Talon Clayton, Olivia Jew, Sabrina Layne, Ali Maggioncalda, Ruth Marks, Rachel Pedreira

Honors Chair: Katherine Preston

Overseas Studies Courses in Human Biology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
OSPCPTWN 56	HIV Policy Issues and Models	3
OSPFLOR 84	Life in the Balance: Knowing how nutrient intake can match energy expenditure	4
OSPFLOR 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era	4
OSPFLOR 86	Stem Cells in Human Development and Regenerative Medicine	4-5

OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPMADRD 73	The Neuroscience of Language Learning	3
OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time	5

Iberian and Latin American Cultures

Courses offered by the Department of Iberian and Latin American Cultures, formerly the Department of Spanish and Portuguese, are listed under the subject code ILAC on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ILAC&filter-catalognumber-ILAC=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ILAC&filter-catalognumber-ILAC=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ILAC&filter-catalognumber-ILAC=on>). For courses in Catalan, Portuguese, and Spanish language instruction with the subject codes CATLANG, PORTLANG and SPANLANG, see the "Language Center (<http://www.stanford.edu/dept/registrar/bulletin/5966.htm>)" section of this bulletin.

The Language Center offers a series of second- and third-year courses designed for students who grew up in homes where Spanish is spoken (heritage speakers) and who wish to develop their existing linguistic strengths. See the "Language Center (<http://www.stanford.edu/dept/registrar/bulletin/5966.htm>)" section of this bulletin.

The department is a part of the Division of Literatures, Cultures, and Languages (p. 411).

Mission of the Undergraduate Program in Iberian and Latin American Cultures

Studying Iberian and Latin American cultures at Stanford means engaging in a deep and compelling exploration of the languages, literatures, and cultures of the Iberian Peninsula, Latin America (including Brazil), and Latina/o populations of the United States. To achieve our goal of training students as experts in these areas, we balance an emphasis on literary studies with philosophical, historical, and social approaches to cultural issues. As a result of our focus on critical thinking, open discussion, and close textual analysis, our undergraduate majors provide excellent preparation for a large number of professional fields, including business, education, international relations, law, and medicine. Our graduate program provides rigorous and highly individualized advanced training in the analysis of Iberian, Latin American (including Brazil), and Latina/o literatures, and our students go on to produce innovative original research and find excellent jobs, both in academe and beyond.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in Catalan, Portuguese, and/or Spanish beyond the interpersonal level with presentational language abilities;

- close reading skills of authentic texts in Catalan Portuguese, and/or Spanish;
- writing proficiency in Catalan, Portuguese, and/or Spanish beyond the interpersonal level with presentational language abilities.

Bachelor of Arts in Iberian and Latin American Cultures

In this major, students engage in a thoroughly transnational and cross-linguistic study of Iberian and Latin American (including Brazil) literatures and cultures. Courses emphasize critical thinking and close textual analysis, with an emphasis on the deep and often understudied intersections between literature written in Catalan, Portuguese, and Spanish from the medieval period to the present day.

Bachelor of Arts in Spanish

This undergraduate program is designed for students who want to move towards fluency in reading, listening, speaking, and writing Spanish while developing a contextualized understanding of the language through linguistic and cultural study. This degree emphasizes critical use of the Spanish language in a global perspective.

Learning Outcomes (Graduate)

The purpose of the terminal M.A. program in Iberian and Latin American Cultures is for students to develop further the knowledge and skills acquired as undergraduates, and to prepare students for a professional career or doctoral studies. This is achieved through the completion of graduate courses in the student's major area of interest as well as in related areas.

The Ph.D. in Iberian and Latin American Cultures is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis with respect to the areas and traditions taught by the department. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to develop innovative research and to present the results of this research to the world in compelling ways.

Other Programs

Coterminal B.A. and M.A.

The coterminal degree program allows undergraduates to study for a master's degree in Iberian and Latin American Cultures while completing their bachelor's degree(s) in ILAC or a different department. The course requirements for the coterminal B.A. and M.A. are the same as those outlined for the terminal M.A., and students should be aware that university policy prevents one course from counting for both the B.A. and M.A. degrees. University requirements for the coterminal B.A. and M.A. (along with application procedures) are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

Bachelor of Arts in Iberian and Latin American Cultures

This program is designed for students who wish to engage in a transitional and cross-linguistic study of Iberian and Latin American literatures and cultures. Courses emphasize critical thinking and close textual analysis, with an emphasis on the deep and often understudied intersections between literature written in Catalan, Portuguese, and Spanish from the medieval period to the present day. B.A. Iberian and Latin American Cultures appears on the official transcript and on the diploma. The major in Iberian and Latin American Cultures required 60 units of coursework. Courses cannot be duplicated for two degrees. All courses must be taken for a letter grade.

Prerequisites

For all ILAC courses taught in Spanish, students must have successfully completed SPANLANG 102 Composition and Writing Workshop or successfully tested above this level through the Language Center. One course above 100 and one core course, or consent of the instructor, are prerequisites for 200-level courses.

Declaring the Major

Students declare the major in Iberian and Latin American Cultures through ACESS. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study. Majors are also urged to attend department events such as public talks and conferences.

Double Majors

The major in ILAC is designed to combine with a second major in another field and with study abroad. Students should be aware, however, that university policy prevents one course from counting for both degree programs.

General Course Requirements

Students must complete a total of 60 units for the major. The first four requirements listed below are considered core requirements and must be taken at Stanford University.

- ILAC 120 Advanced Critical Reading in Spanish, Writing in the Major (WIM): 5 units are required, and this is a prerequisite for every course in the major; however, concurrent enrollment is allowed.

- Core courses in literature. All three courses must be completed

		Units
ILAC 136	Modern Iberian Literatures	3-5
ILAC 157	Medieval and Early Modern Iberian Literatures	3-5
ILAC 161	Modern Latin American Literature	3-5

- Core courses in culture, history, and civilization. Choose at least one.

		Units
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5

- Senior Seminar. Students must take one of the following:
- ILAC 278 Senior Seminar: Monsters of Modern Spanish Empire 3-5
- ILAC 278A Senior Seminar: Pau-Brazil from Modernism to Concretism 5

- Elective Courses. Elective courses can be taken within the following parameters:

- Up to 15 units of language courses (not including conversational courses) in Spanish, Portuguese, or Catalan.
- Additional 100- or 200- level ILAC literature courses.
- Up to 15 units of pre-approved coursework from Stanford Study Abroad programs in Barcelona, Madrid, or Santiago.
- Up to 5 units of pre-approved coursework from outside ILAC
- Up to 10 units of Thinking Matters courses taught at least partially by an ILAC faculty member
- Up to 10 units of coursework in Structured Liberal Education (SLE).

6. In addition to course requirements for the major, students must also take an Oral Proficiency Interview (OPI) in Catalan, Portuguese, or Spanish through the Language Center two quarters prior to degree conferral.

Bachelor of Arts in Spanish

This program is designed for students who want to move towards fluency in reading, listening, speaking, and writing Spanish while developing a contextualized understanding of the language through linguistic and cultural study. This degree emphasizes critical use of the language in a global perspective. "B.A. Spanish" appears on the official transcript and on the diploma. The major in Spanish requires 60 units of coursework. All coursework must be done in Spanish. If a class is taught in a language other than Spanish, then written work (e.g. final papers) must be completed in Spanish. Courses cannot be duplicated for two degrees. All courses must be taken for a letter grade.

Prerequisites

Students must be at or above the level of SPANLANG 13 or successfully tested above this level through the Language Center.

Declaring the Major

Students declare the major in Spanish through Axess. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study. Majors are also urged to attend department events such as public talks and conferences.

Double Majors

The Spanish major is designed to combine with a second major in another field and with study abroad. Students should be aware, however, that university policy prevents one course from counting for both degree programs.

General Course Requirements

Students must complete a total of 60 units for the major. The first five requirements listed below are core requirements and must be taken at Stanford University.

1. ILAC 120 Advanced Critical Reading in Spanish, Writing in the Major (WIM). 5 units are required. This is a prerequisite for every course in the major; however, concurrent enrollment is allowed.
2. Core courses in culture, history, and civilization. Choose at least one.

		Units
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5

3. Senior Seminar

		Units
ILAC 277	Spanish and Society: Rock en Español	3-5

4. Elective Courses. Elective courses can be taken within the following parameters:

- Additional 100- or 200-level ILAC courses
- Up to 15 units of pre-approved coursework from Stanford study abroad programs in Barcelona, Madrid, or Santiago.
- Up to 5 units of pre-approved coursework from outside ILAC

5. In addition to the course requirements listed above, all majors must test their proficiency in Spanish through the Language Center by winter quarter of their senior year. Students must receive a notation of at least "Advanced Mid" to be deemed adequately proficient. Those needing outside tutoring

will be advised to do so (resources available through the CTL and ILAC). The proficiency examination will consist of both an oral interview and a writing proficiency test.

Honors Program

ILAC majors and Spanish majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

- Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
- Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course will focus on researching and writing the honors thesis.
- Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
- Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
- Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

Minors in Spanish and Portuguese

Both the minor in Portuguese and the minor in Spanish are for students who want to combine acquisition of linguistic competence with the study of

the literatures and cultures of the Lusophone or Spanish-speaking worlds. Each minor requires 30 units of course work taken for a letter grade. Up to 5 units of course work outside the department, and up to 15 units of second-year and above Spanish or Portuguese language courses (not including conversational courses) may count toward these minors with the approval of the Chair of Undergraduate Studies.

Minor in Portuguese

Required Courses:

1. A 100- or 200-level course in Iberian literature with a Lusophone component
2. A 100- or 200-level course in Latin American literature with a Lusophone component.
3. Any additional 100- or 200-level courses in literature and culture to complete the required 30 units. Thinking Matters courses with a Lusophone component taught at least partially by ILAC faculty may count toward these elective as may 5 units of SLE.

Units
30

Minor in Spanish

Required Courses:

1. A 100- or 200-level course in Iberian literature
2. A 100- or 200-level course in Latin American literature
3. Any additional 100- or 200-level courses in literature and culture to complete the required 30 units. Thinking Matters courses with a Hispanophone component taught at least partially by ILAC faculty may count towards these electives, as may 5 units of SLE.

Units
30

Master of Arts in Iberian and Latin American Cultures

The purpose of the terminal M.A. program in Iberian and Latin American Cultures is for students to develop further the knowledge or skills acquired as undergraduates, and to prepare students for a professional career or doctoral studies. This is achieved through the completion of graduate courses in the student's major area of interest as well as in related areas. Students in this program may not apply concurrently for entrance to the Ph.D. program.

Students must complete a minimum of 45 graduate-level units, 36 of which must be taken at Stanford. All 45 units must have a letter grade of B or above. Students enrolled in the terminal M.A. program must file a Program Proposal for a Master's Degree during their first quarter of enrollment. Any changes to the proposal should be reviewed and approved by the Chair of Graduate Studies.

The requirements for the terminal M.A.(and coterminial M.A.) are:

1. A 200-level or above course in literary or cultural theory
2. Two 200-level or above courses in Latin American (including Brazilian) or Latino/Chicano literature and culture
3. Two 200-level or above courses in Iberian literature and culture
4. One 300-level course in Latin American (including Brazilian) or Latino/Chicano literature and culture
5. One 300-level course in Iberian literature and culture
6. Enrollment in at least two graduate seminars (200- or 300- level) offered in the department each quarter
7. Intermediate-high proficiency in Portuguese or Catalan (equivalent to one year of university study).

Independent study courses (ILAC 299 Individual Work, ILAC 399 Individual Work) and crosslisted courses originating outside the department

may not be used to fulfill requirements except by consent of the Chair of Graduate Studies.

Doctor of Philosophy in Iberian and Latin American Cultures

The Ph.D. in Iberian and Latin American Cultures is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis with respect to the areas and traditions taught by the department. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to develop innovative research and to present the results of this research to the world in compelling ways.

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin. The requirements of the Ph.D. in Iberian and Latin American Cultures (ILAC) are:

1. Course work

A total of 135 units is required for the Ph.D. During each quarter in year one and year two, students are required to enroll in and complete at least two graduate courses (200- or 300- level) offered through the Department of Iberian and Latin American Cultures. It is anticipated that students make every effort to take a seminar with a core member of the faculty each quarter. Students may take independent study courses (ILAC 299, 399) only during the summer quarter until they achieve TGR status. Any exceptions must be made in consultation with the ILAC Chair of Graduate Studies and with the relevant faculty member and/or the student's faculty adviser.

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of B+ or better in each course instructed in the DLCL. Any grade of B or below is considered to be less than satisfactory. Grades of B or below are reviewed by faculty and the following actions may be taken: 1) the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; 2) the grade stands and the student is required to revise and resubmit the work associated with the course; or 3) the student may be required to retake the course.

In consultation with their primary adviser, students in their first year choose one major field and two minor areas of study from the following:

- A1. Medieval and Early Modern Iberian Literature and Culture
- A2. Eighteenth- and Nineteenth-Century Iberian Literature and Culture
- A3. Twentieth- and Twenty-First-Century Iberian Literature and Culture
- B1. Colonial to Nineteenth-Century Latin American Literature and Culture
- B2. Twentieth- and Twenty-First-Century Latin American Literature and Culture
- B3. Luso-Brazilian Literature and Culture
- C. US Latin/Chicano Literature and Culture

Students must select one minor area from a group (A, B, C) other than that in which their major area falls. At least four graduate-level courses must be taken in the major area of study. At least two graduate-level courses must be taken in each minor area.

1a. First Year

Students must enroll in and complete a minimum of 54 graduate units during their first year of graduate study as well as 10 units during the summer. First year required coursework:

- A 200-level or above course in literary or cultural theory
- Two 200-level or above courses in Latin American (including Brazil) or Latino/Chicano literature and culture

- Two 200-level or above courses in Iberian literature and culture
- One 300-level course in Latin American (including Brazil) or Latino/Chicano literature and culture
- One 300-level course in Iberian literature and culture
- Enrollment in and completion of ILAC 309 First Year Writing Workshop and DLCL 301 The Learning and Teaching of Second Languages
- Intermediate-high proficiency in Portuguese or Catalan (equivalent to one year of university study)

1b. Second Year

Students must enroll in and complete a minimum of 30 graduate units during their second year of graduate study as well as 10 units during the summer. In addition, second-year students must enroll in and complete at least two graduate seminars (200- or 300- level) offered in the department each quarter.

1c. Third Year

Students must enroll in and complete a minimum of 30 graduate units during their third year of graduate study. In addition, they must successfully complete ILAC 310 (the Dissertation Prospectus Workshop).

2. Language

All students are required to have advanced-high proficiency in English and Spanish by the time they take the comprehensive examination. In addition, students specializing in Iberian literature and culture must attain intermediate-mid proficiency in Catalan and Portuguese (equivalent to two quarters of university study for each language); for students specializing in Latin American and/or US Latino/Chicano literature and culture, the level of advanced-low proficiency in Portuguese (equivalent to four quarters of university study) must be attained. Alternatively, they may substitute one quarter of Catalan or a native American language such as Quechua for the fourth quarter in Portuguese. This requirement must be fulfilled before students take the comprehensive examination. Students wishing to satisfy the language requirements in Catalan and/or Portuguese may do so by passing a proficiency exam administered by the Language Center.

3. Examinations

All students must pass the following: 1) a Qualifying Exam; 2) a written and oral Comprehensive examination; and 3) a University Oral examination.

3a. Qualifying Exam

In the Autumn quarter of their first year, students will receive a digital reader containing 24 secondary texts related to all areas of Iberian and Latin American literature and culture. These texts will serve as the basis for the Qualifying Exam, which will be administered the week before classes begin for the Autumn quarter of the student's second year of study. During the one hour oral examination, students must answer questions from all active members of the ILAC faculty. Students who fail this examination may request to retake it during the Winter quarter.

3b. Comprehensive examination

This exam consists of two parts: 1) a written submission; and 2) an oral presentation. It is designed for students to demonstrate intellectual competence in multiple areas of study. This exam occurs during Winter Quarter of the fourth year of graduate study, and it must be completed prior to the last day of instruction in that same quarter. Students must select a major and two minor areas for the exam from the following options:

- A1. Medieval and Early Modern Iberian Literature and Culture
- A2. Eighteenth- and Nineteenth-Century Iberian Literature and Culture
- A3. Twentieth- and Twenty-First-Century Iberian Literature and Culture

- B1. Colonial to Nineteenth-Century Latin American Literature and Culture
- B2. Twentieth- and Twenty-First-Century Latin American Literature and Culture
- B3. Luso-Brazilian Literature and Culture
- C. US Latin/Chicano Literature and Culture

Students must select one minor area from a group (A, B, C) other than that in which their major area falls.

The committee for the Comprehensive Exam is formed by asking three ILAC professors to serve on the committee, one for each of the three examination areas chosen by the student. In consultation with each member of the committee, the student must develop a list of twenty-one themes (seven for each area of study) plus a reading list of 130 texts and critical works (approximately 60 for the major area and 35 for each of the minor areas). In addition, the student will submit a 6,000-word research paper on a topic preferably related to the dissertation. This paper must be written in English. The comprehensive exam reading list and research paper must be presented to committee members and to the Graduate Student Services Coordinator at least two weeks prior to the Oral portion of the Comprehensive Exam. The Oral exam will be based upon the submitted list and research paper and will last no more than two hours.

3c. University Oral examination

All Ph.D. candidates in ILAC are required to take a University Oral examination after successfully completing the Comprehensive Examination and before the end of the Spring quarter of their fourth year. This examination is a defense of the dissertation prospectus. During the examination, the candidate speaks for approximately 20 minutes on the proposed dissertation, the methods to be used in research and the conclusions the candidate expects to reach. Afterward, there will be questions by the members of the committee, in an order established by the Chair of the committee. The examination will last no more than two hours.

The University Oral examination committee must be finalized no later than the last week of the quarter during which the student successfully completes the comprehensive examination. The examination committee should include the dissertation adviser and three other members, usually from the Reading Committee, and a Chair from outside the department, for a total of five members. All members must belong to the Academic Council. The adviser and two other members must be ILAC faculty. Once a committee and date are finalized, the student must submit the University Oral Examination form to the Graduate Student Services Coordinator. The members of the Oral Examination committee must receive copies of the dissertation prospectus no later than three weeks prior to the examination.

The dissertation prospectus should consist of 20-25 pages (approximately 7,000 words) and follow the most recent MLA Style guidelines. The dissertation prospectus must contain a title along with the following sections: 1) Statement of Thesis; 2) Statement of Significance and Impact; 3) Brief Literature Review; 4) Outline of Theoretical Framework (i.e., a definition of key terms and concepts); 5) Chapter Outline; 6) Preliminary Biography; 7) Timetable for Completion.

4. Teaching

Each Ph.D candidate must teach a minimum of five quarters of undergraduate courses (three are taught during the second year and the remaining two after advancing to TGR status). Language course assignments are arranged through the Language Center. In preparation for teaching, Ph.D. candidates are required to take DLCL 301 The Learning and Teaching of Second Languages during the Spring quarter of their first year.

5. Ph.D. Dissertation

The doctoral dissertation should demonstrate the student's ability to carry out original research and to organize and present the results in

publishable form. The scope of the dissertation should be such that it is completed in twelve to eighteen months of full-time work. A copy of the completed dissertation must be submitted to each member of the reading committee at least eight weeks before the University filing deadline in the quarter during which the candidate expects to receive the Ph.D. degree. Committee members will have three weeks to read the dissertation before determining whether to approve or require changes. Ph.D. dissertations must be completed and approved within five years from the date of admission to candidacy. Students taking more than five years must apply for reinstatement of candidacy which is reviewed on a case by case basis.

Yearly review

In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough; each student's performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strength and potential weakness.

Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, coursework, performance on the Qualifying Exam, and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of Iberian and Latin American Studies conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (<http://exploreddegrees.stanford.edu/graduatedegrees/#doctoraltext-candidacy>) and GAP (<http://gap.stanford.edu/4-6.html>).

Ph.D. Minor in Iberian and Latin American Cultures

Stanford Ph.D. students wishing to earn a minor in Iberian and Latin American Cultures must complete 25 units, with a grade point average

(GPA) or 3.0 or above, selected from courses numbered 200 or higher. For more information, students should speak with the ILAC Chair of Graduate Studies. Students in the Ph.D. program in ILAC who choose a minor in another department should consult with advisers in that department.

Emeriti: (Professors) Bernard Gicovate, Mary Pratt, Sylvia Wynter; (Professor, Teaching) María-Paz Haro

Director: Gabriella Safran

Chair of Graduate Studies: Héctor M. Hoyos (Autumn), Marília Librandi Rocha (Winter, Spring)

Chair of Undergraduate Studies: Jorge Ruffinelli

Professors: Michael P. Predmore (on leave, Autumn), Joan Ramon Resina (Iberian and Latin American Cultures, Comparative Literature)(on leave), Jorge Ruffinelli, Yvonne Yarbro-Bejarano

Associate Professors: Vincent Barletta, Lisa Surwillo

Assistant Professors: Héctor M. Hoyos, Marília Librandi Rocha (on leave Autumn)

Courtesy Professors: John Felstiner, Roland Greene, Hans U. Gumbrecht, Ramón Saldívar

Courtesy Associate Professors: James A. Fox, Paula Moya

Visiting Professors: Antoni Martí Monerterde (Winter), Andrés Lema-Hincapié (Spring)

Visiting Lecturer: Miquel Bota (Autumn)

Lecturer: Ximena Briceño

Director of Iberian Studies Program: Joan Ramon Resina

Spanish Language Program Coordinator: Alice Miano

Portuguese Language Program Coordinator: Lyriss Wiedemann

Catalan Language Program Coordinator: Joan Molitoris

Overseas Studies Courses in Iberian and Latin American Cultures

Study Abroad Programs in Iberian and Latin American Cultures

All majors are encouraged to study abroad. To transfer credits from non-Stanford programs abroad, consult the Bing Overseas Studies Office. Course work taken abroad may be applied toward both our major and minor programs. Students planning to study abroad must consult with the Chair of Undergraduate Studies to coordinate the course work from abroad with their degree program. The maximum number of units is identified in the elective section for each major.

The department and Bechtel International Center maintain information on study abroad programs. Stanford supports the options listed below and credits course work taken in academically sound programs. Students considering different options are encouraged to speak with the Director of the department or the Chair of Undergraduate Studies.

Stanford in Santiago de Chile and Madrid or Barcelona, Spain

The Bing Overseas Studies Programs in Santiago de Chile and Madrid, Spain require a certain level of proficiency in Spanish. For more information, students should consult the program summary of their interested campus. Course work is primarily in Spanish. Information is available in the "Overseas Studies" section of this bulletin or at the Bing Overseas Studies web site. Internships and research opportunities may be arranged for students staying for two quarters.

For ILAC majors with an interest in Iberian Studies, the department recommends study in Barcelona through the Consortium for Advanced Study in Barcelona (CASB), a consortium of U.S. universities of which Stanford is a participating member. This program combines courses at the program's center with open access to courses at three Barcelona universities: Universitat Pompeu Fabra, University of Barcelona, and Autonomous University of Barcelona. Visiting faculty from Brown, Chicago, Columbia, Cornell, Duke, Harvard, Northwestern, Princeton, and Stanford complement the offerings of these three major universities. Admission is highly competitive.

The department also recognizes other programs, and students are encouraged to discuss their interests with the Director of the department or with the Chair of Undergraduate Studies.

Brazil and Portugal

The University maintains a relationship with the State University of Rio de Janeiro in Brazil at the graduate level. Students interested in study in Brazil should contact Professor Marília Librandi Rocha. Students interested in study in Portugal should contact Professor Vincent Barletta.

Bing Overseas Studies Program

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPMADR41	Dissidence and Continuity: Spanish Theater, 1907 to the Present	4-5
OSPMADR43	The Jacobean Star Way and Europe: Society, Politics and Culture	5
OSPMADR45	Women in Art: Case Study in the Madrid Museums	4
OSPMADR46	Drawing with Four Spanish Masters: Goya, Velazquez, Picasso and Dali	3
OSPMADR61	Society and Cultural Change: The Case of Spain	4
OSPMADR62	Spanish California: Historical Issues	4
OSPSANTG14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG68	The Emergence of Nations in Latin America	4-5
OSPSANTG116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5

OSPSANTG Artistic Expression in Latin America 5
118X

International Policy Studies

Courses offered by the Ford Dorsey Program in International Policy Studies are listed under the subject code IPS on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/search;jsessionid=CD85410D8306285785D60502AD7D575F?page=0&q=ips&filter-coursestatus-Active=on&view=timeschedule&collapse=&catalog=71>).

The Ford Dorsey Program in International Policy Studies (IPS), established in 1982, is an interdisciplinary program devoted to rigorous analysis of international policy issues in diplomacy, governance, security, global health, and international economic policy. Its goal is to provide students with exposure to issues they will face in the international arena, and to develop the skills and knowledge to address those issues. The program allows students to specialize in democracy, development, and the rule of law; energy, environment, and natural resources; global health; international political economy; or international security and cooperation.

The IPS program combines a rigorous scholarly focus with practical training designed to prepare students for careers in public service and other settings where they can have an impact on international issues. The program is designed to integrate perspectives from political science, law, economics, history, and other disciplines, while also incorporating research opportunities and a focus on implementation and administration of solutions addressing global problems.

University requirements for the M.A. degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to help students develop knowledge and skills in preparation for professional careers in international policy and related fields. This is achieved through completion of required courses in the global, quantitative, and skills core, as well as courses in an area of concentration and the capstone practicum course. Students are also encouraged to gain experience through a summer internship and research skills through assistantships with Stanford faculty.

Admission

IPS is designed for students who have undergraduate backgrounds in economics, political science, and international relations. To enroll in the program, students must have completed prerequisite courses in microeconomics, macroeconomics, statistics, international trade and international finance. Stanford courses satisfying these requirements are:

	Units
Microeconomics and Macroeconomics	
ECON 51 Economic Analysis II	
ECON 52 Economic Analysis III	
International Finance and International Trade	
ECON 166 International Trade	
ECON 165 (not offered this year) also counts toward this requirement	

To apply or for information on graduate admission, see the Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>) website.

Applicants must submit a graduate admission application including:

- Statement of purpose on relevant personal, academic, and career plans and goals
- Official transcripts (two hard copies, which are mailed to the IPS program office, and one copy electronically uploaded to the online application)
 - Stanford students, and alumni with an active SUNet ID and password, may request an official eTranscript to be sent from Stanford University and automatically deposited into the application; in this case, hard copies are not required.
- Three letters of recommendation
- Graduate Record Examination (GRE) scores
- Academic writing sample (written in English, 7-15 pages in length, and double-spaced)
- Resume or curriculum vitae
- TOEFL scores (only required of applicants who are non-native English speakers and who did not attend undergraduate institutions where English is the language of instruction; please see Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions/faq-gre-toefl>) for additional information)

Applicants are expected to have a B.A. or B.S. degree from an accredited school.

Applications for admission in Autumn Quarter must be filed with supporting credentials by January 6, 2015.

Joint, Dual Degree, and Coterminal Programs

Joint Degree Programs

Up to a maximum of 45 units, or one year, of the University residency requirement can be credited toward both graduate degree programs (i.e., the joint degree may require up to 45 fewer units than the sum of the individual degree unit requirements). For example, an M.A./M.P.P. has a three-year residency requirement, one year less than what is required for the separate degrees. The reduced requirement recognizes the subject matter overlap between the fields comprising the joint degree.

Juris Doctor and Master of Arts in International Policy Studies (J.D./M.A.)

Students may choose to pursue a joint J.D./M.A. in IPS degree. The joint degree program combines the strengths of the Law School and IPS. Prospective students interested in the joint J.D./M.A. in IPS program may apply concurrently to both the Stanford Law School and the IPS program. Two separate application forms are required and applicants must submit LSAT scores to the Law School and GRE scores to the IPS program.

Students already enrolled at Stanford Law School may apply to the joint J.D./M.A. in IPS program no later than the end of the second year of Law School. The IPS program will make rolling admissions decisions based on the student's original application materials (GRE scores are not required in addition to LSAT scores in this case). Submission of the following is required for consideration:

- IPS Joint Degree Application Form (available from the IPS web site (http://ips.stanford.edu/joint_program))
- Law School Joint Degree Petition (available from the Law School Registrar's Office (<http://www.law.stanford.edu/program/degrees/joint>))
- Graduate Program Authorization Petition (submitted via Axess (<http://axess.stanford.edu>))

- Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page (<http://studentaffairs.stanford.edu/registrar/forms/grad/#enrollment>))
- Current resume or curriculum vitae

For further information, see the "Joint Degree Programs (p. 47)" section of this bulletin and the University Registrar's site (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>).

Master of Arts in International Policy Studies and Master of Public Policy (M.A./M.P.P.)

Admission to the joint degree program requires admission to and matriculation in Stanford's Ford Dorsey program in International Policy Studies and consent of that program.

Applicants should apply to IPS, indicating an interest in the joint program. There is one admissions application and one fee. When a decision is made to admit such a student to the IPS program, that student's file will be forwarded to Public Policy for review. An admission decision, based on the information in the IPS application, will be made promptly. Students may also apply after they have matriculated in IPS.

Details on the joint degree curriculum can be found at http://publicpolicy.stanford.edu/jt_mips_mpp.

For further information, see the "Joint Degree Programs (p. 47)" section of this bulletin and the University Registrar's site (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>).

Dual Degree Programs

Students who have attended Stanford for at least one term and who are currently enrolled may submit a Graduate Program Authorization Petition to seek to add a new degree program in a different department to be pursued concurrently with the existing program.

It is important that the attempt to add degree programs be made while the student is enrolled. Otherwise, a new Application for Graduate Admission must be submitted and an application fee paid. Similarly, enrollment must be continuous if a new degree program is added after completion of an existing program. Summer quarter enrollment is optional for students who intend to begin a new degree program in the Autumn quarter, provided that they have been enrolled the prior Spring quarter.

Graduate Program Authorization Petitions are filed electronically in Axess (<https://axess.stanford.edu>) and approved by the current and the new department. In addition, petitions from international students will be routed to the Bechtel International Center for review. Upon all approvals, the student's record will automatically update with the requested changes.

Master of Business Administration and Master of Arts in International Policy Studies

The dual degree is designed for students who want to work at the intersection of business and the state both in the U.S. and abroad. Prospective students interested in the MBA/M.A. in IPS dual degree program may apply concurrently to both the Stanford Graduate School of Business and the IPS program. Two separate applications are required and applicants must submit GRE scores with each application.

Students already enrolled at the Stanford Graduate School of Business may apply to the MBA/M.A. in IPS dual degree program no later than the end of the first year. The IPS program will make rolling admissions decisions based on the student's original application materials. Submission of the following is required for consideration:

- IPS/GSB Dual Degree Application Form (available from the IPS web site (http://ips.stanford.edu/joint_program))

- Stanford Official Transcript
- Graduate Program Authorization Petition (submitted via Axess (<http://axess.stanford.edu>))
- Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page (<http://studentaffairs.stanford.edu/registrar/forms/grad/#enrollment>))

Completing this combined course of study requires approximately three academic years, depending on the student's background and quantitative preparation. Admissions processes for both programs are completely independent of each other and units from courses can only be applied to one degree or the other, not both.

Coterminal Program

Undergraduates at Stanford may apply for admission to the coterminal master's program in IPS when they have earned a minimum of 120 units toward graduation, including Advanced Placement and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The co-terminal application requires the following supporting materials:

- Two letters of recommendation from University faculty
- Academic writing sample of at least eight double-spaced pages
- Statement of purpose focusing on relevant personal, academic, and career plans and goals
- Resume

Applications must be filed together with supporting materials by January 6, 2015.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Exchange Programs

Stanford – Vienna Academic Exchange

The Stanford – Vienna Academic Exchange is an Autumn Quarter exchange program between the Ford Dorsey Program in International Policy Studies and the Diplomatic Academy of Vienna. Two second-year students from each institution will be selected by application to receive fellowships to spend Autumn Quarter in an academic exchange at the other institution, where they will take courses, pursue extracurricular activities, and participate in the academic life of the host institution.

IPS-specific Academic Policies

The University's general requirements, applicable to all graduate degrees at Stanford, are listed in the Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees/#doctoraltext>) overview of the University Bulletin. In addition, the IPS-specific degree requirement academic policies are listed below.

Academic Standing & Grade Requirement

IPS graduate students must maintain a minimum 3.0 cumulative GPA in order to maintain good academic standing. In addition, a minimum 3.0 cumulative GPA is required for conferral of the M.A. degree.

All courses taken to fulfill requirements for the M.A. degree in International Policy Studies must be taken for a letter grade. The only exceptions are IPS 300 Issues in International Policy Studies, which is only offered as

"S/NC", or courses taken in the Law School, the School of Medicine, or the Graduate School of Business where a letter grade may not be offered. Pre-approval is required from the IPS student services officer in order to apply a non-letter grade course in Law, Medicine, or the Graduate School of Business toward the IPS degree.

Language Requirement

Proficiency in a foreign language is required and may be demonstrated by completion of three years of university-level course work in a foreign language or by passing an oral and written proficiency examination prior to graduation. International students who speak English as a second language already meet this requirement.

Additional Academic Requirements

1. Students are not required to repeat a course that covers material they have already mastered. In such cases, students may petition to substitute a different course for a core required course. This flexibility does not reduce the unit requirements for the M.A. degree.
2. All graduate degree candidates must submit a Master's Degree Program Proposal (i.e., IPS Program Proposal) to the International Policy Studies office by the end of the eighth week of Spring Quarter. Submission of the IPS Program Proposal requires scheduling a 30-minute advising session with the IPS Student Services Advisor to review degree progress and outline coursework that needs to be completed in order to graduate. This document must be on file in order for the student to apply to graduate. Failure to complete this process will result in a hold being placed on the student's account.
3. All first-year graduate students in IPS are required to submit the list of courses for which they have enrolled to the IPS Student Services Officer no later than the third Wednesday of each academic quarter, which is two days prior to the Final Study List Deadline.
4. A maximum of 10 undergraduate units can be applied towards the IPS degree (ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, and MSE 152 Introduction to Decision Analysis do not count towards the 10-unit maximum allowance). Courses listed at the 100-level or below are considered to be at the undergraduate level. The exceptions are History and Political Science, which list undergraduate courses at the 200-level and below. In addition, Public Policy courses listed at the 200-level may be considered undergraduate-level (please consult with IPS and Public Policy before assuming these courses do not apply to the maximum of 10 undergraduate units that can be applied toward the IPS degree).

Master of Arts in International Policy Studies (IPS)

University requirements for the master's degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Degree Requirements

To earn the M.A. degree in International Policy Studies, students must complete the courses listed in the curriculum below. These requirements include:

- Two courses in the global core
- Four courses in the quantitative core
- Four courses in the skills core
- Six courses in the area of concentration, including the gateway course
- The practicum or master's thesis

The minimum number of units required to graduate is 73.

During the first year of the program, students must complete required coursework in statistics, econometrics, international economics, advanced economics, international relations theory, policy writing, and an introductory (gateway) course in the area of concentration. During the second year of the program, students are required to complete either the practicum or master's thesis during Autumn and Winter Quarters. Only students with two or more years of relevant policy work may petition to write a master's thesis.

Language Requirement

In order to earn the M.A. degree in International Policy Studies, students must be proficient in a foreign language. Foreign language proficiency can be demonstrated by:

- Completion of three years of university-level coursework in a foreign language (verified by a transcript)
- Passing an oral and written proficiency exam at Stanford prior to graduation
- Status as a non-native English speaker

Prerequisite Course Work

The IPS program requires the completion of five prerequisite courses prior to matriculation. These are microeconomics, macroeconomics, statistics, international trade and international finance. International trade and international finance are often covered in a single international economics course. Prerequisite courses may be taken at community colleges, at four-year institutions, or through online courses, and must be taken for a letter grade. Proof of completion, which is usually verified by a transcript, is required. The Stanford equivalents of our prerequisite courses are listed below:

Microeconomics and Macroeconomics

ECON 51 Economic Analysis II

ECON 52 Economic Analysis III

International Economics (finance and trade)

ECON 165 (International Finance) Listing from Academic Year 2013-14 (<https://explorecourses.stanford.edu/search?view=catalog&filter=coursestatus-Active=on&page=0&catalog=&academicYear=20132014&q=econ165&collapse>)

ECON 166 International Trade

Curriculum

Global Core

Colloquium (*): 1

IPS 300 Issues in International Policy Studies

International Relations Theory (*): 3

IPS 201 Managing Global Complexity

Quantitative Core

Statistics Course (*): 5

Note: POLISCI 350A is an advanced-level course that requires approval from professor of course and IPS Faculty Director; in some years course may not be available to IPS students

IPS 205 Introductory Statistics for Policy

ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists

POLISCI 350A Political Methodology I: Regression

Econometrics Course - Select one of the following (*): 5

Note: POLISCI 350B is an advanced-level course that requires approval from professor of course and IPS Faculty Director; in some years course may not be available to IPS students

IPS 206 Applied Statistics for Policy

ECON 102B Applied Econometrics

POLISCI 350B Political Methodology II: Causal Inference

International Economics Course - Select one of the following (*): 5

IPS 202 Topics in International Macroeconomics

IPS 203 Issues in International Economics

Advanced Economics Course - Select one of the following: 4-5

IPS 202 Topics in International Macroeconomics

IPS 203 Issues in International Economics

IPS 204A Microeconomics

Skills Core

Policy Writing - Select one of the following (*): 5

IPS 210 The Politics of International Humanitarian Action

IPS 211 The Transition from War to Peace: Peacebuilding Strategies

IPS 213 International Mediation and Civil Wars

IPS 244 U.S. Policy toward Northeast Asia

IPS 264 Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia

IPS 316S Decision Making in U.S. Foreign Policy

Justice - Select one of the following: 4-5

IPS 208 Justice

IPS 208A International Justice

POLISCI 336 Introduction to Global Justice

Units Decision Making - Select one of the following: 4

ECON 137 Decision Modeling and Information

GSBGEN 646 Behavioral Decision Making

IPS 207A Problem Solving and Decision Making for Public Policy and Social Change

IPS 207B Public Policy and Social Psychology: Implications and Applications

MSE 152 Introduction to Decision Analysis

MSE 252 Decision Analysis I: Foundations of Decision Analysis

POLISCI 352 Introduction to Game Theoretic Methods in Political Science

Units Skills Elective

Select one of the skills electives listed below. The skills elective may also be fulfilled by completing an additional elective in the student's area of concentration, an additional policy writing course, an additional quantitative course, or a pre-approved course in one of the four other areas of concentration (see "Related Courses" tab):

CEE 251 Negotiation

ENGR 103 Public Speaking

FINANCE 221 Finance for Non-MBAs

GSBGEN 315 Strategic Communication

IPS 204B Cost-Benefit Analysis and Evaluation

LAW 615 Negotiation

LAW 650 Advanced Negotiation: Public Policy

ME 377 Design Thinking Studio: Experiences in Innovation and Design

Area of Concentration: Gateway and elective courses: 26

Capstone

Select one to be completed during Autumn and Winter quarters of the second year: 8

IPS 209	Practicum
IPS 209A	IPS Master's Thesis

* indicates courses which must be completed during the first year of the program

Total Units 73-77

Area of Concentration Curriculum

Students are required to choose one area of concentration from the list below and complete a total of six courses within the concentration for a minimum of 24 total units. Each area of concentration has a gateway course, which must be taken during the first year and prior to enrolling in subsequent courses. Additionally, each area of concentration has a list of approved elective courses, which can be found under the 'Related Courses (p. 515)' tab of this page. Courses not listed under the 'Related Courses (p. 515)' tab have not been approved and need to be petitioned. Petitions are reviewed by the IPS Faculty Director. The petition form (<http://ips.stanford.edu/resources>) can be found on the IPS website.

Area of Concentration Requirements:

1. Students must select an area of concentration during the first year of the program.
2. Students must complete a minimum of six courses within the area of concentration, including the gateway course, for a minimum total of 26 units.
3. Each course must be taken for a minimum of three units.
4. Students may petition to count two two-unit courses as one elective course within the area of concentration.
5. All coursework must be taken for a letter grade.
6. Students concentrating in International Political Economy are required to take IPS 202 Topics in International Macroeconomics for the international economics requirement and IPS 203 Issues in International Economics for the area of concentration gateway. In addition, they must complete IPS 204A Microeconomics to fulfill the advanced economics requirement.
7. Students from any other area of concentration may fulfill the advanced economics requirement by taking either IPS 204A Microeconomics or the second course in the international economics category listed within the Quantitative Core.

Area of Concentration Gateway Courses

	Units
Democracy, Development, and Rule of Law Gateway Course:	5
IPS 230 Democracy, Development, and the Rule of Law	
Energy, Environment, and Natural Resources Gateway Course:	3-5
CEE 207A Energy Resources	
Global Health Gateway Course:	4
HUMBIO 129S Global Public Health	
International Political Economy Gateway Course:	5
IPE concentrators take IPS 202 for the international economics requirements and IPS 203 for the area of concentration gateway	
IPS 202 Topics in International Macroeconomics	
IPS 203 Issues in International Economics	
International Security and Cooperation Gateway Course:	5
Students with an advanced background may petition to be exempted from the gateway course and instead take six elective courses in the concentration. Consultation with the student services officer and approval from the faculty director are required for this option.	
IPS 241 International Security in a Changing World	

Academic Policies

- All courses taken to fulfill requirements for the M.A. degree in International Policy Studies must be taken for a letter grade. The only exceptions are IPS 300, which is only offered as "S/NC", or courses taken in the Law School, the School of Medicine, or the Graduate School of Business where a letter grade may not be offered. Pre-approval is required from the IPS student services officer in order to apply a non-letter grade course in Law, Medicine, or the Graduate School of Business toward the IPS degree.
- A maximum of 10 undergraduate units can be applied towards the IPS degree (not including ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, or MSE 152 Introduction to Decision Analysis). Courses listed at the 100-level or below are considered to be at the undergraduate level. The exceptions are History and Political Science, which list undergraduate courses at the 200-level and below. In addition, some Public Policy courses listed at the 200-level may be undergraduate (please consult with IPS and Public Policy before assuming these courses do not apply to the maximum 10 undergraduate units that can be counted toward the IPS degree).
- Units from language courses do not count towards the IPS degree requirements, except in cases in which they are used to substitute for units that were made available through an exemption from a core course.
- Only students with two or more years of relevant policy work may petition to write a master's thesis (IPS 209A IPS Master's Thesis)
- Students are not required to repeat a course that covers material they have already mastered. In such cases, students may petition to substitute a different course for a core required course. However, while course substitutions may be permitted, the unit requirements for the M.A. degree will not be reduced.
- All graduate degree candidates must submit a Master's Degree Program Proposal (i.e., IPS Program Proposal) to the International Policy Studies office by the end of the eighth week of Spring Quarter. Submission of the IPS Program Proposal requires scheduling a 30-minute advising session with the IPS Student Services Advisor to review degree progress and outline coursework that needs to be completed in order to graduate. This document must be on file in order for the student to apply to graduate. Failure to complete this process will result in a hold being placed on the student's enrollment.
- All first-year graduate students in IPS are required to submit the list of courses for which they have enrolled to the IPS Student Services Officer no later than the third Wednesday of each academic quarter, which is two days prior to the Final Study List Deadline.

Course Petitions

Students may petition for units from a course that is not currently listed in the Related Course (p. 515)s tab to fulfill area of concentration requirements. A course petition may also be used to apply for an exemption from a core course that covers coursework previously completed at the graduate level. The course petition (<http://ips.stanford.edu/resources>) must be submitted no later than the end of the second week of the quarter in which the course is offered. The IPS Faculty Director reviews the petition and renders a decision within one week of the petition submission.

Directed Readings

Students may arrange directed reading courses if the current course offerings do not meet particular research or study needs. Directed reading courses are independent study projects students may undertake with Stanford faculty members. Once the student has identified a faculty member to support his or her studies, the student must submit the directed reading petition (<http://ips.stanford.edu/resources>) to the IPS office for review by the IPS faculty director. Directed reading petitions must be submitted no later than the end of the second week of the quarter to allow sufficient

time to for review. If approved, the IPS staff creates a section number for the specific instructor so the student can enroll in the course. The course is listed as IPS 299 Directed Reading and the section number assigned is based on the particular instructor. The restrictions for directed reading units include:

1. Students can receive credit for a maximum of five units per directed reading course.
2. Students must receive a letter grade for the directed reading course.

Joint, Dual Degree, and Coterminal Programs

Joint Degree Programs

Up to a maximum of 45 units, or one year, of the University residency requirement can be credited toward both graduate degree programs (i.e., the joint degree may require up to 45 fewer units than the sum of the individual degree unit requirements). For example, an M.A./M.P.P. has a three-year residency requirement, one year less than what is required for the separate degrees. The reduced requirement recognizes the subject matter overlap between the fields comprising the joint degree.

Juris Doctor and Master of Arts in International Policy Studies (J.D./M.A.)

Students may choose to pursue a joint J.D./M.A. in IPS degree. The joint degree program combines the strengths of the Law School and IPS. Prospective students interested in the joint J.D./M.A. in IPS program may apply concurrently to both the Stanford Law School and the IPS program. Two separate application forms are required and applicants must submit LSAT scores to the Law School and GRE scores to the IPS program.

Students already enrolled at Stanford Law School may apply to the joint J.D./M.A. in IPS program no later than the end of the second year of Law School. The IPS program will make rolling admissions decisions based on the student's original application materials (GRE scores are not required in addition to LSAT scores in this case). Submission of the following is required for consideration:

- IPS Joint Degree Application Form (available from the IPS web site (http://ips.stanford.edu/joint_program))
- Law School Joint Degree Petition (available from the Law School Registrar's Office (<http://www.law.stanford.edu/program/degrees/joint>))
- Graduate Program Authorization Petition (submitted via Axess (<http://axess.stanford.edu>))
- Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page (<http://studentaffairs.stanford.edu/registrar/forms/grad/#enrollment>))
- Current resume or curriculum vitae

For further information, see the "Joint Degree Programs (p. 47)" section of this bulletin and the University Registrar's site (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>).

Master of Arts in International Policy Studies and Master of Public Policy (M.A./M.P.P.)

Admission to the joint degree program requires admission to and matriculation in Stanford's Ford Dorsey program in International Policy Studies and consent of that program.

Applicants should apply to IPS, indicating an interest in the joint program. There is one admissions application and one fee. When a decision is made to admit such a student to the IPS program, that student's file is forwarded to Public Policy for review. An admission decision, based on the

information in the IPS application, is made promptly. Students may also apply after they have matriculated in IPS.

Details on the joint degree curriculum can be found at http://publicpolicy.stanford.edu/jt_mips_mpp.

For further information, see the "Joint Degree Programs (p. 47)" section of this bulletin and the University Registrar's site (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>).

Dual Degree Programs

Students who have attended Stanford for at least one term and who are currently enrolled may submit a Graduate Program Authorization Petition to seek to add a new degree program in a different department to be pursued concurrently with the existing program.

It is important that the attempt to add degree programs be made while the student is enrolled. Otherwise, a new Application for Graduate Admission must be submitted and an application fee paid. Similarly, enrollment must be continuous if a new degree program is added after completion of an existing program. Summer quarter enrollment is optional for students who intend to begin a new degree program in the Autumn quarter, provided that they have been enrolled the prior Spring quarter.

Graduate Program Authorization Petitions are filed electronically in Axess (<https://axess.stanford.edu>) and approved by the current and the new department. In addition, petitions from international students is routed to the Bechtel International Center for review. Upon all approvals, the student's record is automatically updated with the requested changes.

Master of Business Administration and Master of Arts in International Policy Studies

The dual degree is designed for students who want to work at the intersection of business and the state both in the U.S. and abroad. Prospective students interested in the MBA/M.A. in IPS dual degree program may apply concurrently to both the Stanford Graduate School of Business and the IPS program. Two separate applications are required and applicants must submit GRE scores with each application.

Students already enrolled at the Stanford Graduate School of Business may apply to the MBA/M.A. in IPS dual degree program no later than the end of the first year. The IPS program makes rolling admissions decisions based on the student's original application materials. Submission of the following is required for consideration:

- IPS/GSB Dual Degree Application Form (available from the IPS web site (http://ips.stanford.edu/joint_program))
- Stanford Official Electronic Transcript
- Graduate Program Authorization Petition (submitted via Axess (<http://axess.stanford.edu>))
- Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page (<http://studentaffairs.stanford.edu/registrar/forms/grad/#enrollment>))

Completing this combined course of study requires approximately three academic years, depending on the student's background and quantitative preparation. Admissions processes for both programs are completely independent of each other and units from courses can only be applied to one degree or the other, not both.

Coterminal Program

Undergraduates at Stanford may apply for admission to the coterminal master's program in IPS when they have earned a minimum of 120 units toward graduation, including Advanced Placement and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The co-terminal application requires the following supporting materials:

- Two letters of recommendation from University faculty
- Academic writing sample of at least eight double-spaced pages
- Statement of purpose focusing on relevant personal, academic, and career plans and goals
- Resume

Applications must be filed together with supporting materials by January 6, 2015.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Exchange Program

Stanford–Vienna Academic Exchange

The Stanford–Vienna Academic Exchange is an Autumn Quarter exchange program between the Ford Dorsey Program in International Policy Studies and the Diplomatic Academy of Vienna. Two second-year students from each institution are selected by application to receive fellowships to spend Autumn Quarter in an academic exchange at the other institution, where they take courses as full-time students, pursue extracurricular activities, and participate in the academic life of the host institution.

IPS students participating in the Stanford–Vienna Academic Exchange must complete all requirements listed in the M.A. curriculum. However, the minimum number of Stanford units required to graduate will be 58. In addition to the minimum requirement of 58 units, students must complete at minimum the equivalent of three full-time courses at the Diplomatic Academy of Vienna (DA), of which one course must be IPS 209 Practicum.

The IPS Practicum is offered as an independent study course in Vienna, and students receive a credit/no credit grade for their participation in the course during Autumn Quarter. Students register for a total of 4 units of IPS Practicum during Winter Quarter at Stanford.

IPS students' status is listed as active, but they are not considered enrolled at Stanford during their participation in the exchange program with the DA. In addition, IPS students receive an academic transcript from the DA for Autumn Quarter. Hence, there is no reference to the exchange on IPS students' Stanford transcripts.

For further information, please see the "Stanford–Vienna Academic Exchange (<http://ips.stanford.edu/content/stanford-vienna-academic-exchange>)" section of the IPS website.

Director:

Kathryn Stoner (Freeman Spogli Institute for International Studies)

Executive Committee Co-chairs:

Mariano-Florentino Cuéllar (Freeman Spogli Institute for International Studies, Law)

Norman Naimark (History)

Executive Committee:

Coit D. Blacker (Freeman Spogli Institute for International Studies)

Lisa Blaydes (Political Science)

Mariano-Florentino Cuéllar (Freeman Spogli Institute for International Studies, Law)

James Fearon (Political Science)

Francis Fukuyama (Freeman Spogli Institute for International Studies)

David Holloway (History)

Beatriz Magaloni (Political Science)

Michael McFaul (Political Science)

Norman Naimark (History)

Scott Sagan (Political Science)

Kathryn Stoner (Freeman Spogli Institute for International Studies)

Andrew Walder (Sociology)

Affiliated Faculty:

Paul Brest (Law)

Jeremy Bulow (Economics)

Mary Kate Bundorf (Health Research and Policy)

Joshua Cohen (Political Science)

Martha Crenshaw (Freeman Spogli Institute for International Studies)

Alberto Díaz-Cayeros (Freeman Spogli Institute for International Studies)

Karen Eggleston (Freeman Spogli Institute for International Studies)

Donald Emmerson (Freeman Spogli Institute for International Studies)

Walter P. Falcon (Freeman Spogli Institute for International Studies)

Siegfried Hecker (Freeman Spogli Institute for International Studies)

Donald Kennedy (Freeman Spogli Institute for International Studies, emeritus)

Stephen Krasner (Political Science)

Jenny Martinez (Law)

Rosamond Naylor (Freeman Spogli Institute for International Studies)

Julie Parsonnet (Medicine)

Condoleezza Rice (Political Science)

Lee Ross (Psychology)

Scott Rozelle (Freeman Spogli Institute for International Studies)

Kenneth Scheve (Political Science)

Stephen J. Stedman (Freeman Spogli Institute for International Studies)

Allen Weiner (Law)

Paul Wise (Pediatrics)

Frank Wolak (Economics)

Amy Zegart (Hoover Institution)

Consulting Professors:

Michael Armacost (Freeman Spogli Institute for International Studies)

Thomas Fingar (Freeman Spogli Institute for International Studies)

Lecturers, Academic Staff & Scholars:

Andrea Abel (International Policy Studies)

Chonira Aturupane (International Policy Studies)

Jeffrey Ball (Law)

Byron Bland (Law)

Arik Carmon (International Policy Studies)

Larry Diamond (Hoover Institution)

Lynn Eden (Freeman Spogli Institute for International Studies)

Karl Eikenberry (Freeman Spogli Institute for International Studies)

Joseph Felter (Hoover Institution)

Nicholas Hope (Stanford Center for International Development)

Christine Jojarth (International Policy Studies)

Karl Knapp (Civil and Environmental Engineering)

Anja Manuel (International Policy Studies)

Eric Morris (International Policy Studies)

Daniel Sneider (Freeman Spogli Institute for International Studies)

David Straub (Freeman Spogli Institute for International Studies)

Mark Thurber (Freeman Spogli Institute for International Studies)

Jane Woodward (Civil and Environmental Engineering)

Visiting Faculty:

David Cohen

Beth van Shaack

Area of Concentration Curriculum

The Ford Dorsey Program in International Policy Studies (IPS) offers five areas of concentration:

- Democracy, Development and Rule of Law (p.) (DDRL)
- Energy, Environment, and Natural Resources (p.) (EENR)
- Global Health (p.) (GH)

- International Political Economy (p.) (IPE)
- International Security and Cooperation (p.) (ISC)

Each concentration is guided by one -or- more- major international research centers at Stanford. This collaboration provides IPS students with exposure to cutting-edge research on global policy issues. Students are required to choose one area of concentration and complete a total of six courses within the concentration for a minimum of 26 total units. Each area of concentration requires the completion of a gateway course (indicated on the Master's tab), which must be taken during the first year and prior to enrolling in subsequent courses. Additionally, each area of concentration has a list of approved elective courses, as shown below. See the Master's tab for information on how to petition to apply a course toward the area of concentration that is not included in the lists below.

Democracy, Development and Rule of Law

		Units
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 301A	The Dynamics of Change in Africa	4-5
ANTHRO 313	Anthropology of Neoliberalism	5
BIOE 372	Design for Service Innovation	4
CEE 207A	Energy Resources	3-5
CEE 241A	Infrastructure Project Development	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
COMM 312	Models of Democracy	3-5
CS 379L	Designing Liberation Technology	3-4
EARTHSYS 242	Remote Sensing of Land	4
EARTHSYS 281	Urban Agriculture in the Developing World	3-4
EASTASN 217	Health and Healthcare Systems in East Asia	3-5
EASTASN 289K	The Political Transition for Economic Development in East Asian: Government or Market?	3
ECON 214	Development Economics I	2-5
ECON 216	Development Economics III	2-5
EDUC 224A	Social Entrepreneurship and Social Innovation	3
EDUC 306A	Economics of Education in the Global Economy	5
EDUC 377B	Strategic Management of Nonprofits	4
EESS 262	Remote Sensing of Land	4
EESS 281	Urban Agriculture in the Developing World	3-4
EESS 318	Global Land Use Change to 2050	2-3
ENGR 231	Transformative Design	3-5
ENVRES 380	Collaborating with the Future: Launching Large Scale Sustainable Transformations	3-4
ETHICSOC 232T	Theories of Civil Society, Philanthropy, and the Nonprofit Sector	5
ETHICSOC 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
HISTORY 248S	Colonial States and African Societies, Part I	4-5
HISTORY 378A	The Logic of Authoritarian Government, Ancient and Modern	5
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5
HRP 274	Design for Service Innovation	4
INTNLREL 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
IPS 207	Governance, Corruption, and Development	3-5
IPS 210	The Politics of International Humanitarian Action	3-5
IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5
IPS 213	International Mediation and Civil Wars	3-5
IPS 230	Democracy, Development, and the Rule of Law	5
IPS 231	Russia, the West and the Rest	4
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
IPS 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
LAW 695	International Human Rights: Media and Education	2
ME 206A	Entrepreneurial Design for Extreme Affordability	4
ME 377	Design Thinking Studio: Experiences in Innovation and Design	3-4
MED 262	Economics of Health Improvement in Developing Countries	5
OIT 333	Design for Extreme Affordability	4
OIT 334	Design for Extreme Affordability	4
PEDS 225	Humanitarian Aid and Politics	3
PHIL 271	Justice	4-5
PHIL 276	Political Philosophy: The Social Contract Tradition	4
POLISCI 136S	Justice	4-5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
POLISCI 247G	Governance and Poverty	5
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 314R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 316S	Decision Making in U.S. Foreign Policy	5
POLISCI 337T	Designing Liberation Technology	3-4
POLISCI 346P	The Dynamics of Change in Africa	4-5
POLISCI 348	Chinese Politics: The Transformation and the Era of Reform	3-5
POLISCI 350C	Political Methodology III: Model-Based Inference	3-5
POLISCI 440B	Comparative Political Economy	5
POLISCI 451	Design and Analysis of Experiments	3-5
PUBLPOL 242	Design Thinking for Public Policy Innovators	3-4
PUBLPOL 302A	Introduction to American Law	3-5
PUBLPOL 307	Justice	4-5
REES 205	Central and East European Politics	5
REES 320	State and Nation Building in Central Asia	3-5
SOC 218	Social Movements and Collective Action	4
SOC 230	Education and Society	4-5
SOC 231	World, Societal, and Educational Change: Comparative Perspectives	4-5
SOC 240	Introduction to Social Stratification	3
SOC 314	Economic Sociology	4-5
SOC 370A	Sociological Theory: Social Structure, Inequality, and Conflict	5
STRAMGT 325	Starting and Growing a Social Venture	4
STRAMGT 367	Social Entrepreneurship and Social Innovation	3
STRAMGT 368	Strategic Management of Nonprofit Organizations and Social Ventures	4
STS 210	Ethics, Science, and Technology	4

URBANST 137	Innovations in Microcredit and Development Finance	3
PUBLPOL 364	The Future of Finance	2

Energy, Environment, and Natural Resources

		Units
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 207A	Energy Resources	3-5
CEE 224A	Sustainable Development Studio	1-5
CEE 227	Global Project Finance	3-5
CEE 241A	Infrastructure Project Development	3
CEE 241C	Global Infrastructure Projects Seminar	1-2
CEE 246	Entrepreneurship in Civil & Environmental Engineering	3-4
CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 265A	Sustainable Water Resources Development	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 266D	Water Resources and Water Hazards Field Trips	2
CEE 272S	Green House Gas Mitigation	1-3
CEE 297M	Managing Critical Infrastructure	2
CS 379L	Designing Liberation Technology	3-4
EARTHSYS 106	World Food Economy	5
EARTHSYS 180B	Principles and Practices of Sustainable Agriculture	3-4
EARTHSYS 242A	Negotiating Sustainable Development	3
EARTHSYS 275	California Coast: Science, Policy, and Law	3-4
EARTHSYS 281	Urban Agriculture in the Developing World	3-4
EARTHSYS 284	Climate and Agriculture	3-4
EARTHSYS 288	Social and Environmental Tradeoffs in Climate Decision-Making	1-2
ECON 106	World Food Economy	5
ECON 214	Development Economics I	2-5
ECON 216	Development Economics III	2-5
EESS 106	World Food Economy	5
EESS 281	Urban Agriculture in the Developing World	3-4
EESS 284	Climate and Agriculture	3-4
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 291	Optimization of Energy Systems	3-4
ENVRES 200	Sustaining Action: Research, Analysis and Writing for the Public	3
ENVRES 380	Collaborating with the Future: Launching Large Scale Sustainable Transformations	3-4
FINANCE 335	Corporate Valuation, Governance and Behavior	4
GES 253	Petroleum Geology and Exploration	3
GSBGEN 322	Measuring and Improving the Impact of Social Enterprises	3
GSBGEN 532	Cleantech: Business Fundamentals and Public Policy	2
IPS 270	The Geopolitics of Energy	3-5
LAW 768	Environmental Justice	3
ME 206A	Entrepreneurial Design for Extreme Affordability	4
ME 368	d.Leadership: Design Leadership in Context	1-3

MED 262	Economics of Health Improvement in Developing Countries	5
MSE 243	Energy and Environmental Policy Analysis	3
MSE 273	Technology Venture Formation	3-4
MSE 295	Energy Policy Analysis	3
OIT 333	Design for Extreme Affordability	4
OIT 334	Design for Extreme Affordability	4
OIT 343	D-Lab: Design for Service Innovation	4
POLISCI 337T	Designing Liberation Technology	3-4
STS 210	Ethics, Science, and Technology	4
URBANST 114	Urban Culture in Global Perspective	5

Global Health

		Units
AFRICAST 151	AIDS in Africa	3
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
BIO 102	Demography: Health, Development, Environment	3
BIO 146	Population Studies	1
BIOE 371	Global Biodesign: Medical Technology in an International Context	1-3
BIOMEDIN 256	Economics of Health and Medical Care	5
CEE 265D	Water and Sanitation in Developing Countries	1-3
EASTASN 117	Health and Healthcare Systems in East Asia	3-5
EASTASN 217	Health and Healthcare Systems in East Asia	3-5
ECON 118	Development Economics	5
GSBGEN 569	Online Financial Training for Managers and Entrepreneurs in Developing Economies	2
HISTORY 243G	Tobacco and Health in World History	4-5
HRP 207	Introduction to Concepts and Methods in Health Services and Policy Research I	2
HRP 208	Introduction to Concepts and Methods in Health Services and Policy Research II	3
HRP 212	Cross Cultural Medicine	3
HRP 231	Epidemiology of Infectious Diseases	3
HRP 256	Economics of Health and Medical Care	5
HUMBIO 119	Demography: Health, Development, Environment	3
HUMBIO 129S	Global Public Health	4
HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges	4
IPS 290	Practical Approaches to Global Health Research	3
ME 206A	Entrepreneurial Design for Extreme Affordability	4
MED 236	Economics of Infectious Disease and Global Health	3
MSE 256	Technology Assessment and Regulation of Medical Devices	3
MSE 292	Health Policy Modeling	3
OIT 333	Design for Extreme Affordability	4
OIT 334	Design for Extreme Affordability	4
PEDS 222	Beyond Health Care: Seeking Health in Society	3
PUBLPOL 231	Health Law: Finance and Insurance	3
SURG 231	Healthcare in Haiti and other Resource Poor Countries	1

International Political Economy

IPE concentrators will take IPS 202 as the international economics requirements and IPS 203 as the area of concentration gateway.

		Units			
IPS 202	Topics in International Macroeconomics (International Economics Requirement)	5	POLISCI 444	Comparative Political Economy: Advanced Industrial Societies	3-5
IPS 203	Issues in International Economics (IPE Gateway)	5	PUBLPOL 204	Economic Policy Analysis	4-5
ANTHRO 377	The Mystery of Ministry: What is Authority?	5	PUBLPOL 242	Design Thinking for Public Policy Innovators	3-4
BIOMEDIN 251	Outcomes Analysis	4	PUBLPOL 303B	Political Methodology II: Causal Inference	5
CEE 227	Global Project Finance	3-5	PUBLPOL 303D	Applied Econometrics for Public Policy	4-5
EARTHSYS 106	World Food Economy	5	PUBLPOL 364	The Future of Finance	2
EASTASN 217	Health and Healthcare Systems in East Asia	3-5	SOC 214	Economic Sociology	4
ECON 102C	Advanced Topics in Econometrics	5	SOC 231	World, Societal, and Educational Change: Comparative Perspectives	4-5
ECON 106	World Food Economy	5	STRAMGT 325	Starting and Growing a Social Venture	4
ECON 214	Development Economics I	2-5	STRAMGT 353	Entrepreneurship: Formation of New Ventures	4
ECON 215	Economic Development II	2-5	STRAMGT 367	Social Entrepreneurship and Social Innovation	3
ECON 216	Development Economics III	2-5	STRAMGT 369	Social Entrepreneurship	4
ECON 241	Public Finance and Taxation I	2-5	International Security and Cooperation		
ECON 242	Public Finance and Taxation II	2-5	The ISC gateway is IPS 241. Those with an advanced background in ISC may petition to bypass the gateway course and take six elective courses in the concentration. Those who do not plan to take IPS 241 must consult with the IPS Student Services Officer and receive approval through petition from the IPS Faculty Director.		
ECON 246	Labor Economics I	2-5			Units
ECON 251	Natural Resource and Energy Economics	2-5	AFRICAST 301A	The Dynamics of Change in Africa	4-5
ECON 252	The Future of Finance	2	COMM 312	Models of Democracy	3-5
ECON 265	International Economics I	2-5	CS 379L	Designing Liberation Technology	3-4
ECON 266	International Economics II	2-5	EARTHSYS 251	Biological Oceanography	3-4
ECON 267	Topics in International Trade	2-5	EASTASN 262	Seminar on the Evolution of the Modern Chinese State, 1550-Present	3-5
EDUC 224A	Social Entrepreneurship and Social Innovation	3	EASTASN 294	The Rise of China in World Affairs	3-5
EESS 106	World Food Economy	5	ECON 252	The Future of Finance	2
ENERGY 271	Energy Infrastructure, Technology and Economics	3	ENGLISH 172D	Introduction to Comparative Studies in Race and Ethnicity	5
FINANCE 221	Finance for Non-MBAs	3	ETHICSOC 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
FINANCE 324	Practical Corporate Finance	4	HISTORY 103E	The International History of Nuclear Weapons	5
FINANCE 327	Financial Markets	4	HISTORY 302G	Peoples, Armies and Governments of the Second World War	4-5
FINANCE 335	Corporate Valuation, Governance and Behavior	4	HISTORY 304G	War and Society	5
GSBGEN 314	Creating High Potential Ventures in Developing Economies	4	HISTORY 306E	International History and International Relations Theory	5
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5	HISTORY 330F	Surveillance in Modern Europe	4-5
HISTORY 381	Economic and Social History of the Modern Middle East	4-5	HISTORY 355	Decision Making in International Crises: The A-Bomb, the Korean War, and the Cuban Missile Crisis	4-5
IPS 207	Governance, Corruption, and Development	3-5	HISTORY 356	America- China Relations	4-5
IPS 236	The Politics of Private Sector Development	3-5	HISTORY 481	Research Seminar in Middle East History	4-5
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5	INTNLREL 110D	War and Peace in American Foreign Policy	5
LAW 285	International Trade Regulation	3	INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
MED 262	Economics of Health Improvement in Developing Countries	5	IPS 210	The Politics of International Humanitarian Action	3-5
MGTECON 591	Management Practices in Europe, the US and Emerging Markets	1	IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5
MSE 241	Economic Analysis	3-4	IPS 213	International Mediation and Civil Wars	3-5
MSE 246	Financial Risk Management	3	IPS 219	Intelligence and National Security	3-4
MSE 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy	3	IPS 230	Democracy, Development, and the Rule of Law	5
POLISCI 340L	China in World Politics	5	IPS 244	U.S. Policy toward Northeast Asia	5
POLISCI 348	Chinese Politics: The Transformation and the Era of Reform	3-5	IPS 246	China on the World Stage	3-5
POLISCI 350A	Political Methodology I: Regression	5			
POLISCI 350C	Political Methodology III: Model-Based Inference	3-5			
POLISCI 351A	Foundations of Political Economy	3			
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5			
POLISCI 440B	Comparative Political Economy	5			

IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	4
IPS 250	International Conflict Resolution	3
IPS 250A	International Conflict Resolution Colloquium	1
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
IPS 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
JEWISHST 287S	Research Seminar in Middle East History	4-5
JEWISHST 481	Research Seminar in Middle East History	4-5
LAW 751	Just and Unjust Wars	2
MSE 293	Technology and National Security	3
PHIL 271	Justice	4-5
PHIL 287	Philosophy of Action	4
POLISCI 110Y	War and Peace in American Foreign Policy	5
POLISCI 136S	Justice	4-5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 212X	Civil War and International Politics: Syria in Context	5
POLISCI 215	Explaining Ethnic Violence	5
POLISCI 218T	Terrorism	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 314R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 316S	Decision Making in U.S. Foreign Policy	5
POLISCI 337T	Designing Liberation Technology	3-4
POLISCI 340L	China in World Politics	5
POLISCI 346P	The Dynamics of Change in Africa	4-5
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5
PSYCH 155	Introduction to Comparative Studies in Race and Ethnicity	5
PSYCH 215	Mind, Culture, and Society	3
PSYCH 245	Social Psychological Perspectives on Stereotyping and Prejudice	3
PSYCH 383	International Conflict Resolution	3
PUBLPOL 222	Biosecurity and Bioterrorism Response	2-5
PUBLPOL 242	Design Thinking for Public Policy Innovators	3-4
PUBLPOL 307	Justice	4-5
PUBLPOL 364	The Future of Finance	2
REES 320	State and Nation Building in Central Asia	3-5
SOC 146	Introduction to Comparative Studies in Race and Ethnicity	5
SOC 218	Social Movements and Collective Action	4
SOC 240	Introduction to Social Stratification	3
SOC 245	Race and Ethnic Relations in the USA	4
SOC 310	Political Sociology	4-5

International Relations

Courses offered by the Program in International Relations (IR) are listed under the subject code INTNLREL on the Stanford Bulletin's ExploreCourses web site.

The Program in International Relations offers an undergraduate Bachelor of Arts program, an honors program, and a minor in International Relations.

Mission of the Undergraduate Program in International Relations

The undergraduate program in International Relations is an interdisciplinary undergraduate major allowing students to explore how global, regional and domestic factors influence relations between actors on the world stage. The program equips students with the skills and knowledge necessary to analyze choices and challenges that arise in this arena. IR majors pursue study in world politics, including courses in political science, economics, history, and language, focusing on issues such as international security, political economy, economic development, and democratization. Students must spend at least one quarter overseas. The major prepares students for careers in government and the corporate sector, and for admission into graduate programs in law, business, economics, and political science.

Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in International Relations. Students are expected to demonstrate:

1. understanding of core knowledge necessary to understand contemporary world politics.
2. ability to analyze international issues and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively, communicating ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

Coterminal Programs in Related Fields

It is possible for students majoring in International Relations to work simultaneously for a coterminal master's degree in a number of related fields. Coterminal students should consult advisers in both departments or programs to ensure that they fulfill the degree requirements in both fields. For information on the M.A. program in International Policy Studies, see the "International Policy Studies (p. 511)" section in this bulletin. University requirements for the coterminal M.A. are described in the "Coterminal Degree (p. 41)s" section of this bulletin. For University coterminal degree program rules and University application forms, see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Honors Program

The International Relations honors program offers qualified students the opportunity to conduct a major independent research project under faculty guidance. Such a project requires a high degree of initiative and dedication,

significant amounts of time and energy, and demonstrated skills in research and writing.

In their junior year, students should consult with prospective honors advisers, choose the courses that provide academic background in their areas of inquiry, and demonstrate an ability to conduct independent research. Students can also select to complete an Interdisciplinary honors thesis with other programs on campus.

Prerequisites for participation include a 3.5 grade point average (GPA), a strong overall academic record, good academic standing, successful experience in writing a research paper, and submission of an acceptable thesis proposal. Students should submit their honors thesis proposal late in Winter Quarter of the junior year; please check with IR office for the exact deadline. Students are required to enroll in INTNLREL 200A International Relations Honors Field Research, in Spring Quarter of their junior year and should consider participating in Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html). In their senior year, honors students must enroll in INTNLREL 200B International Relations Honors Seminar in Autumn Quarter, INTNLREL 200C IR Honors Thesis Writing in Winter Quarter, and in research units through INTNLREL 198 Senior Thesis each quarter (Autumn, Winter, and Spring) with their faculty adviser. Honors students present a formal defense of their theses in mid-May. Students must receive at least a grade of 'B+' in order to graduate with honors in International Relations.

Bachelor of Arts in International Relations

Students are encouraged to declare by the end of their sophomore year to ensure timely completion of the program. Students must submit an acceptable major proposal to the Director of the Program in International Relations and declare IR in Axxess. Students completing a double major, fulfilling International Relations as a secondary major, or who have a minor, are also required to file a Major-Minor and Multiple Major Course Approval form by the end of the second quarter of the junior year.

Students majoring in International Relations must complete a minimum of 70 units (30-35 units of core courses as well as 35-40 units of specialization courses). As part of the core curriculum, IR majors must take an Introductory economics course. Effective Autumn Quarter 2013-14, the Economics department is offering ECON 1 Principles of Economics, replacing the former ECON 1A and 1B.

- Students who have already completed two introductory ECON courses (ECON 1A, 1B, 50, 51, 52) complete 35 units of core courses and 35 units of specialization courses in order to meet the 70 units required for the major.
- Students who have taken only ECON 1 Principles of Economics or the old ECON 1A complete 30 units of core courses and 40 units of specialization courses in order to meet the 70 units required for the major.

Students who declared the major prior to September 1, 2013 should consult the Stanford Bulletin for the year in which they submitted their declaration. Requirements for students declaring the major after September 1, 2013 are as follows:

Core Courses (30-35 units):

	Units
Required Courses:	
International Politics:	5
POLISCI 1 Introduction to International Relations	
American Foreign Policy (Select one of the following):	5
POLISCI 110C America and the World Economy	

POLISCI 110D War and Peace in American Foreign Policy	
Introductory Economics (Select one of the following):	5
ECON 1 Principles of Economics	
ECON 50 Economic Analysis I	
ECON 51 Economic Analysis II	
ECON 52 Economic Analysis III	
Comparative Governance (Select one of the following):	5
POLISCI 4 Introduction to Comparative Politics	
HISTORY 102 History of the International System	
Skills Classes (Select one of the following):	5
ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists	
STATS 60 Introduction to Statistical Methods: Precalculus	
Applied Economics Courses (Select one of the following):	5
ECON 106 World Food Economy	
ECON 111 Money and Banking	
ECON 118 Development Economics	
ECON 119 The Russian Economy	
ECON 122	
ECON 123	
ECON 125 Economic Development, Microfinance, and Social Networks	
ECON 126 Economics of Health and Medical Care	
ECON 128 Economic Development: A Historical Perspective	
ECON 127 Economics of Health Improvement in Developing Countries	
ECON 141 Public Finance and Fiscal Policy	
ECON 149 The Modern Firm in Theory and Practice	
ECON 150 Economic Policy Analysis	
ECON 164	
ECON 165 International Finance	
ECON 166 International Trade	
INTNLREL 115	
INTNLREL 118S Political Economy of International Trade and Investment	
INTNLREL 122A The Political Economy of the European Union	
INTNLREL 123 The Future of the European Union: Challenges and Opportunities	
INTNLREL 147	
INTNLREL 149 The Economics and Political Economy of the Multilateral Trade System	
INTNLREL 165A	
IPS 202 Topics in International Macroeconomics	
IPS 203 Issues in International Economics	
IPS 207 Governance, Corruption, and Development	
OSPBEIJ 75	
OSPMOSC 62	
OSPPARIS 124X Building the European Economy: Economic Policies and Challenges Ahead	
OSPSANTG 130X The Chilean Economy in Comparative Perspective	
POLISCI 110C America and the World Economy	

POLISCI 216G	International Organizations and Institutions
POLISCI 210	
POLISCI 210C	
POLISCI 210G	Global Supply Chains and the Future of Global Governance
POLISCI 213R	
POLISCI 218S	Political Economy of International Trade and Investment
PUBLPOL 184	Poverty and Policies in Developing Economies
SIW 103	Economic Growth and Development Patterns, Policies, and Prospects
SOC 114	Economic Sociology

Total Units **30**

Specialization Courses (35-40 units):

The ten specializations are:

1. Africa
2. Comparative International Governance
3. East and South Asia
4. Economic Development/World Economy
5. Europe (East and West) & Russia
6. International History and Culture
7. International Security
8. Latin America and Iberian Studies
9. Middle East and Central Asia (MECA)
10. Social Development/Human Well-Being

Students on the old IR plan who completed two introductory economics courses must complete a total of at least 35 units (usually seven 5 unit courses) in their primary and secondary specializations. 20 units must be from the student's primary specialization; 15 units from the secondary specialization. Functional specializations are not declared on Axess nor are they printed on the diploma or transcript.

Students who have only taken one introductory economics course must take 40 units of specialization courses in order to meet the 70 units required for the major. 20-25 units must be from the student's primary specialization; 15-20 units from the secondary specialization. Functional specializations are not declared on Axess nor are they printed on the diploma or transcript.

The following courses are approved for each functional specialization.

Africa

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 127	African Art and Politics, c. 1900 - Present	4
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 141A	Science, Technology, and Medicine in Africa	4

AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
ANTHRO 138B	Urban Africa	5
ANTHRO 147A	Folklore, Mythology, and Islam in Central Asia	3-5
ARTHIST 127A	African Art and Politics, c. 1900 - Present	4
HISTORY 48Q	South Africa: Contested Transitions	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 147	History of South Africa	5
HISTORY 245	Violence and Identity in the African Great Lakes Region	5
HISTORY 247	Violence in African History: Conflict and Healing in sub-Saharan Africa	4-5
HISTORY 248S	Colonial States and African Societies, Part I	4-5
OSPCPTWN 16	South Africa Sites of Memory	2
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
OSPCPTWN 58	Racism, Colonialism and Genocide	3-5
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4
OSPCPTWN 71	Power and Performance in Community Practice	4
POLISCI 146A	African Politics	4-5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
POLISCI 246P	The Dynamics of Change in Africa	4-5

Comparative International Governance

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
ANTHRO 132B	Islam Law in Muslim and Non-Muslim Societies	3-5
EARTHSYS 61Q	Food and security	3
EESS 61Q	Food and security	3
ENGR 129	The Internet in Global Context	4
HISTORY 48Q	South Africa: Contested Transitions	3
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 201C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 204E	Totalitarianism	4-5
HISTORY 207B	Environment, Technology and Revolution in World History	4-5
HISTORY 272E	Theories of Citizenship and Sovereignty in a Transnational Context	4-5
HISTORY 282F	History of Modern Turkey	5
INTNLREL 61Q	Food and security	3

INTNLREL 114D	Democracy, Development, and the Rule of Law	5
INTNLREL 122	Introduction to European Studies	5
INTNLREL 122A	The Political Economy of the European Union	5
INTNLREL 135A	International Environmental Law and Policy	5
INTNLREL 140A	International Law and International Relations	5
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
INTNLREL 144	New Global Human Rights	3
INTNLREL 145	Genocide and Humanitarian Intervention	5
INTNLREL 149	The Economics and Political Economy of the Multilateral Trade System	5
INTNLREL 157	The Political Economy of the Arab Revolutions	5
IPS 207	Governance, Corruption, and Development	3-5
IPS 210	The Politics of International Humanitarian Action	3-5
IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5
IPS 230	Democracy, Development, and the Rule of Law	5
JEWISHST 271C	Campaigns and Elections in Israel	5
OSPCTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4
OSPISTAN 65	Comparative Political Economy of Emerging Powers	4
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4
OSPOXFRD 24	British and American Constitutional Systems in Comparative Perspective	4-5
OSPOXFRD 45	British Economic Policy since World War II	5
OSPPARIS 32	French Politics in Cross-National Perspective	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5
POLISCI 110G	Governing the Global Economy	5
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 141S	Politics of India	5
POLISCI 143S	Comparative Corruption	4
POLISCI 146A	African Politics	4-5
POLISCI 147	Comparative Democratic Development	5
POLISCI 149T	Middle Eastern Politics	5
POLISCI 212X	Civil War and International Politics: Syria in Context	5
POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 216	State Building	5
POLISCI 237S	Civil Society and Democracy in Comparative Perspective	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
POLISCI 241C	Campaigns and Elections in Israel	5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
POLISCI 244	An Introduction to Political Development	5
POLISCI 244U	Political Culture	5
POLISCI 245A	Politics and Public Finance	5
POLISCI 245R	Politics in Modern Iran	5

POLISCI 247G	Governance and Poverty	5
POLISCI 248S	Latin American Politics	5
SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5
SOC 112	Comparative Democratic Development	5
SOC 113	Comparative Corruption	4

East and South Asia

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
AMSTUD 256	America- China Relations	4-5
ANTHRO 77	Japanese Society and Culture	5
ANTHRO 149	South Asia: History, People, Politics	5
ANTHRO 249	South Asia: History, People, Politics	5
ANTHRO 277	Environmental Change and Emerging Infectious Diseases, Japanese Society and Culture	3-5,5
CHINGEN 91	Introduction to China	5
CHINGEN 150	Sex, Gender, and Power in Modern China	3-5
COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-4
EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
EASTASN 117	Health and Healthcare Systems in East Asia	3-5
EASTASN 189K	The Political Transition for Economic Development in East Asian: Government or Market?	3
EASTASN 289K	The Political Transition for Economic Development in East Asian: Government or Market?	3
ECON 124	Economic Growth, Development, and Challenges of East Asia	5
FILMSTUD 250B	Bollywood and Beyond: An Introduction to Indian Film	3-4
HISTORY 95	Modern Korean History	3
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon	3
HISTORY 98	The History of Modern China	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 193	Late Imperial China	5
HISTORY 195	Modern Korean History	5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 196	Worlds of Gandhi	5
HISTORY 197	Southeast Asia: From Antiquity to the Modern Era	5
HISTORY 198	History of Modern China	5
HISTORY 256	America- China Relations	4-5
HISTORY 292D	Japan in Asia, Asia in Japan	4-5
HISTORY 296F	Short Stories from India and Pakistan	3-5
HISTORY 297	The Cold War and East Asia	5
HISTORY 297F	Religion and Power in the Making of Modern South Asia	3-5
HISTORY 356	America- China Relations	4-5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 392G	Modern Korea	4-5
HISTORY 395	Modern Korean History	5
HISTORY 397	The Cold War and East Asia	5
INTNLREL 143	State and Society in Korea	4
INTNLREL 159	Political Economy of East Asia	3-5
IPS 244	U.S. Policy toward Northeast Asia	5

IPS 246	China on the World Stage	3-5
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
JAPANGEN 51	Japanese Business Culture and Systems	3-5
JAPANGEN 251	Japanese Business Culture and Systems	3-5
KORGEN 120	Narratives of Modern and Contemporary Korea	4-5
OSPBEIJ 20	Communication, Culture, and Society: The Chinese Way	4
OSPBEIJ 24	China's Economic Development	5
OSPBEIJ 42	Chinese Media Studies	4
OSPBEIJ 60	Chinese Philosophies and Modern China	4
OSPBEIJ 67	China-Africa and Middle East Relations	4
OSPISTAN 68	Istanbul: Space, Memory, and Protest	5
POLISCI 115A	The Rise of Asia	3-5
POLISCI 140L	China in World Politics	5
POLISCI 141S	Politics of India	5
POLISCI 148	Chinese Politics: The Transformation and the Era of Reform	3-5
POLISCI 211	Political Economy of East Asia	3-5
POLISCI 211P	International Security in South Asia: Pakistan, India and the United States.	5
POLISCI 218J	Japanese Politics and International Relations	5
POLISCI 243E	Political Economy of Development in Rural India	5
POLISCI 318J	Japanese Politics and International Relations	5
RELIGST 56	Exploring Chinese Religions	4
RELIGST 118	Gandhi, Nonviolence, Religion	4
RELIGST 119	Gandhi and His Legacy: Violence and Nonviolence in the World and in Ourselves	4-5
SOC 111	State and Society in Korea	4
SOC 117A	China Under Mao	5
SOC 211	State and Society in Korea	4
SOC 217A	China Under Mao	5

Economic Development/World Economy

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
ANTHRO 143B	Anthropology and International Development	3-5
BIOMEDIN 156	Economics of Health and Medical Care	5
EARTHSYS 106	World Food Economy	5
ECON 106	World Food Economy	5
ECON 111	Money and Banking	5
ECON 118	Development Economics	5
ECON 119	The Russian Economy	4-5
ECON 124	Economic Growth, Development, and Challenges of East Asia	5
ECON 125	Economic Development, Microfinance, and Social Networks	5
ECON 126	Economics of Health and Medical Care	5
ECON 127	Economics of Health Improvement in Developing Countries	5
ECON 128	Economic Development: A Historical Perspective	5
ECON 141	Public Finance and Fiscal Policy	5
ECON 149	The Modern Firm in Theory and Practice	5

ECON 150	Economic Policy Analysis	4-5
ECON 155	Environmental Economics and Policy	5
ECON 165	International Finance	5
ECON 166	International Trade	5
EESS 106	World Food Economy	5
HISTORY 201A	The Global Drug Wars	4-5
HISTORY 283	The New Global Economy, Oil and Origins of the Arab Spring	4-5
INTNLREL 110C	America and the World Economy	5
INTNLREL 114D	Democracy, Development, and the Rule of Law	5
INTNLREL 118S	Political Economy of International Trade and Investment	5
INTNLREL 122A	The Political Economy of the European Union	5
INTNLREL 123	The Future of the European Union: Challenges and Opportunities	5
INTNLREL 135A	International Environmental Law and Policy	5
INTNLREL 149	The Economics and Political Economy of the Multilateral Trade System	5
INTNLREL 159	Political Economy of East Asia	3-5
IPS 202	Topics in International Macroeconomics	5
IPS 203	Issues in International Economics	5
IPS 207	Governance, Corruption, and Development	3-5
IPS 230	Democracy, Development, and the Rule of Law	5
JAPANGEN 51	Japanese Business Culture and Systems	3-5
JAPANGEN 251	Japanese Business Culture and Systems	3-5
MED 262	Economics of Health Improvement in Developing Countries	5
MSE 185	Global Work	4
MSE 271	Global Entrepreneurial Marketing	3-4
MSE 464	Global Project Coordination	3-4
OSPBEIJ 24	China's Economic Development	5
OSPPER 40	Global Trends: Anticipating the Future in Order to Shape It	4-5
OSPPER 115X	The German Economy: Past and Present	4-5
OSPPER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPPER 161X	The German Economy in the Age of Globalization	4-5
OSPFLO 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPFLO 98	Origins and Consequences of the European Financial Crisis	5
OSPISTAN 62	Business Policy and Strategy in a Global Environment	4
OSPISTAN 65	Comparative Political Economy of Emerging Powers	4
OSPOXFRD 45	British Economic Policy since World War II	5
OSPOXFRD 90	Economic Policy in Advanced Economies	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPSANTG 41	Political Economy: Chile in Comparative Perspective	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5
POLISCI 110C	America and the World Economy	5
POLISCI 110G	Governing the Global Economy	5

POLISCI 110X	America and the World Economy	5
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 115A	The Rise of Asia	3-5
POLISCI 140L	China in World Politics	5
POLISCI 143S	Comparative Corruption	4
POLISCI 210G	Global Supply Chains and the Future of Global Governance	5
POLISCI 211	Political Economy of East Asia	3-5
POLISCI 216G	International Organizations and Institutions	5
POLISCI 218S	Political Economy of International Trade and Investment	5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
POLISCI 243L	Politics of Economic Reform	5
POLISCI 247G	Governance and Poverty	5
POLISCI 248L	Political-Economy of Crime and Violence in Latin America	5
PUBLPOL 104	Economic Policy Analysis	4-5
PUBLPOL 107	Public Finance and Fiscal Policy	5
PUBLPOL 184	Poverty and Policies in Developing Economies	5
PUBLPOL 204	Economic Policy Analysis	4-5
REES 219	The Russian Economy	4-5
SIW 103	Economic Growth and Development Patterns, Policies, and Prospects	5
SOC 113	Comparative Corruption	4
SOC 114	Economic Sociology	4
SOC 137	Global Capitalism and Development	4

Europe (East and West) & Russia

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
ECON 119	The Russian Economy	4-5
FEMGEN 115	Queer Reading and Queer Writing in Early Modern England	5
FRENCH 120	Coffee and Cigarettes: The Making of French Intellectual Culture	4-5
FRENCH 122	Nation in Motion: Film, Race and Immigration in Contemporary French Cinema	3-5
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4
GERMAN 120Q	Contemporary Politics in Germany	3-4
GERMAN 123	German Culture and Film	3-5
GERMAN 182	War and Warfare in Germany	3
GERMAN 264	Post-Cold War German Foreign Policy	3-5
HISTORY 20N	Russia in the Early Modern European Imagination	4
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 110B	Survey of Early Modern Europe	5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 137	The Holocaust	4
HISTORY 138A	Germany and the World Wars	5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 184	Zionism	5
HISTORY 219C	Science, Technology, and Modernity in the Soviet Union	5
HISTORY 221B	The 'Woman Question' in Modern Russia	5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 228	Circles of Hell: Poland in World War II	5
HISTORY 230F	Surveillance in Modern Europe	4-5
HISTORY 239E	Paris: The Making of a Modern Icon	3-5
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 136	Modern Iberian Literatures	3-5
ILAC 193	The Cinema of Pedro Almodovar	3-5
ILAC 224	Literature Inspired by the Spanish Republic and the Spanish Civil War	3-5
INTNLREL 122	Introduction to European Studies	5
INTNLREL 122A	The Political Economy of the European Union	5
INTNLREL 123	The Future of the European Union: Challenges and Opportunities	5
IPS 231	Russia, the West and the Rest	4
ITALIAN 129	Modern Italian Culture: Literary Landscapes	4
ITALIAN 155	The Mafia in Society, Film, and Fiction	4
JEWISHST 155D	Jewish American Literature	5
JEWISHST 183	The Holocaust	4
JEWISHST 282	Circles of Hell: Poland in World War II	5
OSPBER 15	Shifting Alliances? The European Union and the U.S.	4-5
OSPBER 37	Leading from Behind? Germany in the International Arena since 1945	4-5
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPFLOR 98	Origins and Consequences of the European Financial Crisis	5
OSPISTAN 68	Istanbul: Space, Memory, and Protest	5
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4
OSPMADRD 52	Revolution and Reconciliation in Film	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPOXFRD 24	British and American Constitutional Systems in Comparative Perspective	4-5
OSPOXFRD 90	Economic Policy in Advanced Economies	5
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5
OSPPARIS 32	French Politics in Cross-National Perspective	5
OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time	5
POLISCI 142B	British Politics	5

POLISCI 245A	Politics and Public Finance	5
REES 219	The Russian Economy	4-5
SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5
SLAVIC 147	Modern Russian Literature and Culture: The Age of War and Revolution	3-5
SLAVIC 148	Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin	3-5

International History and Culture

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
ANTHRO 49	Violence and Belonging in the Middle East	5
ANTHRO 152	Ritual, Politics, Power	5
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval	5
ARTHIST 106	Byzantine Art and Architecture, 300-1453 C.E.	4
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5
ARTHIST 208C	Architecture, Acoustics and Ritual in Byzantium	1-3
CLASSICS 391	Early Empires: Han and Rome	4-5
COMPLIT 38Q	Ethics of Jihad	4
COMPLIT 144A	Istanbul the Muse: The City in Literature and Film	3-5
COMPLIT 145	Reflection on the Other: The Jew and the Arab in Literature	3-5
COMPLIT 157	Contemporary Turkish Cinema and Society	3-5
COMPLIT 171	Ethics of Jihad	5
ENGLISH 153A	James Joyce	5
ENGLISH 154J	Prep Schools, Frat Houses, and Hogwarts: The Campus in 20th & 21st Century Literature	3-5
FEMGEN 101	Introduction to Feminist Studies	4-5
FRENCH 112	Oscar Wilde and the French Decadents	3-5
FRENCH 122	Nation in Motion: Film, Race and Immigration in Contemporary French Cinema	3-5
FRENCH 124	The View from Paris: Key Moments in French Culture	4
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4
FRENCH 205	Songs of Love and War: Gender, Crusade, Politics	3-5
FRENCH 210	Representation and Theatre Culture in 20th Century France	5
FRENCH 218	Skepticism and Atheism in Early-Modern French Thought	4-5
FRENCH 221	Conceiving Other Worlds: Travel Narrative and Science Fiction in Early-Modern France	4-5
FRENCH 228E	Getting Through Proust	3-5
FRENCH 245	French Political Thought From Rousseau to the Present	3-5
FRENCH 253	Honoré de Balzac	3-5
FRENCH 265	The Problem of Evil in Literature, Film, and Philosophy	3-5
GERMAN 41N	Inventing Modern Theatre: Georg Büchner and Frank Wedekind	3
GERMAN 120N	The Brothers Grimm and Their Fairy Tales	4
GERMAN 120Q	Contemporary Politics in Germany	3-4
GERMAN 131	What is German Literature?	3-5
GERMAN 132	Dynasties, Dictators and Democrats: History and Politics in Germany	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5
GERMAN 218	Central European Literature	4
GERMAN 220	German Literature 1: How Stories are Told (ca. 1170-1600)	5-8
GERMAN 221	German Literature 2: Selfhood and History	3-8
GERMAN 222	German Literature 3: Myth and Modernity	5-8
GERMAN 246	Hegel's Phenomenology of Spirit	3-5
GERMAN 262	The Total Work of Art	5
GERMAN 262A	Explosions of Enlightenment	3-5
GERMAN 264	Post-Cold War German Foreign Policy	3-5
GERMAN 264A	Walter Benjamin	3-5
GERMAN 271	Futurity: Why the Past Matters	3-5
GERMAN 284	The Nervous Age: Neurosis, Neurology, and Nineteenth-century Theatre	5
GERMAN 285	Environmentalism, Literature and Cultural Criticism	3-5
HISTORY 20N	Russia in the Early Modern European Imagination	4
HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad	5
HISTORY 103F	Introduction to Military History	5
HISTORY 110B	Survey of Early Modern Europe	5
HISTORY 113	Before Globalization: Understanding Premodern World History	3-5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 147	History of South Africa	5
HISTORY 165D	The Pacific World	5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
HISTORY 182C	Making of the Islamic World, 600-1500	5
HISTORY 184	Zionism	5
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 193	Late Imperial China	5
HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 198	History of Modern China	5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 204E	Totalitarianism	4-5
HISTORY 204G	War and Society	5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 245	Violence and Identity in the African Great Lakes Region	5
HISTORY 246E	Refugees and the Making of the Modern World: 1945-Present	4-5
HISTORY 247	Violence in African History: Conflict and Healing in sub-Saharan Africa	4-5
HISTORY 272E	Theories of Citizenship and Sovereignty in a Transnational Context	4-5
HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 288	Palestine and the Arab-Israeli Conflict	4-5
HISTORY 292D	Japan in Asia, Asia in Japan	4-5
HISTORY 296F	Short Stories from India and Pakistan	3-5
ILAC 103N	The Millenium Novel in Latin America	3

ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
ILAC 133N	The Animal Within: Animal Presence in Latin American Narrative	3
ILAC 134	In the First Person: Representation of the Self in Modern Latin America	3-5
ILAC 135	From Book to Screen: Brazilian Novels and Their Film Adaptations	3-5
ILAC 136	Modern Iberian Literatures	3-5
ILAC 157	Medieval and Early Modern Iberian Literatures	3-5
ILAC 161	Modern Latin American Literature	3-5
ILAC 193	The Cinema of Pedro Almodovar	3-5
ILAC 193Q	Spaces and Voices of Brazil through Film	3-4
ILAC 240E	Borges and Philosophy	3-5
INTNLREL 103E	Global Catholicism	5
INTNLREL 136	History of International Relations Thought	5
INTNLREL 154	The Cold War: An International History	5
INTNLREL 168	America as a World Power: U.S. Foreign Relations, 1914 to Present	5
INTNLREL 173	Presidents and Foreign Policy in Modern History	5
INTNLREL 174	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
INTNLREL 182	World War I: Three Perspectives	2
IPS 249	Living at the Nuclear Brink: Yesterday and Today	3
ITALIAN 100	Masterpieces: Dante	3-5
ITALIAN 101	Italy: The Good, the Bad and the Ugly	3-5
ITALIAN 127	Inventing Italian Literature	4
ITALIAN 128	The Italian Renaissance: Power and Perspective	4
ITALIAN 129	Modern Italian Culture: Literary Landscapes	4
ITALIAN 152	Boccaccio's Decameron: The Ethics of Storytelling	3-5
ITALIAN 221	Italo Calvino: Literature, Science, Philosophy	3-5
ITALIAN 235E	Dante's "Inferno"	3-5
ITALIAN 236E	Dante's "Purgatorio and Paradiso"	4-5
ITALIAN 256	North/South in Contemporary Italy	4
ITALIAN 281	Novels into Film	4-5
LINGUIST 167	Languages of the World	3-4
OSPCPTWN 58	Racism, Colonialism and Genocide	3-5
OSPISTAN 61	State and Society in the Middle East	4
OSPISTAN 64	Travels in the Ottoman History with Evliya Çelebi	4
OSPMADRD 52	Revolution and Reconciliation in Film	4
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPSANTG 118X	Artistic Expression in Latin America	5
POLISCI 149S	Islam, Iran, and the West	5
RELIGST 1	Religion Around the Globe	4
RELIGST 56	Exploring Chinese Religions	4
RELIGST 61	Exploring Islam	4
RELIGST 61S	Islamic Encounters	4
RELIGST 65	Exploring Global Christianity	4
RELIGST 109	Emperor, Explorer, and God: Alexander the Great in the Global Imagination	3
RELIGST 118	Gandhi, Nonviolence, Religion	4
RELIGST 119	Gandhi and His Legacy: Violence and Nonviolence in the World and in Ourselves	4-5
RELIGST 124	Sufi Islam	4
RELIGST 136	Buddhist Yoga	4
RELIGST 156	Music and Religious Experience in the Contemporary World	3-5
RELIGST 201	Islamic Law	3-5
RELIGST 233	The Ethics of Religious Politics	5
SLAVIC 77Q	Russia's Weird Classic: Nikolai Gogol	3-4
SLAVIC 115	Between Europe and Asia: Introduction to Russian Culture	3
SLAVIC 129	Russian Versification: History and Theory	3-4
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 156	Nabokov in the Transnational Context	3-5
SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	3-5
SLAVIC 190	Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought	3-5
SLAVIC 198	Writing Between Languages: The Case of Eastern European Jewish Literature	3-5
SLAVIC 230	18th Century Russian Literature	5
SLAVIC 235	Late and Post-Soviet Literature	3-5
SLAVIC 242	Artists and Power: Eastern European Literature and Film from 1945 to 1991	2-5
SLAVIC 251	Dostoevsky: Narrative Performance and Literary Theory	3-5

International Security

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
AMSTUD 150C	The United States in the Twentieth Century	5
AMSTUD 256	America- China Relations	4-5
EARTHSYS 61Q	Food and security	3
EESS 61Q	Food and security	3
GERMAN 264	Post-Cold War German Foreign Policy	3-5
HISTORY 66S	The Americans are Coming!: The Cold War at Home and Abroad	5
HISTORY 102	History of the International System	5
HISTORY 103E	The International History of Nuclear Weapons	5
HISTORY 103F	Introduction to Military History	5
HISTORY 104D	International Security in a Changing World	5
HISTORY 138A	Germany and the World Wars	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 158	The United States Since 1945	4-5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
HISTORY 201A	The Global Drug Wars	4-5
HISTORY 201C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
HISTORY 202	International History and International Relations Theory	5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 204G	War and Society	5
HISTORY 252B	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
HISTORY 252K	America as a World Power: U.S. Foreign Relations, 1914 to Present	5

HISTORY 256	America- China Relations	4-5
HISTORY 261G	Presidents and Foreign Policy in Modern History	5
HISTORY 266C	The Cold War: An International History	5
HISTORY 297	The Cold War and East Asia	5
HUMBIO 92Q	Health and Security	3
INTNLREL 61Q	Food and security	3
INTNLREL 102	History of the International System	5
INTNLREL 110D	War and Peace in American Foreign Policy	5
INTNLREL 136	History of International Relations Thought	5
INTNLREL 140A	International Law and International Relations	5
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
INTNLREL 152	Organized Crime and Democracy in Latin America	5
INTNLREL 154	The Cold War: An International History	5
INTNLREL 168	America as a World Power: U.S. Foreign Relations, 1914 to Present	5
INTNLREL 173	Presidents and Foreign Policy in Modern History	5
INTNLREL 174	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
INTNLREL 182	World War I: Three Perspectives	2
IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5
IPS 219	Intelligence and National Security	3-4
IPS 231	Russia, the West and the Rest	4
IPS 241	International Security in a Changing World	5
IPS 244	U.S. Policy toward Northeast Asia	5
IPS 246	China on the World Stage	3-5
IPS 247	Organized Crime and Democracy in Latin America	5
IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	4
IPS 249	Living at the Nuclear Brink: Yesterday and Today	3
MSE 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	3
MSE 193	Technology and National Security	3
OSPBEJ 67	China-Africa and Middle East Relations	4
OSPBEB 15	Shifting Alliances? The European Union and the U.S.	4-5
OSPBEB 40	Global Trends: Anticipating the Future in Order to Shape It	4-5
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 110Y	War and Peace in American Foreign Policy	5
POLISCI 114S	International Security in a Changing World	5
POLISCI 115	Living at the Nuclear Brink: Yesterday and Today	3
POLISCI 116	The International History of Nuclear Weapons	5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 140L	China in World Politics	5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 211P	International Security in South Asia: Pakistan, India and the United States.	5
POLISCI 212X	Civil War and International Politics: Syria in Context	5
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 215	Explaining Ethnic Violence	5

POLISCI 215F	Nuclear Weapons and International Politics	5
POLISCI 216	State Building	5
POLISCI 216E	International History and International Relations Theory	5
POLISCI 218T	Terrorism	5
POLISCI 238T	History of International Relations Thought	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
POLISCI 242A	Why is Africa Poor?, Civil War and Peace Processes	5
POLISCI 244T	Organized Crime and Democracy in Latin America	5
PUBLPOL 122	Biosecurity and Bioterrorism Response	4-5
REES 231	Russia, the West and the Rest	4
SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5
THINK 19	Rules of War	4

Latin American and Iberian Studies

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
AMSTUD 142	The Literature of the Americas	5
CHILATST 180E	Introduction to Chicana/o-Latina/o Studies	5
CHILATST 275B	Governance, Resistance, and Identity in Modern Mexico	5
COMPLIT 142	The Literature of the Americas	5
CSRE 142	The Literature of the Americas	5
CSRE 142A	What is Hemispheric Studies?	5
EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
ENGLISH 172E	The Literature of the Americas	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 170B	Culture, Society and Politics in Latin America	5
HISTORY 174	Mexico Since 1876: History of a "Failed State"?	5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
HISTORY 279	Latin American Development: Economy and Society, 1800-2014	4-5
HISTORY 471A	Environmental History of Latin America	5
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
ILAC 136	Modern Iberian Literatures	3-5
ILAC 161	Modern Latin American Literature	3-5
ILAC 193	The Cinema of Pedro Almodovar	3-5
ILAC 193Q	Spaces and Voices of Brazil through Film	3-4
ILAC 224	Literature Inspired by the Spanish Republic and the Spanish Civil War	3-5
ILAC 257	Dictatorships in Latin America through testimonies and film	3-5
INTNLREL 152	Organized Crime and Democracy in Latin America	5
IPS 247	Organized Crime and Democracy in Latin America	5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
OSPBARCL 114	The Spanish Civil War and Historical Memory	5
OSPBARCL	Universitat Autònoma de Barcelona: Humanities 150A	5
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4

OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 41	Political Economy: Chile in Comparative Perspective	5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 118X	Artistic Expression in Latin America	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5
POLISCI 244P	Religion and Politics in Latin America	5
POLISCI 244T	Organized Crime and Democracy in Latin America	5
POLISCI 248L	Political-Economy of Crime and Violence in Latin America	5
POLISCI 248S	Latin American Politics	5
POLISCI 348S	Latin American Politics	5
PORTLANG 193Q	Spaces and Voices of Brazil through Film	3-4

Middle East and Central Asia (MECA)

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
ANTHRO 49	Violence and Belonging in the Middle East	5
ANTHRO 132B	Islam Law in Muslim and Non-Muslim Societies	3-5
ANTHRO 149A	Cities and Citizens in the Middle East	4
ANTHRO 150A	Minaret and Mahallah: Women and Islam in Central Asia	3-5
ANTHRO 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4
ARTHIST 106	Byzantine Art and Architecture, 300-1453 C.E.	4
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5
ARTHIST 208C	Architecture, Acoustics and Ritual in Byzantium	1-3
CLASSICS 171	Byzantine Art and Architecture, 300-1453 C.E.	4
CLASSICS 175	Architecture, Acoustics and Ritual in Byzantium	1-3
COMPLIT 146A	The Arab Spring in Arabic Literature	3-5
HISTORY 182C	Making of the Islamic World, 600-1500	5
HISTORY 184	Zionism	5
HISTORY 187	The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan	5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 282F	History of Modern Turkey	5
HISTORY 283	The New Global Economy, Oil and Origins of the Arab Spring	4-5
HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 288	Palestine and the Arab-Israeli Conflict	4-5

INTNLREL 151	Decoding the Arab Spring and the Future of the Middle East	5
INTNLREL 157	The Political Economy of the Arab Revolutions	5
INTNLREL 163	Introduction to Israeli Politics	5
IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	4
JEWISHST 271C	Campaigns and Elections in Israel	5
JEWISHST 279P	Introduction to Israeli Politics	5
JEWISHST 288	Palestine and the Arab-Israeli Conflict	4-5
MUSIC 208C	Architecture, Acoustics and Ritual in Byzantium	1-3
OSPISTAN 61	State and Society in the Middle East	4
OSPISTAN 62	Business Policy and Strategy in a Global Environment	4
OSPISTAN 64	Travels in the Ottoman History with Evliya Çelebi	4
OSPISTAN 68	Istanbul: Space, Memory, and Protest	5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 149T	Middle Eastern Politics	5
POLISCI 241C	Campaigns and Elections in Israel	5
POLISCI 245R	Politics in Modern Iran	5
POLISCI 249P	Introduction to Israeli Politics	5
REES 208C	Architecture, Acoustics and Ritual in Byzantium	1-3
REES 250A	Minaret and Mahallah: Women and Islam in Central Asia	3-5
REES 320	State and Nation Building in Central Asia	3-5
RELIGST 61	Exploring Islam	4
RELIGST 61S	Islamic Encounters	4
RELIGST 208C	Architecture, Acoustics and Ritual in Byzantium	1-3

Social Development and Human Well-Being

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
ANTHRO 126	Urban Culture in Global Perspective	5
ANTHRO 137A	Traditional Medicine in the Modern World	3
ANTHRO 138B	Urban Africa	5
ANTHRO 143B	Anthropology and International Development	3-5
ANTHRO 149A	Cities and Citizens in the Middle East	4
ANTHRO 150A	Minaret and Mahallah: Women and Islam in Central Asia	3-5
ANTHRO 152	Ritual, Politics, Power	5
ANTHRO 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4
CHILATST 180E	Introduction to Chicana/o-Latina/o Studies	5
ECON 155	Environmental Economics and Policy	5
EDUC 136	World, Societal, and Educational Change: Comparative Perspectives	4-5
EDUC 202	Introduction to Comparative and International Education	4-5
FEMGEN 101	Introduction to Feminist Studies	4-5
HISTORY 103D	Human Society and Environmental Change	4

HISTORY 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5	OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
HISTORY 106A	Global Human Geography: Asia and Africa	5	OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
HISTORY 106B	Global Human Geography: Europe and Americas	5	OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4
HISTORY 113	Before Globalization: Understanding Premodern World History	3-5	OSPCPTWN 71	Power and Performance in Community Practice	4
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5	OSPFLO 78	The Impossible Experiment: Politics and Policies of the New European Union	5
HISTORY 165D	The Pacific World	5	OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
HISTORY 174	Mexico Since 1876: History of a "Failed State"?	5	OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
HISTORY 201A	The Global Drug Wars	4-5	OSPMADRD 72	Issues in Bioethics Across Cultures	4
HISTORY 204E	Totalitarianism	4-5	OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5
HISTORY 221B	The 'Woman Question' in Modern Russia	5	OSPPARIS 81	France During the Second World War: Between History and Memory	5
HISTORY 224C	Genocide and Humanitarian Intervention	3	OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time	5
HISTORY 243G	Tobacco and Health in World History	4-5	OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
HISTORY 246E	Refugees and the Making of the Modern World: 1945-Present	4-5	POLISCI 133	Ethics and Politics of Public Service	5
HUMBIO 92Q	Health and Security	3	POLISCI 136S	Justice	4-5
HUMBIO 114	Environmental Change and Emerging Infectious Diseases	3-5	POLISCI 143S	Comparative Corruption	4
HUMBIO 129	Critical Issues in International Women's Health	4	POLISCI 149S	Islam, Iran, and the West	5
HUMBIO 129S	Global Public Health	4	POLISCI 244	An Introduction to Political Development	5
INTNLREL 103E	Global Catholicism	5	POLISCI 244U	Political Culture	5
INTNLREL 105C	Human Trafficking: Historical, Legal, and Medical Perspectives	5	PUBLPOL 134	Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
INTNLREL 114D	Democracy, Development, and the Rule of Law	5	PUBLPOL 168	Global Organizations: Managing Diversity	4
INTNLREL 128B	International Problem-Solving Through NGOs: Policy, Players, Strategies, and Ethics	2	RELIGST 1	Religion Around the Globe	4
INTNLREL 136R	Introduction to Global Justice	4	RELIGST 65	Exploring Global Christianity	4
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5	RELIGST 188A	Issues in Liberation: El Salvador	4
INTNLREL 141A	Camera as Witness: International Human Rights Documentaries	5	SIW 116	International Environmental Policy	5
INTNLREL 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5	SOC 113	Comparative Corruption	4
INTNLREL 144	New Global Human Rights	3	SOC 118	Social Movements and Collective Action	4
INTNLREL 145	Genocide and Humanitarian Intervention	5	SOC 134	Education, Gender, and Development	4
INTNLREL 180A	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5	SOC 137	Global Capitalism and Development	4
IPS 210	The Politics of International Humanitarian Action	3-5	SOC 148	Comparative Ethnic Conflict	4
IPS 213	International Mediation and Civil Wars	3-5	STS 140	Science, Technology and Politics	5
IPS 250	International Conflict Resolution	3	URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
IPS 270	The Geopolitics of Energy	3-5			
IPS 271A	U.S. Human Rights NGOs and International Human Rights	1			
LAWGEN 111Q	Introduction to International Human Rights	3			
MSE 92Q	International Environmental Policy	3			
MSE 185	Global Work	4			
MSE 197	Ethics, Technology, and Public Policy	5			
MSE 271	Global Entrepreneurial Marketing	3-4			
MSE 464	Global Project Coordination	3-4			
OSPBEIJ 42	Chinese Media Studies	4			
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5			
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3			
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5			

Additional Policies/Requirements:

- At least one course must be an upper-division seminar or colloquium.
- At least one writing intensive course designated as Writing in the Major (WIM) for International Relations.
- All courses must be taken for a letter grade, and a minimum grade of 'C' is required for courses to count towards major requirements.
- Completion of one quarter of academic study overseas, either through the Stanford Overseas Studies Program or an approved non-Stanford program. Non-Stanford programs must be pre-approved by the IR office before the student enrolls in the program.
- All IR majors must demonstrate proficiency in a foreign language by either completing two years of course work (second-year, third-quarter) or passing a proficiency exam. Foreign language units do not count towards the major.
- Upon approval, a maximum of 15 non-Stanford units may be applied to the major for credit.

Independent Study/Honors

	Units
INTNLREL 197 Directed Reading in International Relations	1-5
INTNLREL 198 Senior Thesis	2-10
INTNLREL 200A International Relations Honors Field Research	3
INTNLREL 200B International Relations Honors Seminar	3
INTNLREL 200C IR Honors Thesis Writing	1

Honors Program

The International Relations honors program offers qualified students the opportunity to conduct a major independent research project under faculty guidance. Such a project requires a high degree of initiative and dedication, significant amounts of time and energy, and demonstrated skills in research and writing.

In their junior year, students should consult with prospective honors advisers, choose the courses that provide academic background in their areas of inquiry, and demonstrate an ability to conduct independent research. Students can also select to complete an Interdisciplinary honors thesis with other programs on campus.

Prerequisites for participation include a 3.5 grade point average (GPA), a strong overall academic record, good academic standing, successful experience in writing a research paper, and submission of an acceptable thesis proposal. Students should submit their honors thesis proposal late in Winter Quarter of the junior year; please check with IR office for the exact deadline. Students are required to enroll in INTNLREL 200A International Relations Honors Field Research, in the Spring Quarter of their junior year and should consider participating in Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html). In their senior year, honors students must enroll in INTNLREL 200B International Relations Honors Seminar in Autumn Quarter, INTNLREL 200C IR Honors Thesis Writing in Winter Quarter, and in research units through INTNLREL 198 Senior Thesis each quarter (Autumn, Winter, and Spring) with their faculty adviser. Honors students present a formal defense of their theses in mid-May. Students must receive at least a grade of 'B+' in order to graduate with honors in International Relations.

Minor in International Relations

A minor in International Relations is intended to provide an interdisciplinary background allowing a deeper understanding of contemporary international issues. To declare the IR minor, complete the application for a minor in Axxs and complete the Course Proposal for IR Minor form and submit this to the IR office.

Students complete the minor by taking 35 units from the IR curriculum that do not duplicate with the student's major, including the following:

	Units
Required Courses:	
International Politics	5
POLISCI 1 Introduction to International Relations	
American Foreign Policy (Select one of the following):	5
POLISCI 110C America and the World Economy	
POLISCI 110D War and Peace in American Foreign Policy	
Upper Division Specialization Courses (25 units)	25
Total Units	35

Complete at least 25 units in one of the following specializations:

- Africa
- Comparative International Governance
- East and South Asia
- Economic Development/World Economy
- Europe (East and West) & Russia
- International History and Culture
- International Security
- Latin America and Iberian Studies
- Middle East and Central Asia (MECA)
- Social Development/Human Well-Being

Director: Michael Tomz (Political Science).

Faculty Committee: Kyle Bagwell (Economics), Judith L. Goldstein (Political Science), Norman Naimark (History), Kenneth Schultz (Political Science), Kenneth Scheve (Political Science), Kathryn Stoner (Freeman Spogli Institute).

Affiliated Faculty: Lisa Blaydes (Political Science), Gordon Chang (History), Joshua Cohen (Political Science), Larry J. Diamond (Hoover Institution), Amir Eshel (German Studies), James Fearon (Political Science), Zephyr Frank (History), Lawrence H. Goulder (Economics), Stephen H. Haber (Political Science), David J. Holloway (History, Political Science), Karen Jusko (Political Science), Terry L. Karl (Political Science), Stephen D. Krasner (Political Science), Philip Lipsky (Political Science), Beatriz Magaloni (Political Science), Robert McGinn (Management Science and Engineering), Norman Naimark (History), Rosamond Naylor (Freeman Spogli Institute for International Studies), Jean C. Oi (Political Science), William J. Perry (Freeman Spogli Institute for International Studies, Management Science and Engineering), Richard Roberts (History), Jonathan Rodden (Political Science), Scott Sagan (Political Science), Debra M. Satz (Philosophy), Andrew Walder (Sociology), Amir Weiner (History), Jeremy Weinstein (Political Science).

Other Affiliation: Jasmina Bojic (International Relations), Christophe Crombez (Freeman Spogli Institute for International Studies), John Dunlop (Hoover Institution), Erica Gould (International Relations), Kathleen Janus (Freeman Spogli Institute for Program on Social Entrepreneurship), Katherine Jolluck (History), Timothy Josling (Senior Member of Academic Council, Professor at the Food Research Institute, Emeritus), Anjini Kochar (Stanford Institute for Economic Policy Research), Martin W. Lewis (History), Pawel Lutomski (International Relations), Alice Lyman Miller (Hoover Institution), Bertrand Patenaude (Hoover Institution), Robert Rakove (International Relations), Margaret Sena (El Centro Chicano), Stephen Stedman (Political Science), Richard Steinberg (International Comparative and Area Studies), Kathryn Stoner (Freeman Spogli Institute for International Studies), Gil-Li Vardi (Hoover Institution).

Overseas Studies Courses in International Relations

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units			
OSPBEIJ 20	Communication, Culture, and Society: The Chinese Way	4	OSPPARIS 32	French Politics in Cross-National Perspective	5
OSPBEIJ 24	China's Economic Development	5	OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPBEIJ 42	Chinese Media Studies	4	OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPBEIJ 67	China-Africa and Middle East Relations	4	OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPBBER 15	Shifting Alliances? The European Union and the U.S.	4-5	OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPBBER 37	Leading from Behind? Germany in the International Arena since 1945	4-5	OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time	5
OSPBBER 40	Global Trends: Anticipating the Future in Order to Shape It	4-5	OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPBBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5	OSPSANTG 41	Political Economy: Chile in Comparative Perspective	5
OSPBBER 115X	The German Economy: Past and Present	4-5	OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPBBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5	OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPBBER 161X	The German Economy in the Age of Globalization	4-5	OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPBBER 174	Sports, Culture, and Gender in Comparative Perspective	5	OSPSANTG 118X	Artistic Expression in Latin America	5
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3	OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPCPTWN 31	Political Economy of Foreign Aid	3	OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5
OSPCPTWN 33	Southern Africa: from Liberation Struggles to Region-Building	4			
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5			
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4			
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4			
OSPCPTWN 71	Power and Performance in Community Practice	4			
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5			
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5			
OSPFLOR 98	Origins and Consequences of the European Financial Crisis	5			
OSPISTAN 61	State and Society in the Middle East	4			
OSPISTAN 62	Business Policy and Strategy in a Global Environment	4			
OSPISTAN 64	Travels in the Ottoman History with Evliya Çelebi	4			
OSPISTAN 65	Comparative Political Economy of Emerging Powers	4			
OSPISTAN 68	Istanbul: Space, Memory, and Protest	5			
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4			
OSPMADRD 52	Revolution and Reconciliation in Film	4			
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4			
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4			
OSPMADRD 72	Issues in Bioethics Across Cultures	4			
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4			
OSPOXFRD 24	British and American Constitutional Systems in Comparative Perspective	4-5			
OSPOXFRD 45	British Economic Policy since World War II	5			
OSPOXFRD 90	Economic Policy in Advanced Economies	5			
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5			

Jewish Studies

The Taube Center for Jewish Studies investigates all aspects of Jewish culture, history, religion, literature, language and education from biblical times to the present. Courses are offered on the undergraduate and graduate levels in a program complemented by a full range of guest lectures, conferences, and symposia. The Center annually sponsors the Donald and Robin Kennedy Undergraduate Award for the best undergraduate essay on any theme in Jewish Studies, the Dr. Bernard Kaufman Undergraduate Research Award in Jewish Studies awarded to an undergraduate engaged in research on Jews in modernity, and the Koret Award for best essay written in Hebrew by an undergraduate.

Graduate students must apply and enroll in the program through the departments of English, History, Comparative Literature, Religious Studies, or the School of Education, and meet the requirements of those departments. All graduate students in the university with an academic interest in Jewish Studies are encouraged to participate in the Colloquium for Jews, Judaism and Jewish Culture, an ongoing opportunity to share work and meet with faculty and visiting scholars. For more information about graduate studies in Jewish Studies, please contact the Center manager or Director.

Undergraduate Program in Jewish Studies

An undergraduate program in Jewish Studies is offered through Comparative Studies in Race and Ethnicity (CSRE) (p.). It is interdisciplinary in that it draws together a wide range of disciplines including history, literary studies, religious studies, gender studies, education and other fields. Through its courses and extra-curricular programs, the Taube Center seeks to introduce students to the ideas and experience of the Jewish people over its entire history, from the biblical period to the Holocaust and contemporary Israeli culture.

Undergraduates interested in completing a major or minor in Jewish Studies should visit the Comparative Studies in Race and Ethnicity (CSRE) (p. 395) section of this bulletin for program descriptions and courses.

Director: Charlotte Fonrobert (Religious Studies)

Affiliated Faculty and Teaching Staff: Zachary Baker (Stanford University Libraries), Joel Beinin (History), Jonathan Berger (Music), Arnold Eisen (Religious Studies, emeritus), Amir Eshel (German Studies), John Felstiner (English, emeritus), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Avner Greif (Economics), Katherine Jolluck (History), Ari Y. Kelman (Education), Jon Levitow (Language Center), Mark Mancall (History, emeritus), Norman Naimark (History), Reviel Netz (Classics), Jack Rakove (History), Aron Rodrigue (History), Noah Rosenberg (Biology), Gabriella Safran (Slavic Languages and Literatures), Vered Karti Shemtov (Language Center, Comparative Literature), Lee Shulman (Education, emeritus), Peter Stansky (History, emeritus), Marie-Pierre Ulloa (French), Amir Weiner (History), Sam Wineburg (Education), Steven Zipperstein (History)

Hebrew Instructional Staff: Gallia Porat, Estee Greif

Visiting Faculty: Avi Tchamni (Music)

Writer in Residence: Maya Arad

Language Center

The Stanford Language Center oversees all language instruction at Stanford. The center's charge is to guarantee that Stanford language programs are of the highest quality; to develop and administer achievement and proficiency tests needed to implement the language requirement; to provide technical assistance and support to the graduate students, lecturers, and faculty who deliver Stanford's language instruction; and to take leadership in research and development efforts in language learning. The Language Center is a unit within the Division of Literatures, Cultures, and Languages (p.).

Courses

Courses offered by the Language Center are listed under the following subject codes on the Stanford Bulletin's ExploreCourses web site:

- AMELANG (African and Middle Eastern Languages and Literatures) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AMELANG&filter-catalognumber-AMELANG=on>)
- ARABLANG (Arabic Language) (<https://explorecourses.stanford.edu/search?view=catalog&catalog=71&page=0&q=ARABLANG&filter-catalognumber-ARABLANG=on&filter-coursestatus-Active=on>)
- CATLANG (Catalan Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CATLANG&filter-catalognumber-CATLANG=on>)
- CHINLANG (Chinese Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CHINLANG&filter-catalognumber-CHINLANG=on>)
- EFSLANG (English for Foreign Students) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=EFSLANG&filter-catalognumber-EFSLANG=on>)
- FRENLANG (French Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=FRENLANG&filter-catalognumber-FRENLANG=on>)

- GERLANG (German Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GERLANG&filter-catalognumber-GERLANG=on>)
- ITALLANG (Italian Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=ITALLANG&filter-catalognumber-ITALLANG=on>)
- JAPANLNG (Japanese Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=JAPANLNG&filter-catalognumber-JAPANLNG=on>)
- KORLANG (Korean Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=KORLANG&filter-catalognumber-KORLANG=on>)
- PORTLANG (Portuguese Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PORTLANG&filter-catalognumber-PORTLANG=on>)
- SLAVLANG (Slavic Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SLAVLANG&filter-catalognumber-SLAVLANG=on>)
- SPANLANG (Spanish Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SPANLANG&filter-catalognumber-SPANLANG=on>)
- SPECLANG (Special Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SPECLANG&filter-catalognumber-SPECLANG=on>)
- TIBETLNG (Tibetan Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=TIBETLNG&filter-catalognumber-TIBETLNG=on>)

Beginning-Level, First-Year Courses

Beginning-level, first-year language courses require no previous knowledge of the language. The beginning-level sequence emphasizes development of the full range of language skills, reading, listening comprehension, the use of grammatical structures, and oral and written communication, through a variety of learning themes. Individual, small group, interactive work and multimedia-based activities reinforce language skills and provide the platform for adapting the curriculum to specific student learning goals. Cultural awareness is a strong component of the curriculum.

Intermediate-Level, Second-Year Courses

Intermediate-level, second-year language courses require completion of the beginning sequence, corresponding placement or consent of the program coordinator. The intermediate-level sequence focuses on continuous mastery and development of skills that help students to converse and present accurately and more fluently, incorporate more advanced grammatical structures in their oral and written work, use idiomatic expressions in the right context, and read and write more sophisticated compositions. Curricular objectives and enhanced cultural understanding are built into the courses through a multimodal approach.

Advanced-Level, Third-Year Courses

Advanced-level, third-year language courses require completion of the intermediate-year sequence, corresponding placement or consent of the program coordinator. The advanced-level sequence focuses on accurate understanding and use of structures through authentic texts and multimedia materials, and readings from various genres. Individual learning goals and student proficiency are taken into account to provide a learning environment that helps students become more autonomous learners.

Proficiency in Foreign Language Notation

A student who demonstrates levels of achievement equivalent to those expected at the end of the third quarter of the third year of study in a language may be awarded the notation "proficiency in" that language on the official transcript. Successful candidates tend to have completed the third year or beyond of language study at Stanford and spent considerable time studying abroad in the foreign language.

In order to receive the proficiency notation and for it to appear on the official transcript, the student must complete the following oral and written requirements according to the timeline below. The notation is available only for languages where external assessment is offered through Language Testing International. Successful completion of the oral component is required before proceeding with the written component.

Both oral and written components must be completed no later than the quarter preceding the graduating quarter.

For more information, please contact languagecenter@stanford.edu.

Application and Oral Component: Two quarters prior to graduation

1. Notify the Language Center via email of the intent to pursue the notation and request an official Oral Proficiency Interview (OPI). Since this is a formal interview conducted according to national academic and professional standards, at least two quarters of lead time are essential for scheduling.
2. Complete the 30-minute Oral Proficiency Interview as scheduled through the Language Center and conducted by a certified OPI tester. The interview must take place no later than one quarter prior to graduation and be administered on campus.
3. Receive an official rating of Advanced Low or higher on the Foreign Service Institute/American Council on the Teaching of Foreign Languages (FSI/ACTFL) scale of oral proficiency, except in the non-cognate languages which require a minimum rating of Intermediate High. Students who do not meet the minimum level for the notation will nonetheless receive an official OPI rating, which carries national recognition of their oral proficiency.

Writing Component: One quarter prior to graduation

1. Once approved to continue with the writing component, schedule a Writing Proficiency Test (WPT) through the Language Center. As an official writing assessment, the 90-minute exam must take place no later than one quarter prior to graduation and as soon as possible after the interview. The WPT is administered on campus and rated by a certified WPT rater.
2. Receive an official rating of Advanced Low or higher on the Foreign Service Institute/American Council on the Teaching of Foreign Languages (FSI/ACTFL) scale of writing proficiency, except in the non-cognate languages which require a minimum rating of Intermediate High. Students who do not meet the minimum level for the notation

will nonetheless receive an official WPT rating, which carries national recognition of their writing proficiency.

Proficiency Notation Timetable

1. Graduating Spring/Summer: Apply Autumn; interview Autumn/Winter; writing Winter.
2. Graduating Autumn: Apply Winter; interview Winter/Spring; writing Spring.
3. Graduating Winter: Apply Spring; interview Spring/Autumn; writing Autumn.

Overseas Studies Courses in the Language Center

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bossp.stanford.edu>) web site. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

African and Middle Eastern Languages and Literatures Program

The African and Middle Eastern Languages and Literatures Program offers classes in Hebrew, Persian, Swahili, Turkish, and African languages not regularly taught at Stanford. Based on current funding and student requests, the courses planned for 2014-15 are listed in the "ExploreCourses" section of this Bulletin under the AMELANG (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=AMELANG&filter-catalognumber-AMELANG=on>) program. Additional languages may still be offered upon request, provided funding is available. Requests for the 2015-16 academic year should be made by Spring Quarter of this year to the AME program office by email to khalil@stanford.edu (ebnerhar@stanford.edu).

First, second, and third year each refer to the yearly sequence of language study. Letter suffixes refer to the quarter within the sequence: "A" courses are typically taught in Autumn; "B" courses, in Winter; and "C" courses in Spring. Courses are 3, 4 or 5 units as listed. In some circumstances, a beginning or intermediate course may be offered in alternate years. Language courses may not be repeated for credit, and must be taken in sequence.

Fulfilling the Language Requirement in AME

Students can fulfill the language requirement by taking an African or Middle Eastern Language. At least 12 units are needed to complete the requirement. In some cases, the requirement is completed after the first quarter of intermediate-level language. In the case of African and Middle Eastern Languages taught only at the beginning level, students may petition the Language Center to fulfill the requirement by taking a directed reading course in the fourth quarter. Contact languagecenter@stanford.edu for more information.

Students who have taken courses in the relevant language at another institution, or have previous knowledge of the language, can request to be tested. Tests are comprised of two parts, written and oral. Students must display first-year level proficiency in the requested language to fulfill the requirement. Testing is guaranteed only for languages currently offered. Students planning to take a test must contact the AME Program no later than the Spring Quarter of their sophomore year. To submit a request for language testing, or to request that a language be taught, and

for further information on the program, see the African and Middle Eastern Language Program (<https://www.stanford.edu/dept/lc/language/courses/africanMidEastern>) web site.

Special Language Program

The Special Language Program (SLP) offers foreign languages not otherwise taught at Stanford. Based on current funding and student requests, the courses planned for 2014-15 are listed in the "Explore Courses (<http://explorecourses.stanford.edu>)" section of this Bulletin under the Special Languages (SPECLANG) Program; however, not every course listed is taught. Additional languages may still be offered upon request, provided funding is available. Requests for the 2015-16 academic year should be made by Spring Quarter of this year at the Special Language Program office (epriomas@stanford.edu).

First-year courses are offered for 3, 4 or 5 units, as listed. The 3-unit first-year courses are offered on a satisfactory/no credit basis only. The 4 and 5-unit first-year courses are offered with a letter grade option. Second-year as well as third-year courses are offered with a grade option. Most 3-unit language courses are offered for a two-year, three quarter sequence.

First, second, and third year each refer to the sequence of language study. Letter suffixes refer to the quarter within the sequence:

'A' suffix courses are typically taught Autumn.

'B' suffix courses are typically taught Winter.

'C' suffix courses are typically taught Spring.

In some circumstances, a beginning or intermediate course may be offered in alternate years. For more information, see <http://www.stanford.edu/dept/SLP>. Language courses may not be repeated for credit, and must be taken in sequence.

Fulfilling the Language Requirement in Special Language Program

Students can fulfill the language requirement by taking courses offered by the Special Language Program. At least 12 units are needed to complete the requirement. Students who have already taken courses in the relevant language at another institution, or who have previous knowledge of the language, can request to be tested. Tests are comprised of written and oral parts. A student must display first-year level proficiency in the requested language in order to fulfill the requirement. Testing is guaranteed only for these languages currently offered. Students planning to take a test must contact the Special Language Program no later than the Spring Quarter of sophomore year. To submit a request for language testing, or to request a language, apply via the Special Language Program (<http://www.stanford.edu/dept/SLP>) web site.

Minor in Middle Eastern Languages, Literatures, and Cultures

The undergraduate minor in Middle Eastern Languages, Literatures, and Cultures has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Middle Eastern and African languages, and to the cultures and civilizations of the Middle East and Africa. Contact the minor adviser before declaring at kyobeid@stanford.edu.

Students declaring a minor must do so no later than the last day of the fourth quarter before degree conferral. For example, students graduating in June (Spring Quarter) must declare the minor no later than the last day of Spring Quarter of their junior year. If a student is not able to meet this

deadline, he or she may petition the Language Center director and request a revised declaration date, which may be granted at the director's discretion.

The requirements for a minor in Middle Eastern Languages, Literatures, and Cultures are:

1. Courses for the minor must be taken for a letter grade unless only offered for faculty-elected satisfactory/no credit.
2. All courses must be completed with a letter grade of 'C' or better.
3. Courses may not overlap with those taken for a major course of study.
4. Relevant courses taken to fulfill a GER may count toward fulfilling both minor and GER requirements.

Cultural Studies Track

Requirements are:

1. Completion of the language prerequisite at the beginning level, or a demonstrated equivalent competence.
2. In the case of Arabic, completion of six non-language courses, including three from the AME program.
3. In the case of Hebrew and African languages, completion of six non-language related courses. Consult minor adviser for course options.

Language Track

- Option one:
 - a. Completion of prerequisite language study at the beginning level, or a demonstrated equivalent competence.
 - b. Completion of one year of language study at the intermediate level.
 - c. Completion of three related non-language courses, including, in the case of Arabic, one of the ARABLANG 10-16 (formerly AMELANG 30-36) series. ARABLANG 10 Arabic Calligraphy is offered this year. Consult the minor adviser (kyobeid@stanford.edu) for course options.
- Option two:
 - a. Completion of prerequisite language study at the advanced level in Arabic, Hebrew, or an African language, for the equivalent of three years of language study.
 - b. Completion of one African and Middle Eastern literature and culture course relevant to the language studied in the case of Arabic or Hebrew; or, in the case of African languages, completion of one non-language African Studies course relevant to the language studied. Consult the minor adviser (kyobeid@stanford.edu) for course options.
- Option three:

Completion of four years of language study, at least two of which must be concluded at Stanford.

Minor in Modern Languages

An undergraduate minor in Modern Languages is offered through the Division of Literatures, Cultures, and Languages and includes courses offered through the Language Center. Students should consult the "Division of Literatures, Cultures, and Languages (p.)" section of this bulletin for further details about the minor and its requirements.

Director: Elizabeth Bernhardt

Associate Director: Joan Molitoris

African and Middle Eastern Languages

Coordinator: Khalil Barhoum

Lecturers: Ameneh Shervin Emami (Persian), Ebru Ergul (Turkish), Jon Levitow (Yiddish), Sarah Mkhonza (Xhosa/Zulu), Samuel Mukoma

(Swahili), Gallia Porat (Hebrew), Vered Shemtov (Sr. Lecturer in Jewish Language & Literature)

Arabic Language

Coordinator and Minor Adviser: Khalid Obeid

Lecturers: Salem Aweiss, Khalil Barhoum (Sr. Lecturer), Thoraya Boumejdi, Eva Hashem, Ramzi Salti

Catalan Language

Coordinator: Joan Molitoris (Associate Director, Language Center)

Lecturer: Robert Casas Roige

Chinese Language

Coordinator: Chao Fen Sun (Professor, Asian Languages and Cultures)

Lecturers: Marina Chung, Michelle DiBello, Sik Lee Dennig, Nina Lin, Yu-hwa Liao Rozelle, Le Tang, Huazhi Wang, Hong Zeng, Youping Zhang, Xiaofang Zhou

English for Foreign Students

Director and Senior Lecturer: Philip Hubbard

Lecturers: Robyn Brinks Lockwood, Kristopher Geda, Carole Mawson, Andrea Kevech, Andrew Oman, Kenneth Romeo, Constance Rylance, Seth Streichler, Dominic Wang

French Language

Coordinator: Heather Howard

Lecturers: Maria Comsa, Marie Lasnier, Alix Mazuet, Vera Shapirshteyn

German Language

Coordinator: Paul Nissler

Lecturers: Jason Kooiker, William E. Petig (Sr. Lecturer)

Italian Language

Coordinator: Anna Cellinese

Lecturers: Giorgio Alberti, Marta Baldocchi, Alessandra McCarty, Giovanni Tempesta

Japanese Language

Coordinator: Yoshiko Matsumoto (Professor, Asian Languages and Cultures)

Lecturers: Momoyo Kubo Lowdermilk, Emiko Yasumoto Magnani, Emi Mukai, Chie Muramatsu, Michelle Rogoyski, Momoe Saito Fu, Yoshiko Tomiyama

Korean Language

Coordinator: Hee-Sun Kim

Lecturer: Hannah Yoon

Portuguese Language

Coordinator and Senior Lecturer: Lyris Wiedemann

Lecturers: Fernanda Consoni, Agripino Silveira

Slavic Language

Coordinator: Eugenia Khassina

Senior Lecturer: Rima Greenhill

Spanish Language

Coordinator: Alice Miano

Lecturers: Vivian Brates, Citlalli del Carpio, Irene Corso, Joan Molitoris (Associate Director, Language Center), Carimer Ortiz Cuevas, Veronika Reinhold, Kara Sanchez, Ana Maria Sierra, María Cristina Urruela, Ana Vivancos, Hae-Joon Won

Special Language Program

Coordinator: Eva Prionas, Modern Greek Language and Literature

Lecturers: Cathy Haas (ASL), Dzuong Nguyen (Vietnamese), Brajesh Samarth (Hindi)

Fulbright Scholars: Joe-Bren Consuelo (Tagalog), Shantanu Das (Bengali), Sita Nurmasitah (Indonesian)

Tibetan Language Program

Lecturer and Coordinator: Robert W. Clark

Overseas Studies Courses in the Language Center

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

Overseas Studies Courses in Chinese

		Units
OSPBEIJ 1C	First-Year Modern Chinese, First Quarter	5
OSPBEIJ 3C	First-Year Modern Chinese, Third Quarter	5
OSPBEIJ 6C	Beginning Conversational Chinese, First Quarter	2
OSPBEIJ 8C	Beginning Conversational Chinese, Third Quarter	2
OSPBEIJ 21C	Second-Year Modern Chinese	5
OSPBEIJ 23C	Second-Year Modern Chinese	5
OSPBEIJ 101C	Third-Year Modern Chinese	5
OSPBEIJ 103C	Third-Year Modern Chinese	5
OSPBEIJ 211C	Fourth-Year Modern Chinese	5
OSPBEIJ 213C	Fourth-Year Modern Chinese	5

Overseas Studies Courses in French

		Units
OSPPARIS 22P	Intermediate French I	5
OSPPARIS 23P	Intermediate French II	5
OSPPARIS 124P	Advanced French I	5
OSPPARIS 125P	Advanced French II	5

Overseas Studies Courses in German

OSPBER 1Z	Accelerated German: First and Second Quarters	8
OSPBER 2Z	Accelerated German, Second and Third Quarters	8
OSPBER 3B	German Language and Culture	5
OSPBER 21B	Intermediate German	5
OSPBER 100B	Berlin Heute	2
OSPBER 101B	Advanced German	5

Overseas Studies Courses in Italian

OSPFLOR 21F	Accelerated Second-Year Italian, Part A	5
OSPFLOR 22F	Accelerated Second-Year Italian Part B	5
OSPFLOR 31F	Advanced Oral Communication: Italian	3

Overseas Studies Courses in Japanese

OSPKYOTO 2K	First-Year Japanese Language, Culture, and Communication, Second Quarter	5
OSPKYOTO 3K	First-Year Japanese Language, Culture, and Communication, Third Quarter	5
OSPKYOTO 21K	Second-Year Japanese Language, Culture, and Communication, First Quarter	5
OSPKYOTO 22K	Second-Year Japanese Language, Culture, and Communication, Second Quarter	5
OSPKYOTO 23K	Second-Year Japanese Language, Culture, and Communication, Third Quarter	5
OSPKYOTO 102K	Third-Year Japanese Language, Culture, and Communication, Second Quarter	5
OSPKYOTO 103K	Third-Year Japanese Language, Culture, and Communication, Third Quarter	5
OSPKYOTO 210K	Advanced Japanese	5

Overseas Studies Courses in Spanish

OSPMADR 12M	Accelerated Second-Year Spanish I	5
OSPMADR 13M	Accelerated Second-Year Spanish II	5
OSPMADR 102M	Composition and Writing Workshop for Students in Madrid	3-5
OSPSANTG 12S	Accelerated Second-Year Spanish, Part I: Chilean Emphasis	5
OSPSANTG 13S	Accelerated Second-Year Spanish, Part II: Chilean Emphasis	5
OSPSANTG 102S	Composition and Writing Workshop for Students in Santiago	3-5

Latin American Studies

Units

Courses offered by the Interdisciplinary Program in Latin American Studies are listed under the subject code LATINAM on the Stanford Bulletin's ExploreCourses web site (<https://explorecourses.stanford.edu/search?filter-term=Autumn=on&filter-catalognumber=LATINAM=on&filter-term=Summer=on&page=0&q=LATINAM&filter-coursestatus=Active=on&view=catalog&filter-term=Spring=on&collapse=&filter-term=Winter=on&catalog=71>).

The Center for Latin American Studies (CLAS) supports research and teaching in all fields of study as they relate to Latin America. Academic programs encourage interdisciplinary approaches and draw on the expertise of nearly sixty active affiliated faculty members representing Stanford's various schools and departments. Stanford University Libraries' substantial Latin American collections are valuable resources for students, faculty, and visiting researchers alike. Each year CLAS hosts a number of Tinker Visiting Professors, highly distinguished Latin American and Iberian scholars who come to Stanford to teach a course in their field of specialization. The Center for Latin American Studies maintains a highly active public events calendar and provides funding to students and faculty for a variety of research, teaching, internship, and conference activities.

Units

Stanford offers three formal academic programs in Latin American Studies: an Undergraduate Minor, Interdisciplinary Honors, and a Master of Arts degree. The Center is a U.S. Department of Education Title VI National Resource Center for Latin America.

Units

Undergraduate Programs in Latin American Studies

Stanford University offers an interdisciplinary honors and a minor in Latin American Studies. Although we currently do not offer an undergraduate major in Latin American Studies, students may concentrate on Latin America through other departmental and interdisciplinary degree programs, such as Anthropology (p. 310), History (p. 485), Political Science (p. 583), Iberian and Latin American Cultures (p. 503), or International Relations (p. 519). Interested students should consult the relevant departmental web sites and sections of this bulletin for further information.

Undergraduates can obtain a coterminal M.A. degree in Latin American Studies while concurrently working on their undergraduate major by applying during the regular admissions cycle no later than their senior year.

Financial Aid

Units

Each summer, CLAS awards grants to a small number of undergraduates to complete internships in Latin America. Applications include a proposal, academic transcript, and letters of recommendation. Students from any department are eligible to apply. See the Center for Latin American Studies (<http://las.stanford.edu>) website.

Students in undergraduate programs who plan to enroll in Portuguese or Quechua language and area or international studies courses may be eligible for Academic Year and Summer Foreign Language and Area Studies (FLAS) fellowships. Recipients of FLAS fellowships must be American citizens or permanent residents. For detailed program information and eligibility, see the Center for Latin American Studies (<http://las.stanford.edu>) website.

Graduate Programs in Latin American Studies

The one-year master's program in Latin American Studies is designed for students who have experience working, living, or studying in Latin America or Iberia and little prior course work on Latin America.

Stanford University does not offer a Ph.D. program in Latin American Studies; however, doctoral candidates may concentrate on Latin America through other departmental programs, such as Anthropology, History, Political Science, or Iberian and Latin American Cultures. Interested applicants should consult the relevant departmental web sites and sections of this bulletin for admissions information and further details.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Latin American Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

Admission

The application deadline for the 2015-16 academic year is December 9, 2014. Applicants submit an online application, including a 500-word statement of purpose, resumé, 10-15 page double-spaced academic writing sample, and three letters of recommendation. In addition, all applicants must submit official transcripts and GRE general test scores. TOEFL scores are required of applicants whose first language is not English or who did not earn a degree from an undergraduate institution where English is the primary language of instruction. For information on university graduate admissions and to access the online application, visit the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) website.

Applicants must meet the University admission requirements, have a working knowledge of Spanish or Portuguese at the university third-year level or higher, and have experience working, living, or studying in Latin America or Iberia prior to admission.

CLAS takes a broad approach to evaluating applications for admission. As important as GRE scores and grades are the applicant's essay, letters of recommendation, academic writing sample, and the experiences and goals conveyed through the personal statement and resume.

Students interested in pursuing the joint degree program in Latin American Studies and Law (J.D.) or a dual degree in Latin American Studies and Business (M.B.A.) or Medicine (M.D.) must apply to each program separately and be accepted by both. Details about the joint and dual degree programs can be found in the "Master's (p. 538)" tab in this section.

Financial Aid

The Center for Latin American Studies provides several graduate fellowships as well as limited course assistantships with the Tinker Visiting Professors each quarter.

Students in graduate programs who plan to enroll in Portuguese or Quechua language and area or international studies courses may be eligible for Academic Year and Summer Foreign Language and Area Studies (FLAS) fellowships. Recipients of FLAS fellowships must be American citizens or permanent residents. Applicants to the M.A. program have priority in the annual FLAS competition; in recent years CLAS has also awarded FLAS fellowships to students enrolled in the School of Engineering and the School of Law. For detailed program information and eligibility, see the Center for Latin American Studies (<http://las.stanford.edu>) website.

CLAS awards Working Group grants to graduate students across the University who wish to organize events such as lectures, speaker series, symposia, exchange of working papers, and collaborative research efforts.

For detailed program information and eligibility, see the Center for Latin American Studies (<http://las.stanford.edu>) website.

Minor in Latin American Studies

The Minor in Latin American Studies is open to students in any major. Students who wish to complete the minor must declare online (through Axess (<http://axess.stanford.edu>)) and submit a proposal of course work no later than the second quarter of their junior year. The minor must be completed by the second quarter of the senior year. Units taken for a student's major cannot be double-counted towards the minor.

Requirements for the minor include:

1. Completion of 25 units as follows:
 - a. A 5-unit course surveying Latin America: either ILAC 131 Introduction to Latin America: Cultural Perspectives or an approved substitute.
 - b. 20 additional units in a number of courses which together comprise a coherent focus on a theoretical problem or issue of the region, such as (but not limited to) culture and identity, political economy, or sustainable development. All courses, with the exception of Overseas Studies courses, must be at the 100-level or higher. For approved courses, see the "Related Courses (p. 539)" tab in this section.
 - c. At least 10 of the 25 units must be completed at Stanford. All courses to be counted toward the minor must be taken for a letter grade.
2. Fulfill the Foreign Language Requirement. The minimum requirement for completion of the minor in Latin American Studies is advanced proficiency in Spanish or Portuguese by any one of the following means:
 - a. Completion of seven quarters of college-level study of Spanish or Portuguese.
 - b. Completion of a course taught in Spanish or Portuguese at the 100-level or higher, with a letter grade of 'B' (3.0) or higher. This may be a course on Spanish or Portuguese language or literature, or some other subject, as long as it fulfills the above criteria.
 - c. Achievement of the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. Contact the Language Center (p. 532) for test dates and procedures.
3. Recommended: experience in Latin America such as study abroad, field research, or an internship.

Upon completion of all requirements, the CLAS subcommittee on undergraduate programs authorizes the designation of the Minor in Latin American Studies on the student's transcript.

Honors in Latin American Studies

Note: The Interdisciplinary Honors Program in Latin American Studies is no longer accepting applications. Students contemplating a thesis with a Latin American emphasis should contact the Center (latinamerica@stanford.edu).

The Honors Program in Latin American Studies is open to undergraduate students in any major. The aim of the honors program is to prepare students to pursue individualized research on Latin America, culminating in an honors thesis completed under the supervision of a faculty adviser. The honors program is particularly suited to the student who wishes to go on to graduate school or pursue employment in an institution emphasizing research and independent work. Although not required, students are encouraged to undertake independent field research in Latin America for

their thesis. It is strongly recommended that students enroll in (1 unit), during their sophomore or junior year for an overview of research design and methods for international field research.

Admission to the honors program is by application by the end of the junior year. Applications are reviewed and approved by the CLAS director and associate director. Applicants must have a cumulative grade point average (GPA) of 3.3 (B+) or higher and maintain this average in courses taken to satisfy the requirements. Courses must be taken for a letter grade where that option is available. Courses credited toward LAS honors may be double-counted toward the student's major requirements.

To graduate with interdisciplinary honors in Latin American Studies a student must:

1. Complete a total of 35 units in courses certified for honors by the Center for Latin American Studies, distributed as follows:
 - a. A 5-unit survey course, normally taken in the sophomore year: either ILAC 131 Introduction to Latin America: Cultural Perspectives or an approved substitute.
 - b. For breadth: two 4-5-unit courses at the 100-level or higher with a focus on Latin America. These courses are normally taken during the sophomore and junior years. For approved courses, see the "Related Courses (p. 539)" tab in this section.
 - c. For depth: one 4-5-unit course, approved by the honors adviser, at the 100-level or higher with a focus on Latin America that explores in depth an issue of particular interest to the student. See the "Related Courses (p. 539)" tab in this section.
 - d. (1-10 units), under the supervision of the honors adviser. Normally these units are spread over two or three quarters of the senior year and are devoted to the completion of the honors thesis.
 - e. Honors Seminar in Latin American social history, taken in the senior year. Please consult the Center for Latin American Studies website for the 2014-15 honors seminar.
 - f. Additional courses at the 100-level or higher focusing on Latin America to bring the total to 35 units. Up to 5 units may come from study of Spanish or Portuguese beyond the seventh quarter. For approved courses, see the "Related Courses (p. 539)" tab in this section.
 - g. Of the courses applied to 'b' and 'c' above, up to 10 units may be completed in Overseas Studies, and up to 5 units may be taken as directed individual study. For approved Overseas Studies courses, see the "Related Courses (p. 539)" tab in this section.
 - h. All courses to be counted toward the honors program must be taken for a letter grade.
2. Fulfill the Foreign Language Requirement. The minimum requirement for completion of the honors program in Latin American Studies is advanced proficiency in Spanish or Portuguese by any one of the following means:
 - a. Completion of seven quarters of college-level study of Spanish or Portuguese.
 - b. Completion of a course taught in Spanish or Portuguese at the 100-level or higher, with a letter grade of 'B' (3.0) or higher. This may be a course on Spanish or Portuguese language or literature, or another subject, as long as it fulfills the above criteria.
3. Achievement of the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. Contact the Language Center (p. 532) for test dates and procedures.
4. Submit an honors thesis that meets standards of scholarly excellence and is approved by the thesis adviser. If graduating in June, participate in the LAS honors symposium in late May or early June.

Master of Arts in Latin American Studies

The Master of Arts in Latin American Studies is an interdisciplinary program. The curriculum consists of a core set of courses surveying the history, politics, society, ecology, and culture of the Latin American region; advanced language training; and in-depth course work. In consultation with a faculty adviser, students select a course of study suited to their individual interests.

Coterminal Bachelor's and Master's Degrees in Latin American Studies

Undergraduates at Stanford may apply for admission to the coterminal master's program in Latin American Studies when they have earned a minimum of 120 units toward graduation, including advanced placement and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The application deadline for the 2015-16 academic year is December 9, 2014.

Coterminal applicants must submit:

- an application form
- a 500-word statement of purpose
- a resumé
- a 10-15 page double-spaced academic writing sample
- three letters of recommendation
- a Stanford transcript
- GRE general test scores

Coterminal applicants must have a minimum cumulative GPA of 3.5 and a working knowledge of Spanish or Portuguese at a university third-year level or higher.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Degree Requirements

University requirements for the master's degree are described in the "Graduate Degrees General Requirements (p. 43)" section of this bulletin.

The program requires completion of a minimum of 45 graduate units. Each student is assigned a faculty adviser who works with the student to develop a customized program of study. All courses for the M.A. degree must be at the 100-level or higher, with at least half being at the 200-level or higher.

Candidates to the M.A. in Latin American Studies must complete the following:

		Units
a. Culture and Society		
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5
b. Environment, Ecology, and Sustainability		
ANTHRO 262	Indigenous Peoples and Environmental Problems	5
c. Political Economy		
POLISCI 348S	Latin American Politics	5
Total Units		14-15

LATINAM 200 Seminar on Contemporary Issues in Latin American Studies 1

1. Core courses (15 units): one core 5-unit course in each of three fields of specialization:
2. *Related courses (15 units)*: three courses (5 units each), one from each of the three fields of specialization listed in '1' above. For approved courses, see the "Related Courses (p. 539)" tab in this section.
3. *Elective courses (10-15 units)*: three elective courses (3-5 units each) in one of the three fields of specialization (see '1' above) from across the University's offerings, selected with guidance and approval from the faculty adviser.
4. *Language requirement*: at least 3 units of course work on a second Latin American language. Students proficient in both Spanish and Portuguese must take either an advanced third-year language course in either Spanish or Portuguese or beginning Quechua; students proficient in only Spanish or only Portuguese must take a basic course in the language in which they are not already proficient. Up to 6 units of foreign language coursework may be applied toward the M.A. degree. All foreign language coursework must be taken at the 100-level or higher.
5. *Seminar requirement*: 3 units (1 per quarter) of:
6. *Thesis option*: students may elect to write a master's thesis; they may register for LATINAM 398 Master's Thesis for up to 10 units of thesis research under the guidance of an Academic Council faculty member. Thesis units may be counted toward the elective field unit requirements (requirement number 3, above).
7. *Grade requirements*: All courses to be counted toward the MA (with the only exception being LATINAM 200 Seminar on Contemporary Issues in Latin American Studies) must be taken for a letter grade and earn a B- or better. M.A. candidates must maintain a cumulative GPA of 3.0 or higher.

Joint Degree Program in Latin American Studies and Law

The joint degree program in Latin American Studies and Law allows students to pursue the M.A. degree in Latin American Studies concurrently with the Doctor of Jurisprudence (J.D.) degree, with a significant number of courses that may apply to both degrees. It is designed to train students interested in a career in teaching, research, or the practice of law related to Latin American legal affairs. Students must apply separately to the Latin American Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of language training. For more information, see the "Joint Degree Programs (p.)" section of this bulletin and consult with the program offices for the two programs.

Dual Master's Degree with Medicine or Business

Stanford offers dual degree programs that grant an M.A. degree in Latin American Studies and a Master of Business Administration degree or a Medical Doctor degree. Students must apply separately to and be accepted by both the Latin American Studies M.A. program and the Graduate School of Business or School of Medicine.

Director of the Center: Rodolfo Dirzo

Associate Director: Elizabeth Sáenz-Ackermann

Tinker Visiting Professors: Violeta Arancibia, Isidoro Cheresky, Petronilha Beatriz Gonçalves e Silva, Jorge Ramón Gonzalez.

Units

Affiliated Faculty and Staff:

Anthropology: Clifford Barnett (emeritus), George Collier (emeritus), Lisa Curran, Carolyn Duffey, William Durham, James Fox, Angela Garcia, John Rick

Art and Art History: Enrique Chagoya

Biology: Gretchen Daily, Rodolfo Dirzo, Harold Mooney (emeritus), Peter Vitousek, Virginia Walbot

BOSP Santiago: Ivan Jaksic

Carnegie Institution for Science: Gregory Asner

Comparative Literature: Roland Greene, Hans Ulrich Gumbrecht, José David Saldívar

Earth Sciences, School of: Pamela Matson

Economics: Roger Noll (emeritus)

Education, Graduate School of: Paulo Blikstein, Martin Carnoy, Amado Padilla, Guadalupe Valdés

Engineering, School of: Jenna Davis, Leonard Ortolano

English: Ramón Saldívar (also Comparative Literature)

Freeman Spogli Institute for International Studies: Rosamond Naylor

History: Zephyr Frank, Ana Raquel Minian Andjel, Mikael Wolfe

Hoover Institute: Herbert Klein

Human Biology: Anne Firth Murray

Iberian and Latin American Cultures: Héctor Hoyos, Marília Librandi Rocha, Michael Predmore, Joan Ramon Resina, Jorge Ruffinelli, Lisa Surwillo, Yvonne Yarbro-Bejarano

Language Center: Alice Miano, Ana Sierra, Agripino Silveira, Lyris Wiedemann

Law, School of: James Cavallaro, Jonathan Greenberg, Thomas Heller (emeritus)

Linguistics: John Rickford

Medicine, School of: Michele Barry, Gabriel Garcia, Grant Miller, Paul Wise

Political Science: Stephen Haber, Terry Karl, Beatriz Magaloni, Robert Packenham (emeritus), Gary Segura, Michael Tomz

Religious Studies: Thomas Sheehan

Sociology: Tomás Jiménez, Michael Rosenfeld

Stanford University Libraries: Adán Griego, Sergio Stone, Robert Trujillo

Latin American Studies Related Courses

The following courses may be used to satisfy requirements for the M.A. degree, honors, or minor in Latin American Studies. Consult the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site for full course descriptions and class schedules.

When selecting courses from this list, please be aware of the following:

1. Overseas Studies courses, denoted by the subject code OSPSANTG, apply only to the undergraduate minor or honors programs and are not options for M.A. students.
2. Courses with numbers ending in the letter N or Q are Introductory Seminars for undergraduates and are not options for M.A. students.

Courses ending in N give preference to freshmen; courses ending in Q give preference to sophomores.

- All courses to be counted toward the M.A., minor, or honors in Latin American Studies must be taken at the 100-level or higher, with the exception of Overseas Studies courses (see also note 1, above).
- All courses to be counted toward the M.A., minor, or honors in Latin American Studies must be taken for a letter grade.
- For the M.A. degree, related courses must be taken for 5 units each. M.A. elective courses may be taken for 3-5 units each.
- Some courses have prerequisites or special enrollment requirements. Students are responsible for making sure they have completed any prerequisites and/or secured an instructor's permission, as needed.

Culture and Society

Courses related to the Culture and Society field of specialization include:

		Units
ANTHRO 102B	Aztec Language and Culture	3
ANTHRO 124N	Maya Mythology and the Popol Vuh	3
ANTHRO 206A	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 215B	Peoples and Cultures of Ancient Mesoamerica	5
ANTHRO 222A	Race and Culture in Mexico and Central America	3-5
CSRE 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
ENVRES 270	Graduate Practicum in Environment and Resources	1-5
FILMSTUD 316	International Documentary	4
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 112	Medicine and Disease in the Ancient World	5
HISTORY 170B	Culture, Society and Politics in Latin America	5
HISTORY 203E	Global Catholicism	5
HISTORY 274	Mexico Since 1876: History of a "Failed State"?	5
HISTORY 274E	Urban Poverty and Inequality in Latin America	5
HISTORY 301A	The Global Drug Wars	4-5
HISTORY 366B	Immigration Debates in America, Past and Present	3-5
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5
HISTORY 477	Transnational Latina/o History	4-5
ILAC 114N	Introduction to Lyric Poetry	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
ILAC 161	Modern Latin American Literature	3-5
ILAC 224	Literature Inspired by the Spanish Republic and the Spanish Civil War	3-5
ILAC 245	Brazil's Rhythm and Songs	3-5
ILAC 252	Guerillas	3-5
ILAC 253	Poverty, Redemption and Writing: Franciscanism in Latin America	3-5
ILAC 277	Spanish and Society: Rock en Español	3-5
ILAC 278A	Senior Seminar: Pau-Brazil from Modernism to Concretism	3-5
ILAC 341	Roberto Bolaño	3-5
ILAC 363	Visions of the Andes	3-5
ILAC 367	João/Joyce: Guimarães Rosa and the World Novel	3-5
ILAC 382	Latin@ Literature	3-5
LAW 681E	Human Rights and Film	1
LAW 695	International Human Rights: Media and Education	2
RELIGST 188A	Issues in Liberation: El Salvador	4
SOC 350W	Workshop: Migration, Race, Ethnicity and Nation	1-3

Environment, Ecology, and Sustainability

Courses related to the Environment, Ecology, and Sustainability field of specialization include:

		Units
ANTHRO 260	Social and Environmental Sustainability: The Costa Rican Case	3-5
ANTHRO 262	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 278	Evolution and Conservation in Galapagos	5
BIO 234	Conservation Biology: A Latin American Perspective	3
EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities	3
ETHICSOC 278M	Introduction to Environmental Ethics	4-5
HUMBIO 129	Critical Issues in International Women's Health	4
HUMBIO 129S	Global Public Health	4

Political Economy

Courses related to the Political Economy field of specialization include:

		Units
ECON 106	World Food Economy	5
EDUC 238X	Teacher Policies in Latin America	3-5
EDUC 306A	Economics of Education in the Global Economy	5
EDUC 404X	Topics in Brazilian Education: Public Policy and Innovation for the 21st Century	1-2
HISTORY 172A	Mexico: From Colony to Nation, or the History of an impossible Republic?	5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
HISTORY 274	Mexico Since 1876: History of a "Failed State"?	5
INTNLREL 141A	Camera as Witness: International Human Rights Documentaries	5
IPS 241	International Security in a Changing World	5
LAW 413T	Policy Practicum: Human Rights in the Americas: the Inter-American System	3-4
POLISCI 244C	Political Change in Latin America: The contemporary challenge to democracy	5
POLISCI 247G	Governance and Poverty	5
POLISCI 348S	Latin American Politics	5
POLISCI 440B	Comparative Political Economy	5

Overseas Studies Courses in Latin American Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 41	Political Economy: Chile in Comparative Perspective	5
OSPSANTG 58	Living Chile: A Land of Extremes	5
OSPSANTG 62	Topics in Chilean History	4-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 85	Marine Ecology of Chile and the South Pacific	5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 118X	Artistic Expression in Latin America	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5

Linguistics

Courses offered by the Department of Linguistics are listed under the subject code LINGUIST on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=LINGUIST&filter-catalognumber-LINGUIST=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=LINGUIST&filter-catalognumber-LINGUIST=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=LINGUIST&filter-catalognumber-LINGUIST=on>).

Linguistics concerns itself with the fundamental questions of what language is and how it is related to the other human faculties. In answering these questions, linguists consider language as a cultural, social, and psychological phenomenon and seek to determine what is unique in languages, what is universal, how language is acquired, and how it changes. Linguistics is, therefore, one of the cognitive sciences; it provides a link between the humanities and the social and natural sciences, as well as education, and hearing and speech sciences.

The department offers courses at the undergraduate and graduate levels in the areas central to linguistic theory and analysis. Many of them deal with the analysis of structural patterns in the different components that make up language, including sounds (phonetics and phonology), meanings (semantics and pragmatics), words (morphology), sentences (syntax), and the ways they vary and change over time. Other courses integrate the analysis of linguistic structure with phenomena that directly concern other disciplines. These include courses in computational linguistics, language acquisition, the philosophy of language, psycholinguistics, and sociolinguistics.

A variety of open forums provide for the discussion of linguistic issues, including colloquia and regularly scheduled workshops in child language, computational linguistics, phonetics and phonology, psycholinguistics, semantics and pragmatics, sociolinguistics, and syntax.

Mission of the Undergraduate Program in Linguistics

The mission of the undergraduate program in Linguistics is to provide students with basic knowledge in the principal areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics, historical linguistics, and sociolinguistics) and the skills to do more advanced work in these subfields. Courses in the major also involve interdisciplinary work with connections to other departments including computer science, psychology, cognitive science, communication, anthropology, and foreign language. The program provides students with excellent preparation for further study in graduate or professional schools as well as careers in business, social services, government agencies, and teaching.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. By the end of the program, students are expected to be able to:

1. formulate theoretically interesting and tractable research questions;
2. find and collect information relevant to answering their research questions;
3. bring linguistic theory to bear in analyzing and evaluating information;
4. articulate the questions and outcomes of the process described in 1-3; and
5. engage with peers in an intellectual community around linguistic issues.

Graduate Programs in Linguistics

The department offers an M.A., Ph.D., and Ph.D. minor in Linguistics.

Learning Outcomes (Graduate)

The purpose of the master's program is to develop students' knowledge and skills in Linguistics and to prepare them for a professional career or doctoral studies. This is achieved through completion of courses, including coursework in an area of specialization within the field, and experience with independent research.

The Ph.D. is conferred upon candidates who have demonstrated the ability to conduct substantive, independent research in Linguistics. Through completion of advanced coursework and rigorous methodological and analytical training, the doctoral program prepares students to make original contributions to knowledge in linguistics, to articulate the results of their work, and to demonstrate its significance to linguistics and related fields.

Cognitive Science

Linguistics is participating with the departments of Philosophy and Psychology in an interdisciplinary program in Cognitive Science for doctoral students. The program is intended to provide an interdisciplinary education as well as a deeper concentration in linguistics. Students who complete the Linguistics and Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Linguistics. To receive this field designation, students must complete 30 units of approved courses; at least 18 of these must be from outside of Linguistics. Special topic seminars are excluded from the approved list in favor of more foundational courses. The courses are to be determined in consultation with the graduate studies adviser.

Linguistics Course Catalog Numbering System

Courses numbered under 100 are designed primarily for pre-majors. Courses with 100-level numbers are designed for majors, minors, and M.A. and Ph.D. minor candidates in Linguistics. Those with numbers 200 and above are primarily for graduate students, but with consent of the instructor some of them may be taken for credit by qualified undergraduates. At all levels, the course numberings indicate a special area, as follows:

Number	Special Area
00-04	General
05-09	Phonetics
10-14	Phonology
15-19	Morphology
20-29	Syntax
30-39	Semantics, Pragmatics, Discourse
40-49	Language Acquisition, Psycholinguistics
50-62	Sociolinguistics, Language Variation, Change
63-73	Language and Culture, Structure of a Language
74-79	Methods, Mathematical Linguistics, Statistics
80-89	Computational Linguistics
90-99	Directed Work, Theses, Dissertations

Bachelor of Arts in Linguistics

The undergraduate major stresses the study of language both as a fundamental human faculty and as a changing social institution. At the core of the program is a set of departmental courses on the nature of human language; the major also draws on courses offered by other departments and programs.

The Linguistics major cuts across the humanities and the social and physical sciences. It provides a solid general education as a background for advanced studies in such disciplines as anthropology, cognitive science, communication, computer science, education (language, literacy, and culture), hearing and speech sciences, languages, law, linguistics, philosophy, and psychology.

Degree Requirements

Requirements for the B.A. include at least 50 units of course work in Linguistics and approved courses in related fields. Of the 50 units required for the major, no more than 12 may be below the 100 level. All required courses must be taken for a letter grade of C- or better. No more than two other courses used towards the 50 units of course work may be taken on a credit/no credit basis (CR/NC).

Required Courses:

Specified Courses

LINGUIST 110	Introduction to Phonetics and Phonology
LINGUIST 196	Introduction to Research for Undergraduates (to be taken Autumn Quarter, junior year)
LINGUIST 197A	Undergraduate Research Seminar (to be taken Winter Quarter, senior year)

Two 200-level courses in Linguistics (see explorecourses for current options)

Breadth Courses

Take one course each from three of the areas below, or two of these courses plus LINGUIST 1.

Courses offered 2014-15 that fulfill the breadth requirement include the following (specific courses that count to be revisited annually)

LINGUIST 1	Introduction to Linguistics (may be counted toward the major only if taken before senior year)
LANGUAGE CHANGE OR TYPOLOGY	
LINGUIST 160	Introduction to Language Change
LINGUIST 162	History Through Language
LINGUIST 167	Languages of the World
MORPHOLOGY AND SYNTAX	
LINGUIST 116	Morphology
LINGUIST 120	Introduction to Syntax
LINGUIST 121	Crosslinguistic Syntax
LINGUIST 222A	Foundations of Syntactic Theory I
LINGUIST 222B	Foundations of Syntactic Theory II
SEMANTICS AND PRAGMATICS	
LINGUIST 130A	Introduction to Semantics and Pragmatics
LINGUIST 230A	Introduction to Semantics and Pragmatics
LINGUIST 130B	Introduction to Lexical Semantics
LINGUIST 230B	Semantics and Pragmatics I
SOCIOLINGUISTICS	
LINGUIST 150	Language in Society
LINGUIST 250	Sociolinguistic Theory and Analysis
PSYCHOLINGUISTICS	
LINGUIST 140	Language Acquisition I
LINGUIST 240	Language Acquisition I
LINGUIST 141	Language and Gesture
LINGUIST 144	Minds and Machines
PSYCH 131	Language and Thought
COMPUTATIONAL LINGUISTICS	
LINGUIST 180	From Languages to Information
LINGUIST 280	From Languages to Information
LINGUIST 183	Programming and Algorithms for Natural Language Processing
LINGUIST 188	Natural Language Understanding

Units

Other Requirements

Other course work— additional courses counting toward the 50 unit requirement should form a coherent program of study. Majors should discuss this course work with the undergraduate studies adviser or approved department adviser.

Language— majors must have competence in at least one language other than English as part of their understanding of the field of linguistics and its study. This is usually demonstrated by the completion of six quarters of language study at Stanford or equivalent; level of proficiency is determined by the Language Center or the relevant language department. Majors may petition to be exempted from the language requirement if they have grown up speaking a language other than English and can use it for everyday purposes and for linguistic analysis.

Honors Program

Students who wish to undertake a more intensive program of study, including independent research, should pursue departmental honors. Students should apply for honors by the end of Spring Quarter of their junior year. As part of the application, the student must write a research proposal describing the honors project, which must be approved by the faculty adviser. Approval is given only to students who have maintained a grade point average (GPA) of 3.3 (B+) or better in the courses required for the major.

Honors students complete a total of 60 units including the 50 units for the major, plus 10 additional units of Independent Study and Honors Research. In addition, they must complete an honors thesis based on research conducted with a principal adviser who must be a member of the Linguistics faculty, and a secondary faculty adviser who may, with the approval of the Undergraduate Studies Committee, be a member of another department. In the Autumn Quarter of the senior year, honors students enroll in LINGUIST 199 Independent Study, to work closely with one of their advisers on the research project. In Winter and Spring quarters, honors students enroll in LINGUIST 198 Honors Research, with the student's principal adviser for close supervision of the honors thesis. The thesis must be submitted in final, acceptable, form by May 15. The thesis topic is presented orally at a department Honors Colloquium late in Spring Quarter.

Joint Major Program in Linguistics and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Linguistics Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 229)" section of this bulletin for details on Computer Science requirements.

All majors must take at least 50 units of course work in linguistics and related fields, with no more than 12 units below the 100 level and at least 8 units above the 200 level. No more than two courses (and none from the breadth list above) can be taken on a credit/no credit basis (CR/NC).

Students in the joint major must take LINGUIST 180 From Languages to Information as one of these breadth courses. Students may count LINGUIST 180/CS 124 towards both major requirements as long as the units are not double-counted. If LINGUIST 180/CS 124 is required for both Linguistics and a student's specific CS track, Linguistics works with the student to identify another course (possibly directed reading/independent study for 3-4 units) that would benefit the academic plan. (In this scenario, LINGUIST 180/CS 124 fulfills major requirements in both Linguistics and CS, but the units are only counted towards CS; additional units of work would be identified in Linguistics to meet the unit requirements.)

All majors must take LINGUIST 196 Introduction to Research for Undergraduates, usually in the junior year, and all majors must take LINGUIST 197A Undergraduate Research Seminar, usually in the senior year.

Within the 50 unit total, students in the joint major are encouraged to sign up for Directed Research units as part of completing the integrative capstone project. The expectation is that this project is supervised by a Linguistics faculty member. The specific number of units varies and is decided by the student and faculty adviser.

Different from LINGUISTICS majors, CS + Linguistics joint majors are not required to display competence in a language other than English and therefore are not required to complete the equivalent of six quarters of language study.

For breadth within Linguistics, each joint major must take at least one course each from five of the following eight areas. Courses offered 2014-15 that fulfill the breadth requirement include the following (specific courses that count to be revisited annually):

	Units
• GENERAL LINGUISTICS	
LINGUIST 1 Introduction to Linguistics (may be counted toward the major only if taken before senior year)	4
• PHONETICS AND PHONOLOGY	
LINGUIST 110 Introduction to Phonetics and Phonology	4
LINGUIST 210A Phonology	2-4
• LANGUAGE CHANGE OR TYPOLOGY	
LINGUIST 162 History Through Language	3-4
LINGUIST 163 History of the English Language	5
LINGUIST 167 Languages of the World	3-4
• MORPHOLOGY AND SYNTAX	
LINGUIST 120 Introduction to Syntax	4
LINGUIST 121 Crosslinguistic Syntax	3-4
LINGUIST 222A Foundations of Syntactic Theory I	3-4
• SEMANTICS AND PRAGMATICS	
LINGUIST 130A Introduction to Semantics and Pragmatics	4
or LINGUIST 230A Introduction to Semantics and Pragmatics	
LINGUIST 130B Introduction to Lexical Semantics	3-4
• SOCIOLINGUISTICS	

LINGUIST 65	African American Vernacular English	3-5
LINGUIST 150	Language in Society	4-5
LINGUIST 156	Language and Gender	4
LINGUIST 157	Sociophonetics	1-4
LINGUIST 250	Sociolinguistic Theory and Analysis	2-4
• PSYCHOLINGUISTICS		
LINGUIST 140	Language Acquisition I	4
LINGUIST 141	Language and Gesture	3
LINGUIST 144	Minds and Machines	4
PSYCH 131	Language and Thought	4
• COMPUTATIONAL LINGUISTICS		
LINGUIST 180	From Languages to Information	3-4
LINGUIST 188	Natural Language Understanding	2-4

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentsservicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in Linguistics

Requirements for the minor include at least 28 units of course work (typically seven courses) in Linguistics and related fields, approved in advance by the Linguistics undergraduate studies adviser. No more than two courses, neither of which is among the required courses, may be taken on a credit/no credit basis. The courses counting towards the minor must be units beyond those needed to satisfy the student's major course of study.

- | Required courses for the minor: | | Units |
|---------------------------------|--|-------|
| LINGUIST 1 | Introduction to Linguistics | 4 |
| Select two of the following: | | 8 |
| LINGUIST 110 | Introduction to Phonetics and Phonology | |
| LINGUIST 120 | Introduction to Syntax | |
| LINGUIST 130A | Introduction to Semantics and Pragmatics | |
| Select one of the following: | | 4 |

LINGUIST 150	Language in Society
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LINGUIST 160	Introduction to Language Change
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or, in advance consultation with the Linguistics undergraduate studies adviser, a course in historical linguistics or the history of a language.

- At least four other courses determined in advance consultation with the Linguistics undergraduate studies adviser. Students are encouraged to take at least one 200-level Linguistics course. Students may also choose to do independent work with a faculty member of their choice.

Master of Arts in Linguistics

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The following are additional departmental requirements. Candidates should review the department's Guidelines for the M.A. Degree in Linguistics for further particulars concerning these requirements.

- Courses*—Individual programs should be worked out in advance with an adviser in Linguistics keeping the following requirements and guidelines in mind. The M.A. degree requires the completion of 45 units; at least 36 of these must be in Linguistics. The course work must include one introductory graduate-level course in each of the areas of syntax, semantics, and sound structure, as well as four courses in the student's area of specialization. If the student can make a compelling case, the department may allow up to 9 of the 45 units to be in a department other than Linguistics. Courses from outside the department must have clear linguistic content or contribute methodological knowledge that facilitates the thesis project; furthermore, if the student is simultaneously enrolled in a degree program in another department, not all of these 9 units can be earned in that department. No more than two courses should be at the 100 level. The overall grade point average (GPA) must be at least 3.0 (B) for all degree program course work.
- Language*—Reading knowledge of a non-native language in which a substantial linguistic literature is written, with sufficient facility to understand and interpret linguistic research published in that language, or in-depth research on the structure of a non-native language.
- Thesis or Thesis Project*—A research paper supervised by a committee of three faculty (normally fulfilled by up to 6 units of LINGUIST 398 Directed Research).

Coterminal Bachelor's and Master's Degree Program in Linguistics

The Department of Linguistics admits a limited number of undergraduates to the coterminal degree program. Students are required to submit to the department a complete application, which includes a statement of purpose identifying a thesis topic, a Stanford transcript, three letters of recommendation (at least one of which must be from a faculty member in Linguistics), and a proposed course of study (worked out in advance with a Linguistics adviser). Applicants for the coterminal degree may apply as early as their eighth quarter and no later than early in the eleventh quarter of undergraduate study. Decisions on admission to the coterminal degree program rest with the Graduate Admissions Committee of the Department of Linguistics. For further application information, see the department's web pages.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University

application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Doctor of Philosophy in Linguistics

The following requirements are in addition to the basic University requirements for the degree sought; see the "Graduate Degrees (p. 43)" section of this bulletin. Candidates should review the department's Guidelines for the Degree of Ph.D. in Linguistics (<https://linguistics.stanford.edu/department-resources>) for further particulars concerning these requirements.

1. *Language*—candidates must demonstrate the ability to read at least one foreign language in which a substantial linguistic literature is written, with sufficient facility to understand and to interpret linguistic research published in that language. (Particular areas of specialization may require additional research languages.)
In addition, each candidate must demonstrate an explicit in-depth knowledge of the structure of at least one language (normally neither the candidate's native language nor the language used for the reading exam). This requirement is fulfilled by writing an original research paper on a language.
2. *Courses*—a minimum of 135 units of graduate work beyond the bachelor's degree, or 90 units beyond the master's degree. The course requirements detailed in the Department of Linguistics Ph.D. Handbook guarantee that each student covers a sufficient set of subareas within the field.
Candidates must maintain a satisfactory record in the number and distribution of units completed. The overall course work GPA must be at least 3.0 (B), and all of the basic courses should be completed with at least a 'B'.
3. *Research*—the prospective Ph.D. candidate is expected to complete two substantial qualifying papers. The deadline for completion of the first qualifying paper is the end of Autumn Quarter of the second year; the deadline for completion of the second qualifying paper is the end of Autumn Quarter of the third year. The subject matter of the two papers, although it may be related (for example, same language), must be clearly distinct. The requirement is fulfilled by two quarters of LINGUIST 395 Research Workshop (1-2 units each), and by oral discussion with a committee of at least three faculty members selected by the student and the faculty.
4. *Candidacy*—students must complete a prescribed portion of the basic course requirement (see item 2 above), one language requirement (see item 1 above), and one qualifying paper (see item 3 above) by the end of their sixth academic quarter, normally the Spring Quarter of the second year. The department faculty reviews each sixth quarter student and votes on whether to admit the student to candidacy. A student is only admitted to candidacy if, in addition to the student's fulfilling the specified department prerequisites, the faculty makes the judgment that the student has the ability to complete the remaining stages of the Ph.D. program at a level of superior quality. Students who are not admitted to candidacy will be terminated from the program; at the department's discretion, they may be allowed to complete any requirements that remain for the M.A. degree and receive this degree.
5. *Teaching*—at least three quarters serving as a teaching assistant in Linguistics courses.
6. *Dissertation*—
 - a. appointment of a dissertation committee.
 - b. an approved written dissertation proposal is required by the end of Autumn Quarter of the fourth year.
 - c. oral discussion of the dissertation proposal with an augmented dissertation committee by Spring Quarter of the 4th year.

- d. passing a University oral examination on the dissertation and related areas which includes a public presentation of the dissertation research.
- e. dissertation (up to 15 units of LINGUIST 399 Dissertation Research).

Ph.D. Minor in Linguistics

1. *Courses*—the candidate must complete 30 units of course work in linguistics. The University requires that at least 20 of these units be at the 200 level or above; the remaining 10 units must be at the 100 level or above. The course work for the minor must include one introductory course in each of sound structure, syntax, and semantics; typically fulfilled by LINGUIST 110 Introduction to Phonetics and Phonology, LINGUIST 120 Introduction to Syntax or LINGUIST 121 Crosslinguistic Syntax, LINGUIST 130A Introduction to Semantics and Pragmatics or LINGUIST 130B Introduction to Lexical Semantics and Pragmatics or LINGUIST 130B Introduction to Lexical Semantics and Pragmatics or LINGUIST 130B Introduction to Lexical Semantics and Pragmatics or by 200-level introductory courses in the same areas. Courses submitted for the minor must be incremental units beyond those used to satisfy the major. Individual programs should be worked out in advance with the student's Ph.D. minor adviser in Linguistics.
2. *Research Project (optional)*—the candidate may elect to present a paper which integrates the subject matter of linguistics into the field of specialization of the candidate.
3. The Linguistics minor adviser or designee serves on the candidate's University oral examination committee and may request that up to one-third of the examination be devoted to the minor subject.

Emeriti: (Professors) Joan Bresnan, Clara N. Bush, Shirley Brice Heath, William R. Leben, Stanley Peters, Elizabeth C. Traugott, Thomas A. Wasow

Chair: Daniel Jurafsky

Professors: Eve V. Clark, Penelope Eckert (on leave Spring), Daniel Jurafsky, Martin Kay, Paul Kiparsky, Beth Levin, Christopher Manning, John R. Rickford

Associate Professors: Arto Anttila, Christopher Potts, Meghan Sumner

Assistant Professors: Vera Gribanova (on leave), Boris Harizanov, Daniel Lassiter, Robert Podesva

Professor Research: Cleo Condoravdi

Courtesy Professors: Herbert H. Clark, Kenji Hakuta, Yoshiko Matsumoto, James McClelland, Orrin W. Robinson III, Chao Fen Sun

Courtesy Associate Professors: H. Samy Alim, James A. Fox, Miyako Inoue

Courtesy Assistant Professors: Michael C. Frank, Noah Goodman

Senior Lecturer: Philip L. Hubbard, Language Center

Lecturers: Bill MacCartney, Sarah Ogilvie, Asya Pereltsvaig

Consulting Professors: Jared Bernstein, Ronald Kaplan, Lauri Karttunen, Paul Kay, Livia Polanyi, Annie Zaenen, Arnold Zwicky

Mathematical and Computational Science

Courses offered by Mathematical and Computational Science program are listed under the subject code MCS on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) website.

This interdisciplinary undergraduate degree program in MCS is administered by the departments of Mathematics, Computer Science, and Statistics. It provides a core of mathematics basic to all the mathematical sciences and an introduction to concepts and techniques of computation, optimal decision making, probabilistic modeling, and statistical inference.

Using the faculty and courses of the departments listed above, this major prepares students for graduate study or employment in the mathematical and computational sciences or in those areas of applied mathematics which center around the use of computers and are concerned with the problems of the social and management sciences. A biology option is offered for students interested in applications of mathematics, statistics, and computer science to the biological sciences (bioinformatics, computational biology, statistical genetics, neurosciences); and in a similar spirit, an engineering and statistics option.

Undergraduate Mission Statement for Mathematical and Computational Science

The mission of the Mathematical and Computational Science Program is to provide students with a core of mathematics basic to all the mathematical sciences and an introduction to concepts and techniques of computation, optimal decision making, probabilistic modeling and statistical inference. The program is interdisciplinary in its focus, and students are required to complete course work in mathematics, computer science, statistics, and management science and engineering. A computational biology track is available for students interested in biomedical applications. The program prepares students for careers in academic, financial and government settings as well as for study in graduate or professional schools.

Learning Outcomes

The program expects undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to demonstrate:

1. understanding of principles and tools of statistics.
2. command of optimization and its applications and the ability to analyze and interpret problems from various disciplines.
3. an understanding of computer applications emphasizing modern software engineering principles.
4. an understanding of multivariate calculus, linear algebra, and algebraic and geometric proofs.

Bachelor of Science in Mathematical and Computational Science

The requirement for the bachelor's degree, beyond the University's basic requirements, is an approved course program of 75-77 units, distributed as follows:

	Units
Mathematics (MATH)	
MATH 41 Calculus *	5
MATH 42 Calculus *	5
Select one of the following:	5
MATH 51 Linear Algebra and Differential Calculus of Several Variables	
MATH 51H Honors Multivariable Mathematics	
Select one of the following:	5
MATH 52 Integral Calculus of Several Variables	
MATH 52H Honors Multivariable Mathematics	
Select one of the following:	5
MATH 53 Ordinary Differential Equations with Linear Algebra	
MATH 53H Honors Multivariable Mathematics	
Select one of the following:	3
MATH 104 Applied Matrix Theory	
MATH 113 Linear Algebra and Matrix Theory	
Computer Science (CS)	
CS 103 Mathematical Foundations of Computing	5
Select one of the following:	5-10
CS 106X Programming Abstractions (Accelerated)	
or both	
CS 106A Programming Methodology	
CS 106B Programming Abstractions	
Select two of the following:	7-9
CME 108 Introduction to Scientific Computing	
CS 107 Computer Organization and Systems	
CS 154 Introduction to Automata and Complexity Theory	
CS 161 Design and Analysis of Algorithms	
CS 181W Computers, Ethics, and Public Policy	
Management Science and Engineering (MS&E)	
MSE 211 Linear and Nonlinear Optimization	
MSE 221 Stochastic Modeling	
Or select three of the following:	7-11
MSE 111 Introduction to Optimization	
MSE 121 Introduction to Stochastic Modeling	
MSE 211 Linear and Nonlinear Optimization	
MSE 221 Stochastic Modeling	
MSE 251 Stochastic Control	
Statistics (STATS)	
STATS 116 Theory of Probability	5
STATS 200 Introduction to Statistical Inference	3
Select one of the following:	3
STATS 191 Introduction to Applied Statistics	
STATS 203 Introduction to Regression Models and Analysis of Variance	

* Students who scored a 5 on both the Calculus AB and BC advanced placement exams (total of 10 units) can be waived out of MATH 41 and MATH 42. See also the Registrar's Advanced Placement (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/mathematicalandcomputationalscience/>) web site.

Writing in the Major Requirement (3-4 units)

The University requires students to complete at least one approved writing-intensive course in each of their majors. See the Hume Center for Writing and Speaking web site (<https://undergrad.stanford.edu/tutoring-support/hume-center/writing/writing-major/overview-wim-requirement>) for a full description of the WIM requirement.

Choose one from the following to fulfill the WIM requirement:

	Units
MATH 109 Applied Group Theory	3-4
MATH 110 Applied Number Theory and Field Theory	units
MATH 120 Groups and Rings	
MATH 171 Fundamental Concepts of Analysis	
CS 181W Computers, Ethics, and Public Policy	
STATS 155 Statistical Methods in Computational Genetics	

Mathematical and Computational Science Electives (9 Units)

Choose three courses in Mathematical and Computational Science 100-level or above, at least 3 units each from two different departments. At least one must be from following list:

	Units
ECON 102C Advanced Topics in Econometrics	9-15
ECON 107 Causal Inference and Program Evaluation	
ECON 140 Introduction to Financial Economics	
ECON 160 Game Theory and Economic Applications	
EE 261 The Fourier Transform and Its Applications	
EE 263 Introduction to Linear Dynamical Systems	
EE 282 Computer Systems Architecture	
EE 364A Convex Optimization I	
EE 364B Convex Optimization II	
MCS 100 Mathematics of Sports	
MSE 220 Probabilistic Analysis	
MSE 223 Simulation	
MSE 251 Stochastic Control	
MATH 104 Applied Matrix Theory	
MATH 106 Functions of a Complex Variable	
MATH 108 Introduction to Combinatorics and Its Applications	
MATH 113 Linear Algebra and Matrix Theory	
MATH 115 Functions of a Real Variable	
MATH 116 Complex Analysis	
MATH 131P Partial Differential Equations I	
MATH 171 Fundamental Concepts of Analysis	
MATH 172 Lebesgue Integration and Fourier Analysis	
MATH 174 Calculus of Variations	

PHIL 151	Metalogic (Winte)
STATS 202	Data Mining and Analysis
STATS 206	Applied Multivariate Analysis
STATS 207	Introduction to Time Series Analysis
STATS 208	Introduction to the Bootstrap
STATS 216	Introduction to Statistical Learning
STATS 217	Introduction to Stochastic Processes
STATS 218	Introduction to Stochastic Processes
STATS 219	Stochastic Processes
STATS 240	Statistical Methods in Finance
STATS 270	A Course in Bayesian Statistics

For Computer Science (CS), electives can include courses not taken as units under the CS list above and the following:

CME 206	Introduction to Numerical Methods for Engineering
CME 211	Introduction to Programming for Scientists and Engineers
CME 302	Numerical Linear Algebra
CS 108	Object-Oriented Systems Design
CS 110	Principles of Computer Systems
CS 140	Operating Systems and Systems Programming
CS 143	Compilers
CS 157	Logic and Automated Reasoning
CS 161	Design and Analysis of Algorithms
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion
CS 194	Software Project
CS 221	Artificial Intelligence: Principles and Techniques
CS 223A	Introduction to Robotics
CS 225A	Experimental Robotics
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 243	Program Analysis and Optimizations
CS 246	Mining Massive Data Sets
CS 248	Interactive Computer Graphics

With the adviser's approval, courses other than those offered by the sponsoring departments may be used to fulfill part of the elective requirement. These may be in fields such as biology, economics, electrical engineering, industrial engineering, and medicine, etc., that might be relevant to a mathematical sciences major, depending on a student's interests.

- At least three quarters before graduation, majors must file with their advisers a plan for completing degree requirements.
- All courses used to fulfill major requirements must be taken for a letter grade with the exception of courses offered satisfactory/no credit only.
- The student must have a grade point average (GPA) of 2.0 or better in all course work used to fulfill the major requirement.
- Electives that are not offered this year, but may be offered in subsequent years, are eligible for credit toward the major: CME 311, Econ 179, EE 278B, STATS 215.

Mathematical and Computational Science Biology Track (Option)

Students in the Biology track take the introductory courses for the Mathematics and Computational Science major with the following allowable substitutions as electives.

	Units
STATS/BIO 141 Biostatistics ¹	3-5
Take three courses from the Biology Core:	10
BIO 41 Genetics, Biochemistry, and Molecular Biology	
BIO 42 Cell Biology and Animal Physiology	
BIO 43 Plant Biology, Evolution, and Ecology	
Or take two courses from the core and one of the following:	3-4
BIO 102 Demography: Health, Development, Environment	
BIO 136 Evolutionary Paleobiology	
BIO 143 Evolution	
BIO 144 Conservation Biology: A Latin American Perspective	
BIO 160A Developmental Biology I	
BIO 160B Developmental Biology II	
BIO 183 Theoretical Population Genetics	
BIO 230 Molecular and Cellular Immunology	
Honors students select the following three courses:	1-4
STATS 155 Statistical Methods in Computational Genetics	
BIO 113 Fundamentals of Molecular Evolution	
BIO 146 Population Studies	

¹ Can replace STATS 191 Introduction to Applied Statistics or STATS 203 Introduction to Regression Models and Analysis of Variance

Mathematical and Computational Science Engineering Track (Option)

Students in the Engineering track take the introductory courses for the Mathematics and Computational Sciences major with the following allowable substitutions.

	Units
With consent of advisor, courses of the CME 100-102-104 series can substitute courses of the MATH 51-52-53 series. Depending on the exact material taught in relevant years, an additional math course might be necessary	
CME 100 Vector Calculus for Engineers	
CME 102 Ordinary Differential Equations for Engineers	
CME 104/ ENGR 155B Linear Algebra and Partial Differential Equations for Engineers	
STATS 116 may be replaced by:	3-5
STATS 110 Statistical Methods in Engineering and the Physical Sciences	
STATS 191/STATS 203 may be replaced by:	3-4
STATS 202 Data Mining and Analysis	
Engineering Track Electives:	
Select one of the following:	3-4
MATH 106 Functions of a Complex Variable	
MATH 108 Introduction to Combinatorics and Its Applications	

MATH 116	Complex Analysis	
MATH 118	Mathematics of Computation	
MATH 132	Partial Differential Equations II	
MATH 174	Calculus of Variations	
PHIL 151	Metalogic	
Select two of the following:		3-5
ENGR 15	Dynamics	
ENGR 20	Introduction to Chemical Engineering	
ENGR 25B	Biotechnology	
ENGR 30	Engineering Thermodynamics	
ENGR 40	Introductory Electronics	
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 105	Feedback Control Design	

Mathematical and Computational Science Statistics Track (Option)

Students in the Statistics track take the introductory courses for the Mathematics and Computational Sciences major with the following additional courses - (85 units total)

Required:

	Units
STATS 217 Introduction to Stochastic Processes	3
Advanced CS, such as:	
CS 246 Mining Massive Data Sets	3-4
Advanced MS&E, such as:	
MSE 220 Probabilistic Analysis	3-4
or	
MSE 223 Simulation	
Statistics Track Electives:	
Select three of the following:	9
STATS 202 Data Mining and Analysis	
STATS 206 Applied Multivariate Analysis	
STATS 207 Introduction to Time Series Analysis	
STATS 208 Introduction to the Bootstrap	
STATS 216 Introduction to Statistical Learning	
STATS 219 Stochastic Processes	
STATS 270 A Course in Bayesian Statistics	

Honors Program

The honors program is designed to encourage a more intensive study of mathematical sciences than the B.S. program. In addition to meeting all requirements for the B.S., the student must:

- Maintain an average letter grade equivalent to at least a 3.5 in all academic work.
- Complete at least 15 units in mathematical sciences in addition to the requirements for the major listed above. Include in these 15 units at least one of the following:
 - An approved higher-level graduate course
 - Participation in a small group seminar
 - At least 3 units of directed reading
- Prepare a statement describing major area of concentration for honors work.

- Describe how each course selected added to the student's knowledge and understanding in area chosen for concentration.
- Students interested in honors should consult with their adviser by last quarter of their junior year to prepare their program of study. Honors work may be concentrated in fields such as biological sciences, environment, physics, etc.
- Suggested electives for students pursuing Honors: EE 364, CME 206, CS 229, CS 248, MATH 171, MATH 172, STATS 202, STATS 216, STATS 217.

Minor in Mathematical and Computational Science

The minor in Mathematical and Computational Science is intended to provide an experience of the four constituent areas: Computer Science, Mathematics, Management Science and Engineering, and Statistics. Five basic courses are required:

Select one of the following:

CS 106X	Programming Abstractions (Accelerated)	3-5
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or

CS 106A & CS 106B	Programming Methodology and Programming Abstractions	
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5

or

MATH 104	Applied Matrix Theory	
MSE 211	Linear and Nonlinear Optimization	3-4

or

MSE 221	Stochastic Modeling	
STATS 116	Theory of Probability	3-5

and either

STATS 191	Introduction to Applied Statistics	
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or

STATS 200	Introduction to Statistical Inference	
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In addition to the above, the minor requires three courses from the following, two of which must be in different departments:

Select three of the following:

CME 108	Introduction to Scientific Computing	
CS 103	Mathematical Foundations of Computing	
CS 107	Computer Organization and Systems	
CS 154	Introduction to Automata and Complexity Theory	
CS 161	Design and Analysis of Algorithms	
EE 261	The Fourier Transform and Its Applications	
ECON 160	Game Theory and Economic Applications	
MSE 251	Stochastic Control	
MATH 104	Applied Matrix Theory	
MATH 106	Functions of a Complex Variable	
MATH 108	Introduction to Combinatorics and Its Applications	
MATH 109	Applied Group Theory	
MATH 110	Applied Number Theory and Field Theory	
MATH 115	Functions of a Real Variable	
MATH 131P	Partial Differential Equations I	
MATH 171	Fundamental Concepts of Analysis	
MATH 174	Calculus of Variations	
PHIL 151	Metaphysics	

Units

3

3-5

5

3-4

3-5

9

STATS 191	Introduction to Applied Statistics
STATS 200	Introduction to Statistical Inference
STATS 202	Data Mining and Analysis
STATS 203	Introduction to Regression Models and Analysis of Variance
STATS 217	Introduction to Stochastic Processes

Other upper-division courses appropriate to the program major may be substituted with consent of the program director. Undergraduate majors in the constituent programs may not count courses in their own departments.

Co-Directors: Bradley Efron, Susan Holmes

Committee in Charge: Takeshi Amemiya (Economics, emeritus), Emmanuel Candes (Mathematics, Statistics), Gunnar Carlsson (Mathematics), Richard Cottle (Management Science and Engineering, emeritus), Bradley Efron (Statistics), Margot Gerritsen (ICME), Peter Glynn (Management Science and Engineering), Susan Holmes (Statistics), Parviz Moin (Engineering), George Papanicolaou (Mathematics), Eric Roberts (Computer Science), David Rogosa (Education), Tim Roughgarden (Computer Science), Chiara Sabatti (Statistics), Amin Saberi (Management Science and Engineering), David Siegmund (Statistics), Jonathan Taylor (Statistics), Brian White (Mathematics).

Mathematics

Courses offered by the Department of Mathematics are listed under the subject code MATH on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MATH&filter-catalognumber-MATH=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MATH&filter-catalognumber-MATH=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MATH&filter-catalognumber-MATH=on>).

The Department of Mathematics offers programs leading to the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy in Mathematics, and also participates in the program leading to the B.S. in Mathematical and Computational Science, and the M.S. and Ph.D. degree programs offered through the Institute for Computational & Mathematical Engineering.

Mission of the Undergraduate Program in Mathematics

The mission of the undergraduate program in Mathematics is to provide students with a broad understanding of mathematics encompassing logical reasoning, generalization, abstraction, and formal proof. Courses in the program teach students to create, analyze, and interpret mathematical models and to communicate sound arguments based on mathematical reasoning and careful data analysis. The mathematics degree prepares students for careers in the corporate sector and government agencies, and for graduate programs in mathematics.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

- problem solving skills.
- the ability to formulate proofs and to structure mathematical arguments.

- the ability to communicate mathematical ideas via extended written presentation.

Advanced Placement in Mathematics for Freshmen

Students of unusual ability in mathematics often take one or more semesters of college-equivalent courses in mathematics while they are still in high school. Under certain circumstances, it is possible for such students to secure both advanced placement and credit toward the bachelor's degree. A decision as to placement and credit is made by the department after consideration of the student's performance on the Advanced Placement Examination in Mathematics (forms AB or BC) of the College Entrance Examination Board, and also after consideration of transfer credit in mathematics from other colleges and universities.

The department does not give its own advanced placement examination. Students can receive either 5 or 10 units of advanced placement credit, depending on their scores on the CEEB Advanced Placement Examination. Entering students who have credit for two quarters of single variable calculus (10 units) are encouraged to enroll in:

Select one of the following series:

Standard Series		Units
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 52	Integral Calculus of Several Variables	5
MATH 53	Ordinary Differential Equations with Linear Algebra	5
Honors Series		Units
MATH 51H	Honors Multivariable Mathematics	5
MATH 52H	Honors Multivariable Mathematics	5
MATH 53H	Honors Multivariable Mathematics	5

These three-course sequences, which can be completed during the freshman year, supply the necessary mathematics background for most majors in science and engineering. They also serve as excellent background for the major or minor in Mathematics, or in Mathematical and Computational Science.

Students who have credit for one quarter of single variable calculus (5 units) should take:

	Units
MATH 42	Calculus (Autumn Quarter) 5
MATH 51	Linear Algebra and Differential Calculus of Several Variables (Winter Quarter) 5

Options available in Spring Quarter include:

MATH 52	Integral Calculus of Several Variables	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	

For proper placement, contact the Department of Mathematics.

Bachelor of Science in Mathematical and Computational Science

The Department of Mathematics participates with the departments of Computer Science, Management Science and Engineering, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the "Mathematical and Computational Science (p. 546)" section of this bulletin.

Introductory and Undergraduate Courses

The department offers two sequences of introductory courses in single variable calculus.

- and MATH 42 Calculus present single variable calculus. Differential calculus is covered in the first quarter, integral calculus in the second.
- MATH 19 Calculus, MATH 20 Calculus, and MATH 21 Calculus cover the material in MATH 41 Calculus, MATH 42 Calculus in three quarters instead of two.

There are options for studying multivariable mathematics:

- MATH 51 Linear Algebra and Differential Calculus of Several Variables, MATH 52 Integral Calculus of Several Variables, and MATH 53 Ordinary Differential Equations with Linear Algebra cover differential and integral calculus in several variables, linear algebra, and ordinary differential equations. These topics are taught in an integrated fashion and emphasize application. MATH 51 Linear Algebra and Differential Calculus of Several Variables covers differential calculus in several variables and introduces matrix theory and linear algebra; MATH 52 Integral Calculus of Several Variables covers integral calculus in several variables and vector analysis; MATH 53 Ordinary Differential Equations with Linear Algebra studies further topics in linear algebra and applies them to the study of ordinary differential equations. This sequence is strongly recommended for incoming freshmen with 10 units of advanced placement credit.
- MATH 51H Honors Multivariable Mathematics, MATH 52H Honors Multivariable Mathematics, and MATH 53H Honors Multivariable Mathematics cover the same material as MATH 51 Linear Algebra and Differential Calculus of Several Variables, MATH 52 Integral Calculus of Several Variables, and MATH 53 Ordinary Differential Equations with Linear Algebra, but with more emphasis on theory and rigor.

The department offers three classes on linear algebra:

	Units
MATH 51	Linear Algebra and Differential Calculus of Several Variables 5
or MATH 51H	Honors Multivariable Mathematics
MATH 104	Applied Matrix Theory 3
MATH 113	Linear Algebra and Matrix Theory 3

Learning Outcomes (Graduate)

The Master's Degree is conferred upon candidates who have developed advanced knowledge and skills in Mathematics. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Mathematics. Through completion of advanced coursework and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Mathematics and to interpret and present the results of such research.

Bachelor of Science in Mathematics

The following department requirements are in addition to the University's basic requirements for the bachelor's degree:

Students wishing to major in Mathematics must satisfy the following requirements:

- Department of Mathematics courses totaling at least 49 units credit; such courses must be taken for a letter grade. For the purposes of this requirement, STATS 116 Theory of Probability, PHIL 151 Metalogic, and PHIL 152 Computability and Logic count as Department of Mathematics courses.
- Additional courses taken from Department of Mathematics courses numbered 101 and above or from approved courses in other disciplines

with significant mathematical content, totaling at least 15 units credit. At least 9 of these units must be taken for a letter grade.

- A Department of Mathematics adviser must be selected, and the courses selected under items '1' and '2' above must be approved by the department's director of undergraduate studies, acting under guidelines laid down by the department's Committee for Undergraduate Affairs. The Department of Mathematics adviser can be any member of the department's faculty.
- To receive the department's recommendation for graduation, a student must have been enrolled as a major in the Department of Mathematics for a minimum of two full quarters, including the quarter immediately before graduation.

Students are normally expected to complete either the sequence MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus or the sequence MATH 41 Calculus, MATH 42 Calculus (but not both). Students with an Advanced Placement score of at least 4 in BC math or 5 in AB math may receive 10 units credit and fulfill requirement '1' by taking at least 39 units of Department of Mathematics courses numbered 51 and above. Students with an Advanced Placement score of at least 3 in BC math or at least 4 in AB math may receive 5 units credit and fulfill requirement '1' by taking at least 44 units of Department of Mathematics courses numbered 42 and above.

Sophomore seminar courses may be counted among the choice of courses under item '1'. Other variations of the course requirements laid down above (under items '1' and '2') may, in some circumstances, be allowed. For example, students transferring from other universities may be allowed credit for some courses completed before their arrival at Stanford. However, at least 24 units of the 49 units under item '1' above and 9 of the units under item '2' above must be taken at Stanford. In all cases, approval for variations in the degree requirements must be obtained from the department's Committee for Undergraduate Affairs. Application for such approval should be made through the department's director of undergraduate studies. The policy of the Mathematics Department is that no courses other than the MATH 50 series and below may be double-counted toward any other University major or minor.

It is to be emphasized that the above regulations are minimum requirements for the major; students contemplating graduate work in mathematics are strongly encouraged to include the courses MATH 116 Complex Analysis, MATH 120 Groups and Rings, MATH 121 Galois Theory, MATH 147 Differential Topology or MATH 148 Algebraic Topology, and MATH 171 Fundamental Concepts of Analysis in their selection of courses, and in addition, take at least three Department of Mathematics courses over and above the minimum requirements laid out under items '1' and '2' above, including at least one 200-level course. Such students are also encouraged to consider the possibility of taking the honors program, discussed below.

To help develop a sense of the type of course selection (under items '1' and '2' above) that would be recommended for math majors with various backgrounds and interests, see the following examples. These represent only a few of a very large number of possible combinations of courses that could be taken in fulfillment of the Mathematics major requirements:

Example 1

A general program (a balanced program of both pure and applied components, without any particular emphasis on any one field of mathematics or applications) as follows:

	Units
Select one of the following series or Advanced Placement credit (see the Overview tab for details):	10
MATH 19 Calculus & MATH 20 and Calculus & MATH 21 and Calculus	
MATH 41 Calculus & MATH 42 and Calculus	

Math 50 Series:		15
MATH 51 Linear Algebra and Differential Calculus of Several & MATH 52 Variables & MATH 53 and Integral Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra		
MATH 104 Applied Matrix Theory		3
or MATH 113 Linear Algebra and Matrix Theory		
MATH 106 Functions of a Complex Variable		3
MATH 109 Applied Group Theory		3
MATH 110 Applied Number Theory and Field Theory		3
MATH 115 Functions of a Real Variable		3
Plus any selection of at least eight of the following courses, including three Department of Mathematics courses:		24
MATH 108 Introduction to Combinatorics and Its Applications		
MATH 131P Partial Differential Equations I		
MATH 132 Partial Differential Equations II		
MATH 143 Differential Geometry		
MATH 146 Analysis on Manifolds		
MATH 147 Differential Topology		
MATH 148 Algebraic Topology		
MATH 152 Elementary Theory of Numbers		
MATH 161 Set Theory		
CME 108 Introduction to Scientific Computing		
ECON 50 Economic Analysis I		
PHYSICS 41 Mechanics		
PHYSICS 43 Electricity and Magnetism		
PHYSICS 45 Light and Heat		
STATS 116 Theory of Probability		
Total Units		64

The courses from other departments are only meant as examples; there are many suitable courses in several departments that can be taken to fulfill part or all of requirement '2'.

Example 2

A theoretical program recommended for those contemplating possible later graduate work providing an introduction to the main areas of mathematics both broader and deeper than the general program outlined above:

	Units
Select one of the following series or Advanced Placement credit (see the Overview tab for details):	10
MATH 19 Calculus & MATH 20 and Calculus & MATH 21 and Calculus	
MATH 41 Calculus & MATH 42 and Calculus	
Math 50 Series:	15
MATH 51 Linear Algebra and Differential Calculus of Several Variables	
or MATH 51H Honors Multivariable Mathematics	
MATH 52 Integral Calculus of Several Variables or MATH 52H Honors Multivariable Mathematics	
MATH 53 Ordinary Differential Equations with Linear Algebra or MATH 53H Honors Multivariable Mathematics	
In addition to the series, the following courses are recommended:	
MATH 106 Functions of a Complex Variable	3
or MATH 116 Complex Analysis	

MATH 113	Linear Algebra and Matrix Theory	3
MATH 120	Groups and Rings	3
MATH 171	Fundamental Concepts of Analysis	3
Plus nine or more 3-unit math courses numbered 121 or higher (the logic courses PHIL 151 and PHIL 152 are considered to be such courses), including at least one algebra course, one analysis course, and one geometry/topology course. (See the description of the honors program below)		27

Total Units **64**

In addition, those contemplating eventual graduate work in Mathematics should consider including at least one graduate-level math course such as MATH 205A Real Analysis, MATH 210A Modern Algebra I, or MATH 215A Complex Analysis, Geometry, and Topology or MATH 215B Complex Analysis, Geometry, and Topology. Such students should also consider the possibility of entering the honors program.

Example 3

An applied mathematics* program:

	Units
Select one of the following series or Advanced Placement credit (see the Overview tab for details):	10
MATH 19 Calculus & MATH 20 and Calculus & MATH 21 and Calculus	
MATH 41 Calculus & MATH 42 and Calculus	
Math 50 Series:	15
MATH 51 Linear Algebra and Differential Calculus of Several Variables & MATH 52 and Integral Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra	
MATH 104 Applied Matrix Theory	3
MATH 106 Functions of a Complex Variable	3
MATH 108 Introduction to Combinatorics and Its Applications	3
MATH 109 Applied Group Theory	3
MATH 110 Applied Number Theory and Field Theory	3
MATH 115 Functions of a Real Variable	3
MATH 131P Partial Differential Equations I	3
MATH 132 Partial Differential Equations II	3
STATS 116 Theory of Probability	3-5
Plus at least 12 units of additional courses in applied mathematics, including, for example, suitable courses from the departments of Physics, Computer Science, Economics, Engineering, and Statistics.	12
Total Units	64-66

* Students interested in applied mathematics, but desiring a broader-based program than the type of program suggested in Example 3, including significant computational and/or financial and/or statistical components, are encouraged to also consider the Mathematics and Computational Science program.

Honors Program

The honors program is intended for students who have strong theoretical interests and abilities in mathematics. The goal of the program is to give students a thorough introduction to the main branches of mathematics, especially analysis, algebra, and geometry. Through the honors thesis, students may be introduced to a current or recent research topic, although occasionally more classical projects are encouraged. The program provides an excellent background with which to enter a Master's or Ph.D. program

in Mathematics. Students completing the program are awarded a B.S. in Mathematics with Honors.

It is recommended that the sequence MATH 51H Honors Multivariable Mathematics, MATH 52H Honors Multivariable Mathematics, and MATH 53H Honors Multivariable Mathematics be taken in the freshman year. To graduate with a B.S. in Mathematics with Honors, the following conditions apply in addition to the usual requirements for math majors:

1. The selection of courses under items '1' and '2' above must contain:

	Units
MATH 106 Functions of a Complex Variable or MATH 116 Complex Analysis	3
MATH 120 Groups and Rings	3
MATH 171 Fundamental Concepts of Analysis	3

And must also include seven additional 3-unit Math courses numbered 121 or higher. (The logic courses PHIL 151 Metalogic and PHIL 152 Computability and Logic can also be used.) These seven courses must include at least:

	Units
One Algebra Course:	
MATH 121 Galois Theory	3
MATH 122 Modules and Group Representations	3
MATH 152 Elementary Theory of Numbers	3
MATH 154 Algebraic Number Theory	3
One Analysis Course:	
MATH 131P Partial Differential Equations I	3
MATH 132 Partial Differential Equations II	3
MATH 136 Stochastic Processes	3
MATH 151 Introduction to Probability Theory	3
MATH 155 Analytic Number Theory	3
MATH 172 Lebesgue Integration and Fourier Analysis	3
MATH 173 Theory of Partial Differential Equations	3
MATH 175 Elementary Functional Analysis	3
One Geometry/Topology Course:	
MATH 143 Differential Geometry	3
MATH 144 Riemannian Geometry	3
MATH 145 Algebraic Geometry	3
MATH 146 Analysis on Manifolds	3
MATH 147 Differential Topology	3
MATH 148 Algebraic Topology	3
MATH 149 Applied Algebraic Topology	3

2. All courses counting towards the honors requirements (MATH 106/MATH 116, MATH 120, MATH 171, all 7 additional Math courses used to fulfill the major requirement, and MATH 197) must be taken for a letter grade.
3. Students must have an average GPA of at least a 3.0 across all math classes counting towards the major at the time of applying for honors to be eligible for acceptance into the honors program, as well as upon graduation to graduate with honors.
4. Majors interested in honors can apply in winter quarter of their junior year at the earliest, and no later than the last day of classes in the spring quarter of junior year.
5. Students in the honors program must write a senior thesis. In order to facilitate this, the student must, by the end of the junior year, choose an undergraduate thesis adviser from the Department of Mathematics faculty and map out a concentrated reading program under the direction and guidance of the adviser. This will occur when the student applies for honors. During the senior year, the student must enroll in MATH 197 Senior Honors Thesis with his/her adviser for a total of 6 units (recommended to be spread over three quarters), and work toward

completion of the thesis under the direction and guidance of the thesis adviser. The thesis may contain original material, or be a synthesis of work in current or recent research literature. The 6 units of credit for MATH 197 Senior Honors Thesis are required in addition to the 64 units required of the major. (See the major requirements at the top of the page.)

6. The deadline for the senior thesis final draft is the Monday of week 8 of the student's graduation quarter.

In addition to the minimum requirements laid out above, it is strongly recommended that students take at least one graduate-level course (that is, at least one course in the 200 plus range). MATH 205A Real Analysis, MATH 210A Modern Algebra I, and MATH 215A Complex Analysis, Geometry, and Topology or MATH 215B Complex Analysis, Geometry, and Topology are especially recommended in this context.

Students with questions about the honors program should see the department's director of undergraduate studies.

Minor in Mathematics

To qualify for the minor in Mathematics, a student should complete, for a letter grade, at least six Department of Mathematics courses numbered 51 or higher, totaling a minimum of 24 units. For the purposes of this requirement, STATS 116 Theory of Probability, PHIL 151 Metalogic, and PHIL 152 Computability and Logic count as Department of Mathematics courses. No other courses from outside the Department of Mathematics may be used towards the minor in Mathematics.

It is recommended that these courses include:

	Units
Math Minor	
MATH 51 Linear Algebra and Differential Calculus of Several Variables	5
or MATH 51H Honors Multivariable Mathematics	
MATH 52 Integral Calculus of Several Variables	5
or MATH 52H Honors Multivariable Mathematics	
MATH 53 Ordinary Differential Equations with Linear Algebra	5
or MATH 53H Honors Multivariable Mathematics	
Plus three additional MATH courses	9
Total Units	24

At least 12 of the units applied toward the minor in Mathematics must be taken at Stanford. The policy of the Mathematics Department is that no courses other than the MATH 50 series and below may be double-counted toward any other University major or minor.

Master of Science in Mathematics

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. Students should pay particular attention to the University's course requirements for graduate degrees. The following are specific departmental requirements:

Candidates must complete an approved course program of 45 units of courses beyond the department requirements for the B.S. degree, of which at least 36 units must be Mathematics Department courses, taken for a letter grade. The Mathematics Department courses must include at least 18 units numbered 200 or above. The candidate must have a grade point average (GPA) of 3.0 (B) over all course work taken in Mathematics, and a GPA of 3.0 (B) in the 200-level courses considered separately. Course work for the M.S. degree must be approved during the first quarter of enrollment in the program by the department's Director of Graduate Studies.

The Financial Mathematics M.S. degree program is no longer offered through the School of Humanities and Sciences. The Institute for Computational and Mathematical Engineering (ICME (<https://icme.stanford.edu>)) now offers a master's degree track in Mathematical and Computational Finance (p. 251).

Doctor of Philosophy in Mathematics

The University's basic requirements for the doctorate (residence, dissertation, examinations, etc.) are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The following are specific departmental requirements.

To be admitted to candidacy, the student must have successfully completed 27 units of graduate courses (that is, courses numbered 200 and above). In addition, the student must pass qualifying examinations given by the department.

Beyond the requirements for candidacy, the student must complete a course of study approved by the Graduate Affairs Committee of the Department of Mathematics and submit an acceptable dissertation. In accordance with University requirements, Ph.D. students must complete a total of 135 course units beyond the bachelor's degree. These courses should be Department of Mathematics courses or approved courses from other departments. The course program should display substantial breadth in mathematics outside the student's field of application. The student must receive a grade point average (GPA) of 3.0 (B) or better in courses used to satisfy the Ph.D. requirement. In addition, the student must pass the Department area examination and the University oral examination.

Experience in teaching is emphasized in the Ph.D. program. Each student is required to complete nine quarters of such experience. The nature of the teaching assignment for each of those quarters is determined by the department in consultation with the student. Typical assignments include teaching or assisting in teaching an undergraduate course or lecturing in an advanced seminar.

For further information concerning degree programs, fellowships, and assistantships, inquire of the department's student services office.

Ph.D. Minor in Mathematics

Requirements for the Ph.D. Minor in Mathematics are:

	Units
Complete both of the following Sequences: ^{1, 2}	
Sequence 1	
MATH 106 Functions of a Complex Variable	3
or MATH 116 Complex Analysis	
MATH 131P Partial Differential Equations I	3
MATH 132 Partial Differential Equations II	3
Sequence 2	
MATH 113 Linear Algebra and Matrix Theory	3
MATH 120 Groups and Rings	3
or MATH 152 Elementary Theory of Numbers	
Additional Courses	
21 units of 200-level MATH courses ³	21
Total Units	36

¹ The 100-level courses may have been completed during undergraduate study, and their equivalents from other universities are acceptable.

² A third coherent sequence designed by the student, subject to the approval of the graduate committee, may be considered as a substitute for Sequence 1 or 2.

³ The 200-level courses must be taken at Stanford and approved by the Department of Mathematics Ph.D. minor adviser.

Emeriti: Gregory Brumfiel, Solomon Feferman, Robert Finn, Yitzhak Katznelson, Joseph Keller, Georg Kreisel, Harold Levine, Tai-Ping Liu, R. James Milgram, Donald Ornstein, Richard Schoen, Leon Simon

Chair: Brian White

Professors: Simon Brendle (on leave Autumn), Daniel Bump, Emmanuel Candes, Gunnar Carlsson (on leave), Sourav Chatterjee (on leave Autumn), Ralph L. Cohen, Brian Conrad, Amir Dembo (on leave Spring), Persi Diaconis, Yakov Eliashberg, Jacob Fox (on leave), Soren Galatius, Eleny Ionel, Steven Kerckhoff (on leave Winter), Jun Li (on leave Autumn), Rafe Mazzeo, Maryam Mirzakhani (on leave Winter and Spring), George Papanicolaou, Lenya Ryzhik, Kannan Soundararajan, Ravi Vakil, Andras Vasy, Akshay Venkatesh, Brian White, Lexing Ying

Assistant Professors: Thomas Church, Jack Poulson, Zhiwei Yun (on leave Autumn)

Szegö Assistant Professors: Daniel Berwick-Evans, Yu Gu, Hilaf Hasson, Zhiyuan Li, Yu-Shen Lin, Davi Maximo, Georg Menz, Jenny Wilson, Tian Yang, Tianyi Zhang

Lecturers: Marion Campisi, Mark Lucianovic, Christelle Vincent, Wojciech Wieczorek

Courtesy Professors: Renata Kallosh

Consulting Professors: Brian Conrey, David Hoffman

Clay Fellow: Alex Wright

Medieval Studies

Stanford Center for Medieval and Early Modern Studies (CMEMS) is a multidisciplinary community working together to produce new perspectives on medieval and early modern studies. The mission of CMEMS is to promote innovative research and foster a lively dialogue among faculty, students, librarians, and research affiliates, to rethink the nature of the field across time, space, and disciplinary boundaries, and to explore the significance of these earlier periods for our understanding of today's world.

There are a number of programs and courses related to medieval and early modern studies. To learn more, see the center's web site (<http://cmems.stanford.edu>).

At present, Stanford University offers a Medieval Studies minor.

Minor in Medieval Studies

Faculty Director: Kathryn Starkey

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Medieval Studies. The minor in Medieval Studies:

- provides Stanford students with an historical knowledge, framework, and depth through which to view globalism;
- embeds the study of medieval culture in a coherent framework that resonates with contemporary issues of community building, the virtual world and mobility;
- and promotes an innovative crossdisciplinary and skill-based approach to Medieval Studies.

Students in any field qualify for the minor by meeting the following requirements:

Students complete a total of 25 units (including a core course) in courses relevant to the major in departments across the University including, but not restricted to, English, East Asian Studies, History, Religious Studies, Music,

all DLCL courses (CompLit, German, French, Italian, ILAC and Slavic), and Classics.

One of the following three introductory core courses is required to be taken for 5 units. Students engage creatively with the Middle Ages and produce projects that will be collected in a database and shared with the Stanford community. The core courses are offered on a regular basis by faculty across the University.

		Units
DLCL 121	Performing the Middle Ages	3-5
DLCL 122	The Digital Middle Ages	3-5
DLCL 123	Medieval Journeys: Introduction through the Art and 3-5 Architecture	

Electives may be selected from a large number of offerings in a variety of disciplines according to student interests, but they must follow a coherent course of study. This course of study must be approved by the faculty director. Up to 5 units may be taken in a medieval language, such as (but not limited to) Old English, Old Norse, Medieval Latin, Old French, Middle High German, Classical Arabic. No transfer credit may be used toward the Medieval Studies minor. Appropriate courses offered through BOSP may count toward the minor.

Course work in this minor may not duplicate work counted toward other majors or minors. Advanced placement credit and transfer credit do not apply to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be required in this minor. Students declare the Minor in Medieval Studies through Axess.

Affiliated Faculty: Vincent Barletta (Iberian and Latin American Cultures), Shahzad Bashir (Religious Studies), Carl Bielefeldt (Religious Studies), George H. Brown (English, Emeritus), Steven Carter (Asian Languages), Paula Findlen (History), Charlotte Fonrobert (Religious Studies), Marisa Galvez (French and Italian), Hester Gelber (Religious Studies), Avner Greif (Economics), Hans Ulrich Gumbrecht (French and Italian), Robert Harrison (French and Italian), Michelle Karnes (English), Nancy S. Kollmann (History), Mark E. Lewis (History), William Mahrt (Music), Patricia Parker (Comparative Literature), Bissera Pentcheva (Art and Art History), Barbara Pitkin (Religious Studies, *Lecturer*), Orrin W. Robinson (German Studies), David Riggs (English, Emeritus), Jesse Rodin (Music), Behnam Sadeki (Religious Studies), Carolyn Springer (French and Italian), Kathryn Starkey (German Studies), Laura Stokes (History), Jennifer Summit (English), Elaine Treharne (English)

Modern Thought and Literature

Courses offered by the Program in Modern Thought and Literature are listed under the subject code MTL on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MTL&filter-catalognumber-MTL=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MTL&filter-catalognumber-MTL=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MTL&filter-catalognumber-MTL=on>).

The program in Modern Thought and Literature admits students for the Ph.D. and a limited number for a coterminal B.A./M.A. Program.

Graduate Programs in Modern Thought and Literature

Modern Thought and Literature (MTL) is an interdisciplinary humanities graduate program advancing the study of critical issues in the modern world. Since 1971, MTL students have helped to redefine the cutting edge of many interdisciplinary fields and to reshape the ways in which disciplinary scholarship is understood and practiced. MTL graduates are leaders in fields such as American studies, ethnic studies, film studies, social and cultural studies, and women's studies, as well as English and comparative literature.

The program trains students to understand the histories and methods of disciplines and to test their assumptions. It considers how disciplines shape knowledge and, most importantly, how interdisciplinary methods reshape objects of study. MTL students produce innovative analyses of diverse texts, forms, and practices, including those of literature, history, philosophy, anthropology, law, and science; film, visual arts, popular culture, and performance; and material culture and technology.

Each student constructs a unique program of study suited to his or her research. Students have focused on such areas as gender and sexuality; race and ethnicity; science, technology, and medicine; media and performance; legal studies; and critical and social theory. The program's affiliated faculty is drawn from fields throughout the humanities and humanistic social sciences, as well as from education and law. As interdisciplinary study is impossible without an understanding of the disciplines under consideration, each student is expected to master the methods of literary analysis and to gain a foundation in a second field or discipline.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in interdisciplinary literary studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in interdisciplinary literary studies. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of interdisciplinary literary studies and to interpret and present the results of such research.

Master of Arts

The Master of Arts is available to students who are admitted to the doctoral program and have not been awarded an M.A. previously. Students are not admitted into the program for the purpose of earning a terminal Master of Arts degree. Candidates for the Ph.D. who satisfy the committee of their progress and satisfactorily complete 45 units of course work forming a coherent program of study, may apply for an M.A. in Modern Thought and Literature.

Coterminal Bachelor's and Master's Program in Modern Thought and Literature

Each year, one or two undergraduates who are exceptionally well prepared in literature and at least one foreign language and whose undergraduate course work includes a strong interdisciplinary component, may petition to be admitted to the program for the purpose of completing a coterminal M.A. degree. Admission to this program is granted only on condition that in the course of working on their master's degrees they do not apply to enter

the Ph.D. program in Modern Thought and Literature. The deadline for application is early February.

To apply, applicants submit:

1. An unofficial grade transcript from Axes.
2. A Petition for Admission to the Coterminal Program from the Registrar's Office.
3. A statement giving the reasons the student wishes to pursue this program and its place in his or her future plans. This statement should pay particular attention to the reasons why the student could not pursue the studies he or she desires in some other way.
4. An initial plan of study listing, quarter by quarter, each course by name, units, and instructor, to be taken in order to fulfill the requirements for the degree for a total of 45 units, including at least 20 units of advanced work in one literature, and at least 20 units in a coherent interdisciplinary program of courses taken in non-literature departments. (Changes in the course list are to be expected.)
5. A writing sample of critical or analytical prose, 20 pages maximum.
6. Two letters of recommendation from members of the faculty who know the applicant well and who can speak directly to the question of his or her ability to do graduate-level work.
7. A designated adviser from among the Stanford faculty; normally one letter of recommendation will be from this faculty member.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Registrar's Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Degree Requirements

The candidate for the M.A. must complete at least 45 units of graduate work, to be divided in the following manner:

1. The introductory seminar, MTL 334A Concepts of Modernity I: Philosophical Foundations, 5 units; students may substitute MTL 334B Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization, with the director's permission.
2. At least 20 units of advanced course work in literature, to be approved by the director.
3. At least 20 units of course work in a coherent and individually arranged interdisciplinary program, to be approved by the director.

By the end of the course of study, each candidate must also demonstrate a reading knowledge of at least one foreign language.

Doctor of Philosophy in Modern Thought and Literature

University requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

A candidate for the Ph.D. degree in Modern Thought and Literature must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the B.A. degree. He or she is expected to complete at least 18 courses of graduate work in addition to the dissertation. Students may spend one year of graduate study abroad.

Requirements for the Ph.D. in Modern Thought and Literature are:

		Units
1.	MTL 334A Concepts of Modernity I: Philosophical Foundations	5

MTL 334B	Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization	5
MTL 299	Edgework: New Directions in the Study of Culture (Spring Quarter; required of all first-year students)	1-3

2. A coherent program of eight courses of advanced work in literary studies to be worked out with the adviser, of which at least six must be regularly scheduled courses in literature. Courses in the teaching of composition, independent study, or thesis registration may not be counted among these six courses; ENGLISH 396L Pedagogy Seminar I, MTL 399 Reading for Orals, MTL 802 TGR Dissertation may not be counted toward these requirements under any circumstances. Petitions to modify this requirement to substitute a course from a non-literature department for one or more of the required eight literature courses must be approved by the MTL Committee in Charge.
3. Eight courses of advanced work in non-literature departments, the core of which is completion of either a departmental minor or an interdepartmental concentration, typically consisting of six courses. Departmental minors are available from the departments of Anthropology, Art and Art History, Communication, History, Philosophy, Political Science, Religious Studies, and Sociology (see the relevant information in those sections of this bulletin). Individually designed concentrations may be approved by petition to the director. In addition to the required six courses in a minor or a concentration, two additional courses from non-literature departments are chosen in consultation with the student's academic adviser. At the end of the first year, each student must submit to the director a preliminary statement of approximately 1500 words outlining the scope and coherence of the interdisciplinary focus, either as it relates to the departmental minor or to the interdepartmental concentration. In either case, the student should note the relevance of any proposed coursework to the overall program (see #7 below). Course restrictions noted above in item 2 also apply.
4. *Qualifying Paper*: This certifies that students are likely to be able to undertake the quality of research, sustained argumentation, and cogent writing demanded in a doctoral dissertation. The qualifying paper must be a substantial revision of a seminar paper written at Stanford during the first year and should embody a substantial amount of independent research, develop an intellectual argument with significant elements of original thinking, and demonstrate the ability to do interdisciplinary work. Each paper is evaluated by two or three readers (designated before the end of the first year of graduate study), one of whom must be a member of the Committee in Charge or have been a member within the previous five years. Qualifying papers must be submitted to the program office no later than the end of the third week of the fifth quarter of enrollment, normally, Winter Quarter of the second year.
5. *Teaching*, an essential part of the program, is normally undertaken in conjunction with the Department of English. Candidates are required to demonstrate competence in teaching.
6. Students must demonstrate, by the end of the third quarter of the first year, a reading knowledge of one foreign language and, by the beginning of the first quarter of the third year, a reading knowledge of one other foreign language. Reading knowledge means the ability to make a genuine scholarly use of the language: that is, to read prose of ordinary difficulty. Students may not take the University oral examination before completion of the foreign language requirement.
7. *Candidacy*: At the end of the second year, students apply for candidacy. The decision to advance a student to candidacy is a judgment of the faculty. The student is only admitted to candidacy if, in addition to the student's fulfilling departmental prerequisites, the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. The following qualifications are required before candidacy can be certified:
 - the earlier submission of a satisfactory qualifying paper;
 - demonstration of a reading knowledge of one foreign language;

- satisfactory progress in course work;
- a list of courses applicable to the degree, distinguishing between courses appropriate to the literary component and courses appropriate to the non-literary component;
- designation of a departmental minor or an interdisciplinary concentration; and,
- the submission of a statement outlining the scope and coherence of the interdisciplinary component of the program in relation to the literary component, and noting the relevance of the course work to that program.

8. *Annual Review*: The program and progress of each student must be approved by the Committee in Charge at the end of each academic year. First-year students will submit the preliminary interdisciplinary statement along with the first year-end report (see #3 above).
9. *University Oral Examination*: This examination, covering the student's areas of concentration, is normally taken in the third year of graduate study. It is a two-hour oral examination administered by four faculty members specializing in the student's areas of concentration, and a chair from another department. The exam is based on a substantial reading list prepared by the student in conjunction with the faculty committee and designed to cover the areas of expertise pertinent to the student's dissertation project.
10. *Dissertation Proposal and Colloquium*: Within one quarter after the University oral examination, the student writes up the dissertation proposal: 15-20 pages with a general description of the project and a chapter breakdown plus a bibliography. The proposal is submitted to the program director and the dissertation committee for approval. After completion of the first chapter of the dissertation, the student sets up a meeting with the dissertation committee for one hour to discuss the work accomplished in the first chapter and plans for completing the rest of the dissertation.
11. *Dissertation*: The fourth and fifth years are devoted to the dissertation, which should be a substantial and original contribution acceptable to the Committee in Charge of Modern Thought and Literature. The subject is drawn from the literature of specialization and the area of nonliterary studies. The dissertation project will conclude with a two-hour defense. The first hour is open to the public and includes a brief presentation of the dissertation project on the part of the Ph.D. candidate. The second hour is reserved to the candidate and his/her Dissertation Committee.

Ph.D. Minor in Feminist, Gender, and Sexuality Studies

The Program in Modern Thought and Literature sponsors a Ph.D. minor in Feminist, Gender, and Sexuality Studies. The Ph.D. minor is administered by the Program in Feminist, Gender, and Sexuality Studies. (p. 455)

Director: Paula M. L. Moya

Committee in Charge: Paula M.L. Moya (Chair), Scott Bukatman, Shelley Fisher Fishkin, Zephyr Frank, Hector Hoyos, Claire Jarvis, Vaughn Rasberry, Pavle Levi, Alison McQueen (on leave 2014-15), Jisha Menon, José David Saldívar

Affiliated Faculty: H. Samy Alim (*Education*), Lanier Anderson (*Philosophy*), Russell Berman (*German Studies*), Jennifer Brody (*Theater & Performance Studies*), Scott Bukatman (*Art & Art History*), Gordon Chang (*History*), Joshua Cohen (*Political Science, Philosophy, Law*), Adrian Daub (*German Studies*), Jean-Pierre Dupuy (*French & Italian*), Paulla Ebron (*Anthropology*), Harry Elam (*Theater & Performance Studies*), Michele Elam (*English*), Amir Eshel (*German Studies, Comparative Literature*), Shelley Fisher Fishkin (*English*), Zephyr Frank (*History*), Estelle Freedman (*History*), Robert Gordon (*Law*), Hans U. Gumbrecht (*French & Italian, Comparative Literature*), Thomas Hansen (*Anthropology*), David Hills (*Philosophy*), Héctor Hoyos (*Iberian & Latin American Cultures*),

Claire Jarvis (*English*), Tomas Jimenez (*Sociology*), Matthew Kohrman (*Anthropology*), Aishwary Kumar (*History*), Joshua Landy (*French & Italian, Comparative Literature*), Pavle Levi (*Art & Art History*), Helen Longino (*Philosophy*), Andrea Lunsford (*English*), Saikat Majumdar (*English*), Douglas McAdam (*Sociology*), Mark McGurl (*English*), Alison McQueen (*Political Science*), Jisha Menon (*Theater & Performance Studies*), Lynn Meskell (*Anthropology*), Franco Moretti (*English, Comparative Literature*), Paula Moya (*English*), Thomas Mullaney (*History*), Sianne Ngai (*English*), David Palumbo-Liu (*Comparative Literature*), Peggy Phelan (*Theater & Performance Studies*), Robert Proctor (*History*), Vaughn Rasberry (*English*), Robert Reich (*Political Science*), Jessica Riskin (*History*), Richard Roberts (*History*), José David Saldívar (*Comparative Literature*), Ramón Saldívar (*English, Comparative Literature*), Londa Schiebinger (*History*), Stephen Sohn (*English*), Helen Stacy (*Freeman Spogli Institute for International Studies*), Fred Turner (*Communication*), Richard White (*History*), Gail Wight (*Art & Art History*), Bryan Wolf (*Art & Art History*), Alex Woloch (*English*), Yvonne Yarbro-Bejarano (*Iberian & Latin American Cultures*)

Music

Courses offered by the Department of Music are listed under the subject code MUSIC on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MUSIC&filter-catalognumber-MUSIC=on>) web site.

Mission of the Department of Music

The Department of Music promotes the practice, understanding and enjoyment of music in the university, offering a broad array of educational opportunities with specialization in composition, performance, musicology, ethnomusicology, and music technology.

Learning Outcomes (Undergraduate)

Students majoring in music pursue foundational theoretical and historical coursework before moving on to this in-depth, writing intensive musical analysis course. This course provides the requisite skills needed to continue in advanced work for the major. Students must demonstrate an understanding of tonal music and facility in discussing it.

1. the ability to select and outline an appropriate topic area and select appropriate methodologies for tonal music analysis.
2. an appropriate mastery of the principles underpinning tonal music analysis, referencing appropriate authors and analytical tools and methodologies.
3. appropriate mastery of the use of primary source materials in written and oral presentations.
4. appropriate mastery of the use of secondary source materials in written and oral presentations.
5. the analytical writing skills necessary for the execution of the course papers.
6. the skills necessary to present a musical analysis to an audience in a coherent manner.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Music, including concentration in the fields of Composition, Music History, Computer-Based Music Theory and Acoustics, or Music, Science, and Technology, and to prepare students for a professional career

or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge and practice of Music and to interpret and present the results of such work in appropriate venues and publications.

The Doctor of Philosophy (Ph.D.) is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in either Musicology or Computer-Based Music Theory and Acoustics, based at the Center for Computer Research in Music and Acoustics (CCRMA).

The Doctor of Musical Arts (D.M.A.) in Composition is conferred upon candidates who have demonstrated substantial abilities in creating new musical works as demonstrated by their completed works under the supervision of composition faculty.

Bachelor of Arts in Music

The undergraduate major in Music is built around a series of foundational courses in theory, musicianship, and music history, in addition to performance and the proficiency requirements outlined below. Majors must complete a minimum of 62 units within the department to earn a Bachelor of Arts degree. All required courses for the B.A. in any concentration must be taken for a letter grade. Electives may be taken credit/no credit, but any courses taken toward concentration requirements must carry a letter grade.

Suggested Preparation for the Major

Students should allow more than two years for completion of the major, in part because of sequence courses with prerequisite requirements. Early planning is especially important for students wishing to double-major, for those contemplating overseas study, and for those wishing to pursue a concentration within the Music major. Music majors should attempt to complete MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, and MUSIC 23 Elements of Music III in the freshman year; the series should be completed no later than Autumn Quarter of the junior year. It is recommended that majors complete MUSIC 40 Music History to 1600, MUSIC 41 Music History 1600-1830, MUSIC 42 Music History Since 1830 in the sophomore year; the series should be completed by the end of the junior year.

Suggested Preparatory Course:		Units
MUSIC 19A	Introduction to Music Theory	3
MUSIC 19B	Intermediate Music Theory	3

Fields of Study or Degree Options Concentrations

Areas of concentration (subplans) are offered in: performance; conducting; composition; history and theory; and music, science, and technology. Subplans are printed on the transcript and diploma and are elected in Axess. Guidelines and further information are available from the Department of Music office. In order to complete requirements in a timely manner, students are urged to select this option no later than the end of the junior year for single-area concentrators and the middle of the sophomore year for multiple-area concentrators. Students pursuing multiple concentrations must fulfill all the requirements of each.

Departmental Honors

Honors in Music are awarded by the faculty to Majors who have produced an independent project of exceptional quality through the Concentration program. Students who wish to pursue Honors must declare their Concentration(s) by May 31 of the Junior year (see the undergraduate student services officer for concentration-specific requirements). To receive Honors students must also have earned an overall GPA of 3.60 or higher and a GPA of 3.70 or higher in courses required for the Music Major. Honors are conferred solely through faculty adjudication. For students concentrating in multiple areas, a single jury will be convened.

Degree Requirements

Prospective majors are required to choose a faculty advisor and submit a courseplan (Course plans and advisor agreement forms are available from the undergraduate student services officer.) It is recommended that students schedule a consultation meeting with the undergraduate student services officer as early as possible to plan a program of study.

Required Courses

The following courses are required of all majors.

1. Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1

Additional Music Theory Requirements

- **Piano Proficiency:** Majors are required to pass a Piano Proficiency examination as part of the music theory core (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, MUSIC 23 Elements of Music III). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the Piano Proficiency examination are required to enroll in either MUSIC 12A Introductory Piano Class, MUSIC 12B Introductory Piano Class, or MUSIC 12C Introductory Piano Class concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Download additional information regarding the proficiency examination (<http://music.stanford.edu/private/downloads/PIANO%20PROFICIENCY%20EXAM.doc>).
- **Elective:** In addition to the Theory requirements listed above, Majors must successfully complete one unit of an ear training elective course from the list below:

MUSIC 65A	Voice Class I	1
MUSIC 126	Introduction to Thoroughbass	1-3
MUSIC 127	Instrumentation and Orchestration	3
Or any course, upon approval from Ear Training Advisor		

- **Exit Exam:** in conjunction with the Music Theory series, and pass an aural skills proficiency examination administered at the end of the junior year. This examination tests the ability to accurately transcribe, represent, and reproduce music vocally and at the keyboard, and must be passed before June of the senior year.

2. History

		Units
MUSIC 40	Music History to 1600	4

MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

3. Analysis

		Units
MUSIC 122A	Counterpoint	4
MUSIC 122B	Analysis of Tonal Music	4
MUSIC 122C	Introduction to 20th-Century Composition	4

4. Writing in the Major (WIM)

Select three courses, including at least two at the 4-unit level, as follows: 11-12

One course numbered 140, 141, or 142

MUSIC 140: Studies in Music of the Middle Ages	Pre- or co-requisites for WIM credit: MUSIC 21, MUSIC 40*
MUSIC 141: Studies in Music of the Renaissance	Pre- or co-requisites for WIM credit: MUSIC 21, MUSIC 40*
MUSIC 142: Studies in Music of the Baroque	Pre- or co-requisites for WIM credit: MUSIC 22, MUSIC 41*

One course numbered 143, 144, or 145

MUSIC 143: Studies in Music of the Classical Period	Pre- or co-requisites for WIM credit: MUSIC 22, MUSIC 41*
MUSIC 144: Studies in Music of the Romantic Period	Pre- or co-requisites for WIM credit: MUSIC 23, MUSIC 42*
MUSIC 145: Studies in Western Art Music Since 1900	Pre- or co-requisites for WIM credit: MUSIC 23, MUSIC 42*

One course, numbered 146, 147, 148, or 251

MUSIC 146: Studies in Ethnomusicology	Pre- or co-requisites for WIM credit: MUSIC 22*
MUSIC 147: Studies in Music, Media, and Popular Culture	Pre- or co-requisites for WIM credit: MUSIC 22*
MUSIC 148: Studies in Performance Practice	Pre- or co-requisites for WIM credit: MUSIC 22*
MUSIC 251: Psychophysics and Music Cognition	
*Any additional pre- and co-requisites will be indicated in the annual course bulletin.	

5. Applied

- A minimum of five quarters totaling 15 units of private instruction in instrumental and/or vocal performance (MUSIC 172/272-177/277); students who do not qualify for private instruction at the intermediate or advanced level, but who wish to pursue the major may take introductory voice (MUSIC 65A Voice Class I and MUSIC 73 Intermediate Voice Class), piano (MUSIC 12A Introductory Piano Class and MUSIC 72A Intermediate Piano Class), or guitar (MUSIC 74C Classical Guitar Class) to reach the minimum proficiency levels required to be accepted into a private studio and then complete their 5 quarters. Requirements for the minimum levels of proficiency in each instrument for private instruction are posted at: <http://music.stanford.edu/Academics/Auditions.html>.
- A minimum of five quarters totaling at least 5 units of work in one or more of the department's organizations or chamber groups. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159-167), with the exception of students whose primary instrument is harp, keyboard, or guitar, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music (MUSIC 171 Chamber Music). MUSIC 156 "sic":

Improvisation Collective may count for up to two of the ensemble-unit requirements for the Music major.

Note—The following courses do not satisfy this requirement:

		Units
MUSIC 128	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
MUSIC 160A	Stanford Philharmonia Orchestra	1
MUSIC 160B	Stanford New Ensemble	1
MUSIC 161C	Red Vest Band	1
MUSIC 161D	Stanford Brass Ensemble	1

Concentration Requirements

1. Concentration in Performance

In addition to degree requirements required of majors listed above, students in the Performance concentration must:

- Complete at least 6 additional, graded course units in one area of performance. Acceptable courses are described under "Applied" in the section describing private instruction and ensemble course work above. Additional courses might include, but are not limited to:

		Units
MUSIC 126	Introduction to Thoroughbass	1-3
MUSIC 154	History of Electronic Music	1-5
MUSIC 182	Diction for Singers	1
MUSIC 269	Research in Performance Practices	1-5
MUSIC 183A	German Art Song Interpretation	1
MUSIC 183B	French Art Song Interpretation	1
MUSIC 184A	Editing and Performing Early Music	1-3
MUSIC 184B	Topics in Opera Stagecraft	1-3

- Register for an independent project (MUSIC 198 Concentrations Project, 4 units) in the senior year under faculty supervision, leading to a faculty adjudicated senior recital with a writing component.
 - In preparation for the senior recital, students should reference the Recitals-At-A-Glance planning document (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>), provided by the Department for all dates and appropriate deadlines.

2. Concentration in Conducting

In addition to degree requirements required of majors listed above, students in the Conducting concentration must:

- Complete at least 6 additional, graded elective course units in conducting. Additional courses might include, but are not limited to:

		Units
MUSIC 127	Instrumentation and Orchestration	3
MUSIC 130A	Introduction to Conducting	3
MUSIC 130B	Elementary Orchestral Conducting	3
MUSIC 130C	Elementary Choral Conducting	3
MUSIC 230	Advanced Orchestral Conducting	2-4
MUSIC 231	Advanced Choral Conducting	2-4

- Register for an independent project (MUSIC 198 Concentrations Project, 4 units) in the senior year under faculty supervision, leading to a senior conducting project.
 - In preparation for the senior recital, students should reference the Recitals-At-A-Glance planning document (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>), provided by the Department for all dates and appropriate deadlines.

3. Concentration in Composition

In addition to degree requirements required of majors listed above, students in the Composition concentration must:

- Complete MUSIC 127 Instrumentation and Orchestration
4. Composition concentrators must take at least 2 quarters of individual study in composition MUSIC 125 Individual Undergraduate Projects in Composition, and at least one quarter of MUSIC 123 Undergraduate Seminar in Composition. These may count as 3 of the 5 quarters of required applied music classes for the major (the remaining two quarters of applied music must be taken in an instrumental or vocal area, as defined in the requirements for the music major).
- Complete at least 3 additional, graded elective course units in composition. Additional courses might include, but are not limited to:

		Units
MUSIC 123	Undergraduate Seminar in Composition	3
MUSIC 125	Individual Undergraduate Projects in Composition	1-3
MUSIC 127	Instrumentation and Orchestration	3
MUSIC 150	Musical Acoustics	3
MUSIC 154	History of Electronic Music	1-5
Select one of the following Series:		
Series A		
MUSIC 220A	Fundamentals of Computer-Generated Sound	2-4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	2-4
MUSIC 220C	Research Seminar in Computer-Generated Music	2-4
Series B		
Any of the series in computer-generated sound, music, and composition		

- Register for an independent project (MUSIC 198 Concentrations Project, 4 units) in the senior year under faculty supervision, leading to a faculty-adjudicated composition project.
 - In preparation for the senior recital, students should reference the Recitals-At-A-Glance planning document (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>), provided by the Department for all dates and appropriate deadlines.

4. Concentration in History and Theory

In addition to degree requirements required of majors listed above, students in the History and Theory concentration must:

- Complete at least 6 additional, graded course units in history and theory. Additional courses might include, but are not limited to:

		Units
Select any course not taken in fulfillment of the major requirement:		
MUSIC 221	Topics in the History of Theory	3-5
MUSIC 140:	Studies in Music of the Middle Ages	
MUSIC 141:	Studies in Music of the Renaissance	
MUSIC 142:	Studies in Music of the Baroque	
MUSIC 143:	Studies in Music of the Classical Period	
MUSIC 144:	Studies in Music of the Romantic Period	
MUSIC 145:	Studies in Western Art Music Since 1900	
MUSIC 146:	Studies in Ethnomusicology	
MUSIC 147:	Studies in Music, Media, and Popular Culture	
MUSIC 148:	Studies in Performance Practice	

- Register for an independent project (MUSIC 198 Concentrations Project 4 units) in the senior year under faculty supervision, leading to a senior research paper.

5. Concentration in Music, Science, and Technology

Requires completion of 62 units of course work that differs from that of the major and is delineated below. This field of study is designed for those students interested in the musical ramifications of rapidly evolving computer technology and digital audio, and in the acoustic and psychoacoustic foundations of music. This program can serve as a complementary major to students in the sciences and engineering. Students in the program are required to include the following courses in their studies:

1. Theory and Analysis

		Units
MUSIC 21	Elements of Music I	3
MUSIC 24A	Ear Training I	1
MUSIC 22	Elements of Music II	3
MUSIC 24B	Ear Training II	1
MUSIC 23	Elements of Music III (includes passing the piano and ear-training proficiency examinations, as described for the major)	3
MUSIC 24C	Ear Training III	1
MUSIC 150	Musical Acoustics	3
MUSIC 122B	Analysis of Tonal Music	4
MUSIC 251	Psychophysics and Music Cognition	4
MUSIC 220A	Fundamentals of Computer-Generated Sound	4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	4
MUSIC 220C	Research Seminar in Computer-Generated Music	4
MUSIC 220D	Research in Computer-Generated Music	4
MUSIC 250A	Physical Interaction Design for Music	4

- Majors are required to pass a Piano Proficiency examination as part of the music theory core as described above in the "Degree Requirements" section, item 6. Additional Requirements. Download additional information regarding the proficiency examination (<http://music.stanford.edu/private/downloads/PIANO%20PROFICIENCY%20EXAM.doc>).
- In addition to the three ear training courses above, MST students are also required to take an elective course in ear training, and pass an aural skills proficiency examination at the end of the junior year. This examination tests the ability to accurately transcribe, represent, and reproduce music vocally and at the keyboard.
- Applied

- Individual studies in performance, MUSIC 172/272-177/277 (6 units) or the sequence below: Course List

		Units
MUSIC 192A	Foundations of Sound-Recording Technology (p. 557)	3
MUSIC 192B	Advanced Sound Recording Technology (p. 557)	3

- A minimum of five quarters totaling at least 5 units of work in one or more of the department's organizations or chamber groups, or 5 units of MUSIC 192C Session Recording. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159-167), with the exception of students whose primary instrument is harp, keyboard, or guitar, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music (MUSIC 192C Session Recording). MUSIC 156 "sic": Improvisation Collective may count for up to two of the ensemble-unit requirements for the Music major.

3. History

Select two of the following:

		Units
MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

4. Research Project

The program requires a senior research project (4 units) completed under faculty guidance. May be completed in conjunction with enrollment in any of the following:

		Units
MUSIC 220D	Research in Computer-Generated Music	4
MUSIC 199	Independent Study	4
MUSIC 198	Concentrations Project	4

Overseas Study or Study Abroad

Courses in Music are often available at Stanford overseas programs, especially in Berlin, Paris, Florence, and Oxford. See the "Overseas Studies Program" section of this bulletin for this year's listings. Music majors and minors should talk to the Department of Music undergraduate administrator prior to going overseas.

Joint Major Program in Music and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Music Major Requirements in the Joint Major Program

Because the Joint Major Program is new and experimental, additional details will be posted here in October. Some changes to the following may occur. Additional details concerning the concentrations in Performance, Conducting, Composition, Music History and Theory, or Music, Science, and Technology will be posted at that time. Students planning to declare the Joint Major in Music and Computer Science must consult the Department of Music student services office in Braun Music Center, Room 101 prior to declaring.

See the "Computer Science Joint Major Program (p. 229)m" section of this bulletin for details on Computer Science requirements.

Students majoring in the joint major program in Computer Science and Music must complete the following:

1. Music Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3

MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1
Total Units		12

Additional Music Theory Requirements

- *Piano Proficiency:* Majors are required to pass a Piano Proficiency examination as part of the music theory core (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, MUSIC 23 Elements of Music III). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the Piano Proficiency examination are required to enroll in either MUSIC 12A Introductory Piano Class, MUSIC 12B Introductory Piano Class, or MUSIC 12C Introductory Piano Class concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Additional information regarding the proficiency examination (<http://music.stanford.edu/private/downloads/PIANO%20PROFICIENCY%20EXAM.doc>) is available here.
- *Elective:* In addition to the Theory requirements listed above, majors must successfully complete one unit of an ear training elective course from the list below:

MUSIC 65A	Voice Class I	1
MUSIC 126	Introduction to Thoroughbass	1
MUSIC 127	Instrumentation and Orchestration	3
Or any course upon approval of the Ear Training adviser		

- *Exit Exam:* in conjunction with the Music Theory series, and pass an aural skills proficiency examination administered at the end of the junior year. This examination tests the ability to accurately transcribe, represent, and reproduce music vocally and at the keyboard, and must be passed before June of the senior year.

2. Music History

Select 2 of 3 from the list below		8
MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

3. Analysis

MUSIC 122B	Analysis of Tonal Music	4
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4. Computing and Music

MUSIC 220A	Fundamentals of Computer-Generated Sound	4
MUSIC 256A	Music, Computing, and Design I: Software Paradigms for Computer Music	4
Total Units		8

5. WIM

WIM at 4 units must be taken. Course below is recommended, but can be replaced with any Music WIM course depending on student's area of interest.

MUSIC 251	Psychophysics and Music Cognition	4
Total Units		4

6. Electives

Students must submit 12 unit elective course plan to the JMP faculty adviser for approval no later than the beginning of the junior year. MUSIC 220B and MUSIC 250A are recommended, but elective course plan can consist of any courses from list below, or other Music department course(s) with permission of adviser

MUSIC 122A	Counterpoint	4
MUSIC 122C	Introduction to 20th-Century Composition	4
MUSIC 128	Stanford Laptop Orchestra: Composition, Coding, and Performance	4
MUSIC 150	Musical Acoustics	3
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	4
MUSIC 220C	Research Seminar in Computer-Generated Music	4
MUSIC 250A	Physical Interaction Design for Music	4
MUSIC 256B	Music, Computing, Design II: Mobile Music	4

7. Applied Music

Students may elect to take either of the following to fulfill the applied music requirement:

7.1 Lesson and Ensemble Study

- 6 units of individual studies in performance, MUSIC 172/272-177/277 and
- 5 quarters totaling 5 units of work in one or more of the department's ensembles or chamber music groups. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensemble (MUSIC 159-167) with the exception of students whose primary instrument is harp, keyboard, or guitar, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music.

7.2 Sound Recording

- 1 quarter (3 units) of MUSIC 192A Foundations of Sound-Recording Technology
- 1 quarter (3 units) of MUSIC 192B Advanced Sound Recording Technology
- 5 units of MUSIC 192C Session Recording

8. Capstone Project

MUSIC 220D	Research in Computer-Generated Music (3 units taken in conjunction with CS Capstone)	3
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9. Optional Concentrations

Because the Joint Major Program is new and experimental, additional details including degree requirements for students who would also like to complete a concentration in Performance, Conducting, Composition, Music History and Theory, or Music, Science, and Technology will be posted here in October.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<http://studentaffairs.stanford.edu/sites/>)

default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentervicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in Music

The Music minor provides students with a core of essential Music courses in the disciplines that establish both a foundation for informed appreciation of music and a basis for more advanced study, should the student wish to pursue it.

Degree Requirements

Total of 36 units required course work as delineated below, and passage of the piano proficiency examination.

Required Courses: General Music

1. Theory

	Units
MUSIC 21 Elements of Music I	3
MUSIC 22 Elements of Music II	3
MUSIC 23 Elements of Music III	3
MUSIC 24A Ear Training I	1
MUSIC 24B Ear Training II	1
MUSIC 24C Ear Training III	1

Additional Music Theory Requirements

- **Piano Proficiency:** Minors are required to pass a Piano Proficiency examination as part of the music theory core (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, MUSIC 23 Elements of Music III). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the Piano Proficiency examination are required to enroll in either MUSIC 12A Introductory Piano Class, MUSIC 12B Introductory Piano Class, or MUSIC 12C Introductory Piano Class concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Download additional information regarding the proficiency examination (<http://music.stanford.edu/private/downloads/PIANO%20PROFICIENCY%20EXAM.doc>).
- **Exit Exam:** in conjunction with the Music Theory series, and pass an aural skills proficiency examination administered at the end of the junior year. This examination tests the ability to accurately transcribe, represent, and reproduce music vocally and at the keyboard, and must be passed before June of the senior year.

2. History

		Units
MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

3. Applied: Ensemble

Two quarters, 2 units total.

		Units
MUSIC 159	Early Music Singers	1
MUSIC 160	Stanford Symphony Orchestra	1
MUSIC 160C	Stanford Baroque Soloists	1
MUSIC 160D	Stanford Chinese Music Ensemble	1
MUSIC 160S	Summer Orchestra	1
MUSIC 161A	Stanford Wind Ensemble	1
MUSIC 161B	Jazz Orchestra	1
MUSIC 162	Symphonic Chorus	1
MUSIC 163	Memorial Church Choir	1
MUSIC 165	Chamber Chorale	1
MUSIC 167	University Singers	1
MUSIC 167S	Summer Chorus	1

4. Applied: Individual

Two quarters at 3 units per quarter, 6 units total.

		Units
MUSIC 159	Early Music Singers	1
MUSIC 160	Stanford Symphony Orchestra	1
MUSIC 160C	Stanford Baroque Soloists	1
MUSIC 160D	Stanford Chinese Music Ensemble	1
MUSIC 160S	Summer Orchestra	1
MUSIC 161A	Stanford Wind Ensemble	1
MUSIC 161B	Jazz Orchestra	1
MUSIC 162	Symphonic Chorus	1
MUSIC 163	Memorial Church Choir	1
MUSIC 165	Chamber Chorale	1
MUSIC 167	University Singers	1
MUSIC 167S	Summer Chorus	1

4. WIM, 4 units

		Units
4 units in any course numbered Music 140-149, except MUSIC 140G, or MUSIC 251. Offerings in 2014-2015 include:		
MUSIC 140J	Studies in Music of the Middle Ages: Music and Memory	4
MUSIC 141	Studies in Music of the Renaissance	4
MUSIC 142	Studies in Music of the Baroque	4
MUSIC 143J	Studies in Music of the Classical Period: Franz Joseph Haydn	4
MUSIC 144J	Studies in Music of the Romantic Period: Faust in 19th-century Music	4
MUSIC 145J	Studies in Western Art Music Since 1900: The Music & Ideas of Charles Ives	4
MUSIC 146J	Studies in Ethnomusicology: Music Ethnography of the Bay Area	4
MUSIC 147J	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	4

MUSIC 147K	Studies in Music, Media, and Popular Culture: Music and Urban Film	4
MUSIC 147L	Studies in Music, Media, and Popular Culture: Latin American Music and Globalization	4
MUSIC 148J	Studies in Perf Practice: Reactions to the Record: Early Recordings, Lost Styles, and Music's Future	4
MUSIC 251	Psychophysics and Music Cognition	4

Required Courses: Music, Science and Technology

1. Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1
MUSIC 150	Musical Acoustics	3
MUSIC 220A	Fundamentals of Computer-Generated Sound	2-4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	2-4

2. Applied

		Units
MUSIC 192A	Foundations of Sound-Recording Technology	3
MUSIC 192B	Advanced Sound Recording Technology	3
MUSIC 192C	Session Recording (two quarters, 3 units total)	1-2

3. WIM, 4 units

		Units
MUSIC 251	Psychophysics and Music Cognition	4

Performance Certificate Program for Non Music Majors

As a locus of great academic and artistic depth and diversity, the Department of Music's performance programs have long engaged students who, even though they are not music majors, are serious and dedicated to furthering their skills in music performance. The Certificate in Music Performance program provides a select cohort of these students the opportunity for further recognition of their artistic achievement.

This program is open by audition to undergraduate students who already demonstrate a high degree of accomplishment in their area of music performance, study privately with one of the Department of Music's faculty, and who wish to bolster their performance studies with coursework that may be drawn from the Department of Music's other areas of academic focus: history, theory, computer music, and composition. The Certificate in Music Performance is issued by the Department of Music and will not appear on any University record, including the student's transcript.

Admission

Students are admitted to the Certificate in Music Performance program based on an audition adjudicated by Department of Music faculty at the beginning of spring quarter. To request an audition, the student should speak with the private lesson instructor and the Department of Music's undergraduate student services officer. Email

ugmusicinquiries@stanford.edu for additional information. At the time of the audition, students must have already declared a major outside of music.

Requirements

Once admitted into the program, students must complete a course plan to be approved by Department faculty based on the requirements below

1. Performance

- A minimum of 6 quarters of individual lessons of private instruction and/or vocal performance (MUSIC 172/272-177/277). Any quarters of instruction taken prior to admission into the program may also count towards these requirements. Requirements for the minimum levels of proficiency in each instrument for private instruction are posted on the Music Department's (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/%20http://music.stanford.edu/Academics/Auditions.html.html>) web site (<https://sites.stanford.edu/music-dept/academics/undergraduates>). All 6 quarters of lesson study must be in the same instrument area.
- A minimum of 6 quarters of ensemble experience in the Department of Music's ensembles and chamber groups. For students whose primary instrument area is guitar, keyboard or harp, at least one quarter of ensemble experience must be in one of the department's traditional large ensembles (MUSIC 159-167, or MUSIC 184). The remaining ensemble requirements may be filled with chamber music (MUSIC 171). Keyboard students may also take MUSIC 171 Chamber Music, MUSIC 171 Chamber Music, and MUSIC 171 Chamber Music to fulfill this requirement. All non-keyboard, guitar or harp students must successfully complete 3 quarters in the department's traditional ensembles (MUSIC 159-167 and MUSIC 184), and 3 quarters in conductor-less, small ensembles such as chamber music or jazz combos MUSIC 171 Chamber Music. MUSIC 156 "sic": Improvisation Collective may count for up to two of the ensemble unit requirements. Any quarters of ensemble taken prior to admission into the program may also count towards these requirements.

2. Music Theory

Students are required to complete one course in Music Theory (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, or MUSIC 23 Elements of Music III). For the purposes of the Performance Certificate, the student may elect to take these courses on a Credit/No Credit grading basis. However, students must also pass the associated Piano Proficiency Exam and take one course in Ear Training.

3. Elective Courses

6 or more total course units in Music, dependent upon course-plan document submitted following acceptance into the program.

4. Final Project

To complete the Performance Certificate, students must enroll in a 4 unit MUSIC 199 Independent Study or 4 unit MUSIC 198 Concentrations Project and complete a final, capstone performance-based project. Students must pass faculty adjudication, and, in addition, complete a writing project (essay or program notes) pre-approved by the lesson instructor. Students should reference the Department of Music website's Recitals at a Glance (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>) page for appropriate recital planning dates and deadlines.

Master of Arts in Music

University requirements for the M.A. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of 'A,' 'B,' or 'Satisfactory' (a passing grade in

an instructor-mandated credit/no credit course) in Music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

Admission

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the second Tuesday in December application deadline. All components of the application are due by the second Tuesday in December. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see the Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>) web site).

Degree Options

All of the following fields of study are declarable as subplans in Axess via the "Declaration or Change to a Field of Student" form; they appear on the transcript and the diploma:

- Master of Arts degree (M.A.) in Music—Composition subplan.
- Master of Arts degree (M.A.) in Music—Music History subplan.
- Master of Arts degree (M.A.) in Music—Computer-Based Music Theory and Acoustics subplan.
- Master of Arts degree (M.A.) in Music—Music, Science, and Technology subplan.
 - Note: The M.A./M.S.T. program is the only terminal master's degree; it is two years in duration. It is available to current Stanford undergraduates as a coterminal MA, current Stanford graduates, and external applicants.

Degree Requirements

A minimum of 45 academic units is required for the master's degree in Music. The Department of Music does not accept students for study only towards the M.A. degree except in the Music, Science, and Technology program, described below.

1. Composition

Students are not admitted into the M.A. as a terminal degree for composition: rather, students in the D.M.A. program in composition who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in composition.

2. Music History

Students are not admitted into the M.A. as a terminal degree for music history: rather, students in the Ph.D. program in musicology who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in music history.

3. Computer-Based Music Theory and Acoustics

Students are not admitted into the M.A. as a terminal degree for computer-based music theory and acoustics: rather, students in the Ph.D. program in computer-based music theory and acoustics who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in computer-based music theory and acoustics.

4. Music, Science, and Technology (M.S.T.)

The M.A. in Music, Science, and Technology is the department's only terminal master's degree. This is a two-year program of 45 graduate-level units focusing on the integration of music perception, music-related signal processing and controllers, synthesis, performance, and composition. The program is designed for students who have an undergraduate music, engineering, or science degree. Required course work is listed below. A complete program with an individually-tailored list of electives will be formed in consultation with the student's adviser.

Units

Required Courses

MUSIC 201	CCRMA Colloquium
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 251	Psychophysics and Music Cognition
MUSIC 255	Intermedia Workshop
MUSIC 256A	Music, Computing, and Design I: Software Paradigms for Computer Music
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters

Electives

The remaining units of graduate level work are determined in consultation with the student's adviser and include CCRMA electives, and may include courses taken outside the department.

Doctor of Musical Arts (D.M.A.) and Doctor of Philosophy (Ph.D.) in Music

University requirements for the D.M.A. and Ph.D. are described in the "Graduate Degrees" section of this bulletin. The following statements apply to all the graduate degrees described below, unless otherwise indicated.

Admission

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers, according to the proposed field of concentration) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the application deadline of the second Tuesday in December. All components of the application are due by the second Tuesday in December. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see the Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>) web site).

Department Examinations

All entering doctoral graduate students are required to take:

1. a diagnostic examination testing the student in theory (counterpoint, harmony, and analysis), a proficiency examination in sight-singing; and,
2. for musicologists and composers only, a proficiency examination in piano sight-reading; and
3. for musicologists only, the history of Western art music.

These exams are given the week before classes begin in September each year. Teaching Assistant assignments and the funding associated with this

portion of a graduate student's financial aid package are determined based upon successful completion of these exams.

Graduate Credit

None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of 'A,' 'B,' or 'S' (a passing grade in an instructor-mandated credit/no credit course) in music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

The following may be taken as electives for graduate credit:

1. any course in another department numbered 100 or over (with adviser's consent)
2. any course in the Music department numbered 100 or over except those required for the B.A. degree. A letter grade of 'A,' 'B,' or 'S' (a passing grade in an instructor-mandated credit/no credit course) is required.
3. Music department group instruction (enroll in MUSIC 199 Independent Study after speaking with instructor):

		Units
MUSIC 72A	Intermediate Piano Class	1
MUSIC 72C	Harpichord Class	1
MUSIC 72D	Jazz Piano Class	1
MUSIC 73	Intermediate Voice Class	1
MUSIC 74C	Classical Guitar Class	1
MUSIC 74D	Harp Class	1
MUSIC 75B	Renaissance Wind Instruments Class	1
MUSIC 76	Brass Instruments Class	1
MUSIC 77	Percussion Class	1

Degree Options

All of the following fields of study are declarable as subplans in Axess via the "Declaration or Change to a Field of Study for Graduate Students" form; they appear on the transcript and the diploma:

• Doctor of Musical Arts degree (D.M.A.) in Composition

The D.M.A. is offered to a limited number of students who demonstrate substantial training in the field and high promise of attainment as composers. Students may work in acoustic and/or electronic forms. Breadth is given through studies in other branches of music and in relevant fields outside music, as desirable. The final project for this degree is a large-scale composition.

• Doctor of Philosophy degree (Ph.D.) in Musicology

• Doctor of Philosophy degree (Ph.D.) in Computer-Based Music Theory and Acoustics

The Ph.D. is offered in areas of the research of Stanford's graduate faculty: Musicology, and Computer-Based Music Theory and Acoustics (CBMTA) at the Center for Computer Research in Music and Acoustics (CCRMA). The department seeks students who demonstrate substantial scholarship, high promise of attainment, and the ability to do independent investigation and present the results of such research in a dissertation.

Degree Requirements

Residence

The candidate must complete a minimum of 135 academic units (see Residency under the Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>) section of this bulletin). Doctoral candidates working on Ph.D. dissertations or Doctor of Musical Arts (D.M.A.) final projects that require consultation with faculty members continue enrollment in the University under Terminal Graduate Registration (TGR), after they have reached the required 135 academic units and have completed their Special Area Examinations.

Qualifying Examination

A written and oral examination given just prior to the fourth quarter of residence for D.M.A. students and Ph.D. students in the Computer-Based Music Theory and Acoustics programs; for Ph.D. students in Musicology, the exams are given just prior to the eighth quarter of residence. This exam tests knowledge of history, theory, repertory, and analysis. For D.M.A. students a *Special Area Examination* topic proposal is due at the time of the *Qualifying Examination*.

Admission to Candidacy

Upon successful completion of the Qualifying Examination and 45 units of graduate level work, faculty consider the student's overall progress and academic achievement and determines if the student has the potential to successfully complete the requirements of the degree program. If a student's progress and potential are deemed sufficient to continue in the degree program, the student is directed to complete the Application for Candidacy for Doctoral Degree (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/appcanddoct.pdf>). Failure to advance to candidacy will result in the dismissal of the student from the program.

Teaching

All students in the Ph.D. or D.M.A. degree programs, regardless of sources of financial support, are required to complete six quarters of supervised teaching (Teaching Assistantship) at half time. MUSIC 280 TA Training Course (offered in Spring Quarter and taken at the end of the first year) is a required course for Teaching Assistants. Additional quarters of teaching may be offered by the department.

I. Composition

The Doctor of Musical Arts (D.M.A.) degree in Composition is given breadth through collateral studies in other branches of music and in relevant studies outside music as seems desirable. In addition to degree requirements required of all doctoral graduate students and listed above, students must complete the following required courses:

Required Courses	Units
MUSIC 280 TA Training Course	1
MUSIC 305C Analysis and Repertoire: Late-Romantic to Contemporary	4
MUSIC 323 Doctoral Seminar in Composition (4 quarters within the first two years of study)	3-4
MUSIC 324 Graduate Composition Forum *	1
MUSIC 325 Individual Graduate Projects in Composition †	1-5

One elective course from the Ph.D. CBMTA curricula chosen from the following:

MUSIC 220A Fundamentals of Computer-Generated Sound
MUSIC 251 Psychophysics and Music Cognition
MUSIC 255 Intermedia Workshop

MUSIC 256A	Music, Computing, and Design I: Software Paradigms for Computer Music	
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	3-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4

* The requirement is for all six quarters during years 1 & 2, and a minimum of three quarters during years 3 & 4.

† Two or more quarters per year are required until advancement to candidacy; by the end of the second year the student shall have enrolled with a minimum of two different faculty members; but the end of the third year the student shall have enrolled with a minimum of three different faculty.

- Besides those requirements listed above, candidates are expected to produce a number of works demonstrating their ability to compose in a variety of forms and for the common media: vocal, instrumental, and electronic music. If possible, the works submitted are presented in public performance prepared by the composer. Annual progress is reviewed by the composition faculty with a major portfolio review conducted during the Fall Quarter of the third year.
- Foreign Language Requirement*—At the time of advancement to candidacy, all D.M.A. students are required to have demonstrated a reading knowledge of one language other than English and the ability to translate it into idiomatic English.
- Special-Area Examination*—A written examination in the candidate's field of concentration, one-hour presentation followed by questions in MUSIC 324 Graduate Composition Forum, sample course syllabus, and final project proposal are required to be completed during the Winter Quarter of the fourth year of study, no later than the ninth week of classes.
- Final Project Presentation*—Required during the last quarter of residence, no later than the ninth week of classes, the purpose of the presentation is to demonstrate the ability of the candidate to organize and present the topic of the final project for public review. It should be one hour in length, followed by questions, treating aspects of the final project. Details regarding the D.M.A. final project presentation may be found in the Department of Music Graduate Handbook.
- Final Project*—Candidate's work culminates in a required Final Project. The final project in composition must be a substantial composition, the scope of which shall be agreed upon by the members of the committee. Typically, work on the final project encompasses several quarters. Usually, smaller works, for specific performances, are composed at the same time.
- Reading Committee*—The membership of the reading committee is the principal final project adviser and a minimum of two additional members. The notice of appointment of a D.M.A. Final Project Reading Committee should be submitted to the department at the same time as the approved final project proposal and the completion of the Special Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee. Obtain the D.M.A. reading committee form from the department office; fill it out; obtain committee members' signatures; return to the department office.

II. Musicology

In addition to degree requirements required of all doctoral graduate students and listed above, students must complete the following required courses:

		Units
Required Courses		
MUSIC 200A	Proseminar in Musicology and Music Bibliography (required of all entering students)	3-4
MUSIC 200B	Proseminar in Ethnomusicology	3-5

MUSIC 280	TA Training Course	1
MUSIC 300A	Medieval Notation	3-4
MUSIC 300B	Renaissance Notation	4
MUSIC 305A	Analysis and Repertoire: Medieval and Renaissance	4
MUSIC 305B	Analysis and Repertoire: Baroque to Early Romantic	4
MUSIC 305C	Analysis and Repertoire: Late-Romantic to Contemporary	4
MUSIC 310	Research Seminar in Musicology *	3-5
MUSIC 312A	Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche	4
MUSIC 312B	Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today	4
MUSIC 330	Musicology Dissertation Colloquium †	1

One elective course from the D.M.A. Composition of Ph.D. CBMTA curricula chosen from the following (or other, by instructor and advisor consent):

MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 251	Psychophysics and Music Cognition
MUSIC 253	Symbolic Musical Information
MUSIC 254	Music Query, Analysis, and Style Simulation
MUSIC 323	Doctoral Seminar in Composition
MUSIC 324	Graduate Composition Forum

* The requirement is for eight seminars of 3-5 units each. Up to two graduate seminars in other departments may be counted toward this requirement, pending adviser's approval.

† The requirement is for enrollment each Spring Quarter beginning in year four and continuing to graduation.

- Foreign Language Requirement*—At the time of advancement to candidacy, all Ph.D. students in Musicology must have passed a Ph.D. Language examination in German and in a second language, chosen from French, Italian, or Latin (or, on a case-by-case basis, another language, if it has significant bearing on the candidate's field of study). If one of these languages is the student's native language, the student may be exempted from an examination.
- Special-Area Examination*—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.
- University Oral Examination*—Taken once the dissertation is substantially under way; an oral presentation is a defense of dissertation research methods and results.
- Dissertation*—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.
- Reading Committee*—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

III. Computer-Based Music Theory and Acoustics

In addition to degree requirements required of all doctoral graduate students and listed above, students must complete the following required courses:

Required Courses

MUSIC 220A	Fundamentals of Computer-Generated Sound	4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	4
MUSIC 220C	Research Seminar in Computer-Generated Music	2-4
MUSIC 220D	Research in Computer-Generated Music *	1-10
MUSIC 251	Psychophysics and Music Cognition	1-5
MUSIC 280	TA Training Course	1
MUSIC 305C	Analysis and Repertoire: Late-Romantic to Contemporary	4
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	3-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4

* The requirement is for 12 units.

1. *Foreign Language Requirement*—At the time of advancement to candidacy, all Ph.D. students in computer-based music theory and acoustics are required to have demonstrated a reading knowledge of one language other than English and the ability to translate it into idiomatic English.
2. *Special-Area Examination*—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.
3. *University Oral Examination*—Taken once the dissertation is substantially under way; an oral presentation is a defense of dissertation research methods and results.
4. *Dissertation*—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.
5. *Reading Committee*—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

Emeriti: (Professors) John M. Chowning, Albert Cohen, George Houle, William H. Ramsey; *(Professors, Performance)* Arthur P. Barnes, Marie Gibson

Chair: Stephen M. Sano

Professors: Jonathan Berger (on leave Winter), Karol Berger, Chris Chafe, Brian Ferneyhough, Thomas Grey, Stephen Hinton, Julius O. Smith

Associate Professors: Mark Applebaum, Heather Hadlock, William P. Mahrt, Jesse Rodin

Assistant Professors: Takako Fujioka, Jaroslaw Kapuscinski, Charles Kronengold, Anna Schultz (on leave), Ge Wang

Professors (Teaching): George Barth (Piano), Stephen M. Sano (Director of Choral Studies)

Associate Professor (Performance): Jindong Cai (Director of Orchestral Studies)

Courtesy Professor: Paul DeMarinis

Senior Lecturers: Giancarlo Aquilanti (Director of Theory; Wind Ensemble; on leave Winter, Spring), Talya Berger (Theory), Stephen Harrison (Cello), Thomas Schultz (Piano), Gregory A. Wait (Voice; Director of Vocal Studies), Frederick R. Weldy (Piano)

Lecturers: Kumaran Arul (Piano), Erika Arulanantham (Theory), Fredrick Berry (Jazz Ensemble), Mark Brandenburg (Clarinet), Marie-Louise Catsalis (Voice), Marjorie Chauvel (Harp), Tony Clements (Tuba), Laura Dahl (Resident Collaborative Pianist), Anthony Doheny (Violin), John Dornenburg (Viola da Gamba), Greer Ellison (Flute, Baroque Flute), Charles A. Ferguson (Guitar), Debra Fong (Violin), Claire Giovannetti (Voice), Dawn Harms (Violin, Viola), Alexandra Hawley (Flute), David Henderson (Classical Saxophone), Wendy Hillhouse (Voice), Melody Holmes-Vedder (Flute), Nova Jiménez (Voice), McDowell Kenley (Trombone), Mary Linduska (Voice, Summer), Murray Low (Jazz Piano), Adam Luftman (Trumpet), Anthony Martin (Baroque Violin), James Matheson (Oboe, Winter & Spring), Robin May (Oboe, Autumn), Seward McCain (Jazz Bass), Charles McCarthy (Jazz Saxophone), Robert Huw Morgan (University Organist, Organ), Bruce Moyer (Contrabass), Herbert Myers (Early Winds), James Nadel (Jazz), Rufus Olivier (Bassoon), Lawrence Ragent (French Horn), David Rokeach (Drum Set), Kelly Savage (Theory), Robin Sharp (Violin), Livia Sohn (Violin), Elaine Thornburgh (Harpichord), Erik Ulman (Composition, Theory), Linda Uyechi (Taiko), Rick Vandivier (Jazz Guitar), Mark Veregge (Percussion), John Worley (Jazz Trumpet), Hui (Daisy) You (Guzheng), Timothy Zerlang (University Carillonneur, Piano)

Consulting Professors: Jonathan Abel (CCRMA), David Berners (CCRMA), Marina Bosi (CCRMA), Poppy Crum (CCRMA), Pierre Divenyi (CCRMA), Walter Hewlett (Computer-Assisted Research in the Humanities), Eleanor Selfridge-Field (Computer-Assisted Research in the Humanities), Malcolm Slaney (CCRMA)

Assistant Consulting Professors: Gautham Mysore (CCRMA), Craig Sapp (Computer-Assisted Research in the Humanities), Jeffrey C. Smith (CCRMA)

Visiting Professor: Thomas Rossing (CCRMA)

Artists-in-Residence (St. Lawrence String Quartet): Geoff Nuttall (Violin), Mark Fewer (Violin), Lesley Robertson (Viola), Christopher Costanza (Cello)

Mellon Fellows: Alexandra Kieffer, Jamie Greenberg Reuland

Philosophy

Courses offered by the Department of Philosophy are listed under the subject code PHIL on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PHIL&filter-catalognumber-PHIL=on>).

Philosophy concerns itself with fundamental problems. Some are abstract and deal with the nature of truth, justice, value, and knowledge; others are more concrete, and their study may help guide conduct or enhance understanding of other subjects. Philosophy also examines the efforts of past thinkers to understand the world and people's experience of it.

Although it may appear to be an assortment of different disciplines, there are features common to all philosophical inquiry. These include an emphasis on methods of reasoning and the way in which judgments are formed, on criticizing and organizing beliefs, and on the nature and role of fundamental concepts.

Students of almost any discipline can find something in philosophy which is relevant to their own specialties. In the sciences, it provides a framework within which the foundations and scope of a scientific theory can be studied, and it may even suggest directions for future development. Since philosophical ideas have had an important influence on human endeavors of all kinds, including artistic, political, and economic, students of the humanities and social sciences should find their understanding deepened by acquaintance with philosophy.

Mission of the Undergraduate Program in Philosophy

The mission of the undergraduate program in Philosophy is to train students to think clearly and critically about the deepest and broadest questions concerning being, knowledge, and value, as well as their connections to the full range of human activities and interests. The Philosophy major presents students with paradigms and perspectives of past thinkers and introduces students to a variety of methods of reasoning and judgment formation. Courses in the major equip students with core skills involved in critical reading, analytical thinking, sound argumentation, and the clear, well-organized expression of ideas. Philosophy is an excellent major for those planning a career in law, medicine, business, or the non-profit sector. It provides analytical skills and a breadth of perspective helpful to those called upon to make decisions about their own conduct and the welfare of others. Philosophy majors who have carefully planned their undergraduate program have an excellent record of admission to professional and graduate schools.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to communicate philosophical ideas effectively orally and in writing.
2. close reading, argument evaluation, and analytical writing.
3. dialectical ability to identify strengths and weaknesses of an argument and devise appropriate and telling responses.
4. the ability to think critically and demonstrate clarity of conceptualization.
5. the ability to differentiate good from unpromising philosophical questions.
6. the ability to sustain an argument of substantial scope, showing control over logical, argumentative, and evidential relations among its parts.

Special and Joint Majors

The Special Program in the History and Philosophy of Science enables students to combine interests in science, history, and philosophy. Students interested in this program should see the special adviser.

The Special Option in Philosophy and Literary Thought enables students to combine interests in philosophy and literary studies. Interested students should see the Director of Undergraduate Studies for Philosophy and Literature.

The combined major in Philosophy and Religious Studies joins courses from both departments into a coherent theoretical pattern.

The joint major in Philosophy and Computer Science provides opportunities for the systematic study of computation together with philosophy in the broadest sense.

Graduate Program in Philosophy

The Department of Philosophy offers an M.A. and a Ph.D. degree. The University's basic requirements for the M.A. and Ph.D. degrees are discussed in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to develop knowledge and skills in Philosophy and to prepare students for a professional career or doctoral studies. This is achieved through completion of core courses, with an option for further specialization. (See below for details.)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Philosophy. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Philosophy and to interpret and present the results of such research.

Library and Associations

The Tanner Memorial Library of Philosophy contains an excellent working library and ideal conditions for study. Graduate students and undergraduate majors in philosophy have formed associations for discussion of philosophical issues and the reading of papers by students, faculty, and visitors.

Bachelor of Arts in Philosophy

There are three ways of majoring in Philosophy:

- The General Program
- The Special Program in the History and Philosophy of Science
- The Special Option in Philosophy and Literature.

A student completing any of these receives a B.A. degree in Philosophy. There is also a major program offered in Philosophy and Religious Studies. To declare a major, a student should consult with the Director of Undergraduate Study and see the undergraduate student services administrator to be assigned an adviser and work out a coherent plan. The department recommends proficiency in at least one foreign language.

General Program

1. Course requirements, minimum 55 units:
 - a. preparation for the major: an introductory course (under 100) and PHIL 80 Mind, Matter, and Meaning. (PHIL 80 should normally be taken no later than the first quarter after declaring the major.) Students taking a Philosophy Thinking Matters course may count 4 units toward the introductory Philosophy requirement. Students who took the Winter/Spring Philosophy Introduction to the Humanities (IHUM) track may count 5 units toward the Introductory Philosophy requirement. (IHUM courses are no longer offered).
 - b. the core: 24 additional Philosophy units as follows:
 - i logic: Select one of the following. More advanced logic courses may also be counted for this requirement by petition.

Select one of the following:

PHIL 50	Introductory Logic	4
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Units

PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

- ii Philosophy of science: This requirement may be satisfied by PHIL 60, PHIL 61, or an intermediate philosophy of science course numbered between PHIL 160 - 169.
- iii Moral and political philosophy: This requirement may be satisfied by any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 - 172 or 174-176.
- iv Contemporary theoretical philosophy: This requirement may be satisfied by any intermediate course numbered between PHIL 180 - 189.
- v History of philosophy:

Select both of the following

PHIL 100	Greek Philosophy	4
PHIL 102	Modern Philosophy, Descartes to Kant	4

- c. one undergraduate philosophy seminar from the PHIL 194 series.
 - d. electives: courses numbered 10 or above, at least 9 units of which must be in courses numbered above 99.
2. Units for Tutorial, Directed Reading (PHIL 196 Tutorial, Senior Year, PHIL 197 Individual Work, Undergraduate, PHIL 198 The Dualist), The Dualist (PHIL 198 The Dualist), Honors Seminar (PHIL 199 Seminar for Prospective Honors Students), or affiliated courses may not be counted in the 55-unit requirement. No more than 10 units completed with grades of 'satisfactory' and/or 'credit' may be counted in the 55-unit requirement.
 3. A maximum of 10 transfer units or two courses can be used for the departmental major. In general, transfer courses cannot be used to satisfy the six area requirements or the undergraduate seminar requirement. Students may not substitute transfer units for the PHIL 80 requirement.

Special Program in History and Philosophy of Science

Undergraduates may major in Philosophy with a field of study in History and Philosophy of Science. This field of study is declared on Axess. Each participating student is assigned an adviser who approves the course of study. A total of 61 units are required for the sub-major, to be taken according to requirements 1 through 5 below. Substitutions for the listed courses are allowed only by written consent of the undergraduate adviser for History and Philosophy of Science. Students are encouraged to consider doing honors work with an emphasis on the history and philosophy of science. Interested students should see the description of the honors thesis in Philosophy and consult their advisers for further information.

1. Three science courses (for example, biology, chemistry, physics) for 12 units.
2. The following Philosophy (PHIL) core courses must be completed with a letter grade by the end of the junior year:
 - a.

Select one of the following:		3
PHIL 50	Introductory Logic	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4
 - b. either PHIL 60 Introduction to Philosophy of Science or PHIL 61 Science, Religion, and the Birth of Modern Philosophy.
 - c. PHIL 80 Mind, Matter, and Meaning.

3. Three history of science courses.
4. Three philosophy of science courses, of which one must be PHIL 164 Central Topics in the Philosophy of Science: Theory and Evidence.
5. Three additional courses related to the major, in philosophy or history, to be agreed on by the adviser.
6. At least six courses in the major must be completed at Stanford with a letter grade. Units for Tutorial, Directed Reading, or The Dualist (PHIL 196 Tutorial, Senior Year, PHIL 197 Individual Work, Undergraduate, PHIL 198 The Dualist) may not be counted in the 61-unit requirement. No more than 10 units completed with grades of 'satisfactory' and/or 'credit' may be counted in the 61-unit requirement.
7. Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring a major. Transfer courses are strictly limited when used to satisfy major requirements.

Units Special Option in Philosophy and Literature

1. Core requirements for the major in Philosophy, including:
 - a. an introductory course
 - b. PHIL 80 Mind, Matter, and Meaning
 - c. the core distribution requirements listed in section 1b of the general program above.
2. Gateway course in philosophy and literature (PHIL 81 Philosophy and Literature). This course should be taken as early as possible in the student's career, normally in the sophomore year.
3. Three courses in a single national literature, chosen by the student in consultation with the adviser and the program director of undergraduate studies. This normally involves meeting the language proficiency requirements of the relevant literature department.
4. Electives within Philosophy beyond the core requirements totaling at least 5 units, and drawn from courses numbered 100 or higher.
5. Two upper division courses of special relevance to the study of philosophy and literature, as identified by the committee in charge of the program. A list of approved courses is available from the program director of undergraduate studies, and is published on the web at <http://philip/programs/relevance.html>
6. Capstone seminar in the PHIL 194 series.
7. Capstone seminar of relevance to the study of philosophy and literature, as approved by the program committee. In some cases, with approval of the Philosophy Director of Undergraduate Study and the program director of undergraduate studies, the same course may be used to meet requirements 6 and 7 simultaneously. In any case, the student's choice of a capstone seminar must be approved in writing by the Philosophy Director of Undergraduate Study and the program director of undergraduate studies. This year's capstone seminars include:

Units

Select one of the following:

PHIL 193D	Dante and Aristotle	5
PHIL 194L	Montaigne	4
FRENCH 228E	Getting Through Proust	3-5
COMPLIT 217	The Poetry of Friedrich Holderlin	3-5

Students are encouraged to consider doing honors work in a topic related to philosophy and literature through the Philosophy honors program.

The following rules also apply to the special option:

1. Units for Honors Tutorial, Directed Reading (PHIL 196 Tutorial, Senior Year, PHIL 197 Individual Work, Undergraduate, PHIL 198 The Dualist), The Dualist (PHIL 198 The Dualist), Honors Seminar (PHIL 199 Seminar for Prospective Honors Students) may not be counted toward the 65-unit requirement. No more than 10 units with

a grade of 'satisfactory' or 'credit' may be counted toward the unit requirement.

2. A maximum of 15 transfer units may be counted toward the major, at most 10 of which may substitute for courses within Philosophy. Transfer credits may not substitute for PHIL 80 or PHIL 81, and are approved as substitutes for the five area requirements or PHIL 194 only in exceptional cases.
3. Courses offered in other departments may be counted toward requirements 3, 5 and 7, but such courses, including affiliated courses, do not generally count toward the other requirements. In particular, such courses may not satisfy requirement 4.
4. Units devoted to meeting the language requirement are not counted toward the 65-unit requirement.

Honors Program

Students who wish to undertake a more intensive and extensive program of study, including seminars and independent work, are invited to apply for the honors program during Winter Quarter of the junior year. Admission is selective on the basis of demonstrated ability in Philosophy, including an average grade of at least 'A-' in a substantial number of Philosophy courses and progress towards satisfying the requirements of the major.

With their application, candidates should submit an intended plan of study for the remainder of the junior and the senior years. It should include at least 5 units of Senior Tutorial (PHIL 196 Tutorial, Senior Year) during Autumn and/or Winter quarter(s) of the senior year. Students who are applying to Honors College may use the same application for philosophy honors. In the quarter preceding the tutorial, students should submit an essay proposal to the Philosophy undergraduate director and determine an adviser.

Students applying for honors should enroll in Junior Honors Seminar (PHIL 199 Seminar for Prospective Honors Students) during the Spring Quarter of the junior year.

The length of the honors essay may vary considerably depending on the problem and the approach; usually it falls somewhere between 7,500 and 12,500 words. This essay may use work in previous seminars and courses as a starting point, but it cannot be the same essay that has been used, or is being used, in some other class or seminar. It must be a substantially new and different piece of work reflecting work in the tutorials.

A completed draft of the essay is submitted to the adviser at the end of the Winter Quarter of the senior year. Any further revisions must be finished by the fifth full week of the Spring Quarter, when three copies of the essay are to be given to the undergraduate secretary. The honors essay is graded by the adviser together with a second reader, chosen by the adviser in consultation with the student. The student also provides an oral defense of the thesis at a meeting with the adviser and second reader. The essay must receive a grade of 'A-' or better for the student to receive honors.

Honors tutorials represent units in addition to the 55-unit requirement.

For further information, contact the Honors' Director.

Philosophy and Religious Studies Combined Major

The undergraduate major in Philosophy and Religious Studies consists of 60 units of course work with approximately one third each in the philosophy core, the religious studies core, and either the general major or the special concentration. Affiliated courses cannot be used to satisfy this requirement.

No courses in either the philosophy or religious studies core may be taken satisfactory/no credit or credit/no credit.

In general, transfer units cannot be used to satisfy the core requirements. Transfer units and substitutions must be approved by the director of undergraduate studies in the appropriate department.

Core Requirements

1. Philosophy (PHIL) courses:
 - a. Required course: PHIL 80 Mind, Matter, and Meaning
 - b. 16 units, including at least one Philosophy course from each of the following areas:
 - i Logic and philosophy of science: Students take either one from this list or an intermediate philosophy of science course numbered PHIL 160-169.

		Units
PHIL 50	Introductory Logic	4
PHIL 60	Introduction to Philosophy of Science	5
PHIL 61	Science, Religion, and the Birth of Modern Philosophy	5
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

- ii Ethics and value theory: This requirement may be satisfied by any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 – 172 or 174-176.
- iii Contemporary theoretical philosophy: Take either PHIL 1 Introduction to Philosophy or an intermediate course numbered PHIL 180-189.
- iv History of philosophy: Select one of

		Units
PHIL 100	Greek Philosophy	4
PHIL 101	Introduction to Medieval Philosophy	4
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 103	19th-Century Philosophy	4

2. Religious Studies (RELIGST) courses: 20 units, chosen in consultation with the student's adviser, including:
 - a. RELIGST 290 Majors Seminar (5 units; Winter Quarter; recommended junior year; fulfills WIM requirement)
 - b. at least one course in philosophy of religion, broadly construed, chosen in consultation with, and approved by, the Religious Studies Director of Undergraduate Studies.
 - c. diversity requirement: Students may not take all their religion courses in one religious tradition.

General Major Requirements

Five additional courses (approximately 20 units) divided between the two departments. No more than 5 of these units may come from courses numbered under 99 in either department. Each student must also take at least one undergraduate seminar in religious studies and one undergraduate seminar in philosophy.

Special Concentration

With the aid of an adviser, students pursue a specialized form of inquiry in which the combined departments have strength; for example, American philosophy and religious thought, philosophical and religious theories of human nature and action, philosophy of religion. Courses for this concentration must be approved in writing by the adviser.

Directed Reading and Satisfactory/No Credit Units

Units of directed reading for fulfilling requirements of the combined major are allowed only with special permission. No more than 10 units of work with a grade of 'satisfactory' count toward the combined major.

Honors Program

Students pursuing a major in Philosophy and Religious Studies may also apply for honors by following the procedure for honors in either of the departments.

Joint Major Program in Philosophy and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

The joint major in Philosophy and Computer Science provides opportunities for the systematic study of computation together with philosophy in the broadest sense.

The joint major is appropriate for three distinct groups of students:

1. students with separate interests in the two fields who wish to begin thinking about their interaction (or else applications of one set to the other);
2. students interested in exploring philosophical issues in, and foundations of, computing;
3. students who would like to pursue philosophical investigations using computational methods.

Philosophy Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 229)m" section of this bulletin for details on Computer Science requirements.

Students in the joint major are required to complete the same introductory and core requirements as other Philosophy majors, with the exception of a more demanding logic requirement. In addition, joint majors must complete a senior capstone seminar in Philosophy (PHIL 194), and are normally expected to complete (separately from PHIL 194) an integrative senior capstone project, developed with faculty adviser(s) in CS and/or Philosophy, and approved in writing by the joint major's faculty adviser in Philosophy. Students may register for 5-10 units Individual Work, Undergraduate (PHIL 197) in association with the integrative capstone. These units may be taken across one or two quarters, and must be taken for a letter grade. Such projects must integrate the student's CS and philosophical learning.

In recognition of the student's work in the CS side of the joint major, the normal elective units required for Philosophy majors are reduced by 5 units for joint majors. Thus, the joint major requires 50 units within Philosophy.

Because logic is a core area of intersection between Philosophy and CS, students are in the best position to leverage the intersection of their work in the two fields if they develop a strong background in logical methods, and have a clear understanding of the way those formal methods are or can be used within Philosophy. Joint majors are therefore required to complete training in logic at least through successful completion of PHIL 150.

Thus, the Philosophy requirements of the joint major are:

1. An Introductory course (numbered under 100)
2. PHIL 80 (writing in the major)
3. Core requirements in philosophy
 - a. One course in logic (PHIL 150 or higher);
 - b. One course in philosophy of science;
 - c. One course in moral or political philosophy (normally PHIL 170s)
 - d. One course in contemporary theoretical philosophy (PHIL 180s)
 - e. Two courses in the history of philosophy, namely
 - i PHIL 100 (ancient philosophy)
 - ii PHIL 102 (modern philosophy)
4. Capstone seminar within philosophy (PHIL 194s)
5. Expected integrative independent capstone project
6. Electives sufficient to bring the student's overall program up to a minimum total of 50 units in Philosophy.

Units for Independent Work, Directed Reading, the Dualist, and Honors Seminar (PHIL 196, 197, 198, 199) do not count toward the overall requirement of 50 units within Philosophy. No more than 10 units of courses completed with grades of 'Satisfactory' or 'Credit' may be counted toward the 50-unit requirement.

Students in the joint major should register their major declaration not only with the Director of Undergraduate Study (DUS) of Philosophy but also with the joint major's faculty adviser in Philosophy. In consultation with the faculty adviser (ideally beginning in the sophomore year), each joint major should work out an individualized program of courses to develop her/his philosophical interests and to explore the connections between them and her/his interests in computation. Each student should meet with the faculty adviser quarterly for a program update, during which there is discussion of opportunities for integrating the ongoing work in Philosophy and CS through course work, employment, projects, or other extracurricular activities. The faculty adviser assists students to develop coherent programs of study leading toward integrative senior experiences. If the normal expectation of a senior project turns out not to be suitable in individual cases, the student must obtain approval in writing from the faculty adviser of the substitute integrative activities and the faculty advisor of the joint major.

Learning Objectives

Because the joint major seeks to develop deep disciplinary knowledge within Philosophy, the learning objectives of the general philosophy major also apply in the case of the joint major. In this aspect, students are expected to demonstrate:

1. the ability to communicate philosophical ideas effectively orally and in writing.
2. close reading, argument evaluation, and analytical writing.
3. dialectical ability to identify strengths and weaknesses of an argument and devise appropriate and telling responses.
4. the ability to think critically and demonstrate clarity of conceptualization.
5. the ability to differentiate good from unpromising philosophical questions.

6. the ability to sustain an argument of substantial scope, showing control over logical, argumentative, and evidential relations among its parts.

In addition, the joint major has the ambition to develop key knowledge and capacities that are relevant to the intersection of Philosophy and CS. In this domain, students in the joint major are expected to:

1. develop problem solving skills suitable to their work in the Computer Science side of the major, in accordance with learning goals specified for the joint major by Computer Science.
2. develop mastery of logical and formal methods adequate to support their work at the intersection of computing and philosophy.
3. demonstrate a deep understanding of at least one particular area of intersection between the two fields, or of how methods and ideas from one of the disciplines can inform or be applied to the other.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentervicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minor in Philosophy

A minor in Philosophy consists of at least 30 units of Philosophy courses satisfying the following conditions:

1. Students taking a Philosophy Thinking Matters course may count it as equivalent to a maximum of 4 units of Philosophy courses under 100. Students who took the Winter/Spring Philosophy Introduction to the Humanities (IHUM) track may count these courses as equivalent to a maximum of 5 units of Philosophy courses under 100. (IHUM courses are no longer offered).
2. The 30 units must include one of:
 - a. a history of philosophy course numbered 100 or above
 - b. one quarter of Philosophy Thinking Matters (THINK)
 - c. two quarters of IHUM (only 5 of the 10 units can count towards 30-unit requirement). IHUM courses are no longer offered.
3. Minors must take one course from any two of the following three areas (PHIL):
 - a. Philosophy of Science and Logic: For philosophy of science, either PHIL 60, PHIL 61, or an intermediate philosophy of science courses numbered between PHIL 160 - 169; or else, for logic, one of:

4. a.

Logic

PHIL 50	Introductory Logic	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

- b. Moral and political philosophy: any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 - 172, or 174-176.
- c. Contemporary theoretical philosophy: This requirement may be satisfied by most intermediate courses numbered between PHIL 180 - 189.
- d. At least 10 units must be from courses numbered 100 or above.
- e. Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring. The number of transfer units is generally limited to a maximum of 10.
- f. No more than 6 units completed with grades of 'satisfactory' or 'credit' count towards the 30-unit requirement.

5. Units for tutorials, directed reading, and affiliated courses may not be counted.

Students must declare their intention to minor in Philosophy in a meeting with the Director of Undergraduate Study. This formal declaration must be made no later than the last day of the quarter two quarters before degree conferral. The Permission to Declare a Philosophy Minor (signed by the Director of Undergraduate Study) lists courses taken and to be taken to fulfill minor requirements. This permission is on file in the department office. Before graduation, a student's record is checked to see that requirements have been fulfilled, and the results are reported to the University Registrar.

Master of Arts in Philosophy

University requirements for the M.A. are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Three programs lead to the M.A. in Philosophy. One is a general program providing a grounding in all branches of the subject. The others provide special training in one branch.

Coterminal Bachelor's and Master's Degrees in Philosophy

It is possible to earn an M.A. in Philosophy while earning a B.A. or B.S. This can usually be done by the end of the fifth undergraduate year, although a student whose degree is not in Philosophy may require an additional year. Standards for admission to, and completion of, this program are the same as for M.A. applicants who already have the bachelor's degree when matriculating. Applicants for the coterminal program are not, however, required to take the Graduate Record Exam.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Admissions

All prospective master's students, including those currently enrolled in other Stanford programs, must apply for admission to the program. No fellowships are available. Entering students must meet with the director of the master's program and have their advisor's approval, in writing, of

Units

program proposals. The master's program should not be considered a stepping stone to the doctoral program; these two programs are separate and distinct.

Unit Requirements

Each program requires a minimum of 45 units in philosophy. Students in a special program may be allowed or required to replace up to 9 units of philosophy by 9 units in the field of specialization. Although the requirements for the M.A. are designed so that a student with the equivalent of a strong undergraduate philosophy major at Stanford might complete them in one year, most students need longer. Students should also keep in mind that although 45 units is the minimum required by the University, quite often more units are necessary to complete department requirements. Up to 6 units of directed reading in philosophy may be allowed. There is no thesis requirement, but an optional master's thesis or project, upon faculty approval, may count as the equivalent of up to 8 units. A special program may require knowledge of a foreign language. At least 45 units in courses numbered 100 or above must be completed with a grade of 'B-' or better at Stanford. Students are reminded of the University requirements for advanced degrees, and particularly of the fact that for the M.A., students must complete three full quarters as measured by tuition payment.

General Program

The General Program requires a minimum of 45 units in Philosophy courses numbered above 99. These courses must be taken for a letter grade, and the student must receive at least a 'B-' in the course. Courses taken to satisfy the undergraduate core or affiliated courses may not be counted in the 45 units. The requirement has three parts:

1. Undergraduate Core

Students must have when they enter, or complete early in their program, the following undergraduate courses (students entering from other institutions should establish equivalent requirements with a master's adviser upon arrival or earlier):

- a. Logic:

Select one of the following:

		Units
PHIL 50	Introductory Logic	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

- b. Philosophy of science: This requirement may be satisfied by PHIL 60, PHIL 61, or any intermediate philosophy of science course numbered between PHIL 160 - 169.
- c. Moral and political philosophy: This requirement may be satisfied by any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 - 172, or PHIL 174-176.
- d. Contemporary theoretical philosophy: This requirement may be satisfied by any intermediate course numbered between PHIL 180 - 189.
- e. History of philosophy: two history of philosophy courses numbered 100 or above

2. Graduate Core

Students must take at least one course numbered over 105 from three of the following five areas (courses used to satisfy the undergraduate core cannot also be counted toward satisfaction of the graduate core). Crosslisted and other courses taught outside the Department of Philosophy do not count towards satisfaction of the core.

- a. Logic and semantics
- b. Philosophy of science and history of science
- c. Ethics, value theory, and moral and political philosophy
- d. Metaphysics, epistemology, philosophy of mind, and philosophy of language
- e. History of philosophy

3. 200-Level Course Requirement

Each master's candidate must take at least two courses numbered above 200; these cannot be graduate sections of undergraduate courses.

4. Specialization

Students must take at least three courses numbered over 105 in one of the five areas.

Special Program in Symbolic Systems

Students should have the equivalent of the Stanford undergraduate major in Symbolic Systems. Students who have a strong major in one of the basic SSP disciplines (philosophy, psychology, linguistics, computer science) may be admitted, but are required to do a substantial part of the undergraduate SSP core in each of the other basic SSP fields. This must include the following philosophy courses:

		Units
PHIL 80	Mind, Matter, and Meaning	5
PHIL 151	Metalogic	4
And one of the following:		
PHIL 181	Philosophy of Language	4
PHIL 184	Theory of Knowledge	4
PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4

This work does not count towards the 45-unit requirement.

Course Requirements

1. Four courses in philosophy at the graduate level (numbered 200 or above), including courses from three of the following five areas:
 - a. Philosophy of language
 - b. Logic
 - c. Philosophy of mind
 - d. Metaphysics and epistemology
 - e. Philosophy of science

At most two of the four courses may be graduate sections of undergraduate courses numbered 100 or higher.
2. Three courses numbered 100 or higher from outside Philosophy, chosen in consultation with an advisor. These courses should be from two of the following four areas:
 - a. Psychology
 - b. Linguistics
 - c. Computer Science
 - d. Education

Remaining courses are chosen in consultation with and approved by an advisor.

Special Program in the Philosophy of Language

Admission is limited to students with substantial preparation in philosophy or linguistics. Those whose primary preparation has been in linguistics may

be required to satisfy all or part of the undergraduate core requirements as described in the "General Program" subsection above. Those whose preparation is primarily in philosophy may be required to take additional courses in linguistics.

Course Requirements

1. Philosophy of language: two approved courses in the philosophy of language numbered 180 or higher.
2. Syntactic theory and generative grammar:

		Units
PHIL 384	Seminar in Metaphysics and Epistemology	4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4

3. Logic: at least two approved courses numbered PHIL 151 Metalogic or higher.
4. An approved graduate-level course in mathematical linguistics or automata theory.

- iii two courses in metaphysics and epistemology (including metaphysics, epistemology, philosophy of science). At least one of the courses satisfying this requirement must be drawn from either metaphysics or epistemology.
- iv Instructors indicate which courses may satisfy particular requirements. If a course potentially satisfies more than one requirement the student may use it for only one of those area requirements; no units may be double-counted. Students must develop broad competencies in all these areas. Those without strong backgrounds in these areas would normally satisfy these distribution requirements by taking more basic courses rather than highly specialized and focused courses. Students should consult with their adviser in making these course decisions, and be prepared to explain these decisions when reviewed for candidacy; see requirement 6 below.

- b. Logic requirement: PHIL 150 Mathematical Logic or equivalent.
- c. History/logic requirement. One approved course each in ancient and modern philosophy, plus either another approved history of philosophy course or PHIL 151 Metalogic.
- d. Students should normally take at least 64 graduate level units at Stanford during their first six quarters (in many cases students would take more units than that) and of those total units, at least 49 units of course work are to be in the Philosophy department. These courses must be numbered above 110, but not including Teaching Methods (PHIL 239 Teaching Methods in Philosophy) or affiliated courses. Units of Individual Directed Reading are normally not to be counted toward this 49-unit requirement unless there is special permission from the student's adviser and the Director of Graduate Studies.

Doctor of Philosophy in Philosophy

Prospective graduate students should see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site for information and application materials. Applicants should take the Graduate Record Examination by October of the year the application is submitted.

The University's basic requirements for the Ph.D. degree including residence, dissertation, and examination are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The requirements detailed here are department requirements. These requirements are meant to balance structure and flexibility in allowing students, in consultation with their advisers, to take a path through the program that gives them a rigorous and broad philosophical education, with room to focus on areas of particular interest, and with an eye to completing the degree with an excellent dissertation and a solid preparation for a career in academic philosophy.

Courses used to satisfy any course requirement in Philosophy must be passed with a letter grade of 'B-' or better (no satisfactory/no credit), except in the case of a course/seminar used to satisfy the third-year course/seminar requirement and taken for only 2 units. Such a reduced-unit third-year course/seminar must be taken credit/no credit.

At the end of each year, the department reviews the progress of each student to determine whether the student is making satisfactory progress, and on that basis to make decisions about probationary status and termination from the program where appropriate.

Any student in one of the Ph.D. programs may apply for the M.A. when all University and department requirements have been met.

Proficiency Requirements

1. *First-year Ph.D. Proseminar*: a one quarter, topically focused seminar offered in Autumn Quarter, and required of all first-year students.
2. *Distribution requirements during the first six quarters*. Intended to ensure a broad and substantial exposure to major areas of philosophy while allowing for considerable freedom to explore.
 - a. six courses distributed across three areas as follows:
 - i two courses in value theory including ethics, aesthetics, political philosophy, social philosophy, philosophy of law. At least one of the courses satisfying this distribution requirement must be in ethics or political philosophy.
 - ii Two courses in language, mind, and action. One course satisfying this requirement must be drawn from the language related courses, and one from mind and action related courses.

3. *Writing Requirement*

A qualifying paper of professional quality and approximately 8000 words. Students must complete a version of the paper, which is itself likely to be a revision of a paper written during the first year of course work, by the beginning of their fourth quarter. The paper is read by a committee of two faculty who make suggestions for additional revision. The final version must be submitted by the first day of the sixth quarter, normally Spring Quarter of the second year.

4. *Teaching Assistancy*

A minimum of five quarters of teaching assistancy are required for the Ph.D. Normally one of these quarters is as a teaching assistant for the Philosophy Department's Writing in the Major course, PHIL 80 Mind, Matter, and Meaning. It is expected that students not teach in their first year and that they teach no more than two quarters in their second year. Students are required to take PHIL 239 Teaching Methods in Philosophy during Spring Quarter of their first year and during Autumn Quarter of their second year. Teaching is an important part of students' preparation to be professional philosophers.

5. *Review at the End of the Second Year for Advancement to Candidacy*

By the fourth week of the sixth quarter students must submit a one-page explanation of their first- and second-year course plan and their writing requirement paper. The faculty's review of each student includes a review of the student's record, an assessment of the qualifying paper, and an assessment of the student's preparation for work in her/his intended area of specialization, as well as recommendations of additional preparation, if necessary.

6. *Candidacy*

To continue in the Ph.D. program, each student must apply for candidacy during the sixth academic quarter, normally the Spring Quarter of the student's second year. Students may be approved for or denied candidacy by the end of that quarter by the department. In some cases, where there are only one or two outstanding deficiencies, the department may defer the candidacy decision and require the student to re-apply for candidacy in a subsequent quarter. In such cases, definite

conditions for the candidacy re-application will be specified, and the student must work with his/her adviser and the DGS to meet those conditions in a timely fashion. A failure to maintain timely progress in satisfying the specified conditions will constitute grounds for a denial of advancement to candidacy.

7. Dissertation Development Seminar in the summer after the second year. This is the point at which students are expected to transition from spending much of their time on coursework to focusing on their thesis project. By the end of the summer, students are expected to have a plan for moving forward with the project in the third year; they should have formed advising relationships with faculty and should have made headway towards identifying a specific topic.
8. Upon completion of the summer dissertation development seminar, students will sign up for independent study credit, PHIL 240 Individual Work for Graduate Students, with their respective advisers each quarter. A plan at the beginning, and a report at the end of each quarter will be signed by both student and adviser and submitted to the Graduate Administrator for inclusion in the student's file. This will be the process every quarter up until the completion of the departmental oral.
9. In autumn and winter quarters of the third year, students will register in and satisfactorily complete PHIL 301 Dissertation Development Proseminar. Students meet to present their work in progress and discuss their thesis project. Participation in these seminars is required.
10. During the third and fourth years in the program, a student should complete at least three graduate-level courses/seminars, at least two of them in philosophy (a course outside philosophy can be approved by the adviser), and at least two of them in the third year. At most one can be taken credit/no-credit, and at most one can be taken for reduced (2) units (in which case it must be taken credit/no-credit); others must be passed with a B- or better. Courses required for candidacy are not counted toward satisfaction of this requirement. This light load of courses allows students to deepen their philosophical training while keeping time free for thesis research.
11. *Dissertation Work and Defense*

The third and following years are devoted to dissertation work. The few requirements in this segment of the program are milestones to encourage students and advisers to ensure that the project is on track.

- a. *Dissertation Proposal*—By Spring Quarter of the third year, students should have selected a dissertation topic and committee. A proposal sketching the topic, status, and plan for the thesis project, as well as an annotated bibliography or literature review indicating familiarity with the relevant literature, must be received by the committee one week before the meeting on graduate student progress late in Spring Quarter. The dissertation proposal and the reading committee's report on it will constitute a substantial portion of the third year review.
- b. *Departmental Oral*—During Autumn Quarter of the fourth year, students take an oral examination based on at least 30 pages of written work, in addition to the proposal. The aim of the exam is to help the student arrive at an acceptable plan for the dissertation and to make sure that student, thesis topic, and advisors make a reasonable fit. It is an important chance for the student to clarify their goals and intentions with the entire committee present.
- c. *Fourth-Year Colloquium*—No later than Spring Quarter of the fourth year, students present a research paper in a 60-minute seminar open to the entire department. This paper should be on an aspect of the student's dissertation research. This is an opportunity for the student to make their work known to the wider department, and to explain their ideas to a general philosophical audience.
- d. *University Oral Exam*—Ph.D. students must submit a completed draft of the dissertation to the reading committee at least one month before the student expects to defend the thesis in the University oral exam. If the student is given consent to go forward, the University oral can take place approximately two weeks later. A

portion of the exam consists of a student presentation based on the dissertation and is open to the public. A closed question period follows. If the draft is ready by Autumn Quarter of the fourth year, the student may request that the University oral count as the department oral.

Interdisciplinary Study

The department supports interdisciplinary study. Courses in Stanford's other departments and programs may be counted towards the degree, and course requirements in Philosophy are designed to allow students considerable freedom in taking such courses. Dissertation committees may include members from other departments. Where special needs arise, the department is committed to making it possible for students to obtain a philosophical education and to meet their interdisciplinary goals. Students are advised to consult their advisers and the department's student services office for assistance.

Interdepartmental Programs Graduate Program in Cognitive Science

Philosophy participates with the departments of Computer Science, Linguistics, and Psychology in an interdisciplinary program in Cognitive Science. It is intended to provide an interdisciplinary education, as well as a deeper concentration in philosophy, and is open to doctoral students. Students who complete the requirements within Philosophy and the Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Philosophy. To receive this field designation, students must complete 30 units of approved courses, 18 of which must be taken in two disciplines outside of philosophy. The list of approved courses can be obtained from the Cognitive Science program located in the Department of Psychology.

Special Track in Philosophy and Symbolic Systems

Students interested in interdisciplinary work relating philosophy to artificial intelligence, cognitive science, computer science, linguistics, or logic may pursue a degree in this program.

Prerequisites—Admitted students should have covered the equivalent of the core of the undergraduate Symbolic Systems Program requirements as described in the "Symbolic Systems (p. 643)" section of this bulletin, including courses in artificial intelligence (AI), cognitive science, linguistics, logic, and philosophy. The graduate program is designed with this background in mind. Students missing part of this background may need additional course work. In addition to the required course work below, the Ph.D. requirements are the same as for the regular program, with the exception that one course in value theory and one course in history may be omitted.

Courses of Study—The program consists of three years of courses and two years of dissertation work. Students are required to take the following courses in the first two years:

1. Philosophy courses:
 - a. at least three graduate seminars in the general area of symbolic systems other than logic, such as philosophy of mind and philosophy of language.
 - b. two quarters of graduate logic courses from among:

		Units
PHIL 350A	Model Theory	3
PHIL 351A	Recursion Theory	3
PHIL 352A	Set Theory	3
PHIL 353A	Proof Theory	3

2. Five cognitive science and computer science courses:

- a. at least two courses in cognitive psychology
 - b. two or three graduate courses in computer science, at least one in AI and one in theory
3. Three linguistics and computational linguistics courses:
 - a. graduate courses on natural language that focus on two of the following areas: phonetics and phonology, syntax, semantics, or pragmatics
 - b. one graduate course in computational linguistics, typically LINGUIST 288 Natural Language Understanding
 4. At least two additional graduate seminars at a more advanced level, in the general area of the program, independent of department. These would typically be in the area of the student's proposed dissertation project.

The requirements for the third year and subsequent years are the same as for other third-year graduate students in philosophy: The dissertation committee must include at least one member of the Department of Philosophy and one member of the Program in Symbolic Systems outside the Department of Philosophy.

Joint Program in Ancient Philosophy

This program is jointly administered by the Departments of Classics and Philosophy and is overseen by a joint committee composed of members of both departments. It provides students with the training, specialist skills, and knowledge needed for research and teaching in ancient philosophy while producing scholars who are fully trained as either philosophers with a strong specialization in ancient languages and philology, or classicists with a concentration in philosophy.

Students are admitted to the program by either department. Graduate students admitted by the Philosophy department receive their Ph.D. from the Philosophy department; those admitted by the Classics department receive their Ph.D. from the Classics department. For Philosophy graduate students, this program provides training in classical languages, literature, culture, and history. For Classics graduate students, this program provides training in the history of philosophy and in contemporary philosophy.

Each student in the program is advised by a committee consisting of one professor in each department.

Requirements for Philosophy Graduate Students: These are the same as the proficiency requirements for the Ph.D. in Philosophy.

One year of Greek is a requirement for admission to the program. If students have had a year of Latin, they are required to take 3 courses in second- or third-year Greek or Latin, at least one of which must be in Latin. If they have not had a year of Latin, they are then required to complete a year of Latin, and take two courses in second- or third-year Greek or Latin.

Students are also required to take at least three courses in ancient philosophy at the 200 level or above, one of which must be in the Classics department and two of which must be in the Philosophy department.

Ph.D. Subplan in History and Philosophy of Science

Graduate students in the Philosophy Ph.D. program may pursue a Ph.D. subplan in History and Philosophy of Science. The subplan is declared in Axxess and subplan designations appear on the official transcript, but are not printed on the diploma.

Students must fulfill Departmental degree requirements and the following requirements:

1. Attendance at the HPS colloquium series.
2. Philosophy of Science courses:

PHIL 263	Significant Figures in Philosophy of Science	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 264A	Central Topics in Philosophy of Science: Causation	4
PHIL 265	Philosophy of Physics	4
PHIL 265C	Philosophy of Physics: Probability and Relativity	4
PHIL 266	Probability: Ten Great Ideas About Chance	4
PHIL 267A	Philosophy of Biology	2-4
PHIL 267B	Philosophy, Biology, and Behavior	4

3. One elective seminar in the history of science.
4. One elective seminar (in addition to the course satisfying requirement 2) in philosophy of science.

Ph.D. Minor in Philosophy

To obtain a Ph.D. minor in Philosophy, students must follow these procedures:

1. Consult with the Director of Graduate Study to establish eligibility, and select a suitable adviser.
2. Give to the graduate administrator a signed copy of the program of study (designed with the adviser) which offers:
 - a. 30 units of courses in the Department of Philosophy with a letter grade of 'B-' or better in each course. No more than 3 units of directed reading may be counted in the 30-unit requirement.
 - b. At least one course or seminar numbered over 99 to be taken in each of these six areas:
 - i Logic
 - ii Philosophy of science
 - iii Ethics, value theory, and moral and political philosophy
 - iv Metaphysics and epistemology
 - v Language, mind and action
 - vi History of philosophy
 - c. Two additional courses numbered over 199 to be taken in one of those (b) six areas.
3. A faculty member from the Department of Philosophy (usually the student's adviser) serves on the student's doctoral oral examination committee and may request that up to one third of this examination be devoted to the minor subject.
4. Paperwork for the minor must be submitted to the department office before beginning the program.

Emeriti (Professors): Solomon Feferman, Dagfinn Føllesdal, Georg Kreisel, John Perry, David S. Nivison, Patrick Suppes, Thomas Wasow, Allen Wood, Rega Wood, Denis Phillips (Courtesy Professor)

Chair: R. Lanier Anderson

Director of Graduate Study: Krista Lawlor

Director of Undergraduate Study: Tamar Schapiro

Honors Director and Undergraduate Outreach Coordinator: Nadeem Hussain

Faculty Advisor for Joint Major with Computer Science: Thomas Icard

Professors: Chris Bobonich, Michael Bratman, Alan Code, Joshua Cohen, John Etchemendy, Michael Friedman, Helen Longino, Thomas Ryckman (Teaching), Debra Satz, Brian Skyrms (Spring), Kenneth Taylor, Johan van Benthem (Spring)

Associate Professors: R. Lanier Anderson, Mark Crimmins, Graciela De Pierris, David Hills (Teaching), Nadeem Hussain, Krista Lawlor, Tamar Schapiro

Units

Select one of the following:

Assistant Professors: Jorah Dannenberg, Thomas Donaldson, Thomas Icard, Anna-Sara Malmgren

Courtesy Professors: Eamonn Callan, Reviel Netz, Josiah Ober, Thomas Sheehan

Courtesy Associate Professor: Rob Reich

Courtesy Assistant Professor: Kristi Olson

Visiting Professor: John Broome (Winter), Alan Ryan, Kendall Walton (Spring)

Visiting Assistant Professor: Han van Wietmarschen

Lecturers: Shane Duarte, Paul Skokowski, Richard Sommer, Jennifer Wang

Cognate Courses

The following courses have substantial philosophical content. However, in the absence of special permission these courses cannot generally be used to satisfy requirements for the Philosophy major or graduate degrees in Philosophy.

		Units
MATH 161	Set Theory	3
RELIGST 279	After God: Why religion at all?	4
RELIGST 183	Atheism: Hegel to Heidegger	5

Physics

Courses offered by the Department of Physics are listed under the subject code PHYSICS on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PHYSICS&filter-catalognumber-PHYSICS=on>).

Mission of the Undergraduate Program in Physics

The mission of the undergraduate program in Physics is to provide students with a strong foundation in both classical and modern physics. The goal of the program is to develop both quantitative problem solving skills and the ability to conceive experiments and analyze and interpret data. These abilities are acquired through both course work and opportunities to conduct independent research. The program prepares students for careers in fields that benefit from quantitative and analytical thinking, including physics, engineering, teaching, medicine, law, science writing, and science policy, in government or the private sector. In some cases, the path to this career will be through an advanced degree in physics or a professional program.

Learning Outcomes (Undergraduate)

Students develop an understanding of the fundamental laws that govern the universe, and a strong foundation of mathematical, analytical, laboratory, and written communication skills. They will also be presented with opportunities for learning through research. Upon completion of the Physics degree, students should have acquired the following knowledge and skills:

1. a thorough quantitative and conceptual understanding of the core areas of physics, including mechanics, electricity and magnetism, thermodynamics, statistical physics, and quantum mechanics, at a level compatible with admission to graduate programs in physics at peer institutions.
2. the ability to analyze and interpret quantitative results, both in the core areas of physics and in complex problems that cross multiple core areas.

3. the ability to apply the principles of physics to solve new and unfamiliar problems. This ability is often described as "thinking like a physicist."
4. the ability to use contemporary experimental apparatus and analysis tools to acquire, analyze and interpret scientific data.
5. the ability to communicate scientific results effectively in written papers and presentations or posters.

Course Work

The course work is designed to provide students with a sound foundation in both classical and modern physics. Students who wish to specialize in astronomy, astrophysics, or space science should also consult the "Astronomy Program (p. 341)" section of this bulletin.

Three introductory series of courses include labs in which undergraduates carry out individual experiments. The Intermediate and Advanced Physics Laboratories offer facilities for increasingly complex individual work, including the conception, design, and fabrication of laboratory equipment. Undergraduates are also encouraged to participate in research; most can do this through the senior thesis and/or the summer research program.

The study of physics is undertaken by three principal groups of undergraduates: those including physics as part of a general education; those preparing for careers in professional fields that require a knowledge of physics, such as medicine or engineering; and those preparing for careers in physics or related fields, including teaching and research in colleges and universities, research in federally funded laboratories and industry, and jobs in technical areas. Physics courses numbered below 100 are intended to serve all three of these groups. The courses numbered above 100 mainly meet the needs of the third group, but also of some students majoring in other branches of science and engineering.

Entry-Level Sequences in Physics

The Department of Physics offers three year-long, entry-level physics sequences, the PHYSICS 20, 40, and 60 series. The first of these (the 20 series) is non-calculus-based, and is intended primarily for those who are majoring in biology. Students with AP Physics credit, particularly those who are considering research careers, may wish to consider taking the PHYSICS 40 series, rather than using AP placement. These introductory courses provide a depth and emphasis on problem solving that has significant value in biological research, given today's considerable physics-based technology.

For those intending to major in engineering or the physical sciences, or simply wanting a stronger background in physics, the department offers the PHYSICS 40 and 60 series. Either of these satisfies the entry-level physics requirements of any Stanford major. The 60 series is intended for those who have already taken a Physics course at the level of the 40 series, or at least have a strong background in mechanics, some background in electricity and magnetism, and a strong background in calculus.

The PHYSICS 40 series begins with PHYSICS 41 Mechanics in Winter Quarter, PHYSICS 43 Electricity and Magnetism in Spring Quarter, and PHYSICS 45 Light and Heat in Autumn Quarter. While it is recommended that most students begin the sequence with PHYSICS 41 in Winter Quarter, those who have had strong physics preparation in high school (such as a score of at least 4 on the Physics AP C exam) may start the sequence with PHYSICS 45 in Autumn Quarter.

PHYSICS 41A is an optional one-unit companion course to PHYSICS 41 that provides additional problem solving for students with less preparation in math and physics.

The Physics Tutoring Center offers help to students in the Entry-Level courses. It is staffed Monday through Friday. For more detailed schedule and location. See schedule at <http://physicstutor.stanford.edu>.

Entry-Level Course List

One course from the following is recommended for the humanities or social science student who wishes to become familiar with the methodology and content of modern physics:

		Units
PHYSICS 15	The Nature of the Universe	3
PHYSICS 16	Cosmic Horizons	3
PHYSICS 17	Black Holes	3
PHYSICS 19	How Things Work: An Introduction to Physics	3

The 20 series (below) is recommended for general students and for students preparing for medicine or biology:

		Units
PHYSICS 21	Mechanics and Heat	3
PHYSICS 22	Mechanics and Heat Laboratory	1
PHYSICS 23	Electricity and Optics	3
PHYSICS 24	Electricity and Optics Laboratory	1
PHYSICS 25	Modern Physics	3
PHYSICS 26	Modern Physics Laboratory	1

The 40 series (below) is for students majoring in engineering, chemistry, earth sciences, mathematics, or physics:

		Units
PHYSICS 41	Mechanics	4
PHYSICS 42	Classical Mechanics Laboratory	1
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 44	Electricity and Magnetism Lab	1
PHYSICS 45	Light and Heat	4
PHYSICS 46	Light and Heat Laboratory	1

The 60 series (below), or advanced freshman series, is for students who have had strong preparation in physics and calculus in high school. Students who have had the appropriate background and wish to major in physics should take this introductory series:

		Units
PHYSICS 61	Mechanics and Special Relativity	4
PHYSICS 62	Classical Mechanics Laboratory	1
PHYSICS 63	Electricity, Magnetism, and Waves	4
PHYSICS 64	Electricity, Magnetism and Optics Laboratory	1
PHYSICS 65	Quantum and Thermal Physics	4
PHYSICS 67	Introduction to Laboratory Physics	2

Physics Placement Test

Students who are planning to take either of the calculus-based sequences (PHYSICS 40 or 60 sequence) are advised to take the Physics Placement Test (<https://physics.stanford.edu/undergraduate-program/placement-test>) that is offered twice at the beginning of the school year: during New Student Orientation and on the evening of the first day of instruction in the Autumn quarter. Advice will be sent to each student with guidance on placement in the 40 or 60 sequence. See this page for details: <https://physics.stanford.edu/undergraduate-program/placement-test>. Students who do not plan to take the 40 or 60 sequence do *not* need to take the Placement Test..

Graduate Programs in Physics

Graduate students find opportunities for research in the fields of astrophysics, particle astrophysics, cosmology, experimental particle physics, particle theory, string theory, intermediate energy physics, low temperature physics, condensed matter physics, materials research,

atomic physics, laser physics, quantum electronics, coherent optical radiation, novel imaging technologies, and biophysics. Faculty advisers are drawn from many departments, including Physics, Applied Physics, Materials Science and Engineering, Electrical Engineering, and Biology. Opportunities for research are also available with the faculty at SLAC in the areas of theoretical and experimental particle physics, particle astrophysics, cosmology, accelerator design, and photon science.

The number of graduate students admitted to the Department of Physics is strictly limited. Students should submit applications by Tuesday, December 16, 2014 for matriculation the following Autumn Quarter. Graduate students may normally enter the department only at the beginning of Autumn Quarter.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in physics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis using the tools of Physics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of physics and to interpret and present the results of such research.

Fellowships and Assistantships

The Department of Physics makes an effort to support all its graduate students through fellowships, teaching assistantships, research assistantships, or a combination of sources. More detailed information is provided with the offer of admission.

Laboratories and Institutes

The Russell H. Varian Laboratory of Physics, the Physics and Astrophysics Building, the W. W. Hansen Experimental Physics Laboratory (HEPL), the E. L. Ginzton Laboratory, the Center for Nanoscale Science and Engineering and the Geballe Laboratory for Advanced Materials (GLAM) together house a range of physics activities from general courses through advanced research. Ginzton Lab houses research on optical systems, including quantum electronics, metrology, optical communication and development of advanced lasers. GLAM houses research on novel and nanopatterned materials, from high-temperature superconductors and magnets to organic semiconductors, subwavelength photon waveguides, and quantum dots. GLAM also supports the materials community on campus with a range of characterization tools: it is the site for the Stanford Nanocharacterization Lab (SNL) and the NSF-sponsored Center for Probing the Nanoscale (CPN). The SLAC National Accelerator Laboratory is just a few miles from the Varian Laboratory. SLAC is a national laboratory funded by the Offices of Basic Energy Sciences and High Energy Physics of the Department of Energy. Scientists at SLAC conduct research in photon science, accelerator physics, particle physics, astrophysics and cosmology. The laboratory hosts a two-mile-long linear accelerator that can accelerate electrons and positrons. The Stanford Synchrotron Radiation Light Source (SSRL) uses intense x-ray beams produced with a storage ring on the SLAC site. The Linac Coherent Light Source (LCLS), completed in 2009, is the world's first x-ray free-electron laser and has opened new avenues of research in ultra-fast photon science.

The Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), formed jointly with the SLAC National Accelerator Laboratory, provides a focus for theoretical, computational, observational, and instrumental research programs. A wide range of research areas in particle astrophysics and cosmology are investigated by students, postdocs, research staff and faculty. The two major projects with which KIPAC is heavily involved are the Fermi Gamma-Ray Space Telescope (FGST) and the Large Synoptic

Survey Telescope (LSST). KIPAC members also participate fully in the Cryogenic Dark Matter Search (CDMS), the Solar Dynamics Observatory (SDO), the EXO-200 double beta decay experiment, the Dark Energy Survey (DES), the NuSTAR and Astro-H X-ray satellites, the Cerenkov Telescope Array (CTA) and several cosmic microwave background experiments (BICEP, KECK, QUIET and POLAR-1).

The Ginzton Laboratory, HEPL, GLAM, KIPAC, SLAC, and SSRL are listed in the "Centers, Laboratories, and Institutes (p. 707)" section of this bulletin. Students may also be interested in research and facilities at two other independent labs: the Center for Integrated Systems, focused on electronics and nanofabrication; and the Clark Center, an interdisciplinary biology, medicine, and bioengineering laboratory.

The Stanford Institute for Theoretical Physics is devoted to the investigation of the basic structure of matter (particle theory, string theory, M-theory, quantum cosmology, condensed matter physics).

Physics Course Numbering System

Course numbers beyond 99 are numbered in accordance with a three-digit code. The first digit indicates the approximate level of the course:

Digit	Description
100	intermediate and advanced undergraduate courses
200	first-year graduate courses
300	more advanced courses
400	research, special, or current topics

The second digit indicates the general subject matter:

Digit	Description
00	laboratory
10,20,30	general courses
40	nuclear physics, nuclear energy, energy
50	elementary particle physics
60	astrophysics, cosmology, gravitation
70	condensed matter physics
80	optics and atomic physics
90	miscellaneous courses

Bachelor of Science in Physics

To help in deciding which introductory sequence is most suitable, students considering a major in Physics may contact the undergraduate program coordinator (elva@stanford.edu) to arrange an advising appointment. Also see the Physics Placement Test web site (<https://physics.stanford.edu/undergraduate-program/placement-test>). Although it is possible to complete the Physics major in three years, students who contemplate starting the major during sophomore year should make an advising appointment to map out their schedule. Students who have had previous college-level courses (including EPGY) should make an advising appointment for placement and possible transfer credit. For advanced placement advice, see the Registrar's web site (<http://studentaffairs.stanford.edu/registrar/students/ap>).

Prospective Physics majors are advised to take PHYSICS 59 FRONTIERS OF PHYSICS RESEARCH in their freshman or sophomore year.

Required Courses for Majors

All courses for the Physics major must be taken for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the major.

For sample schedules illustrating how to complete the Physics major, see the Department of Physics (<https://physics.stanford.edu/undergraduate-program/four-year-plans>) web site.

Introductory Sequence		Units
Complete either the 40 Series or the 60 Series		19-20
40 Series (19-20 units):		
PHYSICS 41	Mechanics	
PHYSICS 42	Classical Mechanics Laboratory	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 44	Electricity and Magnetism Lab	
or PHYSICS 67	Introduction to Laboratory Physics	
PHYSICS 45	Light and Heat	
PHYSICS 46	Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	
60 Series (16 units):		
PHYSICS 61	Mechanics and Special Relativity	
PHYSICS 62	Classical Mechanics Laboratory	
PHYSICS 63	Electricity, Magnetism, and Waves	
PHYSICS 64	Electricity, Magnetism and Optics Laboratory	
PHYSICS 65	Quantum and Thermal Physics	
PHYSICS 67	Introduction to Laboratory Physics	
Physics majors who complete the PHYSICS 60 series must take one additional PHYSICS course numbered 100 or above, selected from this list (3-4 units):		
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	
PHYSICS 112	Mathematical Methods of Physics	
PHYSICS 113	Computational Physics	
PHYSICS 134	Advanced Topics in Quantum Mechanics	
PHYSICS 152	Introduction to Particle Physics I	
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	
PHYSICS 161	Introduction to Extragalactic Astrophysics and Cosmology	
PHYSICS 172	Solid State Physics	
PHYSICS 211	Continuum Mechanics	
PHYSICS 216	Back of the Envelope Physics	
PHYSICS 220	Classical Electrodynamics	
PHYSICS 230	Quantum Mechanics	
PHYSICS 231	Quantum Mechanics	
PHYSICS 262	Introduction to Gravitation	
Required Math Courses (21-23 units)		
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
or MATH 51H	Honors Multivariable Mathematics	
MATH 52	Integral Calculus of Several Variables	5
or MATH 52H	Honors Multivariable Mathematics	
MATH 53	Ordinary Differential Equations with Linear Algebra	5
or MATH 53H	Honors Multivariable Mathematics	
MATH 131P	Partial Differential Equations I	3
or MATH 173	Theory of Partial Differential Equations	
Plus one advanced mathematics elective (3-5 units)		3-5
Select one of the following:		
Any MATH (101 or higher)		
PHYSICS 112	Mathematical Methods of Physics	
STATS 116	Theory of Probability	

EE 261	The Fourier Transform and Its Applications	
Intermediate Sequence		
PHYSICS 105	Intermediate Physics Laboratory I: Analog Electronics	4
PHYSICS 107	Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis	4
PHYSICS 112	Mathematical Methods of Physics (recommended) ¹	
PHYSICS 113	Computational Physics (recommended) ²	
PHYSICS 120	Intermediate Electricity and Magnetism I	4
PHYSICS 121	Intermediate Electricity and Magnetism II	4
Advanced Sequence		
PHYSICS 108	Advanced Physics Laboratory: Project	4
PHYSICS 110	Advanced Mechanics	4
PHYSICS 130	Quantum Mechanics	4
PHYSICS 131	Quantum Mechanics II	4
PHYSICS 134	Advanced Topics in Quantum Mechanics ²	
PHYSICS 170	Thermodynamics, Kinetic Theory, and Statistical Mechanics I	4
PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics II	4
Total Units		80-83

¹ Those wishing to pursue theoretical physics in graduate school may wish to take a collection of courses in the Department of Mathematics rather than or in addition to PHYSICS 112 Mathematical Methods of Physics.

² These courses are not required. PHYSICS 113 Computational Physics is recommended for students planning to work in technical fields. Both PHYSICS 113 Computational Physics and PHYSICS 134 Advanced Topics in Quantum Mechanics are recommended for students who intend to complete a Ph.D. in Physics.

Concentrations in Physics

The primary purpose of concentrations in the Physics major is to provide consistent and more formal advising to students who want to concentrate in a particular area of physics during their undergraduate education, or prepare for future graduate studies in a particular area of physics. Physics majors are not required to choose a concentration and a concentration does not add any formal requirements to the Physics major. Upon graduation, students receive a certificate of completion of a concentration.

Students seeking further advice on a given concentration should contact the professor whose name appears next to the respective title of each section below. Within the chosen concentration below, complete at least four courses from the list or three courses plus a senior thesis. No more than one of the courses can be taken for CR/NC.

A. Applied Physics (Hari Manoharan (manoharan@stanford.edu))

Solid State		
PHYSICS 172	Solid State Physics	3
APPPHYS 270	Magnetism and Long Range Order in Solids	3
MATSCI 195	Waves and Diffraction in Solids	3-4
Lasers		
EE 236A	Modern Optics	3
EE 236C	Lasers	3
Lab Methods		
APPPHYS 207	Laboratory Electronics	4
APPPHYS 304	Lasers Laboratory	4

B. Astrophysics (Roger Romani (rwr@astro.stanford.edu), Sarah Church (schurch@stanford.edu))

		Units
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3-4
PHYSICS 161	Introduction to Extragalactic Astrophysics and Cosmology	3
Select one of the following:		3-4
PHYSICS 211	Continuum Mechanics	
PHYSICS 262	Introduction to Gravitation	
PHYSICS 312	Basic Plasma Physics (not offered 2014-15)	
GES 122	Planetary Systems: Dynamics and Origins (offered alternate years, given 2015-16)	

C. Biophysics and Medical Physics (Seb Doniach (SXDWC@SLAC.Stanford.Edu))

		Units
BIOC 202	Biochemistry Bootcamp	1
BIOPHYS 228	Computational Structural Biology	3
BIO 141	Biostatistics	3-5
BIO 217	Neuronal Biophysics (not offered 2014-15)	4
BIOE 221	Physics and Engineering of Radionuclide Imaging	3
BIOE 222	Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects	4

It is recommended that Physics majors interested in pursuing a career in biophysics consider a minor in Biology.

D. Geophysics (Simon Klemperer (sklemp@stanford.edu))

The following requirements apply to students matriculating 2010-11 or later:

		Units
GEOPHYS 110	Earth on the Edge: Introduction to Geophysics	3
GEOPHYS 120	Ice, Water, Fire	3-5
Select one of the following:		
GEOPHYS 130	Introductory Seismology	
GEOPHYS 186	Tectonophysics & Global Tectonics	
GEOPHYS 190	Near-Surface Geophysics	

Physics majors matriculating prior to 2010-11 who wish to complete a concentration in Geophysics should consult Prof. Klemperer.

E. Theoretical Physics (Andrei Linde (alinde@stanford.edu))

		Units
PHYSICS 152	Introduction to Particle Physics I	3
PHYSICS 260	Introduction to Stellar and Galactic Astrophysics	3-4
PHYSICS 262	Introduction to Gravitation	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3
PHYSICS 351	Standard Model of Particle Physics	3

PHYSICS 362	Advanced Extragalactic Astrophysics and Cosmology (not offered 2014-15)	3
PHYSICS 364	Advanced Gravitation (not offered 2014-15)	3

Notes to students taking this concentration:

1. Students should discuss the choice of courses with members of the Institute for Theoretical Physics and/or their major adviser.
2. Students may attend PHYSICS 330 Quantum Field Theory I after taking PHYSICS 130 Quantum Mechanics, PHYSICS 131 Quantum Mechanics II and PHYSICS 134 Advanced Topics in Quantum Mechanics. Prior study of special topics in quantum mechanics (PHYSICS 232, not offered this year) may be helpful.

Senior Thesis

The department offers Physics majors the opportunity to complete a senior thesis. These are the guidelines:

1. Students must submit a Senior Thesis Application form once they identify a physics project, either theoretical or experimental, in consultation with individual faculty members. Proposal forms are available from the undergraduate coordinator and must be submitted by the week prior to the Thanksgiving break of the academic year in which the student plans to graduate.
2. Credit for the project is assigned by the adviser within the framework of PHYSICS 205 Senior Thesis Research. A minimum of 3 units of PHYSICS 205 Senior Thesis Research must be completed for a letter grade during the senior year. Work completed in the senior thesis program may not be used as a substitute for regular required courses for the Physics major.
3. A written report and a presentation of the work at its completion are required for the senior thesis. By mid-May, the senior thesis candidate is required to present the project at the department's Senior Thesis Presentation Program. This event is publicized and open to the general public. The expectation is that the student's adviser, second reader, and all other senior thesis candidates attend.

Honors Program

Physics majors are granted a Bachelor of Science in Physics with Honors if they satisfy these three requirements beyond the general Physics major requirements:

1. The student files for entry into the Honors Program by completing an Honors Program Application (available from the undergraduate coordinator) by the same deadline as the Senior Thesis Application. Eligibility is confirmed by the department.
2. The student completes a senior thesis by meeting the deadlines and requirements described above.
3. The student completes course work with an overall GPA of 3.30 or higher, and a GPA of 3.50 or higher in courses required for the Physics major.

Minor in Physics

The Physics minor allows the student to select a concentration in Physics or Astronomy. The Astronomy concentration has a technical and non-technical option.

All courses for the minor must be taken at Stanford University for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the minor except as noted in the following paragraph.

Students who take the PHYSICS 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor. Those who have fulfilled Physics requirements at the 20 or 40 level by enrollment at another accredited university, or through advanced placement credits, may

count credits towards PHYSICS 21, PHYSICS 23, and PHYSICS 24, or PHYSICS 41/PHYSICS 42 and PHYSICS 43/PHYSICS 44.

PHYSICS 25/PHYSICS 26, or PHYSICS 45 /PHYSICS 46 for a minor in Physics or the technical minor concentration in Astronomy, must be taken at Stanford even if similar material has been covered elsewhere.

The minor declaration deadline is three quarters before graduation, typically the beginning of Autumn Quarter if the student is graduating at the end of Spring Quarter.

Concentration in Physics

An undergraduate minor in Physics requires a minimum of 25 units with the following course work:

	Units
Select one of the following Series:	16-19
Series A (19 units)	
PHYSICS 41 Mechanics & PHYSICS 42 and Classical Mechanics Laboratory	
PHYSICS 43 Electricity and Magnetism & PHYSICS 44 and Electricity and Magnetism Lab ¹	
PHYSICS 45 Light and Heat & PHYSICS 46 and Light and Heat Laboratory	
PHYSICS 70 Foundations of Modern Physics	
Series B (16 units)	
PHYSICS 61 Mechanics and Special Relativity & PHYSICS 62 and Classical Mechanics Laboratory	
PHYSICS 63 Electricity, Magnetism, and Waves & PHYSICS 64 and Electricity, Magnetism and Optics Laboratory	
PHYSICS 65 Quantum and Thermal Physics & PHYSICS 67 and Introduction to Laboratory Physics	
At least three PHYSICS courses numbered 100 or above from the following courses: PHYSICS 100, 105, 107, 108, 110, 112, 113, 120, 121, 130, 131, 134, 152, 160, 161, 170, 171, 172, 211, 216, 220, 230, 231, or 262.	9-12
Total Units	25-31

¹ PHYSICS 67 Introduction to Laboratory Physics may be substituted for PHYSICS 44 Electricity and Magnetism Lab.

Minor in Physics with Concentration in Astronomy

Students wishing to pursue advanced work in astrophysical sciences should major in Physics (p. 579) and concentrate in astrophysics. However, students outside of Physics with a general interest in astronomy may organize their studies by completing one of the following Physics minor concentration programs.

Students who take the 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor.

An undergraduate Physics minor with a concentration in Astronomy requires the following courses:

Non-Technical

For students whose majors do not require the PHYSICS 40 or 60 series:

PHYSICS 21	Mechanics and Heat	3
PHYSICS 23	Electricity and Optics	3
PHYSICS 25 & PHYSICS 26	Modern Physics and Modern Physics Laboratory	4
PHYSICS 50 or PHYSICS 100	Astronomy Laboratory and Observational Astronomy Introduction to Observational and Laboratory Astronomy	3-4
Select two of the following:		6
PHYSICS 15	The Nature of the Universe	
PHYSICS 16	Cosmic Horizons	
PHYSICS 17	Black Holes	
Total Units		19-20

Technical

For students whose majors require the PHYSICS 40 or 60 series:

Select one of the following Series:		14-17
Series A		
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45 & PHYSICS 46	Light and Heat and Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	
Series B		
PHYSICS 61	Mechanics and Special Relativity	
PHYSICS 63	Electricity, Magnetism, and Waves	
PHYSICS 65	Quantum and Thermal Physics	
PHYSICS 67	Introduction to Laboratory Physics	
And take the following three courses:		
PHYSICS 100	Introduction to Observational and Laboratory Astronomy	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3-4
PHYSICS 161	Introduction to Extragalactic Astrophysics and Cosmology	3
Total Units		24-28

Students are also encouraged to take the electricity and magnetism/optics lab of the appropriate PHYSICS series, PHYSICS 24, PHYSICS 44 or PHYSICS 64 for 1 additional unit.

Master of Science

The department does not offer a coterminal degree program, or a separate program for the M.S. degree, but this degree may be awarded for a portion of the Ph.D. degree work.

University requirements for the master's degree, discussed in the "Graduate Degrees (p. 43)" section of this bulletin, include completion of 45 units of unduplicated course work after the bachelor's degree. Among the department requirements are a grade point average (GPA) of at least 3.0 (B) for the following required courses (or their equivalents):

PHYSICS 220	Classical Electrodynamics	3
PHYSICS 271	Thermodynamics, Kinetic Theory, and Statistical Mechanics II	3-4
Plus one of the following courses:		

PHYSICS 230	Quantum Mechanics	3
PHYSICS 231	Quantum Mechanics	3
PHYSICS 234	Advanced Topics in Quantum Mechanics	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3
Plus two 3 unit graduate level courses in Physics or Applied Physics.		6

Up to 6 of these required units may be waived on petition if a thesis is submitted.

Doctor of Philosophy in Physics

The University's basic requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

The minimum department requirements for the Ph.D. degree in Physics consist of completing all courses listed below and at least one course from each of two subject areas outside the student's primary area of research (among biophysics, condensed matter, quantum optics and atomic physics, astrophysics and gravitation, and nuclear and particle physics). For this requirement students must choose from courses numbered above PHYSICS 234, excluding 270, 271, 290, and 294. For a full list of courses by concentration that satisfy the breadth requirement see the Physics Department (<https://physics.stanford.edu>) website.

The requirements in the following list may be fulfilled by passing the course at Stanford or passing an equivalent course elsewhere:

		Units
PHYSICS 220	Classical Electrodynamics	3
PHYSICS 271	Thermodynamics, Kinetic Theory, and Statistical Mechanics II ¹	3-4
PHYSICS 290	Research Activities at Stanford	1-3
PHYSICS 294	Teaching of Physics Seminar	1
Plus one of the following courses:		
PHYSICS 230	Quantum Mechanics	3
PHYSICS 231	Quantum Mechanics	3
PHYSICS 234	Advanced Topics in Quantum Mechanics	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3

¹ For students who have had a basic introduction to Thermal and Statistical Physics at the advanced undergraduate level. Students who have not had that level of preparation should take PHYSICS 270 prior to taking PHYSICS 271.

A grade point average (GPA) of at least 3.0 (B) is required for courses taken toward the degree.

All Ph.D. candidates must have math proficiency equivalent to the following Stanford MATH courses:

		Units
MATH 106	Functions of a Complex Variable	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 116	Complex Analysis	3
MATH 132	Partial Differential Equations II	3

Prior to making an application for candidacy, each student is required to pass a comprehensive qualifying examination on undergraduate physics. This closed book exam is given in January following the student's arrival at Stanford. This two-day written examination covers particle mechanics, electricity and magnetism, quantum mechanics, statistical mechanics, thermodynamics, special relativity, and general physics. A thesis proposal

must be submitted during the third year. In order to assess the direction and progress toward a thesis, an oral report and evaluation are required during the fourth year. After completion of the dissertation, each student must take the University oral examination (defense of dissertation).

Three quarters of teaching (including a demonstrated ability to teach) are a requirement for obtaining the Ph.D. in Physics.

Students interested in applied physics and biophysics research should also take note of the Ph.D. granted independently by the Department of Applied Physics and by the Biophysics Program. Students interested in astronomy, astrophysics, or space science should also consult the "Astronomy Course Program (p. 341)" section of this bulletin.

Ph.D. Minor in Physics

Doctoral students seeking a minor in Physics must take at least six courses from the following list: 210, 211, 216, 220, 230, 231, 234, 270, and 271 among the 20 required units. All prospective minors must obtain approval of their Physics course program from the Physics Graduate Study Committee at least one year before conferral of the Ph.D.

Emeriti: (Professors) Alexander L. Fetter, William A. Little, Douglas D. Osheroff, David M. Ritson, H. Alan Schwettman, Robert V. Wagoner, John Dirk Walecka, Stanley G. Wojcicki, Mason R. Yearian; (Professors, Research) John A. Lipa (ends 1/15/2015)*, Todd I. Smith, John P. Turneaure; (Professors, Courtesy) Peter A. Sturrock (Applied Physics), Richard Taylor (SLAC National Accelerator Laboratory)

Chair: Peter M. Michelson

Associate Chair: Mark Kasevich

Professors: Roger Blandford, Phil Bucksbaum, Patricia Burchat, Blas Cabrera, Steven Chu, Sarah Church, Persis Drell, Savas G. Dimopoulos, Sebastian Doniach, David Goldhaber-Gordon, Giorgio Gratta, Patrick Hayden, Kent Irwin, Shmit Kachru, Steven Kahn, Renata E. Kallosh, Aharon Kapitulnik, Mark Kasevich, Steven A. Kivelson, Robert B. Laughlin, Andrei D. Linde, Bruce Macintosh, Kathryn Moler, Peter F. Michelson, Vahe Petrosian, Roger W. Romani, Zhi-Xun Shen, Stephen Shenker, Eva Silverstein, Leonard Susskind, Carl Wieman, Shoucheng Zhang

Associate Professors: Tom Abel, Steven Allen, Chao-Lin Kuo, Hari Manoharan, Xiao-liang Qi, Risa Wechsler

Assistant Professors: Peter Graham, Sean Hartnoll, Jason Hogan, Srinivas Raghu, Monica Schleier-Smith, Leonardo Senatore, Lauren Tompkins

Professors (Research): Leo Hollberg, Phillip H. Scherrer

Courtesy Professors: Rhiju Das, Benjamin Lev, Craig Levin, Stephen Quake, Richard N. Zare

Lecturers: Chaya Nanavati, Rick Pam

Consulting Professors: Ralph Devoe, Gerald Fisher, Jay Wacker

* Recalled to active duty.

Political Science

Courses offered by the Department of Political Science are listed under the subject code POLISCI on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=POLISCI&filter-catalognumber-POLISCI=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=POLISCI&filter-catalognumber-POLISCI=on>) ExploreCourses web site ([http://explorecourses.stanford.edu/CourseSearch/search?](http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=POLISCI&filter-catalognumber-POLISCI=on)

[view=catalog&catalog=&page=0&q=POLISCI&filter-catalognumber-POLISCI=on](http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=POLISCI&filter-catalognumber-POLISCI=on)).

Mission of the Undergraduate Program in Political Science

The mission of the undergraduate program in Political Science is to provide students with a solid grasp of the American political system and other political systems within the context of global forces, international conflicts, social movements, ideological systems and diversity. Courses in the major are designed to help students gain competency in the primary subfields of political science including American and comparative politics, international relations, and the theory/philosophy of politics; to introduce students to a variety of research methodologies and analytical frameworks; and to develop students' written and oral communication skills. Students in the program have excellent preparation for further study in graduate or professional schools as well as careers in government, business, and not-for-profit organizations.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of political science.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of Political Science.

Graduate Programs in Political Science

The Department of Political Science offers two types of advanced degrees:

- the Doctor of Philosophy
- the Master of Arts in Political Science which is available to Stanford students who are currently enrolled in other advanced degree programs.

The department does not have a terminal M.A. program for external applicants.

The principal goal of the Stanford Ph.D. program in Political Science is the training of scholars. Most students who receive doctorates in the program do research and teach at colleges or universities. The department offers courses and research opportunities in a wide variety of fields in the discipline, including American politics, comparative politics, international relations, political theory, and political methodology. The program is built around small seminars that analyze critically the literature of a field or focus on a research problem. These courses prepare students for the Ph.D. comprehensive exam requirement within a two-year period and for work on the doctoral dissertation.

Admission to the graduate program in Political Science is highly selective. Approximately 14-18 students, chosen from a large pool of applicants, enter the program each year. The small size of the student body allows more individual work with members of the faculty than most graduate programs. It also makes possible financial assistance to most students admitted to the Ph.D. program.

Additional information on the admissions process is available on the Department of Political Science website (<https://>

politicalscience.stanford.edu/graduate-program/prospective-students/phd-admissions).

Learning Outcomes (Graduate)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Political Science. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Political Science and to interpret and present the results of such research.

Pursued in combination with a doctoral degree, the master's program furthers students' knowledge and skills in Political Science. This is achieved through completion of courses in three subfields, and experience with independent work and specialization.

Bachelor of Arts in Political Science

To receive a B.A. in Political Science, a student must:

1. Submit a Political Science major proposal during a meeting with the undergraduate administrator and declare on Axess. Forms are available in Encina Hall West, room 100, or at the Department of Political Science (<http://polisci.stanford.edu/bachelors>) web site. For additional information, come to the office or phone (650) 723-1608.
2. Complete 70 units including:
 - a. 45 Political Science course units in the primary and secondary concentration combined. Each major should declare a primary concentration in one subfield and take at least 30 units in this concentration, including the introductory course for that subfield. The secondary concentration must be completed with at least 15 units, including the introductory course for that subfield. Subfields include:

		Units
POLISCI 1	Introduction to International Relations	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 110G	Governing the Global Economy	5
POLISCI 110Y	War and Peace in American Foreign Policy	5
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 114S	International Security in a Changing World	5
POLISCI 115A	The Rise of Asia	3-5
POLISCI 116	The International History of Nuclear Weapons	5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 210G	Global Supply Chains and the Future of Global Governance	5
POLISCI 212C	Civil War and International Politics: Syria in Context	5
POLISCI 213E	Introduction to European Studies	5
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 216	State Building	5

POLISCI 216E	International History and International Relations Theory	5
POLISCI 314R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 315A	The Rise of Asia	3-5

ii American Politics:

		Units
POLISCI 2	Introduction to American National Government and Politics	5
POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5
POLISCI 120C	What's Wrong with American Government? An Institutional Approach	5
POLISCI 121	Political Power in American Cities	5
POLISCI 122	Introduction to American Law	3-5
POLISCI 123	Politics and Public Policy	4-5
POLISCI 124A	The American West	5
POLISCI 124R	The Federal System: Judicial Politics and Constitutional Law	5
POLISCI 125P	The First Amendment: Freedom of Speech and Press	4-5
POLISCI 128S	The Constitution: A Brief History	5
POLISCI 223	The Politics of Gender in the United States	5
POLISCI 224L	The Psychology of Communication About Politics in America	4-5
POLISCI 225C	Fixing US Politics: Political Reform in Principle and Practice	5
POLISCI 226D		5
POLISCI 226T	The Politics of Education	5
POLISCI 227	U.S. Immigration Politics	5
POLISCI 326T	The Politics of Education	5

iii Political Theory:

		Units
POLISCI 3P	Justice	4-5
POLISCI 134L	Introduction to Environmental Ethics	4-5
POLISCI 134P	Contemporary Moral Problems	4-5
POLISCI 136R	Introduction to Global Justice	4
POLISCI 136S	Justice	4-5
POLISCI 137A	Political Philosophy: The Social Contract Tradition	4
POLISCI 230A	Classical Seminar: Origins of Political Thought	4-5
POLISCI 235J	Creative Political Thinking: From Machiavelli to Madison, Creative Political Thinking: Three Cases	4-5, 5
POLISCI 330A	Classical Seminar: Origins of Political Thought	4-5
POLISCI 336	Introduction to Global Justice	4
POLISCI 336S	Justice	4-5
POLISCI 337A	Political Philosophy: The Social Contract Tradition	4

iv Comparative Politics:

		Units
POLISCI 4	Introduction to Comparative Politics	5
POLISCI 146A	African Politics	4-5
POLISCI 147P	The Politics of Inequality	5
POLISCI 148	Chinese Politics: The Transformation and the Era of Reform	3-5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 244A	Authoritarian Politics	3-5
POLISCI 245R	Politics in Modern Iran	5
POLISCI 246P	The Dynamics of Change in Africa	4-5
POLISCI 247G	Governance and Poverty	5
POLISCI 248S	Latin American Politics	5
POLISCI 344A	Authoritarian Politics	3-5
POLISCI 346P	The Dynamics of Change in Africa	4-5
POLISCI 348S	Latin American Politics	5

v Methodology:

		Units
POLISCI 153	Strategy: An Introduction to Game Theory	5
POLISCI 155	Political Data Science	5
POLISCI 356A	Formal Theory I: An Introduction to Game Theory	3-5
POLISCI 356B	Formal Theory II: Models of Politics	3-5

b. A 5-unit methods requirement satisfied by:

Select one of the following:		5
STATS 60	Introduction to Statistical Methods: Precalculus	
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	
POLISCI 155	Political Data Science	

c. 20 additional Political Science units including no more than 5 units of directed reading. 5 units of ECON 1 Principles of Economics may substitute for one 5-unit POLISCI course.

d. No more than two 3-unit Stanford Introductory Seminar courses can be applied toward the 70-unit major requirement.

3. *Introductory Courses:* Each student must take two from the following Political Science courses, one of which must be in the primary concentration, the other in the secondary concentration. These courses should be completed by the end of sophomore year.

		Units
POLISCI 1	Introduction to International Relations	5
POLISCI 2	Introduction to American National Government and Politics	5
POLISCI 3P	Justice	4-5
POLISCI 4	Introduction to Comparative Politics	5

4. Demonstrate the capacity for sustained research and writing in the discipline. This requirement is satisfied by taking a Political Science course designated as a Writing in the Major (WIM) course and may be in any subfield of the major.

5. Take at least one 5-unit, 200-level or 300-level undergraduate seminar in Political Science and may be within your primary or secondary concentration.

6. Students may petition a maximum of ten units towards the major. Transfer students are allowed to petition up to twenty units towards the major. A maximum of 15 units may be applied towards the concentrations and 5 towards other Political Science course units. All Stanford-in-Washington courses and transfer credit from outside of Stanford require petitions which must be reviewed and approved by the Director of Undergraduate Studies. Petitions must be submitted to the undergraduate administrator within one quarter of course completion or within one quarter of declaring the major. Cognate courses do not require a petition unless the units are being applied to primary or secondary concentrations.

7. Directed reading and Oxford tutorial units also require a petition and may only be applied towards related course work units. These units may not be used in the concentrations, and no more than 10 combined units of directed reading and Oxford tutorial units may count toward the required 70 Political Science units.

8. All courses for the major must be completed with a letter grade of 'C' or better.

Research Honors Track

The Research Honors Track in Political Science leads to a B.A.H. (Bachelor of Arts with Honors) in Political Science. This program is designed to provide its students with the analytical tools they need to write honors theses and collaborate with Stanford faculty and Ph.D. students. Professor Paul Sniderman is the 2014-15 program director.

To receive a B.A.H. in Political Science, students must apply and be accepted to the Research Honors Track. Students must apply to the program in the Spring Quarter of the freshman or sophomore year or Autumn Quarter of the sophomore or junior year. A complete application includes a transcript; a letter of recommendation from a member of the Stanford Political Science faculty or from a teaching assistant in a Political Science course; and an essay outlining the student's interest in the Research Honors Track.

To fulfill the research honors track major requirements, a student must:

1. Complete 70 units

- a. All courses taken for the research honors track must receive a letter grade of 'C' or better. Junior research honors track courses (see 1e) must receive a 'B' or better to count toward the major. Students unable to meet these requirements may be removed from the track.
- b. 10 units of introductory course work in Political Science.
 - i Students must complete at least two of the following courses, preferably by the end of Spring Quarter of sophomore year:

	Units
Select two of the following:	10
POLISCI 1	Introduction to International Relations
POLISCI 2	Introduction to American National Government and Politics
POLISCI 3P	Justice
POLISCI 4	Introduction to Comparative Politics

c. 10 units of statistics, which can be completed by taking one of the following sequences:

Select one of the following:	10
STATS 60 & POLISCI 155	Introduction to Statistical Methods: Precalculus and Political Data Science
ECON 102A & POLISCI 155	Introduction to Statistical Methods (Postcalculus) for Social Scientists and Political Data Science

ECON 102A Introduction to Statistical Methods
& ECON (Postcalculus) for Social Scientists
102B and Applied Econometrics

- d. Students are also encouraged (but not required) to complete one of the following calculus sequences:

Select one of the following Series:

Series A

MATH 19 Calculus

MATH 20 Calculus

MATH 21 Calculus

Series B

MATH 41 Calculus

MATH 42 Calculus

MATH 51 Linear Algebra and Differential Calculus of
Several Variables

Units

15

- e. Three courses designed for the research honors track, to be taken during sophomore or junior year:

POLISCI 291 Political Institutions

POLISCI 292 Political Behavior

POLISCI 293 Research Design

Units

5

5

5

- f. To accommodate students studying at overseas campuses during their junior year, these courses are offered during the Winter and Spring quarters.
- g. Two 200-level, 300-level, or 400-level graduate elective courses.
- h. Three 100-level Stanford POLISCI courses that must be approved by the student's adviser. One of these courses must be a POLISCI Writing in the Major (WIM) course.
- i. 10 units of honors thesis writing. To satisfy this requirement, students must take POLISCI 299Q Honors Thesis Seminar, during the Autumn of their senior year, and must complete the remaining units by taking POLISCI 299A Honors Thesis, POLISCI 299B Honors Thesis, and/or POLISCI 299C Honors Thesis with their thesis adviser.
2. Complete at least one intensive summer research experience by participating in the Political Science Department's Summer Research College (SRC) program, or by completing an independent project under the direction of a Political Science faculty member. Independent projects must be approved by the director of the research honors track prior to completion and a research project form should be submitted to the undergraduate administrator with a description of the project.
3. Students may petition a maximum of 10 units to count for the major. Transfer students are allowed to petition a maximum of 20 units. All petitions and transfer courses require approval from the research honors track director.

Minor in Political Science

Students must complete their declaration of the minor on Axess no later than Autumn of their senior year. They must submit the minor declaration form to the undergraduate administrator in Encina Hall West 100. This form can be found in Encina Hall West 100 or on the Political Science web site (<https://politicalscience.stanford.edu/undergraduate-program/political-science-minor>).

To receive a minor in Political Science, a student must complete a minimum of 30 unduplicated units. All units must be in Political Science courses or cognate courses. All courses for the minor must be taken for a letter grade. Students must receive a minimum letter grade of 'C' in all courses for the minor.

Concentration

The student selects a primary subfield in which three courses are taken. One of these courses must be the introductory course, the other two are at a more advanced level (numbered above 100). The concentration corresponds to one of the subfields the department already has in place, namely, American politics, comparative politics, international relations, and political theory.

Distribution

Three courses must be in the primary concentration, as specified above, for 15 units. An additional 10 units of intermediate and advanced courses (100 level or above) must be in two additional subfields. The final 5 units may be in any related subfield. ECON 1 Principles of Economics, cognate course, including overseas courses, or any of the Political Science related courses may also be used to satisfy the last five units.

Petitioned courses

Students may petition for a maximum of 5 units to count towards the minor. This includes directed readings and Stanford in Washington courses. Directed readings and Stanford in Washington courses may only count towards the last five related units for the minor. Transfer students can petition a maximum of 10 units towards the minor. Petitions must be submitted within one quarter of course completion or within one quarter of declaring the minor. All petitioned courses must be individually reviewed and approved by the Director of Undergraduate Studies. Students can download the petition form from the Political Science website or pick one up from Encina Hall West, room 100. Students must submit petitions to the undergraduate administrator in Encina Hall West, room 100.

Master of Arts in Political Science

The Political Science department does not offer a terminal M.A. degree. An M.A. degree may only be pursued in combination with a doctoral degree from another department within the University or with an advanced degree from one of the University's professional schools. Students interested in pursuing the M.A. should discuss the application requirements with the graduate administrator in Political Science.

Students from within the department and from other degree programs who have applied to the M.A. program may elect to take the M.A. degree in Political Science when they have met the following requirements:

1. Completion of at least three quarters of residency as a graduate student with 45 units of credit of which at least 25 units must be taken in Political Science graduate seminars of 300 level and above. Not more than 25 units of the 45-unit requirement may be taken in a single field.
2. At least two graduate seminars in each of two fields and at least one graduate seminar in a third field.
3. The remaining 20 units must come from courses numbered above 100. Of those 20 units, not more than 10 units of work from related departments may be accepted in lieu of a portion of the work in Political Science. Not more than 10 units may be taken as directed reading.
4. A grade point average (GPA) of 2.7 (B-) or better must be attained for directed readings and all course work. No thesis is required.

The department does not offer a coterminal bachelor's and master's degree.

Political Science doctoral candidates may pursue master's degrees from other departments. Recent examples include but are not restricted to master's degrees in Statistics and Economics. Students interested in this option should consult the relevant sections of this Bulletin for both University and department requirements for master's degrees.

Doctor of Philosophy in Political Science

The University's basic requirements for the Ph.D. degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Programs of study leading to the Ph.D. degree are designed by the student, in consultation with advisers and the Director of Graduate Studies, to serve his or her particular interests as well as to achieve the general department requirements. A student is recommended to the University Committee on Graduate Studies to receive the Ph.D. degree in Political Science when the following program of study has been completed:

1. *Statement of Purpose:* By the end of the third quarter in residence, each graduate student submits a statement of purpose to the student's adviser. This statement indicates the student's proposed major fields of study, the courses taken and those planned to be taken to cover those fields, the student's plan for meeting language and/or skill requirements, plans for scheduling of comprehensive examinations and/or research papers, and, where possible, dissertation ideas or plans. This statement is discussed with, and must be approved by, the student's adviser. In the Autumn Quarter following completion of their first year, students are reviewed at a regular meeting of the department faculty. The main purposes of this review are, in order of importance: to advise and assist the student to realize his or her educational goals; to provide an opportunity for clarifying goals and for identifying ways to achieve them; and to facilitate assessment of progress toward the degree.
2. *Two Major Fields:* The candidate for the Ph.D. degree must demonstrate proficiency in two major fields: American politics, comparative politics, international relations, methodology, and political theory. Students demonstrate proficiency by fulfilling, depending on the field, combinations of the following: written qualifying examinations, research papers, or course work. Each field offers a series of three or four courses designed to familiarize students with the literature of that field. In addition, a field may require that students take one or more elective courses covering a specific aspect of the field. All courses that a student uses to fulfill a major field requirement must be taken for a letter grade of 'B' or better.
3. *Third Minor Field:* The candidate for the Ph.D. degree must also complete a third minor field. The third field requirement is usually satisfied by taking ten units of credit from among courses approved by the field convener. All courses used to fulfill the third minor field requirement must be taken for a letter grade of 'B' or better. The third field cannot be satisfied by courses taken as a requirement for a major field. A third field in political theory requires 10 units in addition to the five units necessary to fulfill the political theory program requirement (see item 4). A third concentration in methodology requires 10 units in addition to the 10 units necessary to fulfill the quantitative methods program requirement (see item 5).
4. *Political Theory Requirement:* Every Ph.D. candidate must complete at least 5 units of graduate-level instruction in political theory. All courses used to fulfill the political theory requirement must be taken for a letter grade of 'B' or better.
5. *Quantitative Methods Requirement* Every Ph.D. candidate must take POLISCI 350A Political Methodology I: Regression and POLISCI 350B Political Methodology II: Causal Inference in order to fulfill the quantitative methods requirement. Credit for equivalent classes is at the discretion of the political methodology field convener. All courses used to fulfill the quantitative methods requirement must be taken for a letter grade of 'B' or better.
6. *Competence in a Language and/or Skill:* The Ph.D. candidate is required to demonstrate competence in a language and/or skill that is likely to be relevant to the dissertation research. The level of competence needed for completion of the research is determined by the student's adviser. Previous instruction can be counted towards this requirement only if approved by the Director of Graduate Studies.
7. *Comprehensive Exams:* Students must take the comprehensive exams in two major fields by the end of their second year in the program. Students are expected to have passed these examinations by the end of their second year.
8. *Second-year Research Paper:* Prior to being advanced to candidacy, each student must produce a research paper (field paper) demonstrating the capacity to produce research at a level expected of students preparing to write a high quality Ph.D. dissertation. The second-year research paper is given considerable weight as the faculty consider an application for candidacy. Students are advised to begin work on their second-year research papers in the summer between their first and second years in the program, and to submit a first draft to their advisers sometime in the Autumn Quarter of their second year. Second-year research papers are considered incomplete until approved by the two faculty readers. Students are expected to have submitted an approved field paper by the end of their second year.
9. *Advancement to candidacy* In accordance with University guidelines, Ph.D. students are expected to advance to candidacy by the end of their sixth quarter in the program (i.e., by the end of their Spring Quarter in their second year in the program). It is the department's practice that all students in their sixth quarter be considered for candidacy at a special meeting of the faculty (typically in Week 10 of Spring Quarter). All the requirements for advancing to candidacy listed below must be completed by this meeting. Should a student not be advanced to candidacy by the end of the sixth quarter, the student is at risk of being dismissed from the Ph.D. program. To be eligible for advancement to candidacy, students must complete the requirements listed below.
 - a. two major #elds
 - b. a third minor #eld
 - c. the political theory requirement
 - d. the quantitative methods requirement
 - e. the second-year research paper
 - f. Advancement to candidacy is not automatic upon completion of these requirements. Advancement to candidacy is an expression by the faculty of their confidence that the student can successfully complete the Ph.D. program, and in particular, complete a doctoral dissertation that is an original contribution to scholarship that exemplifies the highest standard of the discipline.
10. *Dissertation Prospectus:* During the third year, a formal dissertation prospectus must be submitted to and approved by the student's dissertation adviser and the Director of Graduate Studies. The dissertation prospectus must be approved by the end of the third year. Students must also make a dissertation prospectus presentation in the third year.
11. *TA Requirement:* A candidate for the Ph.D. in Political Science is required to serve as a teaching assistant (TA) in the department for a minimum of three quarters. Many students need to TA for up to five quarters as part of their funding package.
12. *Oral Examination:* The candidate must pass the University oral examination on the area of the dissertation at a time, after the passing of the written comprehensive examinations, suggested by the candidate's dissertation committee.
13. *Dissertation:* The candidate must complete a dissertation satisfactory to the dissertation reading committee.
14. *Adequate Progress* In addition to the specific program requirements listed above, at each stage of the Ph.D. program, the department has the following minimum standards for adequate academic progress:
 - Except in rare circumstances, no more than two of the following on the transcript at any given time: incomplete ('I'); grade not reported ('GNR'); not passed or no credit ('NP' or 'NC'); or withdraw ('W').
 - Adequate grades in all courses taken each term ('B-' and below are regarded as inadequate).

- Graduate students in the first year must enroll for at least 15 units and must pass at least 8 units per term by the end of the term. Graduate students in years 2, 3 and 4 must register for at least 8 units and must pass at least 6 units by the end of each term.
- Advance to candidacy by close of sixth quarter (i.e., for most students, the end of their second academic year in the Ph.D. program);
- Dissertation prospectus presentation made and approval of dissertation prospectus on file by the end of the third year.
- Dissertation reading committee formed by end of the fourth year.
- Advance to TGR status by end of the fourth year.
- Substantial progress toward completion of the dissertation in fourth and fifth years.

Ph.D. Minor in Political Science

Candidates in other departments which accept a minor in Political Science select two concentrations in political science in consultation with the Director of Graduate Studies and submit to her or him a program of study for approval. Written approval for the program must be obtained from the Director of Graduate Studies before application for doctoral candidacy. Students are required to complete at least 20 units in Political Science courses. Courses must be 300 level and above. Grades must be a GPA of 3.0 (B) or better.

Emeriti: (Professors) David B. Abernethy, Lucius J. Barker, Richard A. Brody, David Danielski, Charles Drekmeier, Richard R. Fagen, John A. Ferejohn, John W. Lewis, John Manley, James March, Hubert R. Marshall, Daniel Okimoto, Robert A. Packenham, Philippe Schmitter, Hans N. Weiler

Chair: Judith L. Goldstein

Professors: David W. Brady, Bruce E. Cain, Joshua Cohen, Gary W. Cox, James D. Fearon, Morris P. Fiorina, Judith L. Goldstein, Stephen H. Haber, David J. Holloway, Shanto Iyengar, Simon D. Jackman, Terry L. Karl (on leave), Stephen D. Krasner, Jon A. Krosnick, David D. Laitin, Margaret Levy, Michael A. McFaul, Terry M. Moe, Josiah Ober, Jean C. Oi, Jack N. Rakove, Condoleezza Rice, Douglas Rivers, Jonathan A. Rodden, Scott D. Sagan, Kenneth F. Scheve Jr., Kenneth A. Schultz, Gary M. Segura, Paul M. Sniderman, Michael R. Tomz, Barry R. Weingast (on leave, Fall)

Associate Professors: Lisa Blaydes, Justin Grimmer, Jens Hainmueller, Beatriz Magaloni, Rob Reich, Jeremy M. Weinstein (on leave)

Assistant Professors: Avidit Acharya, Adam Bonica (on leave), Lauren Davenport, Karen L. Jusko (on leave, Fall), Phillip Y. Lipsy, Alison McQueen (on leave), Clayton Nall

Lecturers: Robert Gulotty, Tammy Frisby, Abbas Milani, Andrew R. Rutten, Bruce Sievers, Kathryn Stoner, Yuki Takagi

Courtesy Professors: Jonathan B. Bendor, Coit D. Blacker, Gerhard Casper, Martha Crenshaw, Mariano Florentino-Cuellar, Larry Diamond, Jean-Pierre Dupuy, James Fishkin, Lawrence Friedman, Francis Fukuyama, Keith Krehbiel, Nathaniel Persily, Debra M. Satz, Stephen J. Stedman, Andrew Walder, Amy Zegart

Acting Instructors: Lucila Figueroa, Mackenzie Israel-Trummel

Courtesy Associate Professors: Alberto Diaz-Cayeros, Neil Malhotra, Ken Shotts

Courtesy Assistant Professor: Saumitra Jha

Cognate Courses

		Units
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	5

AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
ECON 1	Principles of Economics	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
IPS 219	Intelligence and National Security	3-4
MSE 193	Technology and National Security	3
OSPBER 15	Shifting Alliances? The European Union and the U.S.	4-5
OSPBER 37	Leading from Behind? Germany in the International Arena since 1945	4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPFLO 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPMADRD 52	Revolution and Reconciliation in Film	4
OSPOXFRD 24	British and American Constitutional Systems in Comparative Perspective	4-5
OSPPARIS 32	French Politics in Cross-National Perspective	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 129X	Latin America in the International System	4-5
REES 320	State and Nation Building in Central Asia	5
STATS 60	Introduction to Statistical Methods: Precalculus	5

Overseas Studies Courses in Political Science

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 15	Shifting Alliances? The European Union and the U.S.	4-5
OSPBER 37	Leading from Behind? Germany in the International Arena since 1945	4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPFLO 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPMADRD 52	Revolution and Reconciliation in Film	4

OSPOXFRD 24	British and American Constitutional Systems in Comparative Perspective	4-5
OSPPARIS 32	French Politics in Cross-National Perspective	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 129X	Latin America in the International System	4-5

Psychology

Courses offered by the Department of Psychology are listed under the subject code PSYCH on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PSYCH&filter-catalognumber-PSYCH=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PSYCH&filter-catalognumber-PSYCH=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PSYCH&filter-catalognumber-PSYCH=on>).

The department, housed in Jordan Hall, maintains many computer-equipped laboratories and the Stanford Center for Cognitive and Neurobiological Imaging (CNI). Bing Nursery School, located on campus at 850 Escondido Road, provides a laboratory for child observation, training in nursery school teaching, and research. It was constructed with funding from the National Science Foundation and a special grant from Mrs. Anna Bing Arnold and Dr. Peter Bing.

The department provides

- courses designed for the general student
- a major program leading to the degree of Bachelor of Arts, including options for honors and a specialization in one of four content area tracks
- an undergraduate minor program
- a coterminal master's degree program leading to the degree of Master of Arts
- programs of graduate study and research leading to the degree of Doctor of Philosophy
- a Ph.D. minor

Applications are not accepted for the master's degree except as noted below.

Mission of the Undergraduate Program in Psychology

The mission of the undergraduate program in Psychology is to introduce students to the theories and empirical studies of human behavior. This includes the study of aging, achievement, child development, cognitive processes, conflict, culture, decision making, emotion, group behavior, health, identity, infancy, language, learning and memory, morality, motivation, personality, psychopathology, race, self, social perception, visual perception, and other related topics. The major provides students with knowledge and skills relevant to professional careers in technology, business, counseling, education, public policy, law, and medicine, as well as graduate studies in Psychology.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are

used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of psychology including relevant theory and research.
2. the ability to analyze a problem correctly using discipline specific methodology.
3. the ability to draw sound inferences and conclusions from data.
4. the ability to write and communicate ideas clearly.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Psychology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Psychology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Psychology and to disseminate this knowledge.

Bachelor of Arts in Psychology Major Requirements

Students declaring a major in Psychology must complete a minimum of 70 units of course work in Psychology, 60 of which must be taken in the Psychology department. The remaining 10 units can be taken outside of the Psychology department but must be pre-approved by the student services office or faculty adviser. These courses should represent a coherent thematic focus. One way to achieve this focus is through a field of study. Courses taken to satisfy the 70-unit requirement must be taken for a grade of C- or better (except for courses offered only on a satisfactory/no credit basis). Majors must take PSYCH 1 Introduction to Psychology, and PSYCH 10 Introduction to Statistical Methods: Precalculus. Advanced placement (AP) credit may no longer be used toward the Psychology major requirements. Beyond these two required courses, students must complete at least five of the following eleven core Psychology courses, with a minimum of two from each area A and B:

		Units
Area A		
PSYCH 30	Introduction to Perception	3
PSYCH 35	Minds and Machines	4
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
Area B		
PSYCH 60	Introduction to Developmental Psychology	4
PSYCH 70	Introduction to Social Psychology	4
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 80	Introduction to Personality and Affective Science	3
PSYCH 90	Introduction to Clinical Psychology	3
PSYCH 95	Introduction to Abnormal Psychology	3

Students must take one Writing in the Major (WIM) course in Psychology, and should check the Stanford Bulletin yearly as these courses may change. The department also strongly recommends that all majors take at least one advanced seminar.

Students may count up to 10 units of research, independent study, and practica (including but not limited to PSYCH 194 Reading and Special Work, PSYCH 195 Special Laboratory Projects, PSYCH 281 Practicum

in Teaching) toward the Psychology major. Students who are teaching assistants for a Psychology course or are enrolled in the senior honors program are allowed up to 15 units in independent study and research. Any units beyond the limit of 10 or 15 may be counted toward the 180 units required for graduation.

Students who are double majoring or completing a minor degree in another department may not overlap (double-count) courses, unless the overlapping courses constitute introductory skill requirements, such as PSYCH 10 Introduction to Statistical Methods: Precalculus. In this instance, while the course requirement would be satisfied, the units for the course can only be applied to one program of study, not both. Consult the student services office for further clarification.

Summer Quarter Psychology courses are not equivalent to courses given during the regular academic year and, while applicable toward the 70 units needed for the major, may not be used to fulfill core course requirements. Additionally, a course taken during the Summer Quarter cannot be used to replace the grade of a non-Summer Quarter course, even if the title and units of the two courses are the same.

Beyond the Minimal Requirements

The following recommendations may be helpful to students who wish to plan a program that goes beyond the minimal requirements listed above:

1. Within the general major, the student may take advanced undergraduate or graduate courses (although some require the consent of the instructor), including seminars. The student may also take advantage of widespread opportunities for directed research, working closely with individual faculty and graduate students.
2. The student may apply to the senior honors program, described below.
3. The student may elect to pursue one of four specialization tracks of study: Cognitive Sciences; Health and Development; Mind, Culture, and Society; or Neuroscience, described below.

The training obtained from the pursuit of any of these options is valuable not only for students considering graduate work in Psychology, but also for those thinking of professional careers outside of Psychology in fields such as technology, business, counseling, education, law, public policy or medicine.

Credit from Outside the Department

Psychology majors must complete at least 60 units of course work toward their major at Stanford within the Psychology department. Psychology majors may count no more than a total of 10 units credit from outside the department toward the major. Both majors and minors, under extenuating circumstances, may use one course from outside the department to fulfill core course requirements. Additional courses may be used to fulfill the 70-unit major requirement, but may not be counted as core courses. Please see the student services office for further clarification.

Petition for transfer of credit is rarely granted. In cases where petitioning is necessary, there are two types of credit from outside the department: external transfer credit for courses taken at institutions other than Stanford and credit for courses in other Stanford departments. A student must have already declared Psychology as a major or minor in order to submit a petition for transfer credit. Stanford credit for courses completed at other institutions must have been granted by the External Credit Evaluation section of the Registrar's Office; those units may be applied toward the 180 units required for graduation. To have credit from outside the department evaluated to fulfill requirements toward the Psychology major or minor, students must complete an Undergraduate Petition form, available from the student services office, and submit it with a course syllabus. Students requesting external transfer credit must also submit a copy of the signed

transcript from the External Credit Evaluation section of the Registrar's Office showing the number of Stanford units granted for the course. The Psychology department then evaluates external credit courses and courses from other Stanford departments to determine if they can be applied toward Psychology major or minor requirements.

Specialization Tracks

Students in the major program, including those in the senior honors program, may elect to specialize in one of four specialization tracks:

- Cognitive Sciences
- Health and Development
- Mind, Culture, and Society
- Neuroscience

These tracks consist of a coherent set of courses leading to advanced undergraduate or even graduate-level courses in an area. In the ideal case, the student who specializes would acquire an understanding of a range of psychological processes, as well as an appreciation of the significance of these processes in the chosen area of application. Specialization in one of the tracks can facilitate preparation for a professional career as well as for graduate work in Psychology.

Participation in a specialization track is optional, although students who do not wish to complete all the requirements for a track may still want to use the track as a guideline for an integrated program in Psychology. Students who choose to complete a specialization track must meet the requirements for the major plus the additional requirements designated for the track. Typically, the courses required for a track include one or two required courses, four to six recommended courses in Psychology, one or two advanced seminars, and three or four courses in related disciplines. Psychology courses completed for the track count toward satisfying the major requirements. Courses from other departments listed for the track may count toward the 10 outside units for the major requirement, but must be pre-approved by the student services office or faculty adviser.

These specialization tracks are declared on Axxess upon approval of faculty adviser. They appear on the transcript but not on the diploma.

Honors Program

The senior honors program is designed for exceptionally able Psychology majors who wish to pursue a year of intensive supervised independent research. Admission to the program is made at the end of the student's junior year on the basis of:

- excellent academic performance
- previous research experience
- two letters of recommendation by faculty and/or graduate students

Applications are available in April and are to be submitted to the department's student services office with a current transcript and recommendations prior to the student's senior year.

Students interested in the program should involve themselves in research as early as possible and should acquire a broad general background in Psychology, including statistics, and a deep background in their chosen area. Typically, students work in their honor thesis adviser's lab for at least one quarter. The honors program is particularly appropriate for students planning to go to graduate school in Psychology or in other social sciences, as well as in computer science, business, counseling education, law, public policy and medicine.

During Autumn Quarter of their senior year, honors program students participate in a weekly seminar and meet with their advisers to develop their experimental program and begin data collection. Winter and Spring Quarters are devoted to completing the research, analyzing the data, and writing the thesis, which is submitted mid-May. Students give oral

presentations of their projects at the annual Honors Convention. This convention is attended by undergraduates, graduate students, and faculty.

Minor in Psychology Declaration

Students who wish to declare a minor field of concentration in Psychology must do so no later than the deadline for their application to graduate.

Degree Requirements

Completion of a minimum of 35 units in Psychology is required for the minor, including PSYCH 1 Introduction to Psychology and PSYCH 10 Introduction to Statistical Methods: Precalculus, or a comparable statistics course. Advanced placement (AP) credit may no longer be used towards the Psychology minor.

The minor must include three of eleven core courses with a minimum of one from each of two areas and elective Psychology courses of at least three units each, totaling 35 units:

Area A

Select a minimum of one of the following:

PSYCH 30	Introduction to Perception
PSYCH 35	Minds and Machines
PSYCH 45	Introduction to Learning and Memory
PSYCH 50	Introduction to Cognitive Neuroscience

Area B

Select a minimum of one of the following:

PSYCH 60	Introduction to Developmental Psychology
PSYCH 70	Introduction to Social Psychology
PSYCH 75	Introduction to Cultural Psychology
PSYCH 80	Introduction to Personality and Affective Science
PSYCH 90	Introduction to Clinical Psychology
PSYCH 95	Introduction to Abnormal Psychology

Elective Psychology Courses

Students who declared a Psychology minor prior to the 2002-03 academic year may choose any three of the eleven core courses.

Students who declared a Psychology minor prior to the 2005-06 academic year may choose to complete seven total courses:

		Units
PSYCH 1	Introduction to Psychology	5
PSYCH 10	Introduction to Statistical Methods: Precalculus	5
Three core courses		
Two elective courses		

Independent study, research, and practica cannot be counted toward the minor. Summer Quarter Psychology courses are not applicable toward the 35 units needed for the minor.

All courses used to fulfill the requirements of the minor must be passed with a grade of C- or better, except for courses offered only on a satisfactory/no credit basis. No more than 10 units of transfer credit may be counted toward the Psychology minor.

Master of Arts in Psychology

The Department of Psychology offers a Master of Arts degree only to students concurrently enrolled in other Stanford programs.

A Master of Arts degree is available to students enrolled in the Department's Ph.D. program. For such students, the requirements of the M.A. degree are listed in the "Doctoral" tab of this section.

A separate program called the Coterminal Master's Program (described below) is available to Stanford undergraduates.

In exceptional cases, students concurrently enrolled in another doctoral or professional program at Stanford may also apply for the M.A. degree. In such cases, the applicable admissions and degree requirements are determined on a case by case basis. Such applicants should consult with the student services office in the Department of Psychology.

All applicants must satisfy University residency requirements for the degree and are responsible for consulting with their primary departments or the Financial Aid Office about the effects of the proposed program on their current funding. General University requirements for the master's degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Coterminal Master's Program

Stanford undergraduates who would like advanced training in Psychology may apply for a coterminal M.A. degree in Psychology. To do so, students should consult with the student services office. Along with a coterminal program application, applicants must submit:

1. a statement of purpose
2. a preliminary program plan specifying the courses in which they intend to enroll to fulfill degree requirements
3. at least two letters of recommendation from Stanford faculty members familiar with their academic work
4. a current Stanford undergraduate transcript
5. a written nomination by a member of the Psychology faculty who has agreed to serve as the student's master's degree adviser

This program is limited in size and admission is selective. Applicants must have earned a minimum of 120 units towards graduation as shown on the undergraduate transcript. The department's deadline for the submission of an application to the coterminal program is January 30, 2015.

Admission to the coterminal program may not be deferred. Students must start in the quarter (usually Autumn Quarter) for which they are admitted.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Stanford Undergrad Coterm Guide (<http://undergrad.stanford.edu/advising/student-guides/coterm>).

Students in the Coterminal program may be terminated if they no longer have an adviser, or if they are not making satisfactory progress in course work or research.

Degree Requirements for a Coterminal Master's Degree

Course work: For the coterminal master's degree, students must complete at least 45 units of Psychology courses, none of which may duplicate courses taken for the undergraduate degree, and none of which may be courses taken in the Summer Quarter. Courses to be counted toward the master's degree must be passed with a grade of B- or better, unless the course is offered only on a satisfactory/no credit basis.

Of these 45 required units, at least 27 must be in Psychology courses numbered 200 or above. Units from research, teaching, practica, independent study, and lab courses may not be counted toward these 27 units, but may be counted as part of the remaining 18 required units. Examples of such course that may not be counted toward these 27 units include:

		Units		
PSYCH 246	Cognitive and Neuroscience Friday Seminar	1	PSYCH 211	Developmental Psychology
PSYCH 258	Graduate Seminar in Social Psychology Research	1-3	PSYCH 212	Social Psychology
PSYCH 269	Graduate Seminar in Affective Science	1	or PSYCH 215	Mind, Culture, and Society
PSYCH 275	Graduate Research	1-15	PSYCH 213	Affective Science
PSYCH 281	Practicum in Teaching	1-5		
PSYCH 282	Practicum in Teaching PSYCH 1	1-2		
PSYCH 297	Seminar for Coterminal Master of Arts	1-2		

Included in the 27 units of graduate-level courses must be at least one 3-unit course from each of Area A (cognitive science and neuroscience) and Area B (affective, developmental, and social psychology), and at least one upper division statistics course that has been approved by the student's adviser. Further, all coterminal students are encouraged to enroll in PSYCH 196 Contemporary Psychology: Overview of Theory, Research, Applications. The specific courses in Area A and Area B available to coterminal master students vary from year to year, and prospective students should consult with the department's Student Services Office for up-to-date information on courses available and their assignment to Area A and Area B.

Research: Demonstration of competence in the design and execution of psychological research is also required for receipt of the master's degree. This demonstration entails completion of a master's thesis containing original research. If the student is currently writing a senior honors thesis, this honors thesis may be accepted as proof of research competence provided the honors thesis is judged to be master's level research by the student's adviser and the department's graduate program committee. If the student has completed an honors thesis in Psychology in the prior year, the student would be expected to continue independent research during the coterminal year and to submit this research in a written report that, together with the completed honors thesis, would constitute the master's thesis. All students are required to make an oral presentation of their research during the Spring Quarter, and to present their thesis or written report at the end of that Quarter.

Doctor of Philosophy in Psychology

There are no specific course requirements for admission to the doctoral program. However, an applicant should have research experience as an undergraduate, as well as the equivalent of an undergraduate major in Psychology. The major focus of the doctoral program is on research training, and admission is highly selective.

Applicants for admission must submit their scores on the general Graduate Record Examination as part of the application. GRE subject scores are recommended.

General University requirements for the Ph.D. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

In addition to fulfilling Stanford University requirements for the degree, the following departmental requirements are stipulated.

First-Year Course Requirements

During the first year of graduate study, the student must take PSYCH 207 Professional Seminar for First-Year Ph.D. Graduate Students, at least one approved graduate statistics course, and at least two core courses from the following list:

		Units
PSYCH 202	Cognitive Neuroscience	3
PSYCH 205	Foundations of Cognition	1-3

PSYCH 211	Developmental Psychology	1-3
PSYCH 212	Social Psychology	1-3
or PSYCH 215	Mind, Culture, and Society	
PSYCH 213	Affective Science	3

Students in each area may be required to take up to two additional non-core graduate courses in their area of specialization.

The student is expected to spend at least half of the time in research from the beginning of the first year of graduate study to the completion of the Ph.D., taking no more than 10 units of course work each quarter. At the end of the first year of graduate study, the student must file with the department a written report of the first-year research activities.

Second-Year Course Requirements

By the end of the second year of graduate study, the student should complete the core courses listed above and take a second approved graduate course in statistics.

Optional Application for Conferral of the M. A. Degree: Graduate students, who have complete (a) the first-year and second-year course requirements, and (b) at least 45 units of Psychology courses, may apply for conferral of the M.A. degree. This application should be discussed with the Student Services office in the Department of Psychology.

Third-Year and Beyond

Students are expected to form a research committee, which must include the dissertation reading committee, before the initiation of the dissertation research. The research committee includes the dissertation adviser and consists of at least three faculty members, at least two of whom should have primary appointments in the Psychology department. For University guidelines for the composition of the dissertation reading committee, see the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

The research committee should meet no later than the last day of classes of Spring Quarter of the third year, and determines the timeline for further development of the dissertation research project. Subsequent meetings are triggered by the completion of one of two documents: a dissertation proposal (DP) or a conceptual analysis of the dissertation area (CADA). The timing and sequencing of the DP and CADA are developed by the student in consultation with the committee. As a general guide, one of the two preliminary elements (CADA or DP) should be completed by the end of the third Summer Quarter and the second should be completed by the end of the fourth Spring Quarter. Students are free to alter the membership of the committee at any time during the process, subject to consultation with the adviser.

The DP should be a description of the proposed research. The CADA provides a framework for the research topic of the dissertation, addresses the central issues within the specialty area, and reviews the pertinent literature.

Advanced Course or Minor Requirements

The candidate must complete 12 units of advanced graduate course work or a Ph.D. minor in another department. If a student waives the minor requirement in favor of the 12 advanced units, the student must fulfill the advanced course requirement by taking (a) non-core graduate courses required by a particular area, or (b) graduate-level courses in other departments comparable in quality to Psychology's graduate courses. If there is any question about comparability, the student should consult the adviser, student services, and, in some cases, the graduate program committee chair before taking the course.

Orals

The candidate must pass the University oral examination, which also serves as a dissertation defense. A committee is formed to review the oral examination, including the dissertation reading committee, an additional faculty member, and one oral examination committee chair from outside the Psychology department. The oral examination consists of a 40-45-minute presentation to the department of the completed dissertation research. Parents and friends are welcome to attend. Following the presentation, the student and the committee convene for a discussion of the dissertation and the presentation.

Dissertation Requirements

The candidate must complete a dissertation satisfactory to the dissertation reading committee prior to the oral examination. Minor revisions to formatting may be made after the oral examination.

Ph.D. candidacy expires five years after admission to candidacy at the end of the second year of study. Reapplication requires department reexamination.

Student Evaluations

First-Year Evaluation: It is the department's policy to evaluate the progress of each graduate student at the end of the first year of graduate study. As part of the procedure, each student is required to file with the department a report of the first-year research activities.

Students should discuss this report and the evaluation procedures with their adviser as early as possible in their first year. If the student fulfills the academic promise displayed upon entrance, he or she is invited to continue working towards the doctorate.

The first-year evaluation is primarily based on three factors:

1. quality of research carried out in the first year
2. performance in courses (especially required courses)
3. recommendations of the adviser (including a commitment on the part of that adviser to continue in that role).

Second-Year and Beyond Evaluation: A similar evaluation is conducted at the end of each year of graduate training involving the same criteria as the first year; however, the student is not required to submit a paper. Students who are not making satisfactory progress may be dropped from the program.

The Doctoral Training Program

As indicated by the requirements described above, a student concentrates in any one of several areas within Psychology. Regardless of area, however, the training program places emphasis on the development of research competence, and students are encouraged to develop those skills and attitudes that are appropriate to a career of continuing research productivity.

Two kinds of experience are necessary for this purpose. One is the learning of substantial amounts of technical information. A number of courses and seminars are provided to assist in this learning, and a student is expected to work out a program, with his or her adviser, to attain this knowledge in the most stimulating and economical fashion.

A second aspect of training is one that cannot be gained from the courses or seminars. This is firsthand knowledge of, and practical experience with, the methods of psychological investigation and study. These methods include ways of behaving with the subjects being studied. Students are provided with whatever opportunities they need to reach those levels of competence representative of doctoral standing. Continuing research programs, sponsored by members of the faculty, offer direct opportunities for experience in fields represented by the faculty's many research interests.

Each student achieves competence in unique ways and at different rates. Each student and adviser share in planning a program leading to the objectives discussed. The student is expected to spend half of his or her time on research and takes no more than 10 units of course work per quarter. For further information please contact the student services office and the department graduate guide.

Teaching Requirement

The department views experience in supervised teaching as an integral part of its graduate program. Regardless of the source of financial support, all students serve as teaching assistants for at least five Psychology courses during their graduate study. Of these five teaching occasions, two must involve PSYCH 1, or a Statistics course (i.e., PSYCH 10, PSYCH 252, PSYCH 253, and PSYCH 254).

		Units
PSYCH 1	Introduction to Psychology	5
or PSYCH 10	Introduction to Statistical Methods: Precalculus	
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
or PSYCH 253	Statistical Theory, Models, and Methodology	
or PSYCH 254	Lab in Experimental Methods	

Students are discouraged from participating in teaching during the first year of graduate study. Students typically progress from closely supervised teaching to more independent work. Some students may be invited to offer a supervised, but essentially independent, seminar during their final year of graduate study.

Psychology Colloquium

The Psychology Colloquium meets on most Wednesday afternoons at 3:45 p.m. Speakers from Stanford and other institutions present topics of current interest. Graduate students are expected to attend. Additional announcements may be found at the Colloquium Schedule (<http://www.stanford.edu/dept/psychology/colloquium>) web site.

Ph.D. Minor in Psychology

Candidates for the Ph.D. degree in other departments may elect a minor in Psychology. To obtain a minor, the student must complete 20 units of course work at the graduate level in the Department of Psychology, excluding PSYCH 275 Graduate Research. Crosslisted graduate courses can be used to satisfy this requirement. All courses counting toward the Ph.D. minor must be passed with a grade of 'B-' or better, unless the course is offered only on a credit/no credit basis.

Emeriti: (Professors) Albert Bandura, Gordon H. Bower, John H. Flavell, Leonard M. Horowitz, Mark R. Lepper, Roger N. Shepard, Claude Steele, Barbara Tversky, Philip G. Zimbardo

Chair: Ian Gotlib

Professors: Laura L. Carstensen, Herbert H. Clark, Geoffrey Cohen, Carol Dweck, Ian H. Gotlib, James J. Gross, Stephen Kosslyn, John D. Krumboltz, Ellen M. Markman, Hazel R. Markus, James L. McClelland, Dale Miller, Benoit Monin, Russell A. Poldrack, Lee D. Ross, Ewart A. C. Thomas, Anthony D. Wagner, Brian Wandell, Jeffrey J. Wine

Professor (Research): Anthony Norcia

Associate Professors: Jennifer L. Eberhardt, Anne Fernald, Michael C. Frank, Kalanit Grill-Spector, Brian Knutson, Jeanne L. Tsai

Associate Professor (Teaching): Catherine Heaney

Assistant Professors: Alia Crum, Justin Gardner, Noah Goodman, Hyowon Gweon, Samuel M. McClure, Gregory M. Walton, Jamil Zaki

Lecturers: Amie Haas, Beverley Hartman, Jennifer Winters

Courtesy Professors: William C. Dement, Gary H. Glover, Jon Krosnick, Fei-Fei Li, Tanya Luhrmann, Robert MacCoun, William T. Newsome, Robb Willer

Public Policy

Courses offered by the Public Policy Program are listed under the subject code PUBLPOL on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PUBLPOL&filter-catalognumber-PUBLPOL=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PUBLPOL&filter-catalognumber-PUBLPOL=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PUBLPOL&filter-catalognumber-PUBLPOL=on>).

Mission of the Undergraduate Program in Public Policy

The mission of the undergraduate program in Public Policy is to provide students with the concepts and tools used in evaluating policy options and outcomes, and to prepare students for entry-level positions in organizations concerned with such analysis. The focus is chiefly on domestic issues, such as health, education, environmental, regulatory, and science and technology policy, applicable anywhere in the world.

Courses in the major provide students with a background in economics and quantitative methods, political science, law, philosophy, ethics, organizational behavior, and social psychology. Economics and quantitative analyses are central to but not sufficient for modern public policy analysis; political science, law, philosophy, organizational behavior, and psychology are among other necessary disciplinary perspectives. Political philosophy and ethics form the foundations of public policy. Political science offers insights to the decision making process and information needs of a democracy. Organizational behavior focuses on the decisions made outside the market environment in hierarchies, bureaucracies, and teams. Nearly all public policy is formulated as law, and economic analysis of legal rules and institutions is key to effective implementation of policy decisions.

Seniors have a research capstone requirement consisting either of an honors thesis or participation in a team practicum project, conducting applied policy research for an outside client, typically a nonprofit or government agency. Students majoring in Public Policy are prepared for careers in elected or appointed public office; business, law, and governmental agencies; research institutes; or for further study in graduate programs.

The Public Policy program offers a Bachelor of Arts, an honors program, a minor for undergraduates, a coterminal M.A. in Public Policy, a two-year professional Master of Public Policy (M.P.P.) is degree, and a one-year non-professional Master of Arts in Public Policy (M.A.) Admission to the M.P.P. and M.A. programs is restricted to current Stanford undergraduates and graduate students, recent (Class of 2009-current) Stanford alumni, and external applicants seeking a joint degree.

Learning Outcomes (Undergraduate)

The Public Policy Program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the program. Students are expected to:

1. Demonstrate knowledge and understanding of public policy analytical tools.
2. Communicate complex ideas clearly and persuasively in written and oral forms.

3. Evaluate applied theoretical and empirical work in policy-relevant research.
4. Apply skills and knowledge acquired in the curriculum to analyze policy issues and make policy recommendations.
5. Demonstrate mastery of the above outcomes in the senior capstone project.

Mission of the Graduate Program in Public Policy

The mission of the graduate program in Public Policy is to provide students with the advanced skills necessary to assess the performance of alternative approaches to policy making and implementation, evaluate program effectiveness, understand the political constraints faced by policy makers, and appreciate the conflicts in fundamental human values that often animate policy debate. After completing the graduate core curriculum, students apply these skills by focusing their studies in a two-quarter, 10-unit practicum for the M.P.P. degree or a 5-unit master's thesis for the M.A. degree. Each student in the M.P.P. program also completes at least one concentration tailored to the student's primary degree program or the student's interests and skills. Current concentrations include:

- Education Policy
- Health Care Policy
- International and National Security Policy
- Legal and Regulatory Intervention
- Political and Moral Philosophy
- Resources, Environment, and Energy Policy
- Science and Technology Policy
- Self-designed

The graduate program in Public Policy offers two master's degrees:

- Master of Public Policy (M.P.P.), a two-year professional degree program; available to current Stanford students and recent Stanford alumni
- Master of Arts (M.A.), a one-year program, not intended as a professional degree; available to current Stanford students

The following joint degree programs, which permit students to complete requirements for two degrees with a reduced number of total residency units, are also offered:

- Juris Doctor with a Master of Public Policy (J.D./M.P.P.)
- Juris Doctor with an M.A. in Public Policy (J.D./M.A.)
- Doctor of Medicine with a Master of Public Policy (M.D./M.P.P.)
- Doctor of Philosophy in Economics, Education, Management Science and Engineering, Psychology, or Sociology with a Master of Public Policy (Ph.D./M.P.P.)
- Master of Business Administration with a Master of Public Policy (M.B.A./M.P.P.)
- Master of Arts in Education (Policy, Organization, and Leadership subplan) with a Master of Public Policy (M.A./M.P.P.)
- Master of Arts in International Policy Studies with a Master of Public Policy (M.A./M.P.P.)
- Master of Science in Management Science and Engineering with a Master of Public Policy (M.S./M.P.P.)

Requirements for the joint degrees differ from the requirements of completing the two degrees separately. See the "Master's Degrees in Public Policy (<http://www.stanford.edu/dept/registrar/bulletin/69277.htm>)" section for more details.

University requirements for the master's degree are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this Bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in public policy and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The M.P.P. or M.A. degree is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in public policy. Through completion of advanced course work and rigorous skills training, the graduate program prepares students to make original contributions to the knowledge of public policy and to interpret and present the results of such research.

Bachelor of Arts in Public Policy

The Public Policy undergraduate major develops the skills necessary for understanding the political constraints faced by policy makers, assessing the performance of alternative approaches to policy implementation, evaluating the effectiveness of policies, and appreciating the sharp conflicts in fundamental human values that often animate the policy debate.

There are four course elements to the major: preparatory, core, concentration, and senior capstone. Freshman and sophomore years are generally devoted to completing preparatory courses offered in economics, math, and psychology. After completing core courses during the junior year, students apply these skills by focusing their studies in one of several areas of concentration. The areas of concentration address a specific field of public policy, various types of institutions, or a deeper development of the tools of policy analysis. Seniors may complete the senior capstone either by participating in a practicum, a team policy research project for an outside client, and/or by writing an honors thesis.

Completion of the Bachelor of Arts degree in Public Policy requires a minimum of 77 units of course work.

Students must complete the Public Policy core, concentration, and the senior capstone requirement for a letter grade and with an overall grade point average of 2.3 (C+) or higher.

Public Policy students are encouraged to secure a faculty adviser within the first 2 quarters in the major, and must secure a faculty adviser no later than the end of Winter Quarter of the junior year. The director, co-director, student services staff, and peer advisers can assist by suggesting suitable faculty advisers. Advisers must be approved by the program director. The adviser need not be affiliated with the Public Policy program, but does need to be a member of Stanford's Academic Council.

The Public Policy program encourages students to attend the Bing Stanford in Washington Program (<http://bsiw.stanford.edu>) and to participate in appropriate Stanford internship programs, especially those available through the Haas Center for Public Service (<http://haas.stanford.edu>) and Stanford in Government (<http://sig.stanford.edu>). Additionally, students are encouraged to do a Directed Reading (PUBLPOL 198 Directed Readings in Public Policy) with a Public Policy affiliated faculty member.

Preparatory Courses (34 units)

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (must be taken for a letter grade)	5
ECON 51	Economic Analysis II (must be taken for a letter grade)	5

ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5
MATH 51	Linear Algebra and Differential Calculus of Several Variables (must be taken for a letter grade)	5
Select one of the following:		4
MSE 180	Organizations: Theory and Management	
PSYCH 70	Introduction to Social Psychology	
PSYCH 138	Wise Interventions	
PUBLPOL 305B	Public Policy and Social Psychology: Implications and Applications	

A maximum of 10 units of preparatory course work, with the exception of MATH 51 Linear Algebra and Differential Calculus of Several Variables, ECON 50 Economic Analysis I, and ECON 51 Economic Analysis II, may be taken as credit/no credit.

Core Courses (23-25 units)

All core courses must be completed for a letter grade.

		Units
PUBLPOL 101	Politics and Public Policy	5
PUBLPOL 103C	Justice	5
PUBLPOL 104	Economic Policy Analysis	5
PUBLPOL 106	Law and Economics	5
Select one of the following applied econometrics courses:		3-5
ECON 102C	Advanced Topics in Econometrics	
PUBLPOL 157	Political Data Science	
PUBLPOL 303B	Political Methodology II: Causal Inference	
PUBLPOL 303D	Applied Econometrics for Public Policy	
STATS 202	Data Mining and Analysis	

Concentration (15 units)

Majors must complete at least 15 units of course work for a letter grade in an area of concentration. This post-core course work must be approved by the student's faculty adviser and the program director no later than the end of Spring Quarter of the junior year. Any subsequent changes made to a student's concentration must be approved by the student's faculty adviser. Students select their concentration in AXESS as a degree subplan. Subplans are printed on transcripts and diplomas. Areas of concentration include, but are not limited to:

- Advanced Policy Analysis
- Design of Public Institutions
- Development and Growth Policies
- Discrimination, Crime, and Poverty Policy
- Education Policy
- Health Care Policy
- International and National Security Policy
- Law and the Legal System
- Political and Moral Philosophy
- Resources, Environment, and Energy Policy
- Science and Technology Policy
- Urban and Regional Policy

Capstone Research Requirement

Seniors are required to demonstrate competency in applied policy research. This requirement is fulfilled either by participating in a practicum project in which small student teams analyze real world policy problems faced by a government or nonprofit organization and produces a report for use by the client *or* by writing an honors thesis. A seminar for honors students is offered Autumn Quarter (PUBLPOL 200H Senior Honors Seminar, 3 units). The Practicum is offered Autumn, Winter and Spring quarters (PUBLPOL 200A Senior Practicum, 5 units; PUBLPOL 200B Senior Practicum, 5 units; and PUBLPOL 200C Senior Practicum, 5 units). The capstone research requirement must be completed for a letter grade.

Honors Program

The Public Policy Program offers students the opportunity to pursue honors work during the senior year. The honors thesis must address a policy issue and demonstrate mastery of relevant analytical tools. To graduate with honors in Public Policy:

1. A student must submit a completed application (<https://publicpolicy.stanford.edu/academics/undergraduate/honors>) to the Public Policy program office with a brief description of the thesis no later than October 10, 2014. The student must obtain the sponsorship of a faculty member who approves the thesis description and agrees to serve as a thesis adviser. Students intending to write a thesis involving more than one discipline may wish to have two advisers, at least one of whom is affiliated with the Public Policy program. Public Policy staff, executive committee members, lecturers, and affiliated faculty are available to provide assistance in selecting a thesis topic and adviser. At least one of your faculty advisers must be a member of Academic Council.
2. Students are encouraged to complete an applied econometrics course by the end of Spring Quarter of the junior year and are required to take PUBLPOL 200H Senior Honors Seminar during Autumn Quarter.
3. Students must complete the requirements below for the B.A.H. in Public Policy and achieve an overall grade point average (GPA) of 3.5 in these required courses. Courses not taken at Stanford are not included in calculating the GPA.

	Units
Public Policy Core Courses	23-25
Concentration	15
PUBLPOL 200H Senior Honors Seminar	3
PUBLPOL 199 Senior Research	8-15

4. During senior year, honors students must enroll in at least 8 but no more than 15 units of PUBLPOL 199 Senior Research, with the thesis adviser. Students need to contact the program office to have their thesis adviser listed as a 199 instructor. An 'N' (continuing) grade is given by the adviser in quarters prior to Spring, when the thesis is completed and presented. All PUBLPOL 199 Senior Research units must receive a final grade of at least a 'B+.'
5. The honors thesis must be submitted to both the thesis adviser and the Public Policy program office. In order to be considered for University and department awards, the final thesis must be submitted to the program office no later than the second Wednesday in May. All other theses must be submitted by the last Friday in May.

Students who intend to pursue honors work should plan their academic schedules so that most of the core courses are completed before the beginning of the senior year, and all of the core and concentration courses are completed by the end of Winter Quarter of senior year. This scheduling gives students both the time and the necessary course background to complete their honors thesis during Spring Quarter. In addition, prospective honors students are encouraged to attend Bing Honors College and enroll in

PUBLPOL 197 Junior Honors Seminar. This course focuses on developing a research plan and learning the skills necessary to complete an honors thesis.

Graduation with honors requires that the thesis be approved by both the adviser and the program director. The role of the director is to assure that the thesis deals with an issue of public policy and satisfies the standards of excellence of the program. However, the grade for the honors thesis is determined solely by the adviser.

Minors in Public Policy

The Public Policy Program offers a minor that is intended to provide undergraduates in other majors with interdisciplinary training in applied social sciences.

Students who pursue the minor are required to take the courses listed below for a total of 35 units in Public Policy and its supporting disciplinary departments. Because University rules prohibit double-counting courses, the requirements for a minor differ according to the student's major requirements. *Note:* Economics majors are permitted to double-count ECON 1 Principles of Economics, ECON 50 Economic Analysis I, and ECON 51 Economic Analysis II because such courses satisfy only introductory skill requirements for the Economics major.

All courses for the minor must be completed for a letter grade.

Public Policy students are never required to take a course which duplicates material they have already mastered. Students may, by petition, substitute a different course for a requirement whose material would be duplicative. This flexibility does not reduce the unit requirement for the minor.

Students who pursue the minor must complete the Multiple Major/Minor Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) and have it reviewed by all applicable departments/programs at least one month prior to conferring the degree.

Required Course Work

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I	5
ECON 51	Economic Analysis II	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5
PUBLPOL 101	Politics and Public Policy	5
PUBLPOL 104	Economic Policy Analysis	5

Students who have completed one or more of the courses above for a major, choose additional course work from the following list:

ECON 102C	Advanced Topics in Econometrics	5
PUBLPOL 103C	Justice	5
PUBLPOL 106	Law and Economics	5

Coterminal M.A. in Public Policy

The coterminal M.A. in Public Policy is a degree program designed to impart the basic analytical tools of public policy analysis, or to permit Public Policy majors to specialize in an applied field of policy analysis. Most students complete their M.A. in a fifth year at Stanford; occasionally students may be able to complete both their B.A. and coterminal M.A. in the fourth year.

The University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this Bulletin. For University coterminal degree rules and forms, also see the

Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Application and Admission

There are three coterminal degree application deadlines for the 2014-15 academic year: November 13, 2014; February 19, 2015; and April 23, 2015. Seniors wishing to apply to the coterminal program must apply during the November or February application cycles. Applicants may be contacted for an interview. A \$125 fee is charged when adding the M.A. degree program in Axess.

To apply for admission to the Public Policy coterminal M.A. program, students should submit the following materials directly to the Public Policy office by the appropriate deadline:

1. The coterminal application (<http://studentaffairs.stanford.edu/registrar/forms/coterm>)
2. Statement of purpose, 500 words maximum (indicate interest in M.P.P. degree, if applicable)
3. One-page resume
4. GRE Scores; official GRE scores sent to Stanford University and an unofficial copy submitted with the application
5. A preliminary program proposal
6. A current unofficial undergraduate transcript
7. Two confidential letters of recommendation from Stanford faculty members familiar with the student's academic work

University regulations govern both the coterminal M.A. degree application process and the requirements for the degree. Undergraduates with strong academic records may apply for admission upon completion of 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. The University requires that units for a given course may not be counted to meet the requirements of more than one degree; that is, no units may be double-counted. In addition, courses taken more than two quarters prior to the student's first quarter of the coterminal master's program may not be used to meet the 45-unit University minimum requirement for the master's degree. Public Policy students are never required to take a course which duplicates material they have already mastered. Students may, by petition, substitute a different course for a requirement whose material would be duplicative.

The coterminal M.A. is also a gateway to the M.P.P. degree program. Stanford undergraduates may apply for the coterminal M.A. in Public Policy and then, after one quarter in the M.A. program, apply to the M.P.P. program by submitting an unofficial transcript and statement of purpose to the program director. Students accepted to the M.P.P. program must confer their bachelor's degree, submit the Graduate Authorization Petition in Axess, withdraw from the M.A. degree program, and complete the requirements for the 90-unit M.P.P. degree. This does not reduce the total number of units required for the bachelor's or master's degree. Earning the B.A. and M.P.P. typically takes at least five years. Students considering this option should be familiar with the University's coterminal degree policies and procedures and should consult the director and staff of the Public Policy program early in their planning. There is a \$125 fee for submitting the Graduate Authorization Petition to change the M.A. to the M.P.P. degree.

Degree Requirements

All applicants should have completed, or be currently enrolled in, required preparatory course work prior to application. These courses do not count towards the 45 unit M.A. requirement.

		Units
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I	5

ECON 51	Economic Analysis II	5
ECON 52	Economic Analysis III	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5

To graduate with a coterminal M.A. in Public Policy, students must:

1. Follow one of three tracks (A, B, or C) through the program, as described below.
2. Take all courses applied to the coterminal master's degree for a letter grade (with the exception of PUBLPOL 311 Public Policy Colloquium, which is only offered S/NC). For courses with variable units, coterminal students in their graduate career should enroll in the course for 4 units. Courses offered only for C/NC or other non-letter grade system may be applied upon approval of a petition to the program director.
3. Secure a faculty adviser within the first two quarters enrolled in the coterminal M.A. degree program. The director, co-director, and student services staff can assist by suggesting suitable faculty advisers. The adviser need not be affiliated with the Public Policy program, but does need to be a member of Stanford's Academic Council.
4. Achieve a cumulative grade point average (GPA) of 3.0 (B) or better for all courses taken towards the M.A.
5. Coterminal M.A. students who are admitted to the M.P.P. must transfer all applicable M.A. units to the M.P.P. degree.
6. Comply with all relevant University and program deadlines and policies.

Track A

Public Policy majors follow Track A, which consists of at least 45 units of coursework, including:

1. 29 or more units in an area of concentration. The concentration is referred to as a degree subplan. Subplans are printed on the transcript and diploma and are elected via the Declaration or Change to a Field of Study form (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>). Current concentrations include:
 - Education Policy
 - Health Care Policy
 - International and National Security Policy
 - Legal and Regulatory Intervention
 - Political and Moral Philosophy
 - Resources, Environment, and Energy Policy
 - Science and Technology Policy
 - Self-designed (requires detailed statement of study goals, relationship of each proposed course to those goals, and commitment by a supervising faculty member)

Each concentration includes a set of gateway courses and a variety of electives. Gateway courses may vary year to year based on availability. Review the Concentration Elective List (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/publicpolicy/ElectiveLists2014.pdf>) for current gateway courses. Students must present a coherent written study plan to support concentration course choices, designed in consultation with a faculty adviser and approved by the program director. At least one faculty adviser must be a member of the Academic Council.

2. All Public Policy graduate students are required to attend and enroll in three quarters of PUBLPOL 311 Public Policy Colloquium (3 units). Attendance and participation are mandatory.
3. Completion of an applied econometrics course (ECON 102C Advanced Topics in Econometrics, PUBLPOL 157 Political Data Science, PUBLPOL 205 Empirical Methods in Public Policy, PUBLPOL

303B Political Methodology II: Causal Inference, PUBLPOL 303D Applied Econometrics for Public Policy, or STATS 202 Data Mining and Analysis; 4-5 units) if not completed as part of the undergraduate degree.

4. Completion of PUBLPOL 309 Practicum or a faculty-supervised internship or thesis (5-10 units).
5. All 45 units must be taken in upper division (100-level) courses, and at least 25 of those units must be at the graduate level (200-level and above).

Track B

Economics majors typically follow the requirements detailed below in Track C; however, some Economics majors take courses for their major that also satisfy the content requirements of the Public Policy coterminal M.A. The following Economics courses, if taken for the undergraduate degree, can be used to fulfill content requirements, but not unit requirements, for the Public Policy coterminal M.A. In place of these courses, students may take advanced policy skills courses, or an approved (by petition) policy-related elective.

		Units
ECON 150	Economic Policy Analysis (fulfills the PUBLPOL 204 or PUBLPOL 301B requirement)	4-5
ECON 154	Law and Economics (fulfills the PUBLPOL 206 or PUBLPOL 302B requirement)	4-5
ECON 102C	Advanced Topics in Econometrics (fulfills the ECON 102C, PUBLPOL 157, PUBLPOL 303B, or PUBLPOL 303D requirement)	5

Track C

Students who are not pursuing a major in Public Policy or Economics follow Track C, which consists of at least 45 units of course work in the analysis of public policy.

1. The following core courses are required and count toward the required minimum 45 units:

		Units
PUBLPOL 201	Politics and Public Policy	4
or PUBLPOL 308	Political Analysis for Public Policymakers	
PUBLPOL 206	Law and Economics	4
or PUBLPOL 302B	Economic Analysis of Law	
PUBLPOL 301B	Cost-Benefit Analysis and Evaluation	4
or PUBLPOL 204	Economic Policy Analysis	
PUBLPOL 305A	Problem Solving and Decision Making for Public Policy and Social Change	4
PUBLPOL 307	Justice	4
Select one of the following courses:		4
MSE 180	Organizations: Theory and Management	
PSYCH 138	Wise Interventions	
PUBLPOL 305B	Public Policy and Social Psychology: Implications and Applications	
Select one of the following applied econometrics courses:		3-5
ECON 102C	Advanced Topics in Econometrics	
PUBLPOL 157	Political Data Science	
PUBLPOL 205	Empirical Methods in Public Policy	
PUBLPOL 303B	Political Methodology II: Causal Inference	

PUBLPOL Applied Econometrics for Public Policy
303D

STATS 202 Data Mining and Analysis

2. Complete a concentration of at least 15 units, under the guidance of a faculty adviser and the Public Policy program director.
3. All Public Policy graduate students are required to attend and enroll in three quarters of PUBLPOL 311 Public Policy Colloquium. Attendance and participation are mandatory.
4. Students must petition to count additional advanced policy skills courses (if needed) to meet the 45-unit degree requirement. All 45 units must be taken in upper division (100+ level) courses and at least 25 of those units must be taken at the graduate level (200-level and above).

Coterminal M.A. students must meet with their faculty adviser upon acceptance to the program. Advisers must confirm that the courses proposed are likely to be taught during the applicable period, or that appropriate substitute courses are available. Students may refer to the Concentration Electives List (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/publicpolicy/ElectiveLists2014.pdf>), as well as to the Concentrations Page (<https://publicpolicy.stanford.edu/academics/coterminal-degree/requirements/requirements-public-policy-majors>) for Track A coterm students, for a selection of pre-approved elective courses. Public Policy student services staff can verify scheduling of courses. At least one faculty adviser must be a member of the Academic Council.

Financial Aid

The Public Policy Program does not provide financial assistance to coterminal students. For information on student loans and other sources of support, consult the Stanford Financial Aid Office (<http://financialaid.stanford.edu>). Students who enter public service employment with local, state, or federal agencies; schools; or certain not-for-profit organizations may obtain forgiveness for educational loans, based on years of public service employment.

Master's Degrees in Public Policy

The program offers two master's programs in Public Policy. The Master of Public Policy (M.P.P.) is a two-year professional degree, and the Master of Arts in Public Policy (M.A.) is a one-year non-professional degree.

At this time, eligibility for admission to the M.P.P. and M.A. programs is restricted to current Stanford undergraduate and graduate students, recent (Class of 2009-current) Stanford alumni, and external applicants seeking a joint degree. If you do not meet these criteria, you are not eligible for admission to the M.A. or the M.P.P. degree programs.

All Public Policy master's programs, with the exception of the J.D./M.A., require at least one year of study at Stanford beyond the requirements for the other joint or dual degree.

1. Public Policy Joint Degrees. Students enrolled in or applying to certain degree programs in the Schools of Business, Education, Engineering, Humanities and Sciences, Law, and Medicine are eligible to apply for Public Policy joint degrees. For further information, see the "Joint Degree Programs (p. 47)" section of this Bulletin and the University Registrar's site (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>).
 - Juris Doctor and Master of Public Policy (J.D./M.P.P.)
 - Juris Doctor and Master of Arts of Public Policy (J.D./M.A.)
 - Doctor of Medicine and Master of Public Policy (M.D./M.P.P.)
 - Doctor of Philosophy in Education and Master of Public Policy (Ph.D./M.P.P.)

- Doctor of Philosophy in Economics and Master of Public Policy (Ph.D./M.P.P.)
 - Doctor of Philosophy in Management Science & Engineering and Master of Public Policy (Ph.D./M.P.P.)
 - Doctor of Philosophy in Psychology and Master of Public Policy (Ph.D./M.P.P.)
 - Doctor of Philosophy in Sociology and Master of Public Policy (Ph.D./M.P.P.)
 - Doctor of Philosophy in Structural Biology and Master of Public Policy (Ph.D./M.P.P.)
 - Master of Business Administration and Master of Public Policy (M.B.A./M.P.P.)
 - Master of Arts in Education: Policy, Organization, and Leadership subplan and Master of Public Policy (M.A./M.P.P.)
 - Master of Arts in International Policy Studies and Master of Public Policy (M.A./M.P.P.)
 - Master of Science in Management Science & Engineering and Master of Public Policy (M.S./M.P.P.)
2. Dual Degrees. Any other Stanford graduate student (i.e., not covered in '1' above), Stanford senior, or recent alumnus/a is eligible to apply for a Public Policy dual degree. Stanford graduate students may subsequently withdraw from their original degree programs, if desired.
- Master of Public Policy (M.P.P.)
 - Master of Arts in Public Policy (M.A.): Available only to current Stanford graduate students

Prerequisites

Graduate students in Public Policy are expected to be literate in mathematics and microeconomics at a level equivalent to MATH 51 Linear Algebra and Differential Calculus of Several Variables and ECON 50 Economic Analysis I before beginning the curriculum. A no-credit refresher course in mathematics and economics is offered in the two weeks preceding the start of Autumn Quarter.

M.P.P. and M.A. Degree Requirements

1. All graduate degree candidates must submit a Program Proposal for a Master's Degree (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/progpropma.pdf>) to the Public Policy office by the end of Autumn Quarter and must amend this proposal formally if plans for meeting the degree requirements change.
2. Public Policy students are never required to take a course which duplicates material they have already mastered. Students may petition a different course for a core requirement whose material would be duplicative. This flexibility does not reduce the unit requirements for any degree.
3. All Public Policy graduate students must secure a faculty adviser within the first two quarters they are enrolled in the M.A. or M.P.P. degree program. The director, co-director, and student services staff can assist by suggesting suitable faculty advisers. The adviser need not be affiliated with the Public Policy Program, but does need to be a member of Stanford's Academic Council.
4. M.P.P. degree students are not permitted to enroll in PUBLPOL 309 Practicum, without having completed the following core courses: PUBLPOL 301A Microeconomics, PUBLPOL 301B Cost-Benefit Analysis and Evaluation, ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, PUBLPOL 303D Applied Econometrics for Public Policy, and PUBLPOL 306 Writing and Rhetoric for Policy Audiences.

Curriculum Requirements

		Units
PUBLPOL 301A	Microeconomics	4
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
PUBLPOL 301B	Cost-Benefit Analysis and Evaluation	4
PUBLPOL 206	Law and Economics	4
PUBLPOL 303D	Applied Econometrics for Public Policy	4
PUBLPOL 305A	Problem Solving and Decision Making for Public Policy and Social Change	4
PUBLPOL 306	Writing and Rhetoric for Policy Audiences	4
PUBLPOL 307	Justice	4
PUBLPOL 308	Political Analysis for Public Policymakers	4

All core courses listed above must be taken for a letter grade and must be completed with an overall grade point average (GPA) of 3.0 or better.

1. Core Curriculum (shown above)
2. At least two electives are taken during the first year. At least one must be from the Concentration Electives List (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/publicpolicy/ElectiveLists2014.pdf>).
3. Colloquium: All Public Policy graduate students are required to attend and enroll in three quarters of PUBLPOL 311 Public Policy Colloquium (3 units) during their first year of the program. Attendance and participation are mandatory.
4. Practicum (M.P.P. and Track A Coterminial M.A. students): Completion of the two quarter practicum course, PUBLPOL 309 Practicum (10 units, Autumn and Winter quarters), in which interdisciplinary student teams analyze real-world policy issues for outside clients.
5. Master's Thesis (non-coterminial M.A. students): Completion of a 5-unit master's thesis, written under the guidance of a Public Policy-affiliated faculty adviser who is a member of Academic Council on a topic approved in advance by the program director. Students give the program office the name of their thesis adviser during Autumn Quarter and enroll in PUBLPOL 310 Master of Arts Thesis units during quarter(s) of their choosing. The 5 units may be spread over multiple quarters, and an 'N' (continuing course) grade is given during any quarters prior to degree conferral. The thesis must be submitted to the Public Policy program office in both electronic and printed form no later than the last Friday in May. The final grade for PUBLPOL 310 is determined solely by the faculty adviser.
6. Concentration (M.P.P. students only): Advanced course work in a specialized field, chosen from the approved list of concentration courses with the prior approval of the student's faculty adviser and the program director. The Registrar will list your concentration as a "Degree Subplan." Subplans are printed on the transcript and diploma and are elected by the student via the Declaration or Change to a Field of Study form (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>).

Current concentrations include:

- Education Policy
- Health Care Policy
- International and National Security Policy
- Legal and Regulatory Intervention
- Political and Moral Philosophy
- Resources, Environment, and Energy Policy
- Science and Technology Policy

- Self-designed (requires detailed statement of study goals, relationship of each proposed course to those goals, and commitment by a supervising faculty member)

Public Policy Joint Degree Requirements

1. A joint degree (p. 47) is regarded by the University as distinct from either of its component degrees, and requirements for the joint degree differ from the sum of the requirements for the individual degrees.
2. Up to a maximum of 45 units, or one year, of the University residency requirement can be credited toward both graduate degree programs (i.e., the joint degree requirements may contain up to 45 units less than the sum of the individual degree unit requirements). For example, a J.D./M.P.P. has a four-year residency requirement, one year less than the sum of the requirements for the separate degrees. This recognizes that there is a subject matter overlap between the fields comprising the joint degree.
3. The Public Policy Program strives to encourage an intellectual, professional, and social community among its students. For this reason, joint degree students are strongly encouraged to devote one year of full-time study at Stanford entirely to the Public Policy Program, rather than spacing Public Policy courses throughout their graduate careers. For joint degree Ph.D. students, the core requirements of the M.P.P. should be completed over two contiguous years of study, during which students may also be enrolled in courses from their Ph.D. program. Exceptions to this structure must be approved in advance by petition.
4. Joint degree students are expected to have and to consult regularly with an academic adviser. The adviser is generally a member of the faculty of both degree programs and must be a member of Academic Council. The program director and staff are available to make adviser recommendations.
5. In order to take advantage of the reduced residency requirement, joint M.P.P. students must define their area of concentration from among courses offered in their non-Public Policy program. Students wishing to concentrate in another field should apply for a dual, rather than a joint, M.P.P. degree.

Application and Admissions

Applications for graduate study in Public Policy are only accepted from

1. students currently enrolled in any Stanford graduate or undergraduate degree program
2. from external applicants seeking a joint degree, or
3. from recent Stanford alumni (2009-current).

External applicants for joint degrees must apply to the department or school offering the other graduate degree (i.e. Ph.D., M.D., M.A., M.S., M.B.A., or J.D.), indicating an interest in the joint degree program; applicants admitted to the other degree program are then evaluated for admission to the M.P.P. or M.A. program.

To be considered for matriculation beginning in the Autumn Quarter 2015-16, all application materials must be submitted no later than April 15, 2015. The early deadline for applications is Friday, January 30, 2015 with a final deadline on Wednesday, April 15, 2015. Early submission of M.P.P. applications is encouraged. Student funding is very limited. Admission notifications will be sent to applicants by May 1, 2015. Admitted students are required to respond to offers of admission by May 15, 2015.

Stanford Alumni and Current Stanford Seniors

Visit the Stanford Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>). The online application for the

M.P.P. is available beginning Saturday, November 1, 2014. The application fee is \$125. The department is unable to refund an application fee, so prospective applicants are advised to refer to eligibility requirements before submitting an application.

Only complete applications submitted by the deadline are reviewed. A complete application includes the following:

1. Application (<http://studentaffairs.stanford.edu/gradadmissions>).
2. Official transcripts. Copies of student transcripts must bear the official seal of the institution and the signature of the registrar. Upload transcripts to the online application.
3. GRE scores.
4. Letters of recommendation: Three confidential letters of recommendation from a Stanford faculty member or an employer should be submitted electronically via the online application. See the Stanford Office of Graduate Admissions web site regarding letters of recommendation (<http://studentaffairs.stanford.edu/gradadmissions/applying/recommendations>). At least two letters must be from Stanford faculty members.
5. Statement of purpose (not to exceed two pages; upload to the online application).
6. Academic writing sample (upload to the online application): This can be on any topic and may be either something previously written or something written specifically for the application. It should be 6-10 pages (double-spaced) and should showcase academic writing ability.
7. Resume or curriculum vitae (upload to the online application).

Stanford Current Graduate Students

1. Application for Current Stanford Graduate Students (<https://publicpolicy.stanford.edu/academics/graduate/admissions/current-graduate-students>).
2. Two confidential letters of recommendation, one of which must be from a Stanford faculty member familiar with applicant's academic work.
3. Undergraduate and graduate transcripts.
4. GRE, GMAT, LSAT or MCAT test scores.
5. Statement of purpose, not to exceed two pages.
6. Resume or curriculum vitae.
7. Preliminary program proposal.
8. Prerequisite completion statement, demonstrating completion of required prerequisite course work in multivariate calculus and intermediate microeconomics.

Applicants may be interviewed. If admitted, students will submit a Graduate Authorization Petition (<http://studentaffairs.stanford.edu/registrar/students/grad-auth-pet>) through Axess. A \$125 fee is charged when adding the M.A. or M.P.P. degree program in Axess.

Director: Gregory L. Rosston (Stanford Institute for Economic Policy Research)

Director of Undergraduate Capstone Program and Senior Lecturer: Mary Sprague (Public Policy)

Director of Graduate Practicum Program and Professor of the Practice of Public Policy: Joe Nation (Public Policy)

Director of Domestic Policy Studies and Lecturer: Lanhee J. Chen (Public Policy and Hoover Institution)

Director of Honors Program and Lecturer: Marcelo Clerici-Arias (Economics and Public Policy)

Executive Committee: Laurence Baker (Medicine), Jonathan Bendor (Graduate School of Business), David Brady (Political Science, Hoover

Institution, Graduate School of Business, SIEPR), Paul Brest (Law), Bruce Cain (Lane Center for the American West), Samuel Chiu (Management Science and Engineering), Joshua Cohen (Political Science, Philosophy, Law), Thomas Dee (Education), David Kennedy (History, emeritus), David Grusky (Sociology), Eric Hanushek (Hoover Institution, SIEPR), Deborah Hensler (Law), Jonathan Levin (Economics), Roger Noll (Economics, emeritus, SIEPR), Bruce Owen (SIEPR), Madhav Rajan (Graduate School of Business), Gregory Rosston (SIEPR), Debra Satz (Philosophy), John Shoven (SIEPR, Economics)

Affiliated Faculty: William Abrams (Human Biology), Donald Barr (Medicine), Jonathan Bendor (Graduate School of Business), Eric Bettinger (Education), Jayanta Bhattacharya (Medicine), Coit Blacker (Freeman Spogli Institute for International Studies), Lisa Blaydes (Political Science), Adam Bonica (Political Science), Michael J. Boskin (Economics, Hoover Institution), Paul Brest (Law), Jeremy Bulow (Graduate School of Business), M. Kate Bundorf (Medicine), Bruce Cain (Political Science, Bill Lane Center for the American West), Eamonn Callan (Education), Martin Carnoy (Education), John Cogan (Hoover Institution), Joshua Cohen (Political Science, Philosophy, Law), Gary Cox (Political Science), Robert Crews (History), Larry Diamond (Freeman Spogli Institute for International Studies, Hoover Institution), Walter Falcon (Freeman Spogli Institute for International Studies, emeritus), Lawrence Friedman (Law), Francis Fukuyama (Freeman Spogli Institute for International Studies), Lawrence Goulder (Economics, Freeman Spogli Institute for International Studies), Justin Grimmer (Political Science), Stephen Haber (Political Science, Hoover Institution), Deborah Hensler (Law), Pamela Hinds (Management Science and Engineering), Daniel Ho (Law), Nicholas Hope (Stanford Center for International Development), Caroline Hoxby (Economics, Hoover Institution, SIEPR), Jakub Kastl (Economics), Daniel Kessler (Law, Hoover Institution, Graduate School of Business), Pete Klenow (Economics), Stephen Krasner (Political Science, Freeman Spogli Institute for International Studies, Hoover Institution), Jon A. Krosnick (Communication, Political Science), Mark Lemley (Law), Susanna Loeb (Education), Thomas MaCurdy (Economics, Hoover Institution), David Magnus (Medicine), Robert McGinn (Management Science and Engineering; Science, Technology and Society), Milbrey McLaughlin (Education), Terry Moe (Political Science, Hoover Institution), Petra Moser (Economics), Joan Petersilia (Law), James Phillips (Graduate School of Business), A. Mitchell Polinsky (Law), Walter Powell (Education), Robert Reich (Political Science), Eunice Rodriguez (Medicine), Andrew Rutten (Political Science), Baba Shiv (Graduate School of Business), Ken Shotts (Graduate School of Business), Stephan Seiler (Graduate School of Business), Stephan Stedman (Freeman Spogli Institute for International Studies), Jeff Strnad (Law), Barton Thompson (Law, Woods Institute, Freeman Spogli Institute for International Studies), Michael Tomz (Political Science, SIEPR), Milana Trounce (Medicine), Michael Wald (Law), Greg Walton (Psychology), Jonathan Wand (Political Science), Barry Weingast (Political Science, Hoover Institution), John Weyant (Management Science and Engineering), Robert M. White (Materials Science and Engineering), Frank Wolak (Economics, Freeman Spogli Institute for International Studies), Cristobal Young (Sociology)

Lecturers: Newsha Ajami (Woods Institute), Tanya Beder (Law), Frank Benest (Public Policy), David Crane (Public Policy), Tammy Frisby (Hoover Institution, Political Science), Dennis Gale (Urban Studies), Jonathan D. Greenberg (Law), Russell Hancock (Public Policy), Adrienne Jamieson (Bing Stanford in Washington), Michael Kieschnick (Urban Studies), Anjini Kochar (SIEPR), Susan Liautaud (Public Policy), Eva Meyersson Milgrom (SIEPR, Sociology), Alyssa O'Brien (Program in Writing and Rhetoric), Mark Tendall (Economics)

Overseas Studies Courses in Public Policy

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students

should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBEIJ 11	Computers, Ethics, and Public Policy	4
OSPBEIJ 24	China's Economic Development	5
OSPBER 40	Global Trends: Anticipating the Future in Order to Shape It	4-5
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 56	HIV Policy Issues and Models	3
OSPFLO 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPFLO 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era	4
OSPISTAN 65	Comparative Political Economy of Emerging Powers	4
OSPKYOTO 45	Japan's Energy-Environment Conundrum	4-5
OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time	5
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5

Religious Studies

Courses offered by the Department of Religious Studies are listed under the subject code RELIGST on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RELIGST&filter-catalognumber-RELIGST=on>).

Mission of the Department

The Department of Religious Studies brings a variety of disciplinary perspectives to bear on the phenomenon of religion for the purpose of understanding and interpreting the history, literature, thought, social structures, and practices of the religious traditions of the world. Comprised of a dozen regular faculty with particular strengths in the study of Buddhism, Christianity, Islam, and Judaism, it enrolls about thirty graduate students (mostly doctoral) and roughly as many undergraduate majors, minors, and joint majors.

Religious Studies works closely with several related programs at Stanford: the Department of Philosophy, with which it offers a combined undergraduate major; the Ho Center for Buddhist Studies; the Taube Center for Jewish Studies; the Abbasi Program in Islamic Studies; the McCoy Center for Ethics in Society; and the Center for Medieval and Early Modern Studies.

While some undergraduates continue their study of religion in a graduate or professional program, most pursue meaningful and successful careers in business, government, the nonprofit sector, and medicine. In this respect, Religious Studies is an ideal interdisciplinary major in the liberal arts. Graduates of the department's doctoral program generally pursue academic

careers and are routinely placed in the best universities and colleges in the country and overseas.

Undergraduate Programs in Religious Studies

The department offers a Bachelor of Arts major, minor, and honors program in Religious Studies, and a combined major with the Philosophy Department in Philosophy and Religious Studies. Undergraduate courses in Religious Studies are designed to engage students existentially and to assist them in thinking about intellectual, ethical, and sociopolitical issues in the world's religions. The department's faculty seek to provide tools for understanding the complex encounters among religious ideas, practices, and communities, and the past and present cultures that have shaped and been shaped by religion. Courses therefore expose students to: leading concepts in the field of religious studies such as god(s), sacrifice, ritual, scripture, prophecy, and priesthood; approaches developed over the past century, including the anthropological, historical, psychological, philosophical, and phenomenological, that open religion to closer inspection and analysis; and major questions, themes, developments, features, and figures in the world's religious traditions. The department encourages and supports the acquisition of languages needed for engagement with sacred texts and interpretive traditions as well as study abroad at Stanford's overseas centers where religions can be observed and experienced in their contemporary contexts.

Major in Philosophy and Religious Studies

The departments of Philosophy and Religious Studies jointly nominate for the B.A. in Philosophy and Religious Studies those students who have completed a major in the two disciplines. See a description of this combined major under the "Bachelor's" tab of the "Religious Studies" section of this bulletin (p. 602), in the "Philosophy" section of this bulletin (p. 568), or in the guidelines available from the undergraduate director of either department.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. demonstrate familiarity with a variety of methods used analytically in the field of Religious Studies.
2. demonstrate proficiency in writing papers in the style of academic writing in the field of Religious Studies.
3. demonstrate the ability to engage peer scholars' research in constructive and critical ways, and communicate feedback effectively.
4. demonstrate individual expertise through oral presentation of one's advanced research to peers.
5. complete an advanced research project consistent with standards for papers in the field of Religious Studies.

Graduate Programs in Religious Studies

The graduate mission of the department is to provide students with an interdisciplinary setting of study within which to focus on their respective areas of specialization. The department offers an internal M.A. and a Ph.D. degree in Religious Studies. The master's program is restricted to current Stanford students.

Learning Outcomes (Graduate)

Master's Program: The purpose of the Master's program is to develop knowledge and skills in Religious Studies. For some students this will serve as preparation for applications to Ph.D. programs. For others it will serve as a further capstone experience for their undergraduate program of study. The goals are achieved through the completion of courses, in the primary field as well as related areas, and experience with independent work and specialization. For some it will involve an optional Master's thesis.

Doctoral Program: The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Religious Studies. Through completion of advanced coursework and rigorous skills training, the doctoral program prepares students to make original contributions to the field of Religious Studies and to interpret and present the results of such research through teaching and publication.

Bachelor of Arts in Religious Studies

Suggested Preparation for the Major

There is no prescribed route or prerequisite to the major or minor in Religious Studies or the combined major in Philosophy and Religious Studies. Students typically find themselves selecting one of these paths after taking elective courses in the department and becoming acquainted with the faculty.

Students contemplating the major, the minor, or the Philosophy and Religious Studies major are invited to consult with the Director of Undergraduate Studies. The undergraduate student services associate in Building 70 can also field questions regarding the declaration procedure within the department.

Degree Requirements

The curriculum for majors is designed to move students sequentially from foundational courses, through deeper investigations, culminating in integrative research courses. Thus, the introductory sequence is designed to lead to courses which build on this foundation with topics including: particular traditions such as Judaism or Buddhism; comparative studies such as nonviolence in Hinduism and Buddhism, or Muslim and Christian interpretations of scripture; specific topics such as mysticism, gender and religion, or theodicy; and distinctive approaches such as the philosophy of religion or ritual studies. Majors complete their careers with integrative courses that afford opportunity for research and consolidation of the knowledge and skills gained earlier.

Required Courses

A Bachelor of Arts in Religious Studies requires 60 units of course work, distributed as follows:

1. Two courses (at least 3 units each) from courses numbered 1-49, including approved Thinking Matters or Introductory Seminars. Successful completion of SLE may count as one of these two courses. IHUM courses with Religious Studies content taught prior to 2012-13 also fulfill this requirement.
2. Two courses (at least 3 units each) from courses numbered 50-99.
3. Three integrative courses (at least five units each) as follows:

Majors' Seminar (5)

Units

RELIGST 290	Majors Seminar (Winter Quarter of junior year; fulfills WIM requirement; letter grade only)	5
Senior Essay or Honors Thesis Research (5)		
RELIGST 297	Senior Essay/Honors Essay Research (minimum 5 units; up to 10 units over two quarters; graded 'N' until completion of essay or thesis)	3-5
Senior Majors' Colloquium (5)		
RELIGST 298	Senior Colloquium (Spring Quarter; grading option S/NC)	5

4. At least 24 of the remaining units should be in courses numbered 100-289. At least two of these courses should be 200-level seminar courses.

Additional Regulations

- Variations to the required distribution of courses under 1 and 2 above may be approved by the Director of Undergraduate Studies on an individual basis.
- All units must be in Religious Studies courses unless an exception is made by the Director of Undergraduate Studies.
- With the approval of the Director of Undergraduate Studies, up to two language courses relating to the student's program of study (such as Arabic, Biblical Hebrew, New Testament Greek, Chinese, Persian, or Japanese), but not counted towards the University language requirement, may be counted toward the major.
- No more than ten units of the total 60 (excluding RELIGST 298) may be taken for the grade of 'S/NC' or 'CR/NC.'
- Students may not take all courses in one religious tradition.

Senior Essay

A 25-30 page essay on a topic chosen by the student and approved by the adviser upon receipt of a student's proposal by the end of the third quarter prior to expected graduation. The character and content of the essay, which is meant to allow the student to call into play knowledge and skills learned in the course of the major, may take several forms. For example, a student may return to a subject studied earlier but now pursued in more depth or from a new perspective, research a recent or new topic of interest in the field, or offer a carefully framed critical assessment of what has been learned in the major based on review of influential sources, theories, and methods of studying religion. The senior essay is read and graded by the student's adviser and one other member of the Religious Studies faculty.

Honors Thesis

A 40-80 page research paper on a topic chosen by the student and approved by the adviser upon receipt of a proposal in the fourth quarter prior to expected graduation. The paper, supported by mastery of primary and secondary scholarship, advances a well-reasoned, supportable thesis. Writers of honors theses must have a grade point average (GPA) of 3.5 in Religious Studies courses, and at least 3.2 overall, and are expected to have already demonstrated success in writing research papers. The honors thesis is read and graded by the student's adviser and one other member of the Religious Studies faculty. Theses earning a grade of 'B+' or above receive honors.

Philosophy and Religious Studies Combined Major

The undergraduate major in Philosophy and Religious Studies consists of 60 units of course work with approximately one third each in the philosophy core, the religious studies core, and either the general major or the special concentration. Affiliated courses cannot be used to satisfy this requirement.

No courses in either the philosophy or religious studies core may be taken satisfactory/no credit or credit/no credit.

In general, transfer units cannot be used to satisfy the core requirements. Transfer units and substitutions must be approved by the director of undergraduate studies in the appropriate department.

Please see a detailed description of the major in the "Philosophy" section of this Bulletin (p.).

Core Requirements

- Philosophy (PHIL) courses:
 - Required course: PHIL 80 (p. 601) Mind, Matter, and Meaning
 - 16 units, including at least one Philosophy course from each of the following areas:
 - logic and philosophy of science
 - ethics and value theory
 - epistemology, metaphysics, and philosophy of language
 - history of philosophy
- Religious Studies (RELIGST) courses: 20 units, chosen in consultation with the student's adviser, including:
 - Required Course: RELIGST 290 Majors Seminar (5 units; Winter Quarter; recommended junior year; fulfills WIM requirement).
 - At least one course in philosophy of religion, broadly construed, to be approved by the Director of Undergraduate Studies for Religious Studies.
 - Diversity requirement: Students may not take all their religion courses in one religious tradition.

General Major Requirements

Five additional courses (approximately 20 units) divided between the two departments. No more than five of these units may come from courses numbered under 99 in either department. Each student must also take at least one undergraduate seminar in religious studies and one undergraduate seminar in philosophy.

Special Concentration

With the aid of an adviser, students pursue a specialized form of inquiry in which the combined departments have strength; for example, American philosophy and religious thought, philosophical and religious theories of human nature and action, philosophy of religion. Courses for this concentration must be approved in writing by the adviser.

Directed Reading and Satisfactory/No Credit Units

Units of directed reading for fulfilling requirements of the major are allowed only with special permission. No more than 10 units of work with a grade of 'satisfactory' count toward the Philosophy and Religious Studies major.

Honors Program

Students pursuing a major in Philosophy and Religious Studies may also apply for honors by following the procedure for honors in either of the departments.

Minor in Religious Studies

A Religious Studies minor is a complement to many majors throughout the University. Students contemplating the minor are invited to consult with the Director of Undergraduate Studies. The undergraduate student services

associate in Bldg. 70 can also field questions regarding the declaration procedure within the department.

Degree Requirements

A minor in Religious Studies requires a minimum of 30 units. Students are encouraged to focus their program of study either on a religious tradition or on a theme that cuts across traditions. In consultation with their advisers, students may design the minor in Religious Studies to complement their major. The minor must be declared no later than the last day of the quarter, two quarters before degree conferral.

Required Courses for the Minor

1. One course (at least 3 units) from courses numbered 1-49, including approved Thinking Matters or Introductory Seminars. IHUM courses with Religious Studies content taught prior to 2012-13 also fulfill this requirement.
2. One course (at least 3 units) from courses numbered 50-99.
3. At least 14 of the remaining units should be at the intermediate and advanced level (above 100), including at least one 200-level seminar course.

Additional Regulations

1. All units must be in Religious Studies courses unless an exception is made by the Director of Undergraduate Studies.
2. With the approval of the Director of Undergraduate Studies, one language course relating to the student's program of study (such as Arabic, Biblical Hebrew, New Testament Greek, Chinese, Persian, or Japanese), but not counted towards the University language requirement, may be counted toward the minor.
3. No course may be taken on a 'S/NC' or 'CR/NC' basis.
4. Students may not take all courses in one religious tradition.
5. One course in directed reading (RELIGST 199 Individual Work) may be counted towards the minor.

Master of Arts in Religious Studies

University requirements for the M.A. are described in the "Graduate Degrees (p. 43)" section of this bulletin. The department offers a one-year terminal M.A. program. Students can also earn their M.A. degree as part of their coterminal degree program.

The M.A. program serves two groups of students:

1. those who wish to prepare for a doctoral program in Religious Studies
2. those who wish to further deepen their knowledge in an area in which they have acquired some expertise during their undergraduate work.

At this time, eligibility for admission to the master's program is restricted to current Stanford undergraduates and graduate students.

Degree Requirements

The following requirements are in addition to the University's basic requirements (p. 43).

The student completes at least 45 units of graduate work at Stanford beyond the B.A. degree, including RELIGST 300 Theory in the Study of Religion.

Residence may be completed by three quarters of full-time work or the equivalent.

The student's plan of courses is subject to approval by the Graduate Director. No field of specialization is expected, but students may focus work in particular areas. Advanced and graduate courses in other

departments may be taken in consultation with the adviser. No thesis is required; a thesis, if elected, may count for as many as 9 units.

Each student demonstrates reading knowledge of at least one foreign language.

Application and Admissions

At this time, eligibility for admission to the master's program is restricted to current Stanford undergraduates and graduate students.

Current Stanford Undergraduates

Religious Studies accepts coterm applications in Winter Quarter (due end of the second week of classes) for admission starting Spring Quarter. Only complete applications submitted by the deadline are reviewed. A complete application includes the following:

- Complete Coterm Application
- Two confidential letters of recommendation, one of which must be from a Stanford faculty member familiar with applicant's academic work
- Undergraduate transcript(s)
- Preliminary program proposal

Current Stanford Graduate Students

1. Application for Current Stanford Graduate Students
2. Two confidential letters of recommendation, one of which must be from a Stanford faculty member familiar with applicant's academic work
3. Undergraduate and graduate transcripts
4. Statement of purpose, not to exceed two pages
5. Preliminary program proposal

If admitted, students submit a Graduate Authorization Petition through Axess. A fee is charged when adding the M.A. degree program in Axess.

Financial Aid

The Religious Studies department does not provide financial assistance to coterminal or master's students. For information on student loans and other sources of support, consult the Financial Aid Office (<http://financialaid.stanford.edu>).

Doctor of Philosophy in Religious Studies

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin. The Ph.D. in Religious Studies signifies special knowledge of an interdisciplinary field of study and potential mastery of an area of specialization within it. The faculty of the department have established certain fields of study in which the department's strengths and those of other Stanford departments cohere. They are: Buddhist studies, Islamic studies, Jewish studies, and modern religious thought, ethics, and philosophy. Students who wish to specialize in other fields must obtain early approval by the faculty. Each of these areas of specialization follows a shared structure of study.

Degree Requirements

The following requirements are in addition to the University's basic requirements.

1. Residence

Each student completes three years (nine quarters) of full-time study, or the equivalent, in graduate work beyond the B.A. degree, and

a minimum of 135 units of graduate course work (excluding the dissertation).

2. Required Courses

The 135 units of graduate course work must include the following:

		Units
a.		
RELIGST 304A	Theories and Methods	4
RELIGST 304B	Theories and Methods	4
RELIGST 391	Teaching Religious Studies	3
RELIGST 399	Recent Works in Religious Studies	1-2

- Two courses in an area outside the student's field.
- The remainder of the course work is individually designed, in consultation with the adviser.

3. Languages

Each student demonstrates a reading knowledge of two foreign languages, including French or German. One of those language requirements should be fulfilled by the time of advancing to candidacy at the end of the second year. Competence in the second language must be demonstrated at the time of the qualifying examination. Each student also demonstrates reading knowledge of other ancient or modern languages necessary for the field of study, area of specialization, and dissertation topic.

4. Candidacy

At the end of each academic year, the department's faculty recommend second-year students for candidacy on the basis of all relevant information, and especially on the student's candidacy dossier that includes the approved declaration of an area of specialization, certification for one foreign language, and two substantial papers written for courses during the previous two years. Students are required to take RELIGST 304A Theories and Methods, RELIGST 304B Theories and Methods, RELIGST 391 Teaching Religious Studies, and RELIGST 399 Recent Works in Religious Studies prior to candidacy.

5. Paper-in-Field

During the third year, under the supervision of their advisers, students prepare a paper suitable for submission to an academic journal in their field. The paper is read and approved by at least two faculty members in the department. Students are encouraged to register for RELIGST 392 Paper in the Field while working on the paper.

6. Teaching Internship

At least one teaching internship under the supervision of faculty members is undertaken at a time negotiated with the Graduate Director. Students receive academic credit for the required internship, which is a part of academic training and not of employment.

7. Qualifying Examination

To qualify for writing a dissertation, the student must pass a comprehensive examination in the chosen field and the area of specialization, typically during the first quarter of their fourth year. The student must complete the second language requirement before taking the qualifying examination. The qualifying examination is normally conducted by a committee of at least three Academic Council members of the department, one of whom is the adviser. One faculty member may be from outside the department with permission of the Director of Graduate Studies.

8. Dissertation

The dissertation contributes to the humanistic study of religion and is written under the direction of the candidate's dissertation adviser and at

least two other members of the Academic Council. The University Oral examination is a defense of a completed draft of the dissertation.

- Dissertation Committee*—The dissertation committee is formed after successful completion of the qualifying examinations. It is normally composed of the dissertation adviser and at least two Academic Council members of the Religious Studies department. One non-departmental faculty member may serve as a reader when approved by the Director of Graduate Studies.
- Dissertation Proposal*—Candidates submit their dissertation proposal in consultation with their advisers. It is read and approved by the three members of the dissertation committee.

9. University Oral Examination

This examination, required by the University of Ph.D. students, is a defense of a completed draft of the dissertation. The composition of the examination committee is set by University regulation: five or more faculty, normally all of whom are members of the Academic Council, one of whom must be outside the department to serve as chair of the committee. Normally, the examining committee includes all members of the dissertation committee. A majority of those voting must be Academic Council faculty from within the department.

Ph.D. Minor in Religious Studies

Candidates for the Ph.D. in other departments may select a Ph.D. minor in Religious Studies.

Degree Requirements

The minor requires at least 24 units in Religious Studies at the 200 level or above. Four of the 24 units should be in:

	Units
RELIGST 304A Theories and Methods	4
RELIGST 304B Theories and Methods	4

Optional Courses for the Minor

The student should choose any of the courses offered in the department at the 200 level or above, for the equivalent of at least 24 units. Other courses can be chosen in consultation with the Graduate Director.

Faculty

Emeriti: (Professors) Carl W. Bielefeldt, Arnold Eisen, Bernard Faure, Edwin M. Good, Robert C. Gregg, Van Harvey, David S. Nivison, René Girard (Courtesy Professor)

Chair: Paul Harrison

Director of Graduate Study: John Kieschnick

Director of Undergraduate Study: Brent Sockness

Professors: Shahzad Bashir, Hester G. Gelber, Paul Harrison, John Kieschnick, Thomas Sheehan, Lee Yearley

Associate Professors: Charlotte Fonrobert, Brent Sockness

Assistant Professors: Kathryn Gin Lum, Behnam Sadeghi

Senior Lecturers: Linda Hess, Barbara Pitkin

Lecturers: Kirsti Copeland, Audrey Truschke, Yuhan S.-D. Vevaina

Courtesy Professor: Mark Lewis

Courtesy Associate Professor: Ari Y. Kelman

Consulting Professor: Peter Gregory

Affiliated Faculty: Vincent Barletta (Iberian and Latin American Cultures), Jean-Pierre Dupuy (French and Italian)

Cognate Courses

The following courses in other departments/programs have been approved by the Chair as fulfilling requirement 2 (p.) for the bachelor's degree.

		Units
POLISCI 149S	Islam, Iran, and the West	5
HISTORY 293E	Female Divinities in China	4-5
EDUC 231X	Knowing God: Learning Religion in Popular Culture	4
PHIL 113L	Latin 500-1600 CE	5

Overseas Studies Courses in Religious Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPKYOTO 13	Contemporary Japanese Religion	4-5
OSPKYOTO 17R	Religion and Japanese Culture	4-5
OSPOXFRD 76		4
OSPMADR 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPOXFRD 83		4

Russian, East European and Eurasian Studies

Courses offered by the Center for Russian, East European and Eurasian Studies are listed under the subject code REES on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=REES&filter-catalognumber-REES=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=REES&filter-catalognumber-REES=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=REES&filter-catalognumber-REES=on>).

The Center for Russian, East European and Eurasian Studies (CREEES) coordinates the University's teaching, research, and extracurricular activities related to Russia, Eastern Europe, Central Asia, and the Caucasus and administers a one-year interdisciplinary M.A. graduate degree program. Information on the center's degree programs and other activities is available at the CREEES (<http://CREEES.stanford.edu>) web site. CREEES and its degree programs are directed by the CREEES Steering Committee, composed of faculty members associated with the Center. The program

draws on the strengths of nationally recognized area faculty and research affiliates and significant library and archival collections at Stanford. The Center is a U.S. Department of Education Title VI National Resource Center for Russia, East Europe, and Eurasia.

Undergraduate Programs in Russian, East European and Eurasian Studies

Students interested in a minor should consult the Director of Undergraduate Studies in the Department of Slavic Languages and Literatures which offers the following relevant minors:

- Russian, East European and Eurasian Studies
- Russian Language
- Russian Language, Literature and Culture
- Russian Culture

Slavic Theme House

Slavianskii Dom (SlavDom), at 650 Mayfield Avenue, is an undergraduate residence which houses 50 students and offers a wide variety of opportunities to expand knowledge, understanding and appreciation of Russia and the nations of East Europe, the Caucasus and Central Asia.

Overseas Studies Programs

Undergraduates interested in the study of languages, history, culture and social organization of the countries of Russia, Eurasia and East Europe may apply to study at the Stanford centers in Istanbul and Berlin. Information about these programs is available at the Bing Overseas Studies Program (<http://bosp.stanford.edu>) at web site.

Graduate Programs in Russian, East European and Eurasian Studies

The center offers an M.A. in Russian, East European and Eurasian Studies, a coterminal M.A. in Russian, East European and Eurasian Studies, and a joint M.A./J.D. in conjunction with the Stanford Law School.

Learning Outcomes (Graduate)

The purpose of the master's program and the joint M.A./J.D. program is to further develop knowledge and skills in Russian, East European and Eurasian Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

Financial Aid

Subject to funding, CREEES may have a limited number of Foreign Language and Area Studies (FLAS) fellowships for U.S. citizens or permanent residents. Additional financial aid may also be available from CREEES. Applicants to the M.A. program have priority in the annual FLAS competition; in recent years CREEES has also awarded FLAS fellowships to students enrolled in the School of Education and the School of Law. Consult the CREEES associate director for further information about the application and award process. Applications for FLAS fellowships can be obtained at the CREEES (<http://CREEES.stanford.edu/grants>) web site.

Doctoral Programs

Since the University does not offer a Ph.D. in Russian, East European and Eurasian Studies, students wishing to pursue a REEES-related doctoral

program must apply to one of the departments offering a Ph.D. with an emphasis on Russia, Eurasia, or Eastern Europe, such as the departments of History, Anthropology, Political Science, or Slavic Languages and Literatures.

Undergraduate Minor in Russian, East European, and Eurasian Studies

Students interested in a minor should consult the "Minors in Slavic Languages and Literatures (p. 625)" section of this bulletin which describes the following relevant minors:

- Russian, East European, and Eurasian Studies
- Russian Language
- Russian Language, Literature, and Culture
- Russian Culture

Master of Arts in Russian, East European and Eurasian Studies

CREEES offers a one-year interdisciplinary master's degree program in Russian, East European and Eurasian Studies for students with a strong prior language and area studies background.

The program structure allows students the flexibility to pursue their particular academic interests, while providing intellectual cohesion through a required core curriculum that addresses historical and contemporary processes of change in the Russian Federation, Eastern Europe, the Caucasus, and Central Asia.

The core curriculum consists of three courses (one each quarter) and the REES 200 core seminar series. The program may be taken separately or coterminally with a bachelor's degree program.

The interdisciplinary M.A. program typically serves four types of students:

1. Those who intend to apply to a Ph.D. program involving Russian, East European and Eurasian studies and who need to enhance their academic skills and credentials
2. Those who intend to pursue careers and/or advanced degrees in such fields as journalism, education, business, government, law, or medicine, and who wish to establish competence in Russian, East European and Eurasian studies.
3. Those who are mid-career professionals and/or students interested in gaining competence or continuing their interest in and wish to gain competence in Russian, East European and Eurasian studies.

Advising

The advising structure is two-tiered: each M.A. candidate works with the CREEES associate director who advises on the program of course work and monitors the student's progress toward completing the degree. Candidates are also assigned a faculty adviser from the Academic Council faculty, who provides intellectual and academic guidance.

Admission

Applicants apply electronically; see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site for a link to the electronic application and general information regarding graduate admission. In addition, prospective applicants may consult with the CREEES associate director regarding the application process.

To qualify for admission to the program, the following apply:

1. Applicants must have earned a B.A. or B.S. degree, or the equivalent.
2. At least three years of college-level language study in Russian, an East European or Central Asian language is preferred. Candidates with fewer years of area language study will be considered.
3. A one-page statement of purpose that explains how the program would advance the applicant's academic or career goals.
4. Applicants must include the following additional materials in their online application: a writing sample of 20 pages or less in English on an academic topic in Russian, East European, or Eurasian studies and a resume of college-level courses taken that are relevant to Russian, East European & Eurasian Studies, including language courses, with self-reported final grades. These additional materials may be uploaded as "Additional Materials" in a single file along with the application.
5. Applicants must send official transcripts from all post-secondary institutions attended to Graduate Admissions, Office of the University Registrar.
6. All applicants must take the General Test of the Graduate Record Examination (GRE) and have the results sent to Graduate Admissions, Office of the University Registrar.
7. Applicants whose native language is not English and do not possess a U.S. bachelor's degree are expected to take the Test of English as a Foreign Language (TOEFL) and have the results sent to Graduate Admissions, Office of the University Registrar.

The deadline for submission of applications for admission and for financial aid is December 9, 2014. Admission is normally granted for Autumn Quarter, but requests for exceptions are considered.

The successful applicant generally demonstrates the following strengths: requisite foreign language study, significant course work in Russian, East European and Eurasian studies in multiple disciplines, outstanding grades in previous academic work, strong analytical writing skills, high GRE scores (particularly verbal and analytical writing), study or work experience in the region, strong letters of recommendation from faculty members in the Russian, East European, and Eurasian Studies field (one letter may be from a language instructor), and a persuasive statement of purpose explaining how the program would advance the applicant's academic and career goals.

Degree Requirements

Candidates for the M.A. degree must meet University requirements for an M.A. degree as described in the "Graduate Degrees (p. 43)" section of this bulletin.

The M.A. program in REEES can ordinarily be completed in one academic year by a well-prepared student; longer periods of study are permitted.

Requirements to complete the interdisciplinary M.A. degree are principally ones of distribution, with the exception of three required core courses and a core seminar, as described below. Each student, with the advice of the CREEES associate director, selects courses according to the student's interests, needs, and goals.

All students in the M.A. REEES program must complete a minimum of 48 academic credit units within the following guidelines.

1. *Core Courses*: Students must complete the following core courses during the 2014-15 academic year for 5 units each: REES 301B History and Politics in Russian and Eastern European Cinema during Autumn Quarter (5 units), HISTORY 321A State, Society and Nation in Modern Russian Historiography during Winter Quarter (5 units), and REES 313 Transformation of Socialist Societies during Spring Quarter (5 units).
2. *Core Seminar Series*: REES 200 Current Issues in Russian, East European, and Eurasian Studies is required of all students in the M.A. program in Autumn and Winter quarters (2 units total). The goal of this seminar series is to survey current methodological and substantive issues in Russian, East European and Eurasian studies, acquaint students with Stanford resources and faculty, and present professional development and career options.

- Interdisciplinary Course Work:** All courses (other than language courses and approved activity courses) must be taken on the graduate level (200-level or higher). Courses in Russian, East European and Eurasian studies must be completed and distributed among at least three disciplines. All course work applied to the 48-unit minimum must deal primarily with Russian, Eurasian, or East European studies.
- Language Study:** Students in the program are encouraged to study Russian, an East European or Central Asian language, or a language from the Caucasus. Credit towards the 48-unit minimum (maximum 4 units per quarter, 12 units total) is allowed for advanced language work.
- Course work qualifying for the 48-unit minimum must have a letter grade of 'B' or higher. ('B-' does not count for degree credit, nor does 'CR'). Students may apply a maximum of three units of course work with a final grade of 'S' to the 48-unit minimum. 'S' units counting towards the 48-unit minimum must be approved by the CREEES associate director.
- All courses counting towards the 48-unit minimum must be approved by the CREEES associate director, who ensures that planned course work satisfies requirements towards the degree. The CREEES director and steering committee determine the requirements. The list of pre-approved courses for the current academic year appears below. Students can petition to have courses that do not appear on this list counted towards the degree.
- Capstone Requirement:** Students must complete a capstone project (research paper and/or research presentation) in consultation with a faculty adviser, the CREEES director and associate director. Students will enroll in a capstone seminar for 1 unit in Spring quarter.

Pre-approved courses for 2014-15

The following courses are those that have been pre-approved to satisfy the M.A. interdisciplinary course work requirement for 2014-15. Students may choose from:

	Units
ARTHIST 205A Islamic Painting: Landscape, Body, Power	5
ARTHIST 305 Art & Architecture in the Medieval Mediterranean	4
ARTHIST 409 Iconoclasm	5
FILMSTUD 406 Montage	5
HISTORY 201C The U.S., U.N. Peacekeeping, and Humanitarian War	5
HISTORY 221B The 'Woman Question' in Modern Russia	5
HISTORY 222 Crime and Punishment in Early Modern Europe and Russia	5
HISTORY 252B Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
HISTORY 266C The Cold War: An International History	5
HISTORY 301A The Global Drug Wars	4-5
HISTORY 302G Peoples, Armies and Governments of the Second World War	4-5
HISTORY 306E/ POLISCI 316 International History and International Relations Theory	5
HISTORY 304G War and Society	5
HISTORY 307E Totalitarianism	4-5
HISTORY 308B Women Activists' Response to War	4-5
HISTORY 319C Science, Technology, and Modernity in the Soviet Union	5
HISTORY 321A State, Society and Nation in Modern Russian Historiography	4-5
HISTORY 324C Genocide and Humanitarian Intervention	3
HISTORY 326E Famine in the Modern World	3
HISTORY 328 Circles of Hell: Poland in World War II	5

HISTORY 384F Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 385B Core in Jewish History, 20th Century	4-5
HISTORY 424A The Soviet Civilization	4-5
HISTORY 330F Surveillance in Modern Europe	4-5
HISTORY 424B The Soviet Civilization, Part 2	4-5
IPS 210 The Politics of International Humanitarian Action	3-5
IPS 230/POLISCI 314D Democracy, Development, and the Rule of Law	5
MSE 293 Technology and National Security	3
PSYCH 383 International Conflict Resolution	3
REES 23 Issues in Global Health: Russia and Eastern Europe	1-2
REES 200 Current Issues in Russian, East European, and Eurasian Studies	1-2
REES 208C/ ARTHIST 408C Architecture, Acoustics and Ritual in Byzantium	1-3
REES 231 Russia, the West and the Rest	4
REES 301B History and Politics in Russian and Eastern European Cinema	5
REES 313 Transformation of Socialist Societies	3-5
REES 320 State and Nation Building in Central Asia	5
SLAVIC 226 BAKHTIN AND HIS LEGACY	3-5
SLAVIC 230 18th Century Russian Literature	5
SLAVIC 235 Late and Post-Soviet Literature	5
SLAVIC 236 The Russian Long Take	3-5
SLAVIC 311 Introduction to Old Church Slavic	2-4
SLAVIC 315 Isaac Babel and His Worlds	3-4
SLAVIC 325 Readings in Russian Realism	3-5
SLAVIC 327 Boris Pasternak and 20th century Russian Modernist Poetry	3-5
SLAVIC 329 Russian Versification: History and Theory	4
SLAVIC 340 Russia's Castaway Classic: Andrei Platonov	3-5
SLAVIC 345 Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 347 Modern Russian Literature and Culture: The Age of War and Revolution	3-5
SLAVIC 372 Osip Mandelstam In Context and the Russian Experience: 1891-1991	1-4
SLAVIC 379 Literature from Old Rus' and Medieval Russia	2-4
SLAVIC 387 History of 18th and 19th century Russian Poetry	3-4
SLAVIC/ COMPLIT 390 Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought	3-5

Other courses may be counted towards the M.A. by special arrangement with the instructor and the CREEES associate director.

A description of the M.A. program is also available on the web at the CREEES (<http://CREEES.stanford.edu/academic/graduate-masters.html>) web site and by request from the Center for Russian, East European and Eurasian Studies.

Coterminal Master's Program in Russian, East European, and Eurasian Studies

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University

application forms, see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

To qualify for a coterminal M.A. degree in Russian, East European, and Eurasian Studies, besides completing University requirements for the B.A. degree, a student must:

1. Submit a coterminal application for admission to the program no later than the quarter prior to the expected completion of the undergraduate degree, normally Winter Quarter prior to Spring Quarter graduation. Students with advanced placement and transfer credit must apply at least four quarters before the expected master's degree conferral date. The deadline for all coterminal applications to the M.A. program in Russian, East European, and Eurasian Studies is December 9, 2014.
2. Include in the application a proposal which outlines, by quarter, the schedule of courses the student plans to complete toward the M.A. degree. The student should seek the advice of the CREEES associate director in drafting this schedule. The application also should include:
 - a. a current Stanford transcript
 - b. a one-page statement of purpose
 - c. three letters of recommendation from Stanford faculty (one may be from a language instructor)
 - d. a writing sample of 20 pages or less in English on an academic topic in Russian, East European, or Eurasian Studies
3. Applicants must have a grade point average (GPA) of at least 3.0 (B). Coterminal applicants must take the general test of the Graduate Record Examination and have the results sent to Graduate Admissions, Office of the University Registrar.
4. Complete 15 full-time quarters or the equivalent, or three quarters in full-time residence after completing 180 units; and complete, in addition to the 180 units required for the bachelor's degree, a minimum of 48 units for the master's degree.

The same courses may not be counted to meet both undergraduate and graduate requirements, and no courses taken before the junior year may be used to meet the course requirements for the master's degree.

Joint Degree Program in Russian, East European, and Eurasian Studies

The joint degree program in Russian, East European, and Eurasian Studies and Law allows students to pursue the M.A. degree in REES concurrently with the Doctor of Jurisprudence (J.D.) degree, with a significant number of courses that may apply to both degrees. It is designed to train students interested in a career in teaching, research, or the practice of law related to REES legal affairs. Students must apply separately to the REES M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of language training. For more information, see the Joint Degree Programs (p. 47) section of this bulletin and the Stanford Law School (<http://www.law.stanford.edu>)'s website. Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

Director of the Center: Pavle Levi

Affiliated Faculty and Staff:

Anthropology: Ewa Domanska, Alma Kunanbaeva

Art and Art History: Bissera Pentcheva

Biology: Dmitri Petrov

Comparative Literature: Burcu Karahan

Economics: Geoffrey Rothwell

Education, School of: Martin Carnoy

Engineering, School of: Margaret Brandeau, Siegfried Hecker, William Perry (emeritus)

English: Nancy Rutenburg

Freeman Spogli Institute for International Studies: Coit Blacker, Chaim Braun, Christophe Crombez, Gail Lapidus (emerita), Kathryn Stoner-Weiss

Graduate School of Business: Ilya Strebulaev

History: Robert Crews, Terence Emmons (emeritus), David Holloway, Katherine Jolluck, Nancy Kollmann, Norman Naimark, Aron Rodrigue, Edith Sheffer, Amir Weiner, Ali Yaycioglu, Steven Zipperstein

Hoover Institute: Elena Danielson (emerita), John Dunlop (emeritus), Timothy Garton Ash, Paul Gregory, Bertrand Patenaude, Anatol Shmelev, Maciej Siekierski

International Policy Studies: Eric Morris

International Relations: Jasmina Bojic, Robert Rakove

Language Center: Jara Dusatko, Shahla Fahimi, Rima Greenhill, Lessia Jarboe, Eugenia Khassina, Suzan Negip Schatt, Bisera Rakicevic, Eva Soos Szoke, Gerardina Malgorzata Szudelski

Law, School of: Allen Weiner

Linguistics: Vera Griбанова, Asya Pereltsvaig

Medicine, School of: Jayanta Bhattacharya, Grant Miller, Douglas Owens

Political Science: David Holloway, David Laitin, Michael McFaul

Psychology: Lera Boroditsky

Religious Studies: Shahzad Bashir

Slavic Languages and Literatures: Lazar Fleishman, Gregory Freidin (emeritus), Monika Greenleaf, Gabriella Safran, Richard Schupbach (emeritus), Nariman Skakov

Sociology: Nancy Tuma (emerita), Patricia Young

Stanford Humanities Center: TBD

Stanford Libraries: Zachary Baker, Liisi Eglit, John Eilts, Karen Rondestvedt, Wojciech Zalewski (emeritus)

Theater and Performance Studies: Branislav Jakovljevic

Science, Technology, and Society

Courses offered by the Program in Science, Technology, and Society are listed under the subject code STS on the (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-STS=on&filter-term-Summer=on&page=0&q=STS&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on&academicYear=20142015>) ExploreCourses web site (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-STS=on&filter-term-Summer=on&page=0&q=STS&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on&academicYear=20142015>).

Mission of the Undergraduate Program in Science, Technology, and Society

The Program in Science, Technology, and Society (STS) aims to provide students with an interdisciplinary framework through which to understand the complex interactions of science, technology and the social world. After working through a common core of courses drawn from the social sciences, the humanities, the natural and physical sciences and engineering, students pursue coursework in one of five specialized areas:

- Information Technology, Media and Society
- Innovation, Technology and Organizations
- Environment and Sustainability
- Life Sciences and Biotechnology
- Policy, Security and Technology

Students may also undertake research in affiliated laboratories and through the honors program. All students complete a capstone project, either by taking a senior capstone seminar (STS 200) or by applying for and completing an honors thesis. Students must demonstrate mastery in at least one field from within the humanities or social sciences and at least one field from within the sciences or engineering. Majors may declare either a B.A. or a B.S. degree (see the specific requirements for each degree).

The Program's affiliated faculty represent over a dozen departments, including Anthropology, Communication, Computer Science, Education, Electrical Engineering, History, Law, Management Science and Engineering, Political Science and Sociology. By learning to bring such a rich collection of disciplinary approaches to bear on questions of science and technology, students graduate uniquely equipped to succeed in professions that demand fluency with both technical and social frameworks. Recent graduates of STS have entered top-ranked Ph.D. and MBA programs and forged successful careers in a variety of fields, including business, engineering, law, public service, medicine and academia.

Learning Outcomes (Undergraduate)

The Program expects undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Science, Technology, and Society. Students are expected to demonstrate:

1. a knowledge of core theories and methods in the interdisciplinary field of STS.
2. an ability to deploy these theories and methods to analyze interactions between science, technology and society in particular historical and cultural contexts.
3. an ability to critically evaluate empirical evidence and theoretical claims in STS-related debates.
4. an ability to communicate clearly and persuasively about STS issues to a general audience in multiple media including oral presentation and writing.

Advising and Course Selection

The Program in Science, Technology, and Society offers an advising process that includes faculty, staff and peer advisers. Prospective majors must first meet with a peer adviser and then with the Program's Student Services Officer to determine which degree they will pursue (the B.A. or B.S.) and how they will fulfill the Program's basic requirements. When they are ready to declare, they meet with the Program's Student Services Officer

to submit their degree plan and then the Associate Director reviews the coursework for intellectual coherence. Majors are then assigned to a faculty adviser who serves as an intellectual mentor and helps them identify the core questions driving their interest in the field. The Program also sponsors a wide variety of events designed to help students meet their colleagues and Program alumni, discover research and internship opportunities, and make their way toward the career of their choice.

STS Core

The program offers a Bachelor of Arts and Bachelor of Science in Science, Technology, and Society. Both degree programs require that the student complete the STS Core.

Units

With a grade of C or higher in each course, complete 8 courses satisfying the following requirements:

A. Interdisciplinary Foundational Course

STS 1 The Public Life of Science and Technology 5

B. Disciplinary Analyses: six courses, with two in each area, and at least one of these courses must be a STS WIM course and at least one of these courses must be a STS Global course. Note 1 & 2

1. Social Scientific Perspectives 8-10

ANTHRO 90C Theory of Ecological and Environmental Anthropology

ANTHRO 126 Urban Culture in Global Perspective

COMM 120W Digital Media in Society

COMM 166 Virtual People

ECON 106 World Food Economy

POLISCI 110Y War and Peace in American Foreign Policy

SOC 114 Economic Sociology

2. Cultural and Historical Perspectives 8-10

ANTHRO 41 Genes and Identity

ANTHRO 179 Cultures of Disease: Cancer and HIV/AIDS

CLASSICS 151 Ten Things: An Archaeology of Design

HISTORY 131 Leonardo's World: Science, Technology, and Art in the Renaissance

HISTORY 140 World History of Science

HISTORY 144 History of Women and Gender in Science, Medicine and Engineering

HISTORY 232F The Scientific Revolution

HISTORY 278S The Ethical Challenges of Climate Change

PHIL 60 Introduction to Philosophy of Science

3. Scientific and Engineering Perspectives 6-10

CEE 64 Air Pollution and Global Warming: History, Science, and Solutions

CS 106A Programming Methodology

CS 181W Computers, Ethics, and Public Policy

ENGR 131 Ethical Issues in Engineering

ME 214 Good Products, Bad Products

MSE 189 Social Networks - Theory, Methods, and Applications

MSE 193 Technology and National Security

MSE 197 Ethics, Technology, and Public Policy

C. Senior Requirements 5-10

STS 200A Food and Society: Politics, Culture and Technology

or STS 200D	Text Technologies: A History
or STS 200F	Sociology of Innovation and Invention
or STS 200G	Paperwork
or STS 200H	Ethics, Science, & Technology
or STS 200I	Art and Technology
STS 299	Advanced Individual Work

Total Units **32-45**

¹WIM courses: ANTHRO 90C, COMM 120W, CS 181W, HISTORY 140A, HISTORY 232F, MS&E 193 or MS&E 197

²Global courses: ANTHRO 126, ECON 106, HISTORY 44Q, HISTORY 131, HISTORY 140, HISTORY 144, HISTORY 208A, HISTORY 278S, CEE 64

Concentration

Minimum of 50 units, at least twelve courses, from among those designated on the appropriate concentration area course list (available in the Related Courses tab (p. 612) and on the STS website). All courses must be taken for a letter grade where offered and may not be double-counted with core coursework. Students may petition only one course outside the list of approved courses to count toward their STS degree plan. Thematic concentrations are organized around an STS-related problem or area:

1. Information Technology, Media, and Society
2. Innovation, Technology, and Organizations
3. Environment and Sustainability
4. Life Sciences and Biotechnology
5. Policy, Security, and Technology
6. Self-Designed Concentration

A student pursuing a Bachelor of Arts degree must take at least 8 classes from the social science and/or humanities course menus, and at least 4 classes from the science and engineering course menus. Social science/humanities courses should include a sequence of courses that build on one another, and address each of the dimensions of the concentration; and science and engineering courses should include a sequence of technical courses that build on one another.

A student pursuing a Bachelor of Science degree must take at least 8 classes from the science and engineering course menu, and at least 4 classes from social science and/or humanities course menus. Science and engineering courses should include one or two sequences of technical courses that build on one another. Social science and humanities courses should engage with key STS ideas and analytical approaches.

Alternatively, subject to program approval, a student may choose to design a self-designed concentration. A proposal (5 to 10 pages) should describe the intellectual objectives in detail, explain why a self-designed concentration is the optimal way to pursue these objectives (as opposed to the five STS concentrations or other majors at Stanford), and list at least 12 courses and 50 units that comprise the plan of study. Students with a self-designed concentration must fulfill the same core requirements as other STS students.

Each concentration, certified or self-designed, requires the signature of the STS Associate Director before it is approved.

Honors Program

The Stanford Program in Science, Technology, and Society (STS) invites STS majors to apply for admission to its Honors Program. Since the program was launched in 1978, STS honors students have carried out a wide array of innovative research projects. Honors projects present a unique opportunity to pursue one's intellectual interests in depth, work closely

with a faculty advisor, and develop a new set of research and analytical skills that are broadly applicable. STS honors signals expertise in a given field, organizational skills, and intellectual rigor, and students have used them as a springboard for graduate studies and for careers in fields such as information technology, entrepreneurship, finance, public policy, media, education, law, medicine, and the nonprofit sector. Often, the thesis project proves to be among the most rewarding and memorable experiences in a student's academic career at Stanford, as well as an important intellectual milestone. An STS honors thesis tackles a significant problem or question related to a particular area of STS. Students draw research methods from one or more of the disciplines that shape STS, such as history, sociology, communication, anthropology, environmental science, computer programming/modeling, engineering, economics, political science, and art history. Past honors projects are on file in the STS office library.

Honors Program Eligibility and Admission Criteria

To be eligible to apply for the honors program at the end of junior year, students must meet the following criteria:

1. Find an honors faculty adviser and develop research questions, methodology and plan
2. Be a current junior or rising senior and have declared STS as a major in Axess
3. Attend the required Information Session for Juniors in Autumn Quarter
4. Attend at least one (preferably all three) of the quarterly STS workshops offered for prospective honors students
5. Finish all STS core course work by the end of Spring Quarter, junior year
6. Submit a complete honors program application and research proposal by the last day of classes, Spring Quarter, junior year

For application and proposal parameters, see the document STS Honors Program, available on the STS web site.

Honors Degree Requirements

To graduate with honors, seniors in the honors program must meet the following criteria:

1. Attend required monthly workshops for current STS honors students
2. Develop an original and complete thesis in consultation with honors faculty adviser
3. Submit a first draft of thesis to honors adviser no later than April 1
4. Submit the final thesis to honors adviser by May 1
5. Earn at least a grade of 'B' on final thesis
6. Have an overall Stanford GPA of 3.4 at the end of Winter Quarter, senior year

As of September 1, 2012, STS is no longer admitting non-majors to the honors program.

Minor in Science, Technology, and Society

The program no longer offers a minor. Students currently enrolled in the minor should consult the Stanford Bulletin 2011-12 (<http://www.stanford.edu/dept/registrar/bulletin1112/6074.htm>) for degree requirements.

STS Affiliated Faculty

Director and Professor of Education: John Willinsky

Associate Director: Kyoko Sato

Program Committee: Stephen Barley (Management Science and Engineering), Paula Findlen (History), Mark Granovetter (Sociology), Hank Greely (Law), Sarah Lochlann Jain (Anthropology), Robert McGinn (Management Science and Engineering), Brad Osgood (Electrical Engineering), Eric Roberts (Computer Science), Scott Sagan (Political Science), Fred Turner (Communication), John Willinsky (Education)

Affiliated Faculty and Staff: Jeremy Bailenson (Communication), Stephen Barley (Management Science and Engineering), Thomas Byers (Management Science and Engineering), Jean-Pierre Dupuy (French), Paula Findlen (History), Duana Fullwiley (Anthropology), Mark Granovetter, (Sociology), Hank Greely (Law), Ann Grimes (Communication), James T. Hamilton (Communication), Martin Hellman (Electrical Engineering, Emeritus), Miyako Inoue (Anthropology), Sarah Lochlann Jain (Anthropology), Pamela Lee (Art and Art History), Sandra Soo-Jin Lee (Biomedical Ethics), Helen Longino (Philosophy), Henry Lowood (Stanford University Libraries), Robert McGinn (Management Science and Engineering), Thomas Mullaney (History), Brad Osgood (Electrical Engineering), Walter Powell (Education), Robert Proctor (History), Jessica Riskin (History), Eric Roberts (Computer Science), Scott Sagan (Political Science), Kyoko Sato (STS), Londa Schiebinger (History), Michael Shanks (Classics, Anthropology), Elaine Treharne (English), Fred Turner (Communication), John Willinsky (Education), Gavin Wright (Economics)

Emeriti: James Adams (Management Science and Engineering, Mechanical Engineering), Barton Bernstein (History), Walter Vincenti (Aeronautics and Astronautics)

Thematic Concentrations Course Lists Information Technology, Media, and Society

Thematic concentration in Information Technology, Media, and Society:

Social Science Course Menu

COMM 106	Communication Research Methods
COMM 108	Media Processes and Effects
COMM 117	Digital Journalism
COMM 120W	Digital Media in Society
COMM 137W	The Dialogue of Democracy
COMM 140	Digital Media Entrepreneurship
COMM 142W	Media Economics
COMM 166	Virtual People
COMM 168	Experimental Research in Advanced User Interfaces
COMM 169	Computers and Interfaces
COMM 172	Media Psychology
COMM 182	Social Media Issues
COMM 183	Social Media Literacies
CS 546	Seminar on Liberation Technologies
ECON 153	Economics of the Internet
EDUC 358X	Learning, Sharing, Publishing, and Intellectual Property
ENGR 129	The Internet in Global Context
MSE 180	Organizations: Theory and Management

Units

MSE 181	Issues in Technology and Work for a Postindustrial Economy
OSPBEIJ 20	Communication, Culture, and Society: The Chinese Way
OSPBEIJ 42	Chinese Media Studies
PSYCH 30	Introduction to Perception
STS 140	Science, Technology and Politics
STS 160Q	Technology in Contemporary Society
SYMSYS 100	Minds and Machines
SYMSYS 245	Cognition in Interaction Design
Humanities Course Menu	
AMSTUD 152A	"Mutually Assured Destruction": American Culture and the Cold War
ARTHIST 157A	Histories of Photography
ARTHIST 164A	Technology and the Visual Imagination
ARTHIST 245	Art, Business & the Law
ARTHIST 263B	The View through the Windshield: Cars and the American Landscape
ARTHIST 264A	Picturing the Cosmos
ARTSTUDI 160	Design I : Fundamental Visual Language
ARTSTUDI 177	Video Art I
ARTSTUDI 179	Digital Art I
ARTSTUDI 236	Future Media, Media Archaeologies
ARTSTUDI 260	Design II
ARTSTUDI 275	Introduction to Digital Photography and Visual Images
ARTSTUDI 285	Topics in Media Studies: Street Media
COMPLIT 271A	Futurity: Why the Past Matters
EDUC 226X	Curating Experience: Representation in and beyond Museums
ENGLISH 202	History of the Book
FILMSTUD 6	Introduction to Digital Media
FILMSTUD 110	Science Fiction Cinema
GERMAN 154	Poetic Thinking Across Media
GERMAN 184	Technology, Innovation, and the History of the Book
ILAC 235	Critique of Technology
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music
OSPBEIJ 17	Chinese Film Studies
OSPBEIJ 42	Chinese Media Studies
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II

OSPMADR Women in Art: Case Study in the Madrid Museums
45

OSPOXFRD The Rise of the Woman Writer 1660-1860
57

OSPPARIS 30 The Avant Garde in France through Literature, Art,
and Theater

RELIGST 31 The Religious Life of Things

Science and Engineering Course Menu

CEE 112A Industry Applications of Virtual Design &
Construction

CS 105 Introduction to Computers

CS 106A Programming Methodology

CS 106B Programming Abstractions

CS 106X Programming Abstractions (Accelerated)

CS 107 Computer Organization and Systems

CS 108 Object-Oriented Systems Design

CS 109 Introduction to Probability for Computer Scientists

CS 110 Principles of Computer Systems

CS 124 From Languages to Information

CS 144 Introduction to Computer Networking

CS 145 Introduction to Databases

CS 147 Introduction to Human-Computer Interaction Design

CS 148 Introduction to Computer Graphics and Imaging

CS 178 Digital Photography

CS 181 Computers, Ethics, and Public Policy

CS 224W Social and Information Networks

CS 247 Human-Computer Interaction Design Studio

CS 248 Interactive Computer Graphics

CS 255 Introduction to Cryptography

CS 376 Human-Computer Interaction Research

EE 101A Circuits I

EE 101B Circuits II

EE 102A Signal Processing and Linear Systems I

EE 102B Signal Processing and Linear Systems II

EE 108 Digital System Design

EE 168 Introduction to Digital Image Processing

EE 169 Introduction to Bioimaging

EE 180 Digital Systems Architecture

ENGR 40P Physics of Electrical Engineering

ENGR 110 Perspectives in Assistive Technology (ENGR 110)

ENGR 131 Ethical Issues in Engineering

ENGR 145 Technology Entrepreneurship

ENGR 154 Vector Calculus for Engineers

MSE 107 Interactive Management Science

MSE 111 Introduction to Optimization

MSE 120 Probabilistic Analysis

MSE 130 Information Networks and Services

MSE 189 Social Networks - Theory, Methods, and
Applications

MUSIC 253 Symbolic Musical Information

MUSIC 254 Music Query, Analysis, and Style Simulation

MUSIC 257 Neuroplasticity and Musical Gaming

Social Science Course Menu

ANTHRO 41 Genes and Identity

COMM 140 Digital Media Entrepreneurship

COMM 169 Computers and Interfaces

CS 546 Seminar on Liberation Technologies

ECON 50 Economic Analysis I

ECON 51 Economic Analysis II

ECON 52 Economic Analysis III

ECON 102B Applied Econometrics

ECON 116 American Economic History

ECON 118 Development Economics

ECON 145 Labor Economics

ECON 153 Economics of the Internet

ECON 158 Regulatory Economics

EDUC 224A Social Entrepreneurship and Social Innovation

ENGR 129 The Internet in Global Context

HUMBIO 173 Science, Innovation and the Law

ME 177 Global Engineers' Education

ME 297 Forecasting for Innovators: Technology, Tools &
Social Change

MSE 175 Innovation, Creativity, and Change

MSE 177 Engineering Innovation

MSE 180 Organizations: Theory and Management

MSE 181 Issues in Technology and Work for a Postindustrial
Economy

MSE 185 Global Work

OSPPER 126X A People's Union? Money, Markets, and Identity in
the EU

OSPPER 161X The German Economy in the Age of Globalization

OSPCPTWN 36 The Archaeology of Southern African Hunter
Gatherers

OSPOXFRD 45 British Economic Policy since World War II

OSPSANTG 29 Sustainable Cities: Comparative Transportation
Systems in Latin America

OSPSANTG 71 Santiago: Urban Planning, Public Policy, and the
Built Environment

OSPSANTG 119X The Chilean Economy: History, International
Relations, and Development Strategies

OSPSANTG 130X The Chilean Economy in Comparative Perspective

POLISCI 218S Political Economy of International Trade and
Investment

PSYC 136A Valuescience: Shedding Illusion to Live Better

PSYC 136B Valuescience: Shedding Illusion to Live Better

PUBLPOL 102 Organizations and Public Policy

PUBLPOL 134 Ethics On the Edge: Business, Non-Profit
Organizations, Government, and Individuals

PUBLPOL 144 Giving 2.0: Philanthropy by Design

PUBLPOL 183 Philanthropy and Social Innovation

PUBLPOL 194 Technology Policy

PUBLPOL 353 Science and Technology Policy

Innovation, Technology, and Organizations

Thematic concentration in Innovation, Technology, and Organizations:

SOC 114	Economic Sociology
SOC 160	Formal Organizations
SOC 161	The Social Science of Entrepreneurship
STS 140	Science, Technology and Politics
STS 160Q	Technology in Contemporary Society
STS 190	Issues in Technology and the Environment
SYMSYS 100	Minds and Machines
SYMSYS 245	Cognition in Interaction Design

Humanities Course Menu

AMSTUD 152A	"Mutually Assured Destruction": American Culture and the Cold War
ARTHIST 147	MODERNISM AND MODERNITY
ARTHIST 263B	The View through the Windshield: Cars and the American Landscape
ARTSTUDI 160	Design I: Fundamental Visual Language
ARTSTUDI 236	Future Media, Media Archaeologies
ARTSTUDI 260	Design II
BIO 182	Modeling Cultural Evolution
CEE 32B	Design Theory
ENGLISH 184C	Data and Knowledge in the Humanities
GERMAN 184	Technology, Innovation, and the History of the Book
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance
HISTORY 203C	History of Ignorance
HISTORY 219C	Science, Technology, and Modernity in the Soviet Union
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music
OSPBER 115X	The German Economy: Past and Present
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security
OSPFLOR 17	The Evolution of Modern Italian Design
OSPFLOR 20	Design Driven Innovation: Italian Excellence
OSPFLOR 22	The Italian Way to Car Design
OSPFLOR 25	Italian Food: A Cultural History
OSPFLOR 41	The Florentine Sketchbook: A Visual Arts Practicum
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition
OSPFLOR 58	Space as History: Social Vision and Urban Change
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization
OSPKYOTO 64	Japanese Popular Culture
OSPMADR 45	Women in Art: Case Study in the Madrid Museums
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater

OSPPARIS 44	EAP: Analytical Drawing and Graphic Art
OSPPARIS 72	The Ceilings of Paris
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design
PHIL 74	Business Ethics
RELIGST 31	The Religious Life of Things

Science and Engineering Course Menu

CEE 146A	Engineering Economy
CS 105	Introduction to Computers
CS 106A	Programming Methodology
CS 106B	Programming Abstractions
CS 106X	Programming Abstractions (Accelerated)
CS 107	Computer Organization and Systems
CS 108	Object-Oriented Systems Design
CS 109	Introduction to Probability for Computer Scientists
CS 110	Principles of Computer Systems
CS 124	From Languages to Information
CS 147	Introduction to Human-Computer Interaction Design
CS 181	Computers, Ethics, and Public Policy
CS 223A	Introduction to Robotics
CS 225A	Experimental Robotics
CS 247	Human-Computer Interaction Design Studio
CS 376	Human-Computer Interaction Research
CS 402	Beyond Bits and Atoms: Designing Technological Tools
CS 402L	Beyond Bits and Atoms - Lab
EE 101A	Circuits I
EE 101B	Circuits II
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
EE 108	Digital System Design
EE 169	Introduction to Bioimaging
EE 180	Digital Systems Architecture
ENGR 14	Intro to Solid Mechanics
ENGR 40M	An Intro to Making: What is EE
ENGR 40P	Physics of Electrical Engineering
ENGR 60	Engineering Economy
ENGR 145	Technology Entrepreneurship
ENGR 154	Vector Calculus for Engineers
ME 80	Mechanics of Materials
ME 101	Visual Thinking
ME 115A	Introduction to Human Values in Design
ME 115B	Product Design Methods
ME 120	History and Philosophy of Design
ME 203	Design and Manufacturing
ME 214	Good Products, Bad Products
ME 216A	Advanced Product Design: Needfinding
MSE 52	Introduction to Decision Making
MSE 107	Interactive Management Science
MSE 111	Introduction to Optimization
MSE 120	Probabilistic Analysis
MSE 121	Introduction to Stochastic Modeling
MSE 130	Information Networks and Services
MSE 152	Introduction to Decision Analysis

MSE 189	Social Networks - Theory, Methods, and Applications
MUSIC 257	Neuroplasticity and Musical Gaming

Environment and Sustainability

Thematic concentration in Environment and Sustainability:

Social Science Course Menu

ANTHRO 90C	Theory of Ecological and Environmental Anthropology
ANTHRO 147	Nature, Culture, Heritage
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case
ANTHRO 162	Indigenous Peoples and Environmental Problems
EARTHSYS 61Q	Food and security
EARTHSYS 105	Food and Community: New Visions for a Sustainable Future
EARTHSYS 112	Human Society and Environmental Change
EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities
EARTHSYS 173	Aquaculture and the Environment: Science, History, and Policy
EARTHSYS 174	Marine Biodiversity: Law, Science, and Policy
EARTHSYS 181	Urban Agriculture in the Developing World
EARTHSYS 184	Climate and Agriculture
EARTHSYS 185	Feeding Nine Billion
ECON 50	Economic Analysis I
ECON 106	World Food Economy
ECON 155	Environmental Economics and Policy
ECON 156	Marine Resource Economics and Conservation
HUMBIO 2B	Culture, Evolution, and Society
HUMBIO 4B	Environmental and Health Policy Analysis
ME 297	Forecasting for Innovators: Technology, Tools & Social Change
MSE 92Q	International Environmental Policy
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment
POLISCI 110G	Governing the Global Economy
PUBLPOL 125	Law and Public Policy
SIW 116	International Environmental Policy
SIW 137	Energy and Environment: Technology, Economics and Policy
STS 140	Science, Technology and Politics
STS 190	Issues in Technology and the Environment

Units

URBANST 160	Environmental Policy and the City in U.S. History
URBANST 164	Sustainable Cities
URBANST 166	East Palo Alto: Reading Urban Change

Humanities Course Menu

ARTHIST 263B	The View through the Windshield: Cars and the American Landscape
ENGLISH 168	Imagining the Oceans
GERMAN 285	Environmentalism, Literature and Cultural Criticism
HISTORY 131	Leonardo's World: Science, Technology, and Art in the Renaissance
HISTORY 203C	History of Ignorance
HISTORY 254	Popular Culture and American Nature
HISTORY 278S	The Ethical Challenges of Climate Change
OSPBER 115X	The German Economy: Past and Present
OSPFLO 44	Galileo: Genius, Innovation and the Scientific Revolution
POLISCI 233F	Science, Technology, and Society in the Face of the Looming Disaster

Science and Engineering Course Menu

BIO 43	Plant Biology, Evolution, and Ecology
BIO 101	Ecology
BIO 144	Conservation Biology: A Latin American Perspective
BIO 220	Essential Mathematics for Research in Life and Social Sciences
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems
BIOHOPK 187H	Sensory Ecology
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions
CEE 70	Environmental Science and Technology
CEE 100	Managing Sustainable Building Projects
CEE 120A	Building Information Modeling Workshop
CEE 124	Sustainable Development Studio
CEE 129	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future
CEE 173A	Energy Resources
CEE 176A	Energy Efficient Buildings
CEE 176B	Electric Power: Renewables and Efficiency
CEE 272R	Modern Power Systems Engineering
EARTHSYS 101	Energy and the Environment
EARTHSYS 102	Renewable Energy Sources and Greener Energy Processes
EARTHSYS 104	The Water Course
EARTHSYS 155	Science of Soils
EARTHSYS 180B	Principles and Practices of Sustainable Agriculture
ENERGY 104	Transition to sustainable energy systems
ENERGY 120	Fundamentals of Petroleum Engineering

ENERGY 160	Modeling Uncertainty in the Earth Sciences
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use
ENGR 30	Engineering Thermodynamics
MATSCI 154	Thermodynamic Evaluation of Green Energy Technologies
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
OSPAUSTL 10	Coral Reef Ecosystems
OSPAUSTL 25	Freshwater Systems
OSPAUSTL 30	Coastal Forest Ecosystems
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms
OSPSANTG 85	Marine Ecology of Chile and the South Pacific
PHYSICS 240	Introduction to the Physics of Energy
PHYSICS 241	Introduction to Nuclear Energy

Life Sciences and Biotechnology

Thematic concentration in Life Sciences and Biotechnology:

Social Science Course Menu

ANTHRO 15	Sex and Gender
ANTHRO 41	Genes and Identity
ANTHRO 177	Environmental Change and Emerging Infectious Diseases
ANTHRO 179	Cultures of Disease: Cancer and HIV/AIDS
BIOE 131	Ethics in Bioengineering
EARTHSYS 174	Marine Biodiversity: Law, Science, and Policy
EDUC 340	Psychology and American Indian Mental Health
GENE 104Q	Law and the Biosciences
HUMBIO 2B	Culture, Evolution, and Society
HUMBIO 3B	Behavior, Health, and Development
HUMBIO 4B	Environmental and Health Policy Analysis
HUMBIO 122S	Social Class, Race, Ethnicity, and Health
HUMBIO 174	Foundations of Bioethics
MED 157	Foundations for Community Health Engagement
OSPFLOR 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era
OSPMADR 57	Health Care: A Contrastive Analysis between Spain and the U.S.
OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time
PSYCH 30	Introduction to Perception
PUBLPOL 122	Biosecurity and Bioterrorism Response
PUBLPOL 125	Law and Public Policy
STS 140	Science, Technology and Politics
STS 190	Issues in Technology and the Environment

Humanities Course Menu

AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors
ARTSTUDI 284	Art and Biology
FRENCH 219	The Renaissance Body in French Literature and Medicine
HISTORY 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present
HISTORY 140	World History of Science
HISTORY 144	History of Women and Gender in Science, Medicine and Engineering
HISTORY 203C	History of Ignorance
HISTORY 243G	Tobacco and Health in World History
HISTORY 264G	Madness in American Society: The Social History of Mental Illness in the United States
HUMBIO 175	Health Care as Seen Through Medical History, Literature, and the Arts
HUMBIO 175S	Novels and Theater of Illness
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution
OSPMADR 72	Issues in Bioethics Across Cultures
PHIL 60	Introduction to Philosophy of Science
PHIL 63S	Introduction to Bioethics
PHIL 167B	Philosophy, Biology, and Behavior
POLISCI 216E	International History and International Relations Theory
RELIGST 22	Method in the Sciences of Nature and Society

Science and Engineering Course Menu

BIO 41	Genetics, Biochemistry, and Molecular Biology
BIO 42	Cell Biology and Animal Physiology
BIO 43	Plant Biology, Evolution, and Ecology
BIO 44X	Core Molecular Biology Laboratory
BIO 44Y	Core Plant Biology & Eco Evo Laboratory
BIO 109A	The Human Genome and Disease
BIO 109B	The Human Genome and Disease: Genetic Diversity and Personalized Medicine
BIO 144	Conservation Biology: A Latin American Perspective
BIO 150	Human Behavioral Biology
BIO 220	Essential Mathematics for Research in Life and Social Sciences
BIOE 44	Fundamentals for Engineering Biology Lab
BIOE 80	Introduction to Bioengineering
BIOE 101	Systems Biology
BIOE 103	Systems Physiology and Design
BIOE 115	Computational Modeling of Microbial Communities
CHEM 31A	Chemical Principles I
CHEM 31B	Chemical Principles II
CHEM 31X	Chemical Principles Accelerated
CHEM 33	Structure and Reactivity
CHEM 35	Synthetic and Physical Organic Chemistry
CHEM 36	Organic Chemistry Laboratory I
CHEM 130	Organic Chemistry Laboratory
CHEM 131	Organic Polyfunctional Compounds

Units

CHEM 135	Physical Chemical Principles
CHEM 171	Physical Chemistry I
COMP MED 87Q	Introduction to the Mouse in Biomedical Research
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
EE 169	Introduction to Bioimaging
HUMBIO 2A	Genetics, Evolution, and Ecology
HUMBIO 3A	Cell and Developmental Biology
HUMBIO 4A	The Human Organism
OSPAUSTL 10	Coral Reef Ecosystems
OSPAUSTL 25	Freshwater Systems
OSPAUSTL 30	Coastal Forest Ecosystems
OSPFLOR 86	Stem Cells in Human Development and Regenerative Medicine
OSPSANTG 85	Marine Ecology of Chile and the South Pacific

Policy, Security, and Technology

Thematic concentration in Policy, Security, and Technology:

Social Science Course Menu

ANTHRO 318	Democracy and Political Authority
COMM 133	Need to Know: The Tension between a Free Press and National Security Decision Making
EARTHSYS 61Q	Food and security
ENGR 129	The Internet in Global Context
HISTORY 261G	Presidents and Foreign Policy in Modern History
INTNLREL 140A	International Law and International Relations
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War
INTNLREL 180A	Transitional Justice, Human Rights, and International Criminal Tribunals
IPS 203	Issues in International Economics
IPS 219	Intelligence and National Security
IPS 250	International Conflict Resolution
MSE 197	Ethics, Technology, and Public Policy
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa
OSPMADR 57	Health Care: A Contrastive Analysis between Spain and the U.S.
OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies
POLISCI 2 110G	Introduction to American National Government and Politics
POLISCI 110G	Governing the Global Economy

Units

POLISCI 110Y	War and Peace in American Foreign Policy
POLISCI 114D	Democracy, Development, and the Rule of Law
POLISCI 114S	International Security in a Changing World
POLISCI 122	Introduction to American Law
POLISCI 147	Comparative Democratic Development
POLISCI 214R	Challenges and Dilemmas in American Foreign Policy
POLISCI 215F	Nuclear Weapons and International Politics
POLISCI 218T	Terrorism
POLISCI 248L	Political-Economy of Crime and Violence in Latin America
PUBLPOL 122	Biosecurity and Bioterrorism Response
PUBLPOL 125	Law and Public Policy
PUBLPOL 194	Technology Policy
PUBLPOL 353	Science and Technology Policy
STS 140	Science, Technology and Politics
STS 190	Issues in Technology and the Environment

Humanities Course Menu

AMSTUD 152A	"Mutually Assured Destruction": American Culture and the Cold War
ARTHIST 264A	Picturing the Cosmos
COMPLIT 171	Ethics of Jihad
COMPLIT 271A	Futurity: Why the Past Matters
FRENCH 122	Nation in Motion: Film, Race and Immigration in Contemporary French Cinema
GERMAN 132	Dynasties, Dictators and Democrats: History and Politics in Germany
GERMAN 182	War and Warfare in Germany
GERMAN 264	Post-Cold War German Foreign Policy
HISTORY 102	History of the International System
HISTORY 103F	Introduction to Military History
HISTORY 203C	History of Ignorance
HISTORY 219C	Science, Technology, and Modernity in the Soviet Union
HISTORY 235	The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II
POLISCI 116	The International History of Nuclear Weapons
POLISCI 216E	International History and International Relations Theory
POLISCI 233F	Science, Technology, and Society in the Face of the Looming Disaster

Science and Engineering Course Menu

CHEM 31A	Chemical Principles I
CHEM 31B	Chemical Principles II
CHEM 31X	Chemical Principles Accelerated

CHEM 33	Structure and Reactivity
CHEM 35	Synthetic and Physical Organic Chemistry
CHEM 36	Organic Chemistry Laboratory I
CS 105	Introduction to Computers
CS 106A	Programming Methodology
CS 106B	Programming Abstractions
CS 106X	Programming Abstractions (Accelerated)
CS 107	Computer Organization and Systems
CS 108	Object-Oriented Systems Design
CS 109	Introduction to Probability for Computer Scientists
CS 110	Principles of Computer Systems
CS 181	Computers, Ethics, and Public Policy
CS 255	Introduction to Cryptography
MSE 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism
MSE 107	Interactive Management Science
MSE 193	Technology and National Security
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms
PHYSICS 41	Mechanics
PHYSICS 42	Classical Mechanics Laboratory
PHYSICS 43	Electricity and Magnetism
PHYSICS 240	Introduction to the Physics of Energy
PHYSICS 241	Introduction to Nuclear Energy

Overseas Studies Courses in Science, Technology, and Society

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPBEIJ 17	Chinese Film Studies	4
OSPBEIJ 20	Communication, Culture, and Society: The Chinese Way	4
OSPBEIJ 42	Chinese Media Studies	4
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4

OSPFLOR 17	The Evolution of Modern Italian Design	5
OSPFLOR 41	The Florentine Sketchbook: A Visual Arts Practicum	3-5
OSPFLOR 44	Galileo: Genius, Innovation and the Scientific Revolution	5
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era	4
OSPFLOR 86	Stem Cells in Human Development and Regenerative Medicine	4-5
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPISTAN 62	Business Policy and Strategy in a Global Environment	4
OSPISTAN 63	Soundscape Studies: Listening to Istanbul	4
OSPKYOTO 45	Japan's Energy-Environment Conundrum	4-5
OSPKYOTO 64	Japanese Popular Culture	4-5
OSPMADRD 45	Women in Art: Case Study in the Madrid Museums	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPOXFRD 45	British Economic Policy since World War II	5
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater	4
OSPPARIS 44	EAP: Analytical Drawing and Graphic Art	2
OSPPARIS 72	The Ceilings of Paris	4
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 153X	Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time	5
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 31	The Chilean Energy System: 30 Years of Market Reforms	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 85	Marine Ecology of Chile and the South Pacific	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 130X	The Chilean Economy in Comparative Perspective	5

Slavic Languages and Literatures

Courses offered by the Department of Slavic Languages and Literatures are listed on the Stanford Bulletin's ExploreCourses web site (<http://bulletin.stanford.edu>) under the subject codes SLAVIC (Slavic Studies) (<https://explorecourses.stanford.edu/search?q=SLAVIC&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter->

catalognumber=SLAVIC=on), and SLAVLANG (Slavic Language) (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SLAVLANG&filter-catalognumber=SLAVLANG=on>). (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SLAVLIT&filter-catalognumber=SLAVLIT=on>)

The department supports coordinated study of Russian language, literature, literary and cultural history, theory, and criticism. The department's programs may also be combined with the programs in Russian, East European and Eurasian Studies, Jewish Studies, Film Studies, Drama, International Relations, Stanford's Overseas Studies, and the Special Languages Program. The department is a part of the Division of Literatures, Cultures, and Languages (p. 411).

A full undergraduate program provides a choice of several tracks leading to a B.A. (with a major or a minor) or to a B.A. with Honors. The department offers a full graduate program leading to an M.A. in Russian and a Ph.D. in Slavic Languages and Literatures. Stanford undergraduates are eligible to apply to the department for a coterminal B.A./M.A. degree. Students in the department's Ph.D. program are required to choose among minor programs in other national literatures, linguistics, Russian, East European, and Eurasian Studies, Jewish Studies, art and music history, theater, or film studies; or they may design their own minor or choose the related field option.

The department runs a colloquium series, which brings distinguished speakers to Stanford; organizes international conferences and symposia; and since 1987 maintains a continuing publication series, Stanford Slavic Studies. Along with the Center for Russian, East European and Eurasian Studies, the department offers qualified undergraduates summer grants (on a competitive basis) for intensive Russian language instruction in accredited programs in Russia and the U.S.

Improving cultural understanding is a critical part of the department's mission, and the department offers a full range of courses at all levels devoted to Russian literature, music and visual arts that do not require specialized knowledge, as well as advanced research seminars for graduate students. The Slavic theme house, Slavianskii Dom, serves as an undergraduate residence for many students in the program and hosts program-related activities. Undergraduates may also choose to study in Moscow through the Stanford Overseas Studies Program. The undergraduate program has attracted students seeking careers in journalism, business, international relations, law, medicine, and human rights, as well as academia. Russian is still the lingua franca over the vast territory of the former Soviet Union, and a good command of this language offers a gateway to Eurasia's diverse cultures, ethnicities, economies, and religions.

Stanford students of Russian, East European and Eurasian Studies benefit from unmatched faculty resources. Green Library and the Hoover Institution libraries and archives hold world-renowned Russian and East European collections, which undergraduates and graduate students use in their research. Department students master a difficult language and a rich and challenging literature, and are rewarded by gaining entry into a unique, powerful, and diverse civilization that defined major trends in the past century and plays an increasingly significant role in the world today.

Mission of the Undergraduate Program in Slavic Languages and Literatures

The mission of the undergraduate program in Slavic Language and Literatures is to expose students to a variety of perspectives on Russian language, history, culture, literature, and philosophical thought. The program offers three tracks. Courses in the Russian Language and Literature track focus on the linguistic and philological study of literature, as well as the history of Russian literature. The Russian Language, Culture, and History track guides students through a comprehensive interdisciplinary

study of Russian literature and culture in historic context. The Russian and Philosophy track provides students with a background in the Russian language and literary tradition with emphasis on philosophical thought.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

- oral proficiency in Russian or another Slavic language beyond the interpersonal level with presentational language abilities.
- writing proficiency in Russian or another Slavic language beyond the interpersonal level with presentational language abilities.
- close reading skills of authentic texts in Russian or another Slavic language.
- the ability to develop effective and nuanced lines of interpretation.

Slavic Theme House

Slavianskii Dom, at 650 Mayfield Avenue, is an undergraduate residence that offers opportunities for students to expand their knowledge, understanding, and appreciation of Russia, Eastern Europe, and Eurasia. Assignment is made through the regular undergraduate housing draw.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Slavic Languages and Literatures and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Slavic Languages and Literatures. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Slavic Languages and Literatures and to interpret and present the results of their research.

Bachelor of Arts in Slavic Languages and Literatures

The major tracks in Russian Language and Literature and Russian Language, Culture, and History are declared on Axxess and appear on the transcript but not on the diploma. The degree option in Russian and Philosophy is not declared on Axxess and does not appear on the transcript or the diploma.

Writing in the Major

Undergraduates are required by the University to pass at least one writing-intensive course in their field of concentration in order to graduate. Majors in any Slavic track may satisfy the writing requirement in 2014-15 by passing SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky.

Russian Language and Literature

The Russian Language and Literature field of study is designed for those students who wish to gain command of the Russian language and to study the nation's literary tradition. Emphasis is placed on the linguistic and philological study of literature, as well as the history of Russian literature

and related media in the broader context of Russian culture. This major also welcomes students with an interest in Russian and Slavic linguistics.

Majors who concentrate in Russian Language and Literature must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

Degree Requirements

Candidates for the B.A. degree with a Russian Language and Literature field of study must complete an additional 56 units according to the following distribution:

Russian Language

A minimum of 12 units from:

	Units
SLAVLANG 111 Third-Year Russian, First Quarter	4
SLAVLANG 112 Third-Year Russian, Second Quarter	4
SLAVLANG 113 Third-Year Russian, Third Quarter	4
SLAVLANG 177 Fourth-Year Russian, First Quarter	3
SLAVLANG 178 Fourth-Year Russian, Second Quarter	3
SLAVLANG 179 Fourth-Year Russian, Third Quarter	3
SLAVLANG 181 Fifth-Year Russian, First Quarter	3
SLAVLANG 182 Fifth-Year Russian, Second Quarter	3
SLAVLANG 183 Fifth-Year Russian, Third Quarter	3

Russian Literature

The 20-unit core literature sequence consisting of:

	Units
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	5
SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky	5
SLAVIC 147 Modern Russian Literature and Culture: The Age of War and Revolution	5

Electives

Students must take 24 units of electives. These courses are chosen in consultation with the department's chair of undergraduate studies. With department consent, work in related academic fields may be applied toward the degree requirements. Students who have completed a Thinking Matters Course instructed by Slavic faculty, with a grade of 'B' or better may count up to 10 units towards elective courses required for the major, as may students who have completed the SLE sequence.

Russian courses for 2014-15 include:

	Units
SLAVIC 77Q Russia's Weird Classic: Nikolai Gogol	3-4
SLAVIC 115 Between Europe and Asia: Introduction to Russian Culture	3
SLAVIC 129 Russian Versification: History and Theory	4
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 181 Philosophy and Literature	5

THINK 21 Folklore and Literature in Russia and Beyond: Vampires, Talking Cats, and Frog Princesses 4

Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course. Before graduation, skills in writing, textual analysis, and discussion will be evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the Undergraduate Student Affairs Officer.

Russian Language, Culture, and History

The Russian Language, Culture, and History field of study is for students who want to obtain command of the Russian language and to pursue a broad, interdisciplinary study of Russian literature and culture in historical context. Emphasis is on the relation of the Russian literary tradition to other arts, including film, as well as the disciplines that have enriched the historical understanding of Russian literature: history, anthropology, art history, political science, and sociology. Majors in the Russian Language, Culture, and History must earn a GPA of 2.0 (C) or better in order to receive credit toward the major.

Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

Degree Requirements

Candidates for the B.A. degree with a Russian Language, Culture, and History field of study must complete an additional 56 units according to the following distribution.

Russian Language

A minimum of 12 units from:

	Units
SLAVLANG 111 Third-Year Russian, First Quarter	4
SLAVLANG 112 Third-Year Russian, Second Quarter	4
SLAVLANG 113 Third-Year Russian, Third Quarter	4
SLAVLANG 177 Fourth-Year Russian, First Quarter	3
SLAVLANG 178 Fourth-Year Russian, Second Quarter	3
SLAVLANG 179 Fourth-Year Russian, Third Quarter	3
SLAVLANG 181 Fifth-Year Russian, First Quarter	3
SLAVLANG 182 Fifth-Year Russian, Second Quarter	3
SLAVLANG 183 Fifth-Year Russian, Third Quarter	3

19th-Century Russian Literature and History

A minimum of 10 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

	Units
One of the following:	
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	5

or SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky
A pre-revolutionary Russian history course. 5

20th-Century Russian Literature and History

A minimum of 10 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

		Units
SLAVIC 147	Modern Russian Literature and Culture: The Age of War and Revolution	5
	A post-revolutionary Russian history course.	5

Electives

Students must take 24 additional units of course work in Russian language, literature, history, or other fields, chosen in consultation with the Chair of Undergraduate Studies. Students who have completed IHUM 28A/B. Poetic Justice: Order and Imagination in Russian Culture, or Thinking Matters Courses instructed by Slavic faculty, with a grade of 'B' or better may count these 10 units towards elective courses required for the major, as may students who have completed the SLE sequence.

Russian courses for 2014-15 include:

		Units
SLAVIC 77Q	Russia's Weird Classic: Nikolai Gogol	3-4
SLAVIC 115	Between Europe and Asia: Introduction to Russian Culture	3
SLAVIC 129	Russian Versification: History and Theory	4
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 181	Philosophy and Literature	5
THINK 21	Folklore and Literature in Russia and Beyond: Vampires, Talking Cats, and Frog Princesses	4

Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course. Before graduation, skills in writing, textual analysis, and discussion will be evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the Undergraduate Student Affairs Officer.

Russian and Philosophy

The Russian and Philosophy option offers students the opportunity to gain a command of the Russian language and literary tradition, while gaining a background in philosophical thought, broadly construed. They take courses alongside students in other departments participating in the program in Philosophical and Literary Thought, administered through the DLCL. This option is not declared on Axess, thus it does not appear on the transcript or diploma. Majors who concentrate in Russian and Philosophy must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

Degree Requirements

Candidates for the B.A. degree with a concentration in Russian and Philosophy must complete an additional 67 units according to the following distribution:

Russian Language

A minimum of 12 units from:

	Units
SLAVLANG 111 Third-Year Russian, First Quarter	4
SLAVLANG 112 Third-Year Russian, Second Quarter	4
SLAVLANG 113 Third-Year Russian, Third Quarter	4
SLAVLANG 177 Fourth-Year Russian, First Quarter	3
SLAVLANG 178 Fourth-Year Russian, Second Quarter	3
SLAVLANG 179 Fourth-Year Russian, Third Quarter	3
SLAVLANG 181 Fifth-Year Russian, First Quarter	3
SLAVLANG 182 Fifth-Year Russian, Second Quarter	3
SLAVLANG 183 Fifth-Year Russian, Third Quarter	3

Russian Literature

A minimum of 16 units of Russian literature, including the following:

	Units
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 147 Modern Russian Literature and Culture: The Age of War and Revolution	3-5

Electives

At least 12 units of electives in Russian language and literature, chosen in consultation with the Chair of Undergraduate Studies.

Philosophy and Literature Gateway Course

	Units
SLAVIC 181 Philosophy and Literature	5

Philosophy Writing in the Major

	Units
PHIL 80 Mind, Matter, and Meaning (prerequisite: introductory philosophy course)	5

Philosophy Core

12 units of the following:

	Units
A course in the PHIL 170 series (value theory)	4
A course in the PHIL 180 series (theories of the mind, language, action)	4
A course in PHIL 100-139 series (history of philosophy)	4

Related Course

An upper-division course of special relevance to philosophy and literature. Major may choose from:

COMPLIT 217	The Poetry of Friedrich Holderlin	3-5
FRENCH 228E	Getting Through Proust	3-5
PHIL 193D	Dante and Aristotle	5
PHIL 194L	Montaigne	4

Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the Undergraduate Student Affairs Officer.

Capstone Seminar

One capstone seminar must be taken in the student's senior year. This year's capstone seminars are:

COMPLIT 199	Senior Seminar: The Pleasures of Reading	Units 5
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Honors Program

Slavic Languages and Literature majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty

member. Course will focus on researching and writing the honors thesis.

3. Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
4. Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
5. Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

Joint Major Program in Slavic Languages and Literatures and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 26)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Sciences).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Slavic Languages and Literatures Major Requirements in the Joint Major Program

The major tracks in Russian Language and Literature and Russian Language, Culture, and History are declared on Axxess and appear on the transcript but not on the diploma.

1. Senior year, the student enrolls in a 2 unit independent study SLAVIC 199 Individual Work for Undergraduates with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Slavic Languages and Literatures and Computer Science project, the student must submit a description of their project to the Chair of Undergraduate Studies in Slavic.
2. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the undergraduate student affairs officer for the major to begin the process.
3. The remaining units needed to reach 46 units could be completed through elective courses taken in Slavic, at the BOSP Center, or in other departments, as approved by the Chair of Undergraduate Studies.
4. Structured Liberal Education courses.
5. All courses taken at the BOSP Overseas campus may count toward the major electives.
6. Thinking Matters courses approved by the Chair of Undergraduate Studies may also be counted toward the electives.
7. Subject to approval by the Chair of Undergraduate Studies, courses from other fields may count if they contribute to the student's language

skills, the ability to interpret literature and other cultural material, or the capacity to analyze societies.

Writing in the Major

Undergraduates are required by the University to pass at least one writing intensive course in their field of concentration in order to graduate. Majors in any Slavic track may satisfy the writing requirement in 2014-15 by passing SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky.

Russian Language and Literature

The Russian Language and Literature field of study is designed for those students who wish to gain command of the Russian language and to study the nation's literary tradition. Emphasis is placed on the linguistic and philological study of literature, as well as the history of Russian literature and related media in the broader context of Russian culture. This major also welcomes students with an interest in Russian and Slavic linguistics.

Majors who concentrate in Russian Language and Literature must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

Degree Requirements

Candidates for the B.A.S. degree with a Russian Language and Literature field of study must complete an additional 46 units according to the following distribution:

Russian Language

A minimum of 12 units from:

	Units
SLAVLANG 111 Third-Year Russian, First Quarter	4
SLAVLANG 112 Third-Year Russian, Second Quarter	4
SLAVLANG 113 Third-Year Russian, Third Quarter	4
SLAVLANG 177 Fourth-Year Russian, First Quarter	3
SLAVLANG 178 Fourth-Year Russian, Second Quarter	3
SLAVLANG 179 Fourth-Year Russian, Third Quarter	3
SLAVLANG 181 Fifth-Year Russian, First Quarter	3
SLAVLANG 182 Fifth-Year Russian, Second Quarter	3
SLAVLANG 183 Fifth-Year Russian, Third Quarter	3

Russian Literature

The 20-unit core literature sequence consisting of:

	Units
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	5
SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky	5
SLAVIC 147 Modern Russian Literature and Culture: The Age of War and Revolution	5

Electives

Students must take 14 units of electives. These courses are chosen in consultation with the department's chair of undergraduate studies. With department consent, work in related academic fields may be applied toward

the degree requirements. Students who have completed a Thinking Matters Course instructed by Slavic faculty, with a grade of 'B' or better may count up to 10 units towards elective courses required for the major, as may students who have completed the SLE sequence.

Russian courses for 2014-15 include:

	Units
SLAVIC 77Q Russia's Weird Classic: Nikolai Gogol	3-4
SLAVIC 115 Between Europe and Asia: Introduction to Russian Culture	3
SLAVIC 129 Russian Versification: History and Theory	4
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 181 Philosophy and Literature	5
THINK 21 Folklore and Literature in Russia and Beyond: Vampires, Talking Cats, and Frog Princesses	4

Capstone

The capstone for students majoring in the joint program in Slavic+CS should be completed in any 300-level Slavic course taken in the junior or senior year, in consultation with the professor of that class. Before graduation, skills in writing, textual analysis, and discussion are evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the undergraduate student affairs officer.

Russian Language, Culture, and History

The Russian Language, Culture, and History field of study is for students who want to obtain command of the Russian language and to pursue a broad, interdisciplinary study of Russian literature and culture in historical context. Emphasis is on the relation of the Russian literary tradition to other arts, including film, as well as the disciplines that have enriched the historical understanding of Russian literature: history, anthropology, art history, political science, and sociology. Majors in the Russian Language, Culture, and History must earn a GPA of 2.0 (C) or better in order to receive credit toward the major.

Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

Degree Requirements

Candidates for the B.A.S. degree with a Russian Language, Culture, and History field of study must complete an additional 46 units according to the following distribution.

Russian Language

A minimum of 12 units from:

	Units
SLAVLANG 111 Third-Year Russian, First Quarter	4
SLAVLANG 112 Third-Year Russian, Second Quarter	4
SLAVLANG 113 Third-Year Russian, Third Quarter	4

SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3
SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

19th-Century Russian Literature and History

A minimum of 10 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

One of the following:

SLAVIC 145	Survey of Russian Literature: The Age of Experiment	5
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or SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky
A pre-revolutionary Russian history course. 5

20th-Century Russian Literature and History

A minimum of 10 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

SLAVIC 147	Modern Russian Literature and Culture: The Age of War and Revolution	5
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A post-revolutionary Russian history course. 5

Electives

Students must take 14 additional units of course work in Russian language, literature, history, or other fields, chosen in consultation with the Chair of Undergraduate Studies. Students who have completed IHUM 28A/B. Poetic Justice: Order and Imagination in Russian Culture, or Thinking Matters Courses instructed by Slavic faculty, with a grade of 'B' or better may count these 10 units towards elective courses required for the major, as may students who have completed the SLE sequence.

Russian courses for 2014-15 include:

		Units
SLAVIC 77Q	Russia's Weird Classic: Nikolai Gogol	3-4
SLAVIC 115	Between Europe and Asia: Introduction to Russian Culture	3
SLAVIC 129	Russian Versification: History and Theory	4
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 181	Philosophy and Literature	5
THINK 21	Folklore and Literature in Russia and Beyond: Vampires, Talking Cats, and Frog Princesses	4

Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course. Before graduation, skills in writing, textual analysis, and discussion will be evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the undergraduate student affairs officer.

Honors Program

Students have the option to complete the honors program for Computer Science and Slavic, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and honors requirements for this degree. Students also have the option to complete the honors program for Slavic only; such a thesis would not fulfill the capstone requirement for this degree.

Slavic Languages and Literature majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html) website.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf) The Major-Minor and Multiple Major Course Approval Form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf) is required for graduation for students with a joint major.

Dropping a Joint Major Program

Information about dropping a joint major program is still being developed. This bulletin will be updated when that information is available. Student may consult the Student Services Center (<http://studentaffairs.stanford.edu/studentervicescenter>) with questions concerning dropping the joint major.

Transcript and Diploma

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major". The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major".

Minors in Slavic Languages and Literatures

The Department of Slavic Languages and Literatures offers three undergraduate minor options.

The minor is designed for students who, while pursuing a major in another program, seek a comprehensive introduction to Russian culture through Russian language courses, a combination of minimal proficiency in Russian and courses in the history of Russian culture, or a multidisciplinary introduction to Russian, East European, and Eurasian studies. Students seeking a Slavic minor are encouraged to take advantage of the Bing Overseas Studies Program in Moscow. Students who have chosen one of the minor programs in Russian may use 5 units from a Thinking Matters course taught by a Slavic faculty member towards their electives with permission from their adviser.

Minor in Russian Language Prerequisites

The minor option in Russian Language requires completion of second year Russian, or the equivalent, as determined by the results of the Language Center placement examination.

Requirements

Candidates for the B.A. degree with a minor option in Russian Language must complete 24 units of Russian language and literature courses according to the following distribution:

12 to 15 units of Russian language:

	Units
SLAVLANG 111 Third-Year Russian, First Quarter	4
SLAVLANG 112 Third-Year Russian, Second Quarter	4
SLAVLANG 113 Third-Year Russian, Third Quarter	4
SLAVLANG 177 Fourth-Year Russian, First Quarter	3
SLAVLANG 178 Fourth-Year Russian, Second Quarter	3
SLAVLANG 179 Fourth-Year Russian, Third Quarter	3

The remaining 9-12 units should be chosen from:

	Units
SLAVIC 145 Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 147 Modern Russian Literature and Culture: The Age of War and Revolution	3-5
SLAVIC 148 Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin	3-5
SLAVIC 188 20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	3-5

Other courses offered within the Slavic Languages and Literatures department.

Or, with the approval of the department's Chair of Undergraduate Studies, courses in history, politics, linguistics, or other relevant programs.

Minor in Russian Language, Literature, and Culture

Prerequisites

The minor option in Russian Language, Literature, and Culture requires completion of first year Russian, or the equivalent, as determined by the results of the Language Center placement examination.

Requirements

Candidates for the B.A. degree with the minor option in Russian Language, Literature, and Culture must complete 28 units according to the following distribution:

A minimum of 16 units of courses on literature and culture including:

Option 1:

Two courses from the following:		
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 147	Modern Russian Literature and Culture: The Age of War and Revolution	3-5
SLAVIC 148	Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin	3-5

Option 2:

One course from the following:		
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 147	Modern Russian Literature and Culture: The Age of War and Revolution	3-5
SLAVIC 148	Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin	3-5
and one course from the following:		
SLAVIC 187	History of 18th and 19th century Russian Poetry	3-4
SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	3-5

12 units of elective courses either in the Department of Slavic Languages and Literatures or, with the approval of the Slavic Department's Chair of Undergraduate Studies, in other relevant programs dealing with Russian culture, politics, society, and history.

Minor in Russian, East European, and Eurasian Studies

The minor in Russian, East European and Eurasian Studies offers students the opportunity to choose courses offered by the Center for Russian, East European and Eurasian Studies (subject code REES) in various departments for their minor.

Requirements

Candidates for the B.A. degree with the minor option in Russian, East European, and Eurasian Studies must complete 28 units according to the following distribution:

1. Two core courses: one on Russia and one on Eastern Europe or Eurasia, to be chosen by the student from an annual list of qualifying courses issued by CREEES for their M.A. students.
2. At least four additional REES courses, totaling at least 20 units.
3. The student's core and additional courses must include 9 units of course work in the Slavic Department, either literature courses or Russian language in the third year or above. Courses must be distributed among at least three disciplines, such as Slavic, History, Political Science, Anthropology, Art and Art History, Economics, Religious Studies, and Sociology. The Slavic Chair of Undergraduate Studies determines which courses qualify for the minor.
4. A capstone experience in CREEES, including, but not limited to, one of the following:
 - a. a departmental seminar course for advanced undergraduates.
 - b. directed reading and research with a Stanford faculty member or a CREEES-approved resident or visiting scholar.
 - c. participation in the Stanford Overseas Studies Program in Moscow or Berlin.

Foreign Language

The Slavic/REES minor has no language requirement, but students are strongly encouraged to attain working competence in Russian or another relevant language. Courses at the third-year level or above in Russian or another language of Central Asia, the Caucasus, or Eastern Europe may be counted towards the Slavic/REES minor, up to a maximum of 3 units per academic quarter, 9 units total.

Additional Information

Courses taken at Stanford overseas campuses in Moscow and Berlin may count towards the REES minor, with the approval of the Slavic Chair of Undergraduate Studies; at least three courses for the minor must be taken in residence at Stanford.

Students interested in pursuing the Slavic/REES minor should consult the Slavic Chair of Undergraduate Studies.

Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered in this and other literature departments. See the "Literatures, Cultures, and Languages (<http://www.stanford.edu/dept/registrar/bulletin/6009.htm>)" section of this bulletin for further details about this minor and its requirements.

Coterminal Bachelor's and Master's Program in Slavic Languages and Literatures

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

The department allows a limited number of undergraduates to work for coterminal B.A. and M.A. degrees in Slavic Languages and Literatures with a concentration in Russian. In addition to University requirements for the B.A. degree, the student must:

1. Submit an application for admission by January 31 of the senior year. Applicants must meet the same general standards as those seeking admission to an M.A. program. Applicants must submit: an application for admission; a written statement of purpose; a transcript; and three letters of recommendation, at least two of which should be from members of the Department of Slavic Languages and Literatures faculty.

2. Meet all requirements for both the B.A. and M.A. degrees. Applicants must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 225 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three graduate-level courses.

Master of Arts in Slavic Languages and Literatures

The Department of Slavic Languages and Literatures offers a Master of Arts degree only to students concurrently enrolled in other Stanford degree programs. University requirements for the M.A. degree are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Admission

The requirements for admission to the master's degree program in Russian are:

1. A B.A. (or its equivalent) from an accredited college or university.
2. A command of the Russian language sufficient to permit the student to do satisfactory graduate work.
3. A familiarity with Russian literature sufficient to permit the student to perform adequately in courses at the graduate level.

The applicant's previous academic training in Russian language and literature normally serves as an indication of competence. Accordingly, the department does not ordinarily consider applications from students who have not had at least three years of college Russian and some undergraduate training in Russian literature of the 19th and 20th centuries. Before registering for the first quarter's work in the department, entering graduate students are required to take placement examinations in Russian. Students who fail to perform satisfactorily on such examinations must register for remedial courses in the areas in which they are deficient. Course work in third-year Russian and below carries no credit toward the M.A. degree.

Course Requirements

Candidates for the M.A. should plan course work that ensures adequate preparation for the M.A. final examination at the end of the third quarter of work. Course work should be planned in consultation with the graduate adviser, whose approval of the overall course load is required.

Candidates for the M.A. must complete a program of 45 units, of which 36 units must be selected from courses given by the department.

The Qualifying Paper

The Qualifying paper represents a complete article-length research paper (6,000-9,000 words) that, in both form and substance, qualifies for submission to English-language professional publications in the Slavic field. The Qualifying paper must be submitted to the thesis adviser no later than the eighth week of the final quarter of registration.

Final Examination

A final examination may substitute for the Qualifying paper requirement. The final examination requires a student to demonstrate in a written examination:

1. command of the phonology, morphology, syntax, and lexicology of contemporary standard Russian sufficient to teach beginning and intermediate courses at the college level
2. an ability to read contemporary Standard Russian sufficiently to assist students studying contemporary Russian poetry or literary prose

3. sufficient familiarity with Russian literature of either the 19th or 20th century to successfully handle survey courses dealing with the chosen period of specialization.

The examination should be taken at the end of the final quarter of required course work.

Doctor of Philosophy in Slavic Languages and Literatures

University requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Students enrolled in the Ph.D. program in Slavic Languages and Literatures are expected to fulfill the following requirements while meeting the program's deadlines in the course of their progress toward the degree:

1. Course Work, Breadth Requirements, and Overall Scheduling

In consultation with the Chair of Graduate Studies, students are expected to take 18 units of credit each quarter of their first year, 10 units each funded summer, and 10 units each quarter thereafter. They are expected to reach 135 units and attain TGR status in the winter of their fourth year. Entering graduate students must enroll in DLCL 369 Introduction to Graduate Studies: Criticism as Profession. For the Ph.D. degree students are free to select course work to suit their individual program of study. However, candidates must do so in consultation with their adviser (Chair of Graduate Studies or principal dissertation adviser) and are held responsible for all of the areas covered by the general examinations, regardless of whether they have registered for the department's offerings in a given field. For this reason, it is strongly recommended that before taking Ph.D. examinations, students complete seminar-level work directly related to the following broad areas:

- a. Russian poetry
- b. the Russian novel
- c. 20th-century Russian literature
- d. 19th-century Russian literature (the Age of Pushkin and after)
- e. 18th-century Russian literature (the early 1700's to the Age of Pushkin)
- f. medieval Russian literature
- g. a monograph course on a major Russian author
- h. theory of literature relevant to the major field

The candidate must have demonstrated commitment to graduate studies by completing a minimum of 21 content courses (not counting Summer Quarter) with a grade point average (GPA) of 3.3 or better in order to complete the requirements of the degree program. These must include 14 seminars in the Slavic Department.

1. Minor or Related Fields

During the course of study, students must develop substantial expertise in a field contiguous to the area of specialization. A candidate may elect to present a full minor or, in consultation with the graduate adviser, develop a special program in a related field, preferably no later than the second quarter of enrollment.

- a. *Related Field*—A student is required to complete a sequence of basic courses (12 units) in a chosen discipline outside the department of Slavic Languages and Literatures. The choice of patterns is one of the following:
 - i a sequence of three courses in another literature, selected in consultation with the adviser, or

- ii three basic courses in comparative literature chosen in consultation with the Chair of Graduate Studies (CGS), or
- iii a sequence of three courses in another department selected in consultation with the CGS.

- b. *Minor*—Students electing a minor should take a minimum of 20 units in graduate-level courses in the minor department or fulfill the Ph.D. minor requirements established by that department. Students considering minors should consult with their adviser, the CGS, the Chair of Slavic Languages and Literatures, and the Chair of the minor department.

2. Admission to Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the Qualifying Exam, and successful completion of teaching and research assistantships. Additionally, a student must have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of Slavic Languages and Literatures conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 45) and GAP (<http://gap.stanford.edu/4-6.html>).

3. Qualifying Paper

The candidate must submit a complete draft of a qualifying paper approved by the thesis adviser. The qualifying paper represents a complete article-length research paper (6,000-9,000 words) that qualifies in both form and substance for submission to an English language professional publication in the Slavic field. The deadline for the qualifying paper approval is the eighth week of the sixth quarter of registration. Failure to meet these requirements results in termination of enrollment from the Ph.D. program. Following such termination, the student who has fulfilled all of the M.A. requirements may be given the opportunity to take the M.A. written examination in the history of Russian literature. If successful, the student is then awarded the terminal M.A. degree. In exceptional cases, the written examination requirement may be waived at the discretion of the Chair of Graduate Studies and the Chair of the department.

4. Proficiency Test

Administered to all entering graduate students, this test determines whether the student's knowledge of Russian language and literature falls below the department's standard (Advanced Low on the OPI test). Students who fail are required to complete appropriate courses in the first year of graduate study. Courses required to meet the language proficiency are not counted towards the Course Work requirement of the Ph.D. degree.

5. Foreign Languages

A candidate must demonstrate reading knowledge of French or German, plus another language useful for the student's area of concentration, by passing written examinations, or receiving a grade of 'A-' or better in a qualifying class with consent of the CGS. The reading examination in German or French must be passed by the end of the first year of study. The reading examination in the second language of choice must be passed by the end of the second year of study.

6. Examinations

A candidate must pass the departmental general qualifying examinations. The comprehensive exam covers the history of Russian literature from the medieval period through the twenty-first century and is divided into six chronological sections. Two of these are taken early in the fourth quarter of enrollment and the remainder are taken in the seventh quarter of enrollment (preferably a day or two before the beginning of academic instruction). One section of the comprehensive exam is taken orally in Russian. The departmental oral qualifying examination follows no later than two weeks after completion of the comprehensive exams. The oral examination committee consists of four faculty members and may include one member representing the student's minor or related field; the rest must be drawn from among the Slavic Department faculty. The student makes a 20-minute presentation, following an academic conference format, and based possibly on the student's qualifying paper. Each examiner questions the student on the presentation and related topics in the history of Russian literature and the minor related field. Following the departmental examinations, a candidate must pass a University Oral examination, consisting of a defense of a doctoral dissertation prospectus and covering content relevant to the area of study, rationale for the proposed investigation, and strategy to be employed in the dissertation research. The prospectus defense is expected to be scheduled no later than the beginning of the tenth quarter of registration. Note: Ph.D. examinations are scheduled by the graduate student in consultation with the CGS.

7. Teaching

Students are required to complete five quarters of teaching within the funding period, including three quarters of first-year Russian and two quarters as a teaching assistant of literature for a faculty member, usually in the survey courses in translation:

		Units
a.		
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	3-5
SLAVIC 147	Modern Russian Literature and Culture: The Age of War and Revolution	3-5
SLAVIC 148	Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin	3-5

b. Students are required to take in preparation for teaching.

8. Yearly Review

The faculty must provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation

with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include:

- a. continuation of the student in good standing
- b. placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing.
 - i For students on probation at this point (or at any other subsequent points), possible outcomes of a review include:
 1. restoration to good standing
 2. continued probation, again with guidelines for necessary remedial steps
 3. termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

9. Continuation

Continuation in the Ph.D. program is contingent on fulfilling the following criteria: for first-year students, a high quality of performance in course work (decided by department evaluation); for second-year students, satisfactory academic progress and approval of the qualifying paper as described above. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the university, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements will result in corrective measures, which may include a written warning, academic probation, and/or release from the program.

Ph.D. Minor in Slavic Languages and Literatures

The department offers a Ph.D. Minor in Slavic Languages and Literatures. The requirement for the Ph.D. minor is completion of 25 units of graduate course work in Slavic Literature and Culture classes. Interested students should consult the Chair of Graduate Studies.

Emeriti: Gregory Freidin, Richard D. Schupbach, Joseph A. Van Campen

Director: Gabriella Safran

Chair of Graduate Studies: Lazar Fleishman

Chair of Undergraduate Studies: Gabriella Safran

Professors: Lazar Fleishman, Gabriella Safran

Associate Professor: Monika Greenleaf (on leave 2014-15)

Assistant Professor: Nariman Skakov (on leave Autumn 2014-15)

Courtesy Professor: Nancy Rutenburg

Visiting Professors: Alan Timberlake (winter, spring)

Senior Lecturer: Rima Greenhill

Lecturer: Eugenia Khassina

Mellon Fellow: Jessica Merrill

Overseas Studies Courses in Slavic Languages and Literatures

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

	Units
OSPMOSC 44	5
OSPMOSC 45	5
OSPMOSC 46	5
OSPMOSC 68	5
OSPMOSC 72	5

Sociology

Courses offered by the Department of Sociology are listed under the subject code SOC on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SOC&filter-catalognumber-SOC=on>) web site.

Sociology seeks to understand all aspects of human social behavior, including the behavior of individuals as well as the social dynamics of small groups, large organizations, communities, institutions, and entire societies. Sociologists are typically motivated both by the desire to better understand the principles of social life and by the conviction that understanding these principles may aid in the formulation of enlightened and effective social policy. Sociology provides an intellectual background for students considering careers in the professions or business. Students may pursue degrees in sociology at the bachelor's, master's, or doctoral levels. The department organizes its courses by areas of study to assist students in tailoring their education and research to their academic interests and career goals.

Mission of the Undergraduate Program in Sociology

The mission of the undergraduate program in Sociology is to provide students with the skills necessary to understand and address social problems and inequalities in global, institutional, and interpersonal social relations. At its core, the curriculum in the major is rooted in social theory and the scientific method. Sociology majors are given opportunities to develop a broad understanding of core sociological theories and the methodological skills used to evaluate human behavior and social organizations. Sociology provides an intellectual background for students considering careers in business, social services, public policy, government service, international nongovernmental organizations, foundations, or academia.

The Sociology major consists of a core curriculum plus elective courses intended to provide breadth of exposure to the variety of areas encompassed by sociology.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of sociology.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of sociology.

Graduate Programs in Sociology

The Department of Sociology offers three types of advanced degrees:

- the Doctor of Philosophy
- the coterminal Master of Arts in Sociology which is restricted to currently enrolled Stanford undergraduates
- the Master of Arts in Sociology which is available to Stanford students who are currently enrolled in other advanced degree programs.

The department does not have a terminal M.A. program for external applicants.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Sociology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Sociology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Sociology and to interpret and present the results of such research.

Areas of Study

The Department of Sociology specializes in four general areas of study, allowing students to tailor their education and research to their academic interests and career goals. The four areas of study supported by the department are:

Organizations, Business, and the Economy

Focus is on the arrangements which societies construct for the provision of material goods or services. A formal organization which provides goods or services for profit and sells them through a market is called a business, and the economic system is capitalism. Social needs are also met through government and not-for-profit organizations, such as garden clubs, hospitals, prisons, and the Red Cross; some private and social needs are met outside of organizations, such as health care provided by family members and exchange of favors among friends. Courses stress the factors that determine whether needs that people define are met through markets or non-market allocation, through organizations, or by other means. They also investigate the environmental and technical factors that shape organization structure, the determinants of how efficiently organizations operate, and the interpersonal processes that shape individual behavior within organizations.

Careers related to this field include management and administration in business or public settings, management consulting and analysis, and legal studies related to corporations, organizations, and business.

Social Movements, Comparative Politics, and Social Change

Focus is on the emergence, reproduction, and change of political systems and institutions, especially on why and how different political systems and social movements appear in different times and places, and how differences in political regimes and economic systems influence attempts to change these systems. The origins and significance of national and transnational social movements, transition to democracy, including revolution, nationalism, and other forms of collective action, in creating and sustaining these changes analyzed across countries and over time. Careers that are relevant to this field include law, public policy, government service, nonprofit and international nongovernmental organizations, business organizations (especially those with international interests), consulting, and managerial jobs.

Social Psychology and Interpersonal Processes

Focus is on the social organization of individual identity, beliefs, and behavior, and upon social structures and processes which emerge in and define interpersonal interactions. Processes studied include social acceptance and competition for prestige and status, the generation of power differences, the development of intimacy bonds, the formation of expectation states which govern performance in task oriented groups, and social pressures to constrain deviance. Foundation courses emphasize the effect of social processes on individual behavior and the analysis of group processes. This field provides training for careers with a significant interpersonal component, including advertising and marketing, business, education, law, management, medicine and health, or social work.

Social Inequality

Focus is on forms of social inequality, including fields such as: the shape and nature of social inequalities; competition for power; allocation of privilege; production and reproduction of social cleavages; and consequences of class, race, and gender for outcomes such as attitudes, political behavior, and life styles. Many courses emphasize changes in the structure of social inequalities over time, and the processes which produce similarities or differences in stratification across nations. Topics include educational inequality, employment history, gender differences, income distributions, poverty, race, and ethnic relations, social mobility, and status attainment. Careers related to this field include administration, advertising, education, foreign service, journalism, industrial relations, law, management consulting, market research, public policy, and social service.

Race, Gender, Immigration, Identity and Policy

Focus is on population diversity, primarily in the United States, and on how identity is formed and maintained. Classes in this subject area address segregation, integration, and assimilation. What does it mean to cross from one group to another? How has the law treated racial minorities, sexual minorities, and immigrants differently over time? Careers related to this field include social work, teaching, research, law, management, and population studies which can be applied to any industry.

Joint Programs in Sociology with the School of Law

The School of Law and Department of Sociology conduct joint programs leading to either a combined J.D. degree with an M.A. degree in Sociology or to a combined J.D. degree with a Ph.D. in Sociology.

Law students interested in pursuing an M.A. in Sociology apply for admission to the Department of Sociology during the first year of Law school. Once admitted to the Department of Sociology, the student must complete standard departmental master's degree requirements as specified in this bulletin. Applications for the joint J.D./M.A. degree program must be approved by both the department and the Law school. Faculty advisers from each program participate in the planning and supervising of the student's academic program.

The J.D./Ph.D. degree program is designed for students who wish to prepare themselves for research or teaching careers in areas relating to both legal and sociological concerns. Students interested in the joint degree program must be admitted to both the School of Law and the Department of Sociology. Interest in the joint degree program must be noted on each of the student's applications. Alternatively, an enrolled student in either the Law School or the Sociology department may apply to the other program, preferably during their first year of study. Students participating in the joint degree program are not eligible to transfer and receive credit for a masters, or other degree, towards the Sociology Ph.D..

Upon admission, students are assigned a joint program faculty adviser who assists the student in planning an appropriate program and ensuring that all requirements for both degrees are satisfied. The faculty adviser serves in this capacity during the student's course of study regardless of whether the student is enrolled in the School of Law or the Sociology department.

J.D./Ph.D. students may elect to begin their course of study in either the School of Law or the Department of Sociology. Students must be enrolled full-time in the Law school for the first year of Law school, and must enroll full time in the graduate school for the first year of the sociology program. After that time, enrollment may be in the graduate school or the Law school, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the Ph.D. degrees. Up to 81 quarter (54 semester) hours of approved courses may be counted toward both degrees, but no more than 36 quarter (24 semester) hours of courses that originate outside the Law school may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the Law school but count toward the Law degree, the Law school credits permitted under Section 17(1) of the Law School Regulations for cross-registration in other schools or departments of Stanford University are reduced on a unit-per-unit basis, but not below zero. Students must complete the equivalent of 183 quarter units to complete both degrees. Tuition and financial aid arrangements normally are through the school in which the student is currently enrolled.

The law degree may be conferred upon completion of applicable law school requirements; it is not necessary to have both degrees conferred simultaneously.

For more information, see the Sociology (<https://sociology.stanford.edu/academics/phd-programs/jdphd>) web site, and the Law School web site on the J.D./Ph.D. (<https://www.law.stanford.edu/degrees/joint-degrees/law-and-sociology>)

Bachelor of Arts in Sociology Declaring the Major in Sociology

To declare a major in Sociology, students should declare the B.A. in Axes, then download the major declaration form from the department website. Complete the top portion of the form, sign, and email the Director of the Undergraduate Program in Sociology to set up an entrance advising meeting.

Major Requirements

A 3.0 GPA is required to enter the Sociology major. The B.A. in Sociology requires 60 units of course work. Units applied to the major must be taken

for a letter grade (except for independent study or directed reading), and all earned grades must be 'C' or better.

Unit values for courses can vary from year to year. If you have any questions, contact the undergraduate student services officer in Sociology.

Core Curriculum for all Sociology Majors

Students are encouraged to complete some course work at the 200-level. Sociology majors are encouraged to participate in directed research or undertake independent research with Sociology faculty. See the department web site for additional information.

Units required for the Sociology B.A. are:

	Units
Sociology Core Courses (4 courses)	16
Sociology Foundation Courses (3 courses)	12
Social Science Electives (Units sufficient to bring the total # of units to 60--usually 4-6 courses)	27
Statistics (1 course)	5
Total Units	60

Core Courses Required for the Major

The following core courses are required of all Sociology majors.

	Units
SOC 170 Classics of Modern Social Theory	4
SOC 180A Foundations of Social Research	4
SOC 180B Introduction to Data Analysis	4
SOC 200 Junior/Senior Seminar for Majors	4-5
or SOC 202 Preparation for Senior Research	
Total Units	16-17

- It is recommended that students take this required course during junior year or as early as possible during senior year. Students pursuing the regular B.A. should take SOC 200 Junior/Senior Seminar for Majors. Students considering honors are encouraged to enroll in SOC 202 Preparation for Senior Research instead of SOC 200 Junior/Senior Seminar for Majors.

Foundation Courses Required for the Major

Sociology majors must complete 3 foundation courses; one course in three different areas for a total of three courses. For further information about Sociology areas of study, see the department web site.

Foundation courses, classified by area of study, are as follows:

Organizations, Business, and the Economy

	Units
SOC 114 Economic Sociology	4
SOC 160 Formal Organizations	4
SOC 162 Markets and Governance	4

Social Movements, Comparative Politics, and Social Change

		Units
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 130	Education and Society	4-5

Social Psychology and Interpersonal Processes

		Units
SOC 120	Interpersonal Relations	4
SOC 121	The Individual in Social Structure: Foundations in Sociological Social Psychology	5
SOC 127	Bargaining, Power, and Influence in Social Interaction	5

Social Inequality

		Units
SOC 140	Introduction to Social Stratification	3
SOC 141	Controversies about Inequality	5
SOC 144	Inequality and the Workplace	5
SOC 149	The Urban Underclass	4

Race, Gender, Immigration, Identity, and Policy

		Units
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 142	Sociology of Gender	5
SOC 145	Race and Ethnic Relations in the USA	4
SOC 150	Race and Political Sociology	3
SOC 155	The Changing American Family	4

Social Science Elective Courses

Social Science electives are required for the major, sufficient to bring the total number of units in the Sociology major to 60. You may take all elective courses in Sociology if you wish. Students may choose their elective courses according to personal interest. Non-Sociology courses must be approved by the director of undergraduate studies. A maximum of 10 units taken in other Social Science departments (Anthropology, Communication, Economics, Political Science, Psychology) may be counted towards the 60 units required for the Sociology B.A.

Statistics Requirement

Sociology majors are required to take at least one statistics course. The department suggests the courses listed below, or other comparable course with approval of the director of undergraduate studies.

Suggested Statistics courses for Sociology majors:

		Units
PSYCH 10	Introduction to Statistical Methods: Precalculus	5
SOC 181B	Sociological Methods: Statistics	5
STATS 60	Introduction to Statistical Methods: Precalculus	5

Honors Program

Sociology majors who wish to complete an independent scholarly project under the direction of a faculty member are encouraged to apply for admission to the department's honors program. Admission to the program requires a grade point average (GPA) of 3.5 or higher in courses taken within the major, and an overall GPA of 3.3 (B+) or higher in all undergraduate course work. Applicants are required to identify a Sociology faculty member to advise on the research and writing of the essay. With the approval of the Director of Undergraduate Studies, students may work with faculty advisers in other departments.

Students are encouraged to begin planning their honors thesis in their junior year; at this time they should enroll in SOC 202 Preparation for Senior Research, or SOC 200 Junior/Senior Seminar for Majors. Students begin designing their honors project in connection with this seminar and in consultation with the seminar leader. To apply for the honors program, students should complete the honors application, obtain an adviser's approval and signature, and submit the application with a brief description of the proposed project, and a copy of the student's unofficial undergraduate transcript, to the Director of Undergraduate Studies. Prospective candidates are asked to submit an honors application as soon as possible in their junior or senior year, ideally no later than the end of the fourth quarter prior to graduation (typically Spring Quarter of the junior year). Honors students may earn up to 12 independent study units for work leading to completion of the required honors thesis, excluding units associated with the Junior/Senior Seminar.

If the student is admitted to the program, students will be directed to declare the B.A.H. in Axxess and drop the general B.A. Completion of honors in Sociology requires:

1. Application and acceptance into the Sociology honors program
2. Completion of all requirements of the Sociology major
3. Completion of an honors thesis with a grade of A- or higher
4. Participation in the Sociology Honors Colloquium in the Spring Quarter prior to graduation.

If honors program requirements are not met, students must drop the B.A.H. degree program in Axxess and declare the B.A. before applying to graduate.

Minor in Sociology

Students must complete a minimum of 35 units in Sociology for the minor. Courses must be taken for a letter grade, and a minimum grade point average (GPA) of 2.0 (C) must be achieved. Students who wish to declare a minor in Sociology must do so no later than the deadline for their application to graduate. Related course work from other departments may fulfill a minor requirement. All course substitutions must be pre-approved by the Sociology student services office and the Undergraduate Program Director; a student may not exceed 5 substitution units for the minor.

Course requirements for a minor in Sociology are as follows:

	Units
SOC 170	4
SOC 180A	4
or SOC 180B	4
Two foundation courses: see foundation courses required for the major above	10
Additional course work in the department (100- or 200-level courses)	17
Total Units	35

Coterminal Master of Arts in Sociology

Stanford undergraduates, regardless of undergraduate major, who wish to pursue an M.A. in Sociology may apply for the coterminal master's program. The coterminal M.A. in Sociology is a flexible, self-designed program. Most students complete their M.A. in a fifth year at Stanford; occasionally students are able to complete their B.A. and coterminal M.A. in the fourth year.

Application and admission

Undergraduates must be admitted to the program and enrolled as a graduate student for at least one quarter prior to their B.A. conferral. A cumulative GPA of at least 3.5 in previous undergraduate work is required for admission; GRE test scores are required. It is highly recommended that applicants have completed at least one Sociology course at the 100 level with a grade of 'B' or better. The department accepts applications once a year; the application deadline is January 15th for admission in the Spring quarter immediately following. There are no exceptions to this deadline. All application materials are submitted directly to the Sociology graduate student services office. The department does not fund coterminal M.A. students. To apply for admission to the Sociology coterminal M.A. program, students must submit the coterminal application and the following:

1. Statement of purpose; should be 2-5 pages double-spaced. Applicants should outline reasons for pursuing the M.A. in Sociology, including career aspirations and/or future plans for additional advanced degrees;
2. Preliminary program; this is a form in the application packet. Specify at least 45 units of course work relevant to the degree program with at least 40 units in Sociology;
3. Current unofficial undergraduate transcript;
4. Two letters of recommendation from Stanford faculty familiar with the student's academic work; additional letters from teaching assistants, employers, or other individuals will be accepted as supplemental materials but are not required;
5. GRE scores.

Program requirements

Coterminal M.A. students are required to take 45 units of course work during their graduate career; 40 of these units must be in Sociology courses. All units for the coterminal M.A. must be taken at or above the 100 level; advanced-level course work is encouraged and a minimum of 20 units must be taken at the 200 level. Students who wish to take courses outside the department must seek prior approval from the Sociology student services office; coterminal master's students are limited to 5 units from outside of the department; outside courses must be taken in other Social Science departments. Students may transfer a maximum of 10 units from their undergraduate career; to be eligible for transfer, courses must have been taken in the two quarters preceding admission to the M.A. program. Courses cannot be transferred after a student's BA has been conferred. All units applied to the coterminal master's degree must be taken for a letter grade, and an overall grade point average (GPA) of 3.0 (B) or better is required for the degree. Because research methods are an important component of graduate training in the social sciences, coterminal students are encouraged to take SOC 180A Foundations of Social Research, and SOC 180B Introduction to Data Analysis, in sequence when possible. These methods courses provide skills for research opportunities within the department and in academic or professional careers. Coterminal M.A. students should meet with their assigned faculty adviser upon acceptance to the program.

Students are responsible for knowing and adhering to University and Departmental policies, standards, and requirements for coterminal

students. For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/bulletin/4874.htm>. (<http://registrar.stanford.edu/pdf/CotermApplic.pdf.html>) For detailed information regarding the Sociology coterminal M.A. and how to apply, see the Department of Sociology (<http://www.stanford.edu/dept/soc/coterminal>) web site.

Master of Arts in Sociology for Current Stanford Graduate Students

The M.A. degree in Sociology is available to current Ph.D. candidates in Sociology and to students in advanced degree programs (Ph.D., J.D., M.D.) from other Stanford departments and schools.

For the M.A. degree, students must complete a minimum of 45 units of Sociology course work with a grade point average (GPA) of 3.0 (B) or better. All 45 units must be taken in courses taught by Sociology faculty. Students must enroll in SOC course offerings; crosslisted offerings are not accepted. All courses must be taken for a letter grade if possible. Workshop, research, directed reading, and independent study units do not count towards the M.A.

University regulations pertaining to the M.A. are listed in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Students who wish to engage in more in-depth study in a specific area may do so by focusing on course work within an area of study.

No thesis is required.

While formal application to the M.A. program is not required, applicants from outside of the Sociology department must submit:

1. Graduate Authorization Petition form, available electronically through Axess (<https://axess.stanford.edu>);
2. Program Proposal for an M.A. form available for download from the registrar's office website, submitted to Sociology graduate student services officer;
3. Short statement of purpose; 1 page double-spaced, submitted to Sociology graduate student services officer.

Sociology Ph.D.s may receive their M.A. in their second or third year of graduate study. Interested students from other degree programs should visit the department's (<https://sociology.stanford.edu/academics/coterminal-masters-program/master-arts-sociology-current-stanford-graduate-students>) web site.

Doctor of Philosophy in Sociology

The Ph.D. curriculum and degree requirements are designed to provide students with the knowledge and skills to become proficient scholars and teachers. Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B-' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty and the following actions may take place: the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; the grade stands and the student is required to revise and resubmit the work associated with that course; or the student may be required to retake the course.

The following program requirements apply to students who entered the Ph.D. program in 2010-11 or later; students admitted prior to 2010 should consult the department or the Bulletin from their year of admission (<http://>

www.stanford.edu/dept/registrar/bulletin_past) for requirements specific to their cohort.

Students must complete the following department requirements for the Ph.D. degree in Sociology:

1. Students must enroll in SOC 305 Graduate Proseminar in Autumn Quarter of the first year. The course provides an introduction and orientation to the field of sociology, and to the department and faculty. One unit of credit is given for this course; grading is on a satisfactory/no credit basis.
2. Students are required to complete 45 units of course work in Sociology in the first academic year, then 15 units of Sociology course work in the second academic year. Course work excludes workshop, independent study, and directed reading units.
3. *Theory*: Students are required to take at least two courses in sociological theory. One course should be in either macro-sociological theory (SOC 370A Sociological Theory: Social Structure, Inequality, and Conflict), or micro-sociological theory (SOC 370B Social Interaction and Group Process), in the first year of the program. A second course, in research design, should be taken during the second year in the program SOC 372 Theoretical Analysis and Design). Students without a background in Sociology are encouraged to enroll in SOC 370A Sociological Theory: Social Structure, Inequality, and Conflict as well as .
4. *Methodology*: Students are required to complete a series of courses in methodology as well as one methods elective. Students with little background in statistics are encouraged to take an undergraduate statistics course in their first quarter of the program. The required methods sequence, to be taken in order, is listed below.
5. *Survey Courses*: Students must complete four broad survey courses to demonstrate command of a range of sociological literature. Each year the department specifies which courses meet this requirement. A list of courses that generally fulfill this requirement is listed below. Students should consult with their adviser to ensure that the combination of courses selected to meet this requirement exhibits sufficient breadth. This requirement is normally completed by the end of the second year of residency and must be met by the end of the third year of residency. The most current list of approved survey courses is available on the department website.
6. *Workshops*: Beginning in year two, doctoral students are required to enroll in at least one workshop each quarter. First year students may attend workshops but are not required to enroll. Sociology workshops are offered for 1-2 units on a credit/non-credit basis only and attendance is required to receive course credit. The Graduate Studies Director may approve a student's petition to attend a workshop when enrollment is prohibited by unit constraints; such attendance is not noted on the transcript. A list of approved workshops that fulfill this requirement is listed in the requirements section below and also on the department website.
7. *Qualifying Exam #1*: The first comprehensive examination is designed to ensure that students enter their second year with a firm reading knowledge of two substantive subfields. Students write two essays in response to questions provided by the examining committee. The questions are due exactly one week later. Students choose one of two questions to write on for each subfield. Examinations are offered in the subject areas below, based on comprehensive readings lists that are available at the beginning of each academic year. Each subject area has one faculty point person or group leader. Group leaders are responsible for assembling essay questions and agree to meet with students as requested.

Exam subject areas for 2014 -15 are:

- Economic Sociology
- Gender
- Historical and Comparative Sociology
- Organizations

- Political Sociology
- Population, Family, Demography, and Marriage
- Race, Ethnicity, and Immigration
- Social Inequality;
- Political Sociology/Social Movements
- Social Psychology

Students may work together to read and discuss the materials on the comprehensive reading lists (and in fact they are encouraged to do so). They may consult with faculty members as they study for the exams. However, once the examination questions are released, all such collaboration and consultation should stop, and students should work independently on their essays.

8. *Qualifying Exam #2*: The second qualifying examination is a longer critical essay that focuses on a bibliography devised by the student jointly with their faculty adviser. This exam provides students with a more focused critical engagement in a specialized subfield or research area, and serves as a test of the student's ability to work and think independently. Exam #2 is due May 15 of the second year in residence.

A two-person committee that includes the primary adviser evaluates the paper. Although the reading committee is usually comprised of two regular faculty members in the department, emeritus and other faculty outside of the department may serve as a committee member with prior approval. Examinations are graded by both committee members, and the grades on these qualifying exams are an important component of the decision to advance a student to candidacy.

To accommodate student interests and goals, there are two options for Exam #2, an analytic essay (Option 1) or research paper (Option 2); see department website for more detailed information <http://sociology/doctoral/degreq.html>. Students may employ one of the comprehensive examination reading lists (from Exam #1) for an area in which they did not take the exam to construct the bibliography. If students would like to be examined in a more specialized sub-area within one of the fields that they took for Exam #1, they should consult with their reading committee and receive approval from the Director of Graduate Studies. Students should submit the Second Year Qualifying Paper form to the department by the end of Autumn Quarter of the second year.

9. *Third Year Paper*: In preparation for a career of writing scholarly papers, each student must complete a research paper in the third year of residency. This third-year paper may be on any sociological topic, and may address theoretical, empirical, or methodological issues. The paper is expected to reflect original work and be of publishable quality. Students select a committee of at least two Sociology faculty members to serve as third year paper readers. Third-year students are required to enroll in (Soc 385, a workshop that assists in developing the front end of the research paper.) To ensure that students are making adequate progress on their paper, students are required to provide a first draft of the paper to readers by April 1st. The final deadline for paper submission is June 1st. The committee provides a review that speaks to (1) whether the paper is publishable and whether the student should therefore invest in attempting to publish it, and (2) what types of revisions, insofar as the paper is publishable, that the student should be pursuing to ready the paper for publication. These comments will be shared with the Director of Graduate Studies, and copies of the paper and faculty comments will go in the student file.
10. *TA requirement*: Students must complete three quarters of teaching apprenticeship in departmental courses, or in other courses by approval. Students working as either a teaching assistant (TA) under the supervision of a faculty member or as a teaching fellow (TF) fulfills this requirement. Students are required to take SOC 300, Workshop: Teaching Development, in Spring Quarter of the first year. In addition, students are encouraged to take advantage of department and University teacher training programs. Students for whom English is

a second language are expected to acquire sufficient facility in English to be an effective teacher.

11. *RA requirement*: As partial preparation for becoming an accomplished researcher, each student must complete three quarters of research experience, working under the supervision of one or more faculty members, including regular, emeritus, and affiliated faculty. The experience may involve paid (or unpaid) work as a Research Assistant (RA). With the approval of the Director of Graduate Studies, research experience may be acquired by involvement in research projects outside the department. It is recommended that students complete their research requirements early in their graduate program; the requirement must be completed by the end of the fourth year of residency.
12. Students are required to present at least two papers at a major professional meeting (e.g., ASA) in their first five years of graduate study.
13. In order to demonstrate the ability to conduct independent scholarly work, each student must prepare and defend dissertation prospectus by the end of May during the fourth year in residence.
14. *Dissertation Prospectus and Prospectus Defense*: In order to demonstrate the ability to conduct independent scholarly work, each student must prepare and defend dissertation prospectus by the end of May during the fourth year in residence. Students should have their dissertation committee selected by the end of their third year in the program.
15. Each student must complete and defend a doctoral dissertation. At the choice of the student (and in consultation with her or his adviser), the dissertation requirement may be met either by (1) submitting a book-length document, or (2) submitting three independent papers. The papers may address the same topic, but should be written as stand-alone, single-authored papers in standard journal format (i.e., AJS or ASR). None of these papers may overlap substantially with one another, and none of them may be co-authored. (The main criterion in judging substantial overlap is whether any standard journal, such as AJS, would regard the papers as too similar to publish both.) The dissertation must be submitted to all committee members at least 30 days in advance of the defense date. The dissertation defense serves as the Oral Examination required by the University. Assessment of satisfactory completion is determined by the student's doctoral committee members. All students are invited to present their dissertation findings at an informal department colloquium.

The faculty are responsible for providing students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if there are more serious concerns, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough; each student's performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residence or financial support. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strengths and potential weakness.

At the end of the second year of residency, students who are performing well are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded an M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The University requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for the fall quarter of the student's third year.

At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.

Degree Requirements

Survey Courses

Students must complete four courses from an approved list. This list is updated and circulated to students at the start of each academic year. *Note:* class offerings rotate; not all approved survey courses are offered every year. The following courses typically fulfill the survey course requirement:

SOC 310	Political Sociology
SOC 314	Economic Sociology
SOC 316	Historical and Comparative Sociology
SOC 318	Social Movements and Collective Action
SOC 320	Foundations of Social Psychology
SOC 323	Sociology of the Family (not offered 2012-13)
SOC 339	Gender Meanings and Processes
SOC 342B	Gender and Social Structure
SOC 347	Race and Ethnicity in Society and Institutions
SOC 357	Immigration and Assimilation
SOC 358	Sociology of Immigration
SOC 362	Organization and Environment
SOC 363A	Seminar on Organizational Theory
SOC 366A	Organizational Ecology
SOC 376	Perspectives on Organization and Environment: Social Movement Organizations and Environments

Research Methods

Required methodology courses are listed below. Students are required to enroll in SOC 384 New Models and Methods in the Social Sciences, in their first or second year of the program.

		Units
SOC 381	Sociological Methodology I: Introduction	5
SOC 382	Sociological Methodology II: Principles of Regression Analysis	4-5
SOC 383	Sociological Methodology III: Models for Discrete Outcomes	5
SOC 384	New Models and Methods in the Social Sciences	3

Theory

SOC 370A	Sociological Theory: Social Structure, Inequality, and Conflict	5
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SOC 370B	Social Interaction and Group Process	3-5
SOC 372	Theoretical Analysis and Design	3-5

Workshops

		Units
SOC 311A	Workshop: Comparative Studies of Educational and Political Systems	1-5
SOC 311B	Workshop: Comparative Systems of Educational and Political Systems	1-5
SOC 311C	Workshop: Comparative Studies of Educational and Political Systems	1-5
SOC 312W	Workshop: Political Sociology, Social Movements, and Collective Action	1-2
SOC 315W	Workshop: Economic Sociology and Organizations	1-2
SOC 317W	Workshop: Networks, Histories, and Theories of Action	1-2
SOC 321W	Workshop: Social Psychology and Social Structure	1-2
SOC 338W	Workshop: Sociology of Law	1-5
SOC 341W	Workshop: Inequality	1-2
SOC 350W	Workshop: Migration, Race, Ethnicity and Nation	1-3
SOC 368W	Workshop: China Social Science	1

Ph.D. Minor in Sociology

Sociology offers a minor for currently enrolled doctoral students in other Stanford departments and schools. Students must complete a minimum of 30 graduate-level units with a grade point average (GPA) of 3.0 (B) or better. All 30 units for the minor are to be in courses taught by Sociology faculty. Students must enroll in the SOC course offerings (not cross-listed sections). There is one exception: 5 units may be taken in a statistics or methods course taught in another department. All units must be taken for a letter grade. Workshop, research, directed reading, or independent study units do not count towards the Ph.D. minor. The program must be approved by a Sociology adviser and filed with the Sociology student services office. While there is not a formal application process, candidates must submit a short statement of purpose (2 pages), and a completed Application for Ph.D. Minor form (http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf) to the Sociology student services office. The Application for Ph.D. Minor form must have all Sociology or other courses to be applied to the minor listed, including course number, units, and final grades.

Emeriti: (Professors) Joseph Berger, Sanford M. Dornbusch, James G. March, John W. Meyer, W. Richard Scott, Nancy B. Tuma, Morris Zelditch Jr.

Chair: Mark Granovetter

Professors: Karen Cook, Shelley Correll, Mark Granovetter, David Grusky, Michael T. Hannan, Douglas McAdam, Susan Olzak, Cecilia Ridgeway, Gi-Wook Shin, C. Matthew Snipp, Andrew Walder, Xueguang Zhou

Associate Professors: Tomás Jiménez, Michael Rosenfeld, Robb Willer

Assistant Professors: Corey Fields, Michelle Jackson, Paolo Parigi, Aliya Saperstein, Cristobal Young

Courtesy Professors: Glenn Carroll, Prudence Carter, Michele Landis Dauber, Larry Diamond, Daniel McFarland, Walter Powell, Francisco Ramirez, Hayagreeva Rao, Sean Reardon, Jesper Sorensen, Sarah Soule

Courtesy Associate Professors: Mitchell Stevens, Christine Min Wotipka

Courtesy Assistant Professors: Amir Goldberg

Lecturer: Eva Meyersson Milgrom, Patricia Young

Consulting Professor: Ruth Cronkite

Visiting Associate Professors: Patricia Thornton

Overseas Studies Courses in Sociology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 66	Theory from the Bleachers: Reading German Sports and Culture	3
OSPFLOR 46	Images of Evil in Criminal Law: Icons and the Visual Representation on Wrongdoing	5
OSPKYOTO 64	Japanese Popular Culture	4-5
OSPMADR 61	Society and Cultural Change: The Case of Spain	4
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5

Stanford Global Studies

Stanford Global Studies (SGS) supports research and teaching in the cultures and societies of the world, and studies the problems facing developing societies as they seek to end their poverty and social and economic inequalities. SGS promotes new centers of teaching excellence in traditional areas of historical and cultural concerns, as well as promoting interdisciplinary activities related to developing new ideas for dealing with fundamental issues of justice, equality, and growth within nation states, cultures, and regions.

Stanford Global Studies is comprised of research centers, degree granting programs, and religion and cultural centers: Center for African Studies*; Center for East Asian Studies*; The Europe Center; Center for Latin American Studies*; Center for Russian, East European and Eurasian Studies*; Center for South Asia; Ford Dorsey Program in International Policy Studies*; France-Stanford Center for Interdisciplinary Studies; Hamid and Christina Moghadam Program in Iranian Studies; Mediterranean Studies Forum; Program in International Relations*; Sohaib and Sara Abbasi Program in Islamic Studies; and the Taube Center for Jewish Studies*.

Degree granting programs are denoted with an asterisk (*).

Center for African Studies

Director: Jeremy Weinstein
Office: 100 Encina Commons
Web Site: <http://africanstudies.stanford.edu>

The Center for African Studies (CAS) is an interdisciplinary research program. CAS offers an undergraduate minor and certificate, and a Master of Arts (M.A.) degree. For further information, see the "African Studies (p. 302)" section of this bulletin.

Center for East Asian Studies

Director: Gordon Chang
Office: Knight Building, 521 Memorial Way
Web Site: <http://ceas.stanford.edu>

The Center for East Asian Studies (CEAS) supports teaching and research on East Asia-related topics across all disciplines; disseminates knowledge about East Asia through projects of local, regional, national, and international scope; and serves as the intellectual gathering point for a collaborative and innovative community of scholars and students of East Asia. CEAS works with all schools, departments, research centers, and student groups to facilitate and enhance all aspects of East Asia-related research, teaching, outreach, and exchange across the Stanford campus.

For further information, see the "East Asian Studies (p. 426)" section of this bulletin.

The Europe Center

Director: Kenneth Scheve
Office: Encina Central C243
Web Site: <http://europe.stanford.edu>

The Europe Center is a multidisciplinary institute committed to the examination of European society, culture, politics, diplomacy, and security.

Center for Latin American Studies

Director: Rodolfo Dirzo
Office: Bolivar House
Web Site: <http://las.stanford.edu>

The Center for Latin American Studies at Stanford University (CLAS) is a National Resource Center dedicated to promoting research and community awareness about issues affecting Latin America. The Center offers an undergraduate minor, an interdisciplinary honors program for undergraduates, and a master's degree.

For further information, see the "Center for Latin American Studies (p. 536)" section of this bulletin.

Center for Russian, East European and Eurasian Studies

Director: Pavle Levi
Office: Encina Hall West, second floor
Web Site: <http://creees.stanford.edu>

The Center for Russian, East European and Eurasian Studies (CREEES) offers a one-year master's program in interdisciplinary area studies.

For further information, see the "Center for Russian, East European and Eurasian Studies (p. 606)" section of this bulletin.

Center for South Asia

Director: Thomas Blom Hansen
Office: Encina Hall West, first floor
Web Site: <http://southasia.stanford.edu>

The Center for South Asia (CSA) serves to coordinate and develop Stanford's resources for the study of South Asia across all the disciplines in the School of Humanities and Sciences. It works closely with departments and other units of the University to increase faculty strength, support research, enhance the curriculum, build the library collection, and sponsor programs and events.

Ford Dorsey Program In International Policy Studies

Director: Kathryn Stoner
Office: Encina Hall West, second floor
Web Site: <http://ips.stanford.edu>

The Ford Dorsey Program in International Policy Studies (IPS) is a two-year master's program that seeks to train the next generation of policy analysts to solve key global problems.

For further information, see the "International Policy Studies (p. 509)" section of this bulletin.

France-Stanford Center For Interdisciplinary Studies

Director: Amalia Kessler
Office: Building 260, room 122
Web Site: <http://francestanford.stanford.edu>

The France-Stanford Center for Interdisciplinary Studies, founded in partnership with the French Ministry of Foreign Affairs, aims to bridge the disciplines of the humanities, social sciences, sciences, engineering, business, and law, addressing historical and contemporary issues of significance for France and the United States. The Center brings together Stanford faculty and students and academics in France to advance collaborative research and foster interdisciplinary inquiry. Its programs include conferences, support for collaborative research projects, internships, exchanges, lectures, and seminars.

Hamid and Christina Moghadam Program In Iranian Studies

Director: Abbas Milani
Office: Encina Hall West, second floor
Web Site: <http://iranian-studies.stanford.edu>

The Hamid and Christina Moghadam Program in Iranian Studies at Stanford fosters the interdisciplinary study of Iran as a civilization, one of the oldest in the world. The program combines pedagogy, policy analysis, and research on all aspects of Iran's past, present, and future. The program organizes lectures and student research conferences on Iran.

Mediterranean Studies Forum

Director: Robert Crews
Office: Encina Hall West, Room 214
Web Site: <http://mediterraneanstudies.stanford.edu>

The Mediterranean Studies Forum encourages scholars to explore the interplay among societies, cultures, and communities around the Mediterranean Basin from the Middle Ages to the present. Its focus is on all aspects of co-existence and conflict that have marked these encounters in the empires, port cities, nation states, and transregional and transnational social, religious, cultural, and economic contexts of North Africa, Anatolia, the Levant, the Balkans, and Southern Europe. It is also interested in the relations of the Mediterranean with other regions and areas of the world. The central goal of the forum is to contribute to interfield and interdisciplinary dialogue among scholars of these areas through lectures, colloquia, workshops, conferences, and publications. Particular programming fields include Turkish Studies and Sephardic Studies.

Program in International Relations

Director: Mike Tomz
Office: Encina Hall West, second floor
Web Site: <http://internationalrelations.stanford.edu>

International Relations (IR) is an interdisciplinary undergraduate major focusing on changing political, economic, and cultural relations within the international system in the modern era.

For further information, see the "International Relations (p. 519)" section of this bulletin.

Sohaib and Sara Abbasi Program in Islamic Studies

Director: Robert Crews
Office: Encina Hall West, Room 214
Web Site: <http://islamicstudies.stanford.edu>

The mission of the Sohaib and Sara Abbasi Program in Islamic Studies is to serve as a forum for interdisciplinary research and teaching in Islamic studies, complemented by seminars, colloquia and public lectures. The program seeks to illuminate Islamic history from its beginnings to the 21st century, the religion of Islam in its many aspects, and the diversity of Muslim cultures and societies, past and present, not only in the Middle East but also including South and Southeast Asia, Africa, Europe, and America. In addition to geographical breadth, the program promotes the use of scholarly resources from both the humanities and the social sciences. Participating faculty and students bring perspectives and methods from academic fields including anthropology, art, economics, history, international relations, languages, law, literature, philosophy, political science, and religious studies. The program offers student grants for research and language training.

Taube Center For Jewish Studies

Director: Steven Weitzman
Office: Building 360, Room 362H
Web Site: <http://jewishstudies.stanford.edu>

The interdisciplinary Taube Center for Jewish Studies coordinates and promotes the study of all aspects of Jewish life. The center offers an undergraduate minor and an interdisciplinary major coordinated by the Humanities and Sciences dean's office.

For further information, see the "Jewish Studies (p. 531)" section of this bulletin.

Director: Norman Naimark

Advisory Committee: Robert Crews (History), Rodolfo Dirzo (Biology), Thomas Blom Hansen (Anthropology), Kathryn Stoner (Freeman Spogli Institute for International Studies)

Directors' Committee: Gordon Chang (History), Robert Crews (History), Rodolfo Dirzo (Biology), Thomas Blom Hansen (Anthropology), Amalia Kessler (Law), Pavle Levi (Art & Art History), Abbas Milani (Hoover Institution), Norman Naimark (History), Kenneth Scheve (Political Science), Kathryn Stoner (Freeman Spogli Institute for International Studies), Mike Tomz (Political Science), Jeremy Weinstein (Political Science), Stephen P. Weitzman (Religious Studies)

Statistics

Courses offered by the Department of Statistics are listed under the subject code STATS on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=STATS&filter-catalognumber-STATS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=STATS&filter-catalognumber-STATS=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=STATS&filter-catalognumber-STATS=on>).

The department's goals are to acquaint students with the role played in science and technology by probabilistic and statistical ideas and methods, to provide instruction in the theory and application of techniques that have been found to be commonly useful, and to train research workers in probability and statistics. There are courses for general students as well as those who plan careers in statistics in business, government, industry, and teaching.

The requirements for a degree in Statistics are flexible, depending on the needs and interests of the students. Some students may be interested in the theory of statistics and/or probability, whereas other students may wish to apply statistical and probabilistic methods to a substantive area. The department has long recognized the relation of statistical theory to applications. It has fostered this by encouraging a liaison with other departments in the form of joint and courtesy faculty appointments: Economics (Anderson, Romano), Education (Olkin, Rogosa), Electrical Engineering (Montanari), Geological and Environmental Sciences (Rajaratnam, Switzer), Health Research and Policy (Efron, Hastie, Johnstone, Lavori, Olshen, Tibshirani, Wong), Mathematics (Candés, Dembo, Diaconis), Political Science (Jackman), and the SLAC National Accelerator Laboratory (Friedman). The research activities of the department reflect an interest in applied and theoretical statistics and probability. There are workshops in biology/medicine and in environmental factors in health.

In addition to courses for Statistics students, the department offers a number of service courses designed for students in other departments. These tend to emphasize the application of statistical techniques rather than their theoretical development.

The department has always drawn visitors from other countries and universities. As a consequence, there is usually a wide range of seminars offered by both the visitors and the department's own faculty.

Undergraduate Programs in Statistics

Majoring in Statistics

Students wishing to build a concentration in probability and statistics are encouraged to consider declaring a major in Mathematical and Computational Science (<http://www.stanford.edu/group/mathcompsci>). This interdepartmental program is administered in the Department of Statistics and provides core training in computing, mathematics, operations research, and statistics, with opportunities for further elective work and specialization. See the "Mathematical and Computational Science" section of this bulletin.

Graduate Programs in Statistics

University requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Statistics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Statistics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Statistics and to interpret and present the results of such research.

Minor in Statistics

The undergraduate minor in Statistics is designed to complement major degree programs primarily in the social and natural sciences. Students with an undergraduate Statistics minor should find broadened possibilities for employment. The Statistics minor provides valued preparation for professional degree studies in postgraduate academic programs.

The minor consists of a minimum of six courses with a total of at least 20 units. There are two required courses (8 units) and four qualifying or elective courses (12 or more units). All courses for the minor must be letter graded. An overall 2.75 grade point average (GPA) is required for courses fulfilling the minor.

Required Courses

		Units
STATS 116	Theory of Probability	3-5
STATS 200	Introduction to Statistical Inference	3

Qualifying Courses

At most, one of these two courses may be counted toward the six course requirement for the minor:

		Units
MATH 52	Integral Calculus of Several Variables	5
STATS 191	Introduction to Applied Statistics	3-4

Elective Courses

At least one of the elective courses should be a STATS 200-level course. The remaining two elective courses may also be 200-level courses. Alternatively, one or two elective courses may be approved courses in other departments. Special topics courses and seminars for undergraduates are offered from time to time by the department, and these may be counted toward the course requirement. Students may not count any Statistics courses below the 100 level toward the minor. Examples of elective course sequences are:

		Units
Examples of elective course sequences are:		
Data Analysis and Applied Statistics		
STATS 202	Data Mining and Analysis	3
STATS 203	Introduction to Regression Models and Analysis of Variance	3
Statistical Methodology		
STATS 205	Introduction to Nonparametric Statistics	3
STATS 206	Applied Multivariate Analysis	3
STATS 207	Introduction to Time Series Analysis	3
Economic Optimization		

STATS 206	Applied Multivariate Analysis	3
ECON 160	Game Theory and Economic Applications	5
Psychology Modeling and Experiments		
STATS 206	Applied Multivariate Analysis	3
Signal Processing		
STATS 207	Introduction to Time Series Analysis	3
EE 264	Digital Signal Processing	3
EE 279	Introduction to Digital Communication	3
Genetic and Ecologic Modeling		
STATS 217	Introduction to Stochastic Processes	3
BIO 283	Theoretical Population Genetics	3
Probability and Applications		
STATS 217	Introduction to Stochastic Processes	3
STATS 218	Introduction to Stochastic Processes	3
Mathematical Finances		
STATS 240	Statistical Methods in Finance	3-4
STATS 243	Financial Models and Statistical Methods in Active Risk Management	3-4
STATS 250	Mathematical Finance	3

Master of Science in Statistics

The department requires that the student take 45 units of work from offerings in the Department of Statistics (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&filter=coursestatus-Active=on&page=0&catalog=&q=stats&collapse=>) or from authorized courses in other departments. With the advice of the masters advisers and of peer students, each student selects his or her own set of electives and pace of study. All requirements for the Statistics master's degree must be completed within three years after the student's first term of enrollment in the master's program (five years for Honors Cooperative students). Students pursuing a coterminal master's degree must complete their requirements within three years of their first quarter of graduate standing. Ordinarily, four or five quarters are needed to complete all requirements.

Units for a given course may not be counted to meet the requirements of more than one degree, that is, no units may be double-counted.

Students pursuing a coterminal master's degree must complete their requirements within three years of their first quarter of graduate standing. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit university minimum requirement for the master's degree.

For further information about the Statistics master's degree program requirements, see the department web site (<https://statistics.stanford.edu/academics/ms-statistics>). (<https://statistics.stanford.edu/masters-program-proposal-form>)

Students admitted to the Statistics M.S. program prior to academic year 2014-15 fulfill the requirements in effect at the time of their admission.

Students must earn a 3.0 GPA in the following M.S. degree requirements:

1. Statistics core courses (must complete all four courses):

		Units
STATS 116	Theory of Probability	3-5
STATS 191	Introduction to Applied Statistics	3-4
STATS 200	Introduction to Statistical Inference	3
STATS 217	Introduction to Stochastic Processes	2-3

All must be taken for a letter grade. Students with prior background may replace each course with a more advanced course from the same area.

Courses previously taken may be waived by the adviser, in which case they must be replaced by other graduate courses offered by the department.

2. Linear Algebra Mathematics requirement:

		Units
Select one of the following:		
MATH 104	Applied Matrix Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 171	Fundamental Concepts of Analysis	3

All must be taken for a letter grade. Substitution of other courses in Mathematics and Computer Science may be made with consent of the adviser.

3. Programming requirement:

		Units
Select one of the following: ¹		
CS 106A	Programming Methodology	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CME 108	Introduction to Scientific Computing	3-4

¹ The following courses are not offered this year but may be used by students who completed them in fulfillment of this requirement: CS 137, CS 138.

All must be taken for a letter grade. Substitution of other courses in Mathematics and Computer Science may be made with consent of the adviser.

4. Additional Statistics Courses

At least four additional Statistics courses must be taken from graduate offerings in the department (202-399). All must be taken for a letter grade. Students cannot count more than 6 units of STATS 260A Workshop in Biostatistics, STATS 260B Workshop in Biostatistics, STATS 260C Workshop in Biostatistics, STATS 298 Industrial Research for Statisticians, STATS 299 Independent Study, and STATS 399 Research toward the master's degree requirements.

		Units
STATS 260A	Workshop in Biostatistics	1-2
STATS 260B	Workshop in Biostatistics	1-2
STATS 260C	Workshop in Biostatistics	1-2
STATS 298	Industrial Research for Statisticians	1-3
STATS 299	Independent Study	1-10
STATS 390	Consulting Workshop	1-3
STATS 399	Research	1-10

5. Elective Courses

Additional elective units to complete the requirements may be chosen from the list available from the department web site (http://www-stat.stanford.edu/academics/msc_electives.html). Other graduate courses (200 or above) may be authorized by the adviser if they provide skills relevant to statistics or deal primarily with an application of statistics or probability and do not overlap courses in the student's program. There is sufficient flexibility to accommodate students with interests in applications to business, computing, economics, engineering, health, operations research, and biological and social sciences.

Courses below 200 level are generally not acceptable, with the following exceptions:

		Units
STATS 116	Theory of Probability	3-5

STATS 191	Introduction to Applied Statistics	3-4
MATH 104	Applied Matrix Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 171	Fundamental Concepts of Analysis	3
MATH 180	Introduction to Financial Mathematics	3
CS 106A	Programming Methodology	3-5
CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 140	Operating Systems and Systems Programming	3-4
CS 142	Web Applications	3
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	3-5
CS 164	Computing with Physical Objects: Algorithms for Shape and Motion	3
CS 170	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
CS 178	Digital Photography	3-5
CS 181	Computers, Ethics, and Public Policy	4

At most, one of these courses may be counted:

		Units
MATH 104	Applied Matrix Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 151	Introduction to Probability Theory	3
STATS 116	Theory of Probability	3-5

6. Submission of approved Master's Program Proposal (<https://statistics.stanford.edu/masters-program-proposal-form>), signed by the master's adviser, to the student services specialist by the end of the first quarter of the master's degree program. A revised program proposal is required to be filed whenever there are changes to a student's previously approved program proposal.

There is no thesis requirement.

Students with a strong mathematical background who may wish to go on to a Ph.D. in Statistics should consider applying to the Ph.D. program.

Master of Science in Statistics Data Science Subplan

The Department of Statistics and ICME have collaborated on a new subplan for the Master in Science degree focusing on big data in engineering and applied sciences. Students in the program will develop strong mathematical, statistical, computational, and programming skills through the ICME M.S. requirements and will gain a fundamental data science education by focusing 18 units of elective courses in the area of data science and related courses. Upon completion of the M.S. in Statistics with a subplan in Data Science, students will be prepared to continue on to their Ph.D. in Computer Science, ICME, or as a data science professional in industry.

The MSc in Data Science track is overseen by a steering committee comprised of ICME and Statistics faculty members. Current members are Professors Guenther Walther, Trevor Hastie, Emmanuel Candes, and Margot Gerritsen.

Students can apply to the program directly through **Statistics** by selecting the Data Science program during the application process. Selection of the students is made by the Statistics admission committee, which has representation from the Data Science subplan steering committee.

Submission of approved Master's Program Proposal, signed (<https://statistics.stanford.edu/stats-ds-program-proposal-form-pdf>) by the master's adviser, to the student services specialist by the end of the first quarter of the master's degree program. A revised program proposal is required to be filed whenever there are changes to a student's previously approved program proposal.

Subplans are printed on the transcript and diploma.

Curriculum and Degree Requirements

The coursework follows the requirements of the traditional ICME M.S. degree with additional restrictions placed on the general and focused electives. As defined in the general Graduate Student Requirements, students must maintain a grade point average (GPA) of 3.0 or better and classes must be taken at the 200 level or higher. The total number of units to complete the degree is 45.

Requirement 1: Mathematical Core (12 units)

Students must demonstrate breadth of knowledge in the field by completing the following core courses. Courses in this area must be taken for letter grade.

		Units
CME 302	Numerical Linear Algebra	3
CME 304	Numerical Optimization	3
CME 305	Discrete Mathematics and Algorithms	3

In addition to the three core courses, the students are required to take a course in stochastics. They can take either CME 308 Stochastic Methods in Engineering or an equivalent course approved by the steering committee. Must be taken for a letter grade.

Requirement 2: Advanced Scientific Programming and High Performance Computing Core (6 units)

To ensure that students have a strong foundation in programming, all students will be required to take 6 units of advanced programming, with at least 3 units in parallel computing. Courses in this area must be taken for letter grade.

Approved Advanced Programming courses: (3 units)

CME 212	Advanced Programming for Scientists and Engineers	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3

CS 107	Computer Organization and Systems	3-5
CS 249B	Large-scale Software Development	3

Approved Parallel Computing/HCP courses: (3 units)

CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 342	Parallel Methods in Numerical Analysis	3
CS 149	Parallel Computing	3-4

CS 315A	Parallel Computer Architecture and Programming	3
CS 316	Advanced Multi-Core Systems	3

Students who do not start the program with a strong computational and/or programming background will take an extra 3 units to prepare themselves by, for example, taking CME 211 Introduction to Programming for Scientists and Engineers or an equivalent course, such as CS106A/B or CS106X. For Data Science track students, the 1-unit course in MapReduce offered by ICME annually is also highly recommended.

Requirement 3: Statistics Core (12 units)

Courses in this area must be taken for letter grade.

The curriculum for the Data Science track requires 12 units of focused coursework in Statistics consisting of the following courses:

		Units
STATS 200	Introduction to Statistical Inference	3
STATS 203	Introduction to Regression Models and Analysis of Variance	3
or		
STATS 305	Introduction to Statistical Modeling	2-4
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

or equivalent courses as approved by the steering committee.

Of the following 15 units in Requirements **Four** and **Five** combined, 6 units must be taken for a letter grade.

Requirement 4: Domain Specialization or preparatory courses (9 units)

Three courses in specialized areas. One or two of these courses may be used by the students that enter the program with insufficient linear algebra or programming experience to prepare for the core requirements in the MS track.

Specialized courses include courses that further deepen the data science core. Some possibilities include:

		Units
CS 347	Parallel and Distributed Data Management	3
CS 448	Topics in Computer Graphics	3-4
CS 224W	Social and Information Networks	3-4
STATS 366	Modern Statistics for Modern Biology	3
BIOS 221	Modern Statistics for Modern Biology	
PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 303	Human and Machine Hearing	3
OIT 367	Business Intelligence from Big Data	4
BIOMEDIN 215	Data Driven Medicine	3
ENERGY 240	Geostatistics	2-3
BIOE 214	Representations and Algorithms for Computational Molecular Biology	3-4

Requirement 5: Practical component (6 units)

The students need 6 units of practical component that may include any combination of:

- Capstone project, supervised by a faculty member and approved by the steering committee: the capstone project should be computational in nature; students should submit a one-page proposal, supported by the faculty member, to the steering committee (gwalther@stanford.edu) for approval.
- Clinics, such as the new Data Science Clinic offered by ICME starting fall 2013

- Other courses that have a strong hands-on and practical component, such as Stats390 (Statistical Consulting).

Doctor of Philosophy in Statistics

The department looks for students who wish to prepare for research careers in statistics or probability, either applied or theoretical. Advanced undergraduate or master's level work in mathematics and statistics provides a good background for the doctoral program. Quantitatively oriented students with degrees in other scientific fields are also encouraged to apply for admission. The program normally takes five years to complete.

Program Summary

		Units
First-year core program		
STATS 300	Advanced Topics in Statistics (offered Summer Quarter)	2-3
STATS 300A	Theory of Statistics	2-3
STATS 300B	Theory of Statistics	2-4
STATS 300C	Theory of Statistics	2-4
STATS 305	Introduction to Statistical Modeling	3
STATS 306A	Methods for Applied Statistics	3
STATS 310A	Theory of Probability	2-4
STATS 310B	Theory of Probability	2-3
STATS 310C	Theory of Probability	2-4

- Pass two of three parts of the qualifying examinations (end of first year); breadth requirement (second or third year); successfully complete the thesis proposal meeting (before end of third year); pass the University oral examination (fourth or fifth year); dissertation (fifth year).
- In addition, students are required to take 9 units of advanced topics courses offered by the department:

		Units
Select at least two of the following:		
STATS 314	Advanced Statistical Methods	
STATS 317	Stochastic Processes	
STATS 318	Modern Markov Chains	
STATS 315A	Modern Applied Statistics: Learning	
STATS 315B	Modern Applied Statistics: Data Mining	

- Complete 3 units of STATS 390 Consulting Workshop.
- All students who have passed the qualifying exams but have not yet passed the Thesis Proposal Meeting must take STATS 319 Literature of Statistics at least once per year.

First-Year Core Courses

- STATS 300 Advanced Topics in Statistics systematically surveys the ideas of estimation and of hypothesis testing for parametric and nonparametric models involving small and large samples.
- STATS 305 Introduction to Statistical Modeling is concerned with linear regression and the analysis of variance.
- STATS 306A Methods for Applied Statistics and STATS 306B Methods for Applied Statistics: Unsupervised Learning survey a large number of modeling techniques, related to but going beyond the linear models of STATS 305 Introduction to Statistical Modeling.
- STATS 310A Theory of Probability, STATS 310B Theory of Probability, and STATS 310C Theory of Probability are measure-

theoretic courses in probability theory, beginning with basic concepts of the law of large numbers and martingale theory.

- Students who do not have enough mathematics background can take STATS 310A,B,C after their first year but need to have their first-year program approved by the Ph.D. program adviser.

Qualifying Examinations

These are intended to test the student's level of knowledge when the first-year program, common to all students, has been completed. There are separate examinations in the three core subjects of statistical theory and methods, applied statistics, and probability theory, and all are typically taken during the summer between the student's first and second years. Students may take two or three of these examinations and are expected to show acceptable performance in two examinations. Letter grades are not given. After passing the qualifying exams, students will file for Ph.D. candidacy, a University milestone.

Breadth Requirement

Students are advised to choose an area of concentration in a specific scientific field of statistical applications; this can be realized by taking at least 15 units of course work approved by the Ph.D. program adviser.

Popular areas with suggested course options include:

Computational Biology and Statistical Genomics

Students are expected to take 9 units of graduate courses in genetics or neurosciences (imaging), such as GENE 203/BIO 203 (Advanced Genetics), as well as 9 units of classes in Statistical Genetics or Bioinformatics:

Courses can be chosen from the following list: ¹

STATS 345	Statistical and Machine Learning Methods for Genomics	2-3
STATS 366	Modern Statistics for Modern Biology	3
STATS 367	Statistical Models in Genetics	3

- ¹ The following courses are not offered this year but may be used by students who completed them in fulfillment of this requirement: GENE 344A, GENE 344B, STATS 345, STATS 367.

Machine Learning

Courses can be chosen from the following list:

Statistical Learning

STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

Data Bases ¹

CS 245	Database Systems Principles	3
CS 346	Database System Implementation	3-5
CS 347	Parallel and Distributed Data Management	3

Probabilistic Methods in AI

CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 354		3

Statistical Learning Theory and Pattern Classification

CS 229	Machine Learning	3-4
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- ¹ CS 354 is not offered this year, but the department may offer it next year. If so, this course may be used in fulfillment of this requirement.

Applied Probability

Students are expected to take 15 units of graduate courses in some of the following areas:

		Units
Control and Stochastic Calculus ¹		
MSE 322	Stochastic Calculus and Control	3
MSE 351	Dynamic Programming and Stochastic Control	3
MATH 237	Default and Systemic Risk	3
Finance		
STATS 250	Mathematical Finance	3
FINANCE 622	Dynamic Asset Pricing Theory	4
MATH 236	Introduction to Stochastic Differential Equations	3
Information Theory ¹		
EE 376A	Information Theory	3
EE 376B	Network Information Theory	3
Monte Carlo		
STATS 318	Modern Markov Chains	3
STATS 345	Statistical and Machine Learning Methods for Genomics	2-3
STATS 362	Topic: Monte Carlo	2-3
Queueing Theory		
MSE 335	Queueing and Scheduling in Processing Networks	3
Stochastic Processes		
STATS 317	Stochastic Processes	3
MATH 234	Large Deviations Theory	3

- ¹ The following courses are not offered this year but may be used by students who completed them in fulfillment of this requirement: STATS 345, EE 363.

Earth Science Statistics

Students are expected to take:

		Units
STATS 317	Stochastic Processes	3
STATS 318	Modern Markov Chains	3
STATS 352		3

In addition, students are expected to take three courses from the GES or Geophysics departments, such as GES 144 or GEOPHYS 210. ¹

- ¹ GES 144 is no longer offered but may be used by students who completed the course in fulfillment of this requirement.

Social and Behavioral Sciences

Students are expected to take three advanced courses from the department with an applied orientation such as:

		Units
Courses can be chosen from the following list: ¹		
STATS 261/262	Intermediate Biostatistics: Analysis of Discrete Data	3
STATS 324	Multivariate Analysis	2-3

- ¹ The following courses are not offered this year but may be used by students who completed them in fulfillment of this requirement: STATS 343, 354.

In addition, students must complete at least three advanced quantitative courses from departments such as Anthropology, Economics, Political Science, Psychology, and Sociology, and the schools of Education, Business, or Medicine.

Thesis Proposal Meeting and University Oral Examinations

The thesis proposal meeting is intended to demonstrate students' depth in some areas of statistics, and to examine the general plan for their research. It also confirms that students have chosen a Ph.D. faculty adviser and have started to work with that adviser on a research topic. In the meeting, they will give a short presentation and discuss their ideas for completing a PhD thesis, with a committee consisting of their adviser and thesis committee (a total of four members). The meeting must be successfully completed before the end of their third year. "Successful completion" means that the general research plan is sound and has a reasonable chance of success. If they do not successfully complete the meeting to the satisfaction of the committee, then the meeting must be repeated. Repeated failure can lead to a loss of financial support.

The oral examination/dissertation defense is scheduled when the student has finished their dissertation and in the process of completing their final draft, usually within a month of scheduling the oral exam. The oral exam consists of a 40-minute presentation on the thesis topic, followed by a question period. The questions relate both to the student's presentation and also explore the student's familiarity with broader statistical topics related to the thesis research. The oral examination is normally completed within the last few months of the student's Ph.D. period. The examining committee usually consists of four faculty members from the Statistics Department and a fifth faculty member from outside the department. Four out of five passing votes are required and no grades are given. Nearly all students can expect to pass this examination, although it is common for specific recommendations to be made regarding completion of the thesis.

A reading committee must also read and approve the thesis. The reading committee is typically the same as the thesis committee from the thesis proposal meeting.

For further information on University oral examinations and committees, see the Graduate Academic Policies and Procedures (GAP) Handbook, section 4.7 (<http://gap.stanford.edu/4-7.html>) or the "University Oral Examination (p. 45)" section of this bulletin.

Doctoral and Research Advisers

From the student's arrival until the selection of a research adviser, the student's academic progress is monitored by the department Doctoral Adviser. Each student should meet at least once a quarter with the Doctoral Adviser to discuss their academic plans and their progress towards choosing a thesis adviser.

Financial Support

Students accepted to the Ph.D. program are offered financial support. All tuition expenses are paid and there is a fixed monthly stipend determined to be sufficient to pay living expenses. Financial support can be continued for five years, department resources permitting, for students in good standing. The resources for student financial support derive from funds made available for student teaching and research assistantships. Students receive both a teaching and research assignment each quarter which, together, do not exceed 20 hours. Students are encouraged to apply for outside scholarships, fellowships, and other forms of financial support.

Ph.D. Minor in Statistics

Students must complete 30 total units for the Ph.D. minor. 20 units must be from Statistics courses numbered 300 and above and taken for letter grades. The remaining 10 units can be from Statistics courses numbered 200 and above. The selection of courses must be approved by the Ph.D. adviser.

The Application for the Ph.D. Minor form must be approved by both the student's Ph.D. department and the Statistics department.

For further information about the Statistics Ph.D. degree program requirements, see the department web site (<http://www-stat.stanford.edu/academics/msc.html>).

Emeriti: Theodore W. Anderson, Jerome H. Friedman, Ingram Olkin, Charles Stein, Paul Switzer

Chair: Guenther Walther

Professors: Emmanuel Candès, Sourav Chatterjee, Amir Dembo, Persi Diaconis, David L. Donoho, Bradley Efron, Trevor J. Hastie, Susan P. Holmes, Iain M. Johnstone, Tze L. Lai, Art Owen, Joseph P. Romano, David O. Siegmund, Jonathan Taylor, Robert J. Tibshirani, Guenther Walther, Wing H. Wong

Associate Professor: Andrea Montanari

Assistant Professors: John Duchi, Lester Mackey, Balakanapathy Rajaratnam

Courtesy Professors: John Ioannidis, Philip W. Lavori, Richard A. Olshen

Courtesy Associate Professors: Simon Jackman, David Rogosa, Chiara Sabatti, Hua Tang

Courtesy Assistant Professors: Mike Baiocchi, Percy Liang

Consulting Professor: John Chambers

Stein Fellows: Sergio Bacallado, Yuval Benjamini, Rajarshi Mukherjee

Symbolic Systems

Courses offered by the Program in Symbolic Systems are listed under the subject code SYMSYS on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SYMSYS&filter-catalognumber-SYMSYS=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SYMSYS&filter-catalognumber-SYMSYS=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SYMSYS&filter-catalognumber-SYMSYS=on>).

The observation that both human beings and computers can manipulate symbols lies at the heart of Symbolic Systems, an interdisciplinary program focusing on the relationship between natural and artificial systems that represent, process, and act on information. Computer programs, natural languages, the human mind, and the Internet embody concepts whose study forms the core of the Symbolic Systems curriculum, such as computation, representation, communication, and intelligence. A body of knowledge and theory has developed around these notions, from disciplines such as philosophy, computer science, linguistics, psychology, statistics, neurobiology, and communication. Since the invention of computers, researchers have been working across these disciplines to study questions such as: in what ways are computers and computer languages like human beings and their languages; how can the interaction between people and computers be made easier and more beneficial?

The core requirements of the Symbolic Systems Program (SSP) include courses in symbolic logic, the philosophy of mind, formal linguistics, cognitive psychology, programming, the mathematics of computation, statistical theory, artificial intelligence, and interdisciplinary approaches to cognitive science. These courses prepare students with the vocabulary, theoretical background, and technical skills needed for study and research at the advanced undergraduate and graduate levels. Most of the courses in SSP are drawn from affiliated departments. Courses designed specifically for the program are aimed at integrating and supplementing topics covered

by the department-based offerings. The curriculum includes humanistic approaches to questions about language and intelligence, as well as training in science and engineering.

SSP offers B.S. and M.S. degree programs. Both programs require students to master a common core of required courses and to choose an area of specialization.

Mission of the Undergraduate Program in Symbolic Systems

The undergraduate program in Symbolic Systems is an interdisciplinary program focusing on the relationship between natural and artificial systems that represent, process, and act on information. The mission of the program is to prepare majors with the vocabulary, theoretical background, and technical skills necessary to research questions about language, information, and intelligence, both human and machine. The curriculum offers a combination of traditional humanistic approaches to these questions as well as a training and familiarity with contemporary developments in the science and technology of computation. Students in the major take courses in cognitive science, computer programming, computational theory, probability, cognitive psychology, linguistics, and artificial intelligence. The program prepares student for careers in corporate and private sectors as well as for further study in graduate school.

Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Symbolic Systems Program. Students are expected to demonstrate:

1. understanding of important concepts from the undergraduate core requirements.
2. ability to apply core concepts to an advanced problem area.
3. ability to apply concepts and methods from more than one discipline to a particular issue.
4. ability to think critically about advanced reading material.
5. ability to present a cogent, coherent, evidence-backed argument.
6. skills in active listening and productive intellectual discussion in class.

Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Symbolic Systems and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses representing each of the core disciplines of Symbolic Systems as well as an individualized course program in support of the completion of a Master's thesis.

Bachelor of Science in Symbolic Systems

The program leading to a B.S. in Symbolic Systems provides students with a core of concepts and techniques, drawing on faculty and courses from various departments. The curriculum prepares students for advanced training in the interdisciplinary study of language and information, or for postgraduate study in any of the main contributing disciplines. It is also excellent preparation for employment immediately after graduation.

Symbolic Systems majors must complete a core of required courses plus a field of study consisting of five additional courses. All major courses are to be taken for letter grades unless an approved course is offered satisfactory/no credit only. All core courses must be passed with a grade of 'C-' or better. Students who receive a grade lower than this in a core course must

alert the program of this fact so that a decision can be made about whether the student should continue in the major.

Core Requirements

In order to graduate with a B.S. in Symbolic Systems, a student must complete the following requirements. Some of these courses have other courses as prerequisites; students are responsible for completing each course's prerequisites before they take it. With the exception of the advanced small seminar requirement, courses cannot be used towards more than one area of the core requirements. For additional information, see the Symbolic Systems web site (http://symsys.stanford.edu/undergraduate_programs). *Note:* Students matriculating in the Class of 2018 or later must take SYMSYS 100 Minds and Machines before their declaration of the Symbolic Systems undergraduate major can be approved.

1. Introductory Core Course

Students matriculating in the Class of 2018 or later must take SYMSYS 100 Minds and Machines before their declaration of the Symbolic Systems undergraduate major can be approved.

	Units
SYMSYS 100 Minds and Machines	4

2. Continuous Fundamentals Level 1—Single Variable Calculus

Units

Select one of the following Series:

Series A	10
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10 units of Advanced Placement Calculus credit

Series B	10
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MATH 19 Calculus
& MATH 20 and Calculus
& MATH 21 and Calculus

Series C	10
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MATH 41 Calculus
or MATH 41A Calculus ACE
MATH 42 Calculus
or MATH 42A Calculus ACE

3. Continuous Fundamentals Level 2—Multivariable Calculus

Units

Select one of the following:¹

CME 100	Vector Calculus for Engineers	5
CME 100A	Vector Calculus for Engineers, ACE	6
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 51A	Linear Algebra and Differential Calculus of Several Variables, ACE	6
MATH 51H	Honors Multivariable Mathematics	5

¹ MATH 52 Integral Calculus of Several Variables and/or MATH 53 Ordinary Differential Equations with Linear Algebra, or CME 102 Ordinary Differential Equations for Engineers and/or CME 104 Linear Algebra and Partial Differential Equations for Engineers, are recommended and may be required for some optional higher level courses.

4. Continuous Fundamentals Level 3 —Probability and Statistics

Select one of the following:

CS 109	Introduction to Probability for Computer Scientists	3-5
STATS 116	Theory of Probability	3-5
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
MSE 120	Probabilistic Analysis	5
EE 178	Probabilistic Systems Analysis	4
MATH 151	Introduction to Probability Theory	3
CME 106/ENGR 155C	Introduction to Probability and Statistics for Engineers	3-4

5. Discrete Fundamentals

a. Computing Level 1

CS 106A	Programming Methodology	3-5
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b. Computing Level 2

Select one of the following:

CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	

c. Logic and Computational Theory

Select one of the following:

CS 103	Mathematical Foundations of Computing	3-5
PHIL 150	Mathematical Logic	
PHIL 150E	Logic in Action: A New Introduction to Logic	

6. Technical Depth

Two courses chosen from the list below (from either the same or different areas), appropriate to a student's concentration. Students concentrating in HCI, AI, or Computer Music must take CS 107 Computer Organization and Systems. Other concentrations may also restrict the particular courses that can be taken to fulfill this requirement. See concentration lists at <http://symsys.stanford.edu/viewing/htmldocument/16190>

Area A. Computer Programming

CS 107	Computer Organization and Systems (required for HCI, AI, or Computer Music)	3-5
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Area B. Computational Theory¹

CS 154	Introduction to Automata and Complexity Theory	3-4
CS 161	Design and Analysis of Algorithms	3-5

Area C. Logic

CS 157	Logic and Automated Reasoning	3
PHIL 151	Metalogic	4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4

Area D. Decision Theory/Game Theory

CS 224M	Multi-Agent Systems	3
ECON 160	Game Theory and Economic Applications	5
mse 236		
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4

Area E. Probability and Statistics

STATS 200	Introduction to Statistical Inference	3
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Units

CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
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¹ CS 156 is not offered in 2014-15 but may be used to fulfill this requirement.

7. Philosophical Foundations Level 1

Introductory Philosophy¹	3-5
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Select one of the following:

PHIL 1	Introduction to Philosophy	3-5
PHIL 2	Introduction to Moral Philosophy	
PHIL 60	Introduction to Philosophy of Science	
PHIL 102	Modern Philosophy, Descartes to Kant	
PHIL 135	Existentialism	
THINK 14		
THINK 24	Evil	

¹ SLE 91, 92, 93 (Must complete entire sequence).

² Other courses in Philosophy if approved by the Program Directors.

8. Philosophical Foundations Level 2

PHIL 80	Mind, Matter, and Meaning	5
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9. Philosophical Foundations Level 3

Select one of the following advanced undergraduate course in metaphysics/epistemology(post-PHIL 80):¹

PHIL 107B	Plato's Metaphysics and Epistemology	3
PHIL 173B	Metaethics	
PHIL 175	Philosophy of Law	
PHIL 180	Metaphysics	
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	
PHIL 181	Philosophy of Language	
PHIL 182	Truth	
PHIL 186	Philosophy of Mind	
PHIL 187	Philosophy of Action	

Note: Symbolic Systems majors must take PHIL 182 for 3 or more units.

10. Cognition and Neuroscience

PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 55		

An additional undergraduate course in cognition and/or neurosciences¹

Select one of the following:

BIO 20	Introduction to Brain and Behavior	3-4
BIO 150	Human Behavioral Biology	
PSYCH 30	Introduction to Perception	
PSYCH 45	Introduction to Learning and Memory	
PSYCH 50	Introduction to Cognitive Neuroscience	
PSYCH 60	Introduction to Developmental Psychology	

PSYCH 70	Introduction to Social Psychology
PSYCH 131	Language and Thought
PSYCH 141	Cognitive Development
PSYCH 154	Judgment and Decision-Making

11. Natural Language

Language and Mind

Units
4

Select one of the following:

LINGUIST 1	Introduction to Linguistics
LINGUIST 106	Introduction to Speech Perception
LINGUIST 140	Language Acquisition I
PSYCH 131	Language and Thought

Linguistic Theory

Units
4

Select one of the following:

LINGUIST 110	Introduction to Phonetics and Phonology
LINGUIST 120	Introduction to Syntax
LINGUIST 121	Crosslinguistic Syntax
LINGUIST 130A/230A	Introduction to Semantics and Pragmatics
LINGUIST 130B	Introduction to Lexical Semantics

12. Computation and Cognition

Units

Select one of the following:

A course applying core technical skills to cognition

CS 121	
CS 221	Artificial Intelligence: Principles and Techniques
CS 222	Rational Agency and Intelligent Interaction
CS 224M	Multi-Agent Systems
CS 227	
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
LINGUIST 180/CS 124	From Languages to Information
LINGUIST 182	Computational Theories of Syntax
PSYCH 204	Computation and cognition: the probabilistic approach
PSYCH 209	Neural network and deep learning models for cognition and cognitive neuroscience
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science

Advanced Small Seminar Requirement

An upper-division, limited-enrollment seminar drawing on material from other courses in the core. Courses listed under Symbolic Systems Program offerings with numbers from SYMSYS 200 through SYMSYS 209 are acceptable, as are other courses found in the course list below (other courses may be added throughout the Autumn Quarter). Total enrollment must not exceed 20 students for a course to be approved as fulfilling the Advanced

Small Seminar Requirement. A course taken to fulfill this requirement can also be counted toward another requirement, as part of either the core or a student's concentration, but not both.

		Units
CS 331A	Advanced Reading in Computer Vision	3
EDUC 342	Child Development and New Technologies	3
MUSIC 220C	Research Seminar in Computer-Generated Music	2-4
PHIL 385D	Topics in Philosophy of Language	2-4
PSYCH 145	Seminar on Infant Development	1-2
PSYCH 266	Current Debates in Learning and Memory	1-3
SYMSYS 206	Philosophy of Neuroscience	4
SYMSYS 245	Cognition in Interaction Design	3

Fields of Study

In addition to the core requirements listed above, the Symbolic Systems major requires each student to complete a field of study consisting of five courses that are thematically related to each other. Students select concentrations from the list below or design others in consultation with their advisers. The field of study is declared on Axxess; it appears on the transcript but not on the diploma.

- Applied Logic
- Artificial Intelligence
- Cognitive Science
- Computer Music
- Decision Making and Rationality
- Human-Computer Interaction
- Learning
- Natural Language
- Neurosciences
- Philosophical Foundations

Undergraduate Research

The program encourages all SSP majors to gain experience in directed research by participating in faculty research projects or by pursuing independent study. In addition to the Symbolic Systems Honors Program (see below), the following avenues are offered.

Summer Internships: students work on SSP-related faculty research projects. Application procedures are announced in the winter quarter for SSP majors.

Research Assistantships: other opportunities to work on faculty research projects are typically announced to SSP majors as they arise during the academic year.

Independent Study: under faculty supervision. For course credit, students should enroll in SYMSYS 196 Independent Study.

Contact SSP for more information on any of these possibilities, or see the Symbolic Systems (<http://symsys.stanford.edu>) web site. In addition, the Undergraduate Advising and Research office offers grants and scholarships supporting student research projects at all levels; see http://ual.stanford.edu/OO/research_opps/Grants.

Honors Program

Seniors in SSP may apply for admission to the Symbolic Systems honors program prior to the beginning of their final year of study. Students who are accepted into the honors program can graduate with honors by completing an honors thesis under the supervision of a faculty member. Course credit for the honors project may be obtained by registering for , for any quarters while a student is working on an honors project. Juniors who are interested in doing an honors project during their senior year are advised to take

SYMSYS 200 Symbolic Systems in Practice. SYMSYS 191 Senior Honors Seminar, is recommended for honors students during the senior year. Contact SSP or visit the program's web site for more information on the honors program, including deadlines and policies.

Minor in Symbolic Systems

Students may minor in Symbolic Systems by completing either Option 1 or Option 2. For additional information see the Symbolic Systems minors web site (<http://symsys.stanford.edu/viewing/htmldocument/13635>).

Option 1

One course in each of the following core areas (please note that several of these courses have prerequisites):

a. Cognition

Select one of the following:

SYMSYS 100 Minds and Machines ¹

PSYCH 45 Introduction to Learning and Memory

PSYCH 50 Introduction to Cognitive Neuroscience

PSYCH 55

b. Logic and Computation

Select one of the following: 3-5

PHIL 150 Mathematical Logic

PHIL 150E Logic in Action: A New Introduction to Logic

PHIL 151 Metalogic

CS 103 Mathematical Foundations of Computing

c. Computer Programming

Select one of the following: 3-5

CS 106B Programming Abstractions

CS 106X Programming Abstractions (Accelerated)

CS 107 Computer Organization and Systems

d. Philosophical Foundations

Select one of the following:

SYMSYS 100 Minds and Machines ¹ 4

PHIL 80 Mind, Matter, and Meaning 5

e. Formal Linguistics

Select one of the following:

LINGUIST 110 Introduction to Phonetics and Phonology 4

LINGUIST 120 Introduction to Syntax

LINGUIST 130A Introduction to Semantics and Pragmatics

f. Artificial Intelligence 3-4

Select one of the following:

CS 221 Artificial Intelligence: Principles and Techniques

CS 222 Rational Agency and Intelligent Interaction

CS 224M Multi-Agent Systems

CS 227

CS 228 Probabilistic Graphical Models: Principles and Techniques

CS 229 Machine Learning

LINGUIST 180 From Languages to Information

LINGUIST 182 Computational Theories of Syntax

PSYCH 204 Computation and cognition: the probabilistic approach

Units

PSYCH 209 Neural network and deep learning models for cognition and cognitive neuroscience

PSYCH 239 Formal and Computational Approaches in Psychology and Cognitive Science

¹ SYMSYS 100 Minds and Machines may not be counted for both areas 'a' and 'd'.

Option 2

SYMSYS 100 Minds and Machines, plus an interdisciplinary SSP concentration listed on the SSP (<http://symsys.stanford.edu/viewing/htmldocument/16190>) web site. To qualify, the selection of courses used for the minor must be interdisciplinary; it must either include courses from at least three departments, or include more than one course from each of two departments.

Coterminal Bachelor's and Master's Degrees in Symbolic Systems

Many SSP majors also complete coterminal M.S. or M.A. degrees in affiliated departments. In addition to the Symbolic Systems M.S. program, the Department of Philosophy offers a Special Program in Symbolic Systems track for interdisciplinary graduate level work leading to the Master of Arts in Philosophy (<http://www.stanford.edu/dept/registrar/bulletin/6567.htm>).

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. For University coterminal degree program rules and University application forms, see the Publications and Online Guides (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>) web site.

Master of Science in Symbolic Systems

The University's basic requirements for the M.S. degree is discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

The M.S. degree in Symbolic Systems is designed to be completed in the equivalent of one academic year by coterminal students or returning students who already have a B.S. degree in Symbolic Systems, and in two years or less by other students depending upon level of preparation. Admission is competitive, providing a limited number of students with the opportunity to pursue course and project work in consultation with a faculty adviser who is affiliated with the Symbolic Systems Program. The faculty adviser may impose requirements beyond those described here.

Admission to the program as a coterminal student is subject to the policies and deadlines described in the "Coterminal Bachelor's and Master's Degrees (p. 41)" section of this bulletin. Applicants to the M.S. program are reviewed each Winter Quarter. Information on deadlines, procedures for applying, and degree requirements are available from the program's student services coordinator in the Linguistics Department office (460-127E) and at the Symbolic Systems (<http://symsys.stanford.edu/viewing/htmldocument/13623>) web site.

Degree Requirements

A candidate for the M.S. degree in Symbolic Systems must complete a program of 45 units. At least 36 of these must be graded units, passed with an average grade of 3.0 (B) or better. Any course taken as part of the 45-unit program must be taken for a letter grade unless the course is offered 'S/NC' only. Furthermore, none of the 45 units to be counted toward the M.S. degree may include units counted toward an undergraduate degree at Stanford or elsewhere. Course requirements are waived only

if evidence is provided that similar or more advanced courses have been taken, either at Stanford or another institution. Courses that are waived rather than taken may not be counted toward the M.S. degree. For additional information, see the Symbolic Systems web site (http://symsys.stanford.edu/graduate_programs).

Each candidate for the M.S. degree must fulfill the following requirements:

1. Submission to the Symbolic Systems Program office and approval of the following pre-project research documents:
 - a. Project Area Statement, endorsed with a commitment from a student's prospective project adviser no later than May 1 of the academic year prior to the expected graduation year; and
 - b. Qualifying Research Paper due no later than the end of the Summer Quarter prior to the expected graduation year.
2. Completion of a coherent plan of study, to be approved by the Graduate Studies Director in consultation with the student's adviser and designed to support a student's project. An initial plan of study should be delineated on the Program Proposal Form prior to the end of the student's first quarter of study, to be modified at the time of the Project Area Statement with the approval of a student's adviser and the Graduate Studies Director. The final version of the Program Proposal, which should specify all the courses the student has taken and proposes as fulfillment of the unit requirements for the degree, is due by the end of Finals Week in the quarter prior to the student's expected graduation quarter (i.e. end of Winter Quarter for a student graduating in the Spring). The plan of study must include courses more advanced than the Symbolic Systems undergraduate core in four main skill areas: formal, empirical, computational, and philosophical; and in at least three of the following departments: Computer Science, Linguistics, Philosophy, and Psychology. More advanced courses in each of the skill areas are defined as follows:

a) formal: a course in logic and computational theory beyond the level of PHIL 151 Metalogic. The courses below have been approved. Other courses may be approved if appropriate.

- PHIL 252 Computability and Logic
- PHIL 254 Modal Logic
- PHIL 350A Model Theory
- PHIL 352A Set Theory
- PHIL 355 Logic and Social Choice
- CS 154 Introduction to Automata and Complexity Theory
- CS 157 Logic and Automated Reasoning
- CS 161 Design and Analysis of Algorithms
- CS 364A Algorithmic Game Theory

b) empirical: a course drawing on experimental or observational data or methods, beyond the level of Psych 55, Ling 120, or Ling 130A. The courses below are examples of those that have been approved. Other courses may be approved if appropriate.

- COMM 268 Experimental Research in Advanced User Interfaces
- CS 224N Natural Language Processing
- CS 376 Human-Computer Interaction Research
- LINGUIST 230B Semantics and Pragmatics I
- LINGUIST 241 Language Acquisition II
- LINGUIST 274C Linguistic Field Methods: Syntax
- NBIO 258 Information and Signaling Mechanisms in Neurons and Circuits
- PSYCH 204 Computation and cognition: the probabilistic approach
- PSYCH 204A Human Neuroimaging Methods
- PSYCH 252 Statistical Methods for Behavioral and Social Sciences
- PSYCH 254 Lab in Experimental Methods
- STATS 200 Introduction to Statistical Inference

c) computational: a course involving programming beyond the level of CS 107. The courses below have been approved. Other courses may be approved if appropriate.

- CS 108 Object-Oriented Systems Design
- CS 110 Principles of Computer Systems
- CS 124 From Languages to Information
- CS 142 Web Applications
- CS 143 Compilers
- CS 148 Introduction to Computer Graphics and Imaging
- CS 193R
- CS 193S
- CS 221 Artificial Intelligence: Principles and Techniques
- CS 224N Natural Language Processing
- CS 224W Social and Information Networks
- CS 249A Object-Oriented Programming from a Modeling and Simulation Perspective

d) philosophical: a course in the area of Philosophy of Mind/Language/Science/Epistemology or Metaphysics at the 200 level or above, certified by the instructor as worthy of graduate credit. The courses below are examples of those that have been approved. Other courses may be approved if appropriate.

- PHIL 264 Central Topics in the Philosophy of Science: Theory and Evidence
- PHIL 267B Philosophy, Biology, and Behavior
- PHIL 280 Metaphysics
- PHIL 281 Philosophy of Language
- PHIL 285B Philosophy of Perception
- PHIL 286 Philosophy of Mind
- PHIL 287 Philosophy of Action
- PHIL 383B What's an Inference?
- CS 378
- SYMSYS 206 Philosophy of Neuroscience

3. Completion of three quarters of SYMSYS 291 Master's Program Seminar.

4. Completion of a substantial project appropriate to the program plan, represented by the M.S. Thesis, the last of the the M.S research documents (<http://symsys.stanford.edu/viewing/htmldocument/13678>). The project normally takes three quarters, and work on the project may account for up to 15 units of a student's program. The thesis must be read and approved for the master's degree in Symbolic Systems by two qualified readers approved by the program, at least one of whom must be a member of the academic council. A copy of the thesis must be submitted (in both print and electronic forms) to the Associate Director of Symbolic Systems, with the print version including the signatures of each reader indicating approval of the thesis for the degree of Master of Science, no later than 5 pm on the last day of finals week in the quarter of a student's graduation.

Director: Kenneth Taylor

Director of Graduate Studies: Kenneth Taylor

Associate Director: Todd Davies

Program Committee Michael Bernstein, Herbert Clark, Todd Davies, Michael C. Frank, Daniel Jurafsky, Krista Lawlor, Christopher Manning, James McClelland, Stanley Peters, Christopher Potts, Eric Roberts, Kenneth A. Taylor, Johan van Benthem, Thomas A. Wasow,

Program Faculty:

Applied Physics: Bernardo Huberman (Consulting Professor)

Art and Art History: Scott Bukatman (Professor)

Classics: Reviel Netz (Professor)

Civil and Environmental Engineering: John Kunz (Lecturer)

Communication: Jeremy Bailenson (Associate Professor), Byron Reeves (Professor), Frederick Turner (Associate Professor)

Computer Science: Michael Bernstein (Assistant Professor), David Dill (Professor), Michael Genesereth (Associate Professor), Oussama Khatib (Professor), Daphne Koller (Consulting Professor), Jean-Claude Latombe (Professor, emeritus), Marc Levoy (Professor, emeritus), Christopher Manning (Professor), Andrew Ng (Associate Professor), Nils Nilsson (Professor, emeritus), Vaughan Pratt (Professor, emeritus), Eric Roberts (Professor), Tim Roughgarden (Associate Professor), Mehran Sahami (Associate Professor, Teaching), Yoav Shoham (Professor), Sebastian Thrun (Professor, research), Terry Winograd (Professor, emeritus)

Economics: Muriel Niederle (Professor)

Education: BJ Fogg (Consulting Professor), Raymond P. McDermott (Professor), Roy Pea (Professor), Daniel Schwartz (Professor)

Electrical Engineering: Krishna Shenoy (Professor)

French and Italian: Jean-Pierre Dupuy (Professor)

Genetics: Russ B. Altman (Professor)

Graduate School of Business: Baba Shiv (Professor)

History: Jessica G. Riskin (Associate Professor)

Linguistics: Arto Anttila (Associate Professor), Joan Bresnan (Professor, emerita), Eve Clark (Professor), Cleo Condoravdi (Professor Research), Penelope Eckert (Professor), Daniel Jurafsky (Professor), Ronald Kaplan (Consulting Professor), Lauri Karttunen (Consulting Professor), Martin Kay (Professor), Daniel Lassiter (Assistant Professor), Beth Levin (Professor), Christopher Manning (Professor), Stanley Peters (Professor, emeritus), Christopher Potts (Associate Professor), Meghan Summer (Associate Professor), Thomas A. Wasow (Professor, emeritus), Annie Zaenen (Consulting Professor),

Management Science and Engineering: Pamela Hinds (Associate Professor)

Mathematics: Persi Diaconis (Professor), Solomon Feferman (Professor, emeritus)

Medicine: Russ B. Altman (Professor), Mark Musen (Professor)

Music: Jonathan Berger (Professor), Christopher Chafe (Professor), Eleanor Selfridge-Field (Consulting Professor), Ge Wang (Assistant Professor)

Neurobiology: Ben Barres (Professor), William T. Newsome (Professor), Jennifer Raymond (Associate Professor)

Philosophy: Michael Bratman (Professor), Alexis Burgess (Assistant Professor), Mark Crimmins (Associate Professor), John Etchemendy (Professor), Solomon Feferman (Professor, emeritus), Dagfinn Føllesdal (Professor, emeritus), Thomas Icard III (Assistant Professor), Krista Lawlor (Associate Professor), Anna-Sara Malmgren (Assistant Professor), John Perry (Professor, emeritus), Brian Skryms (Professor), Kenneth Taylor (Professor), Johan van Benthem (Professor), Thomas A. Wasow (Professor, emeritus)

Psychiatry and Behavioral Sciences: Vinod Menon (Professor, Research)

Psychology: Herbert H. Clark (Professor), Anne Fernald (Associate Professor), Michael C. Frank (Assistant Professor), Noah Goodman (Assistant Professor), Kalanit Grill-Spector (Associate Professor), Brian Knutson (Associate Professor), Ellen Markman (Professor), James McClelland (Professor), Samuel McClure (Assistant Professor), Barbara Tversky (Professor, emerita), Anthony Wagner (Professor), Brian Wandell (Professor)

Statistics: Persi Diaconis (Professor), Susan P. Holmes (Professor)

Symbolic Systems: Todd Davies (Lecturer), Jeff Shrager (Consulting Professor), Paul Skokowski (Consulting Professor)

Other Affiliates: David Barker-Plummer (CSLI Engineering Research Associate), Keith Devlin H-STAR Operation Senior Researcher), Daniel Flickinger (CSLI Research and Development Engineer)

Cognate Courses for the Bachelor's Degree

The following is a list of cognate courses that may be applied to the B.S. in Symbolic Systems. Click on the course or see ExploreCourses for course descriptions and General Education Requirements (GER) information.

Core

		Units
BIO 20	Introduction to Brain and Behavior	3
CME 100	Vector Calculus for Engineers	5
CME 100A	Vector Calculus for Engineers, ACE	6
CS 103	Mathematical Foundations of Computing	3-5
CS 106A	Programming Methodology	3-5
CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 107	Computer Organization and Systems	3-5
CS 109	Introduction to Probability for Computer Scientists	3-5
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	3-5
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 224M	Multi-Agent Systems	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
ECON 160	Game Theory and Economic Applications	5
EE 178	Probabilistic Systems Analysis	4
ENGR 155C	Introduction to Probability and Statistics for Engineers	3-4
ETHICSOC 20	Introduction to Moral Philosophy	5
LINGUIST 1	Introduction to Linguistics	4
LINGUIST 106	Introduction to Speech Perception	4
LINGUIST 110	Introduction to Phonetics and Phonology	4
LINGUIST 120	Introduction to Syntax	4
LINGUIST 130A	Introduction to Semantics and Pragmatics	4
LINGUIST 140	Language Acquisition I	4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 182	Computational Theories of Syntax	3-4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
LINGUIST 240	Language Acquisition I	4
LINGUIST 282	Computational Theories of Syntax	3-4
MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4
MATH 41	Calculus	5
MATH 41A	Calculus ACE	6
MATH 42	Calculus	5
MATH 42A	Calculus ACE	6

MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 51A	Linear Algebra and Differential Calculus of Several Variables, ACE	6
MATH 151	Introduction to Probability Theory	3
MATH 162	Philosophy of Mathematics	4
MSE 120	Probabilistic Analysis	5
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
PHIL 1	Introduction to Philosophy	5
PHIL 2	Introduction to Moral Philosophy	5
PHIL 60	Introduction to Philosophy of Science	5
PHIL 80	Mind, Matter, and Meaning	5
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 162	Philosophy of Mathematics	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 166	Probability: Ten Great Ideas About Chance	4
PHIL 167B	Philosophy, Biology, and Behavior	4
PHIL 169	Evolution of the Social Contract	4
PHIL 180	Metaphysics	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4
PHIL 182	Truth	2-4
PHIL 184	Theory of Knowledge	4
PHIL 184F	Feminist Theories of Knowledge	4
PHIL 184P	Probability and Epistemology	4
PHIL 185	Memory	4
PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4
PHIL 188	Personal Identity	4
PHIL 189	Examples of Free Will	4
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 289	Examples of Free Will	4
PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 60	Introduction to Developmental Psychology	4
PSYCH 70	Introduction to Social Psychology	4
PSYCH 131	Language and Thought	4
PSYCH 141	Cognitive Development	3
PSYCH 154	Judgment and Decision-Making	3
PSYCH 204	Computation and cognition: the probabilistic approach	3-4
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3
PSYCH 262	Language and Thought	4
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5
STATS 200	Introduction to Statistical Inference	3

Note: Symbolic Systems majors must take PHIL 182 Truth for 3 or more units.

Artificial Intelligence

		Units
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 225A	Experimental Robotics	3
CS 225B	Robot Programming Laboratory	3-4
CS 226	Statistical Techniques in Robotics	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
ECON 160	Game Theory and Economic Applications	5
EE 263	Introduction to Linear Dynamical Systems	3
EE 364A	Convex Optimization I	3
EE 364B	Convex Optimization II	3
EE 376A	Information Theory	3
EE 376B	Network Information Theory	3
ENGR 205	Introduction to Control Design Techniques	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
LINGUIST 180	From Languages to Information	3-4
LINGUIST 188	Natural Language Understanding	3-4
LINGUIST 280	From Languages to Information	3-4
LINGUIST 284	Natural Language Processing	3-4
LINGUIST 288	Natural Language Understanding	3-4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

Applied Logic

		Units
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 222	Rational Agency and Intelligent Interaction	3
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
MATH 161	Set Theory	3
MATH 292A	Set Theory	3
PHIL 154	Modal Logic	4
PHIL 155	General Interest Topics in Mathematical Logic	4
PHIL 350A	Model Theory	3
PHIL 351A	Recursion Theory	3
PHIL 354	Topics in Logic	1-3

PHIL 391	Research Seminar in Logic and the Foundations of Mathematics	1-3
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Philosophical Foundations

		Units
MATH 162	Philosophy of Mathematics	4
PHIL 9N	Philosophical Classics of the 20th Century	4
PHIL 14N	Belief and the Will	3
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 143	Quine	4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 157	Topics in Philosophy of Logic	3
PHIL 162	Philosophy of Mathematics	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 165	Philosophy of Physics	4
PHIL 166	Probability: Ten Great Ideas About Chance	4
PHIL 167B	Philosophy, Biology, and Behavior	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4
PHIL 184	Theory of Knowledge	4
PHIL 184P	Probability and Epistemology	4
PHIL 252	Computability and Logic	4
PHIL 254	Modal Logic	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 265	Philosophy of Physics	4
PHIL 266	Probability: Ten Great Ideas About Chance	4
PHIL 267B	Philosophy, Biology, and Behavior	4
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4

Cognitive Science

		Units
BIO 20	Introduction to Brain and Behavior	3
BIO 150	Human Behavioral Biology	5
COMM 106	Communication Research Methods	4-5
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 222	Rational Agency and Intelligent Interaction	3
CS 224N	Natural Language Processing	3-4
CS 229	Machine Learning	3-4
ECON 160	Game Theory and Economic Applications	5
EE 376A	Information Theory	3
EE 376B	Network Information Theory	3
HUMBIO 21	Introduction to Brain and Behavior	3
HUMBIO 160	Human Behavioral Biology	5
LINGUIST 105	Phonetics	3-4
LINGUIST 110	Introduction to Phonetics and Phonology	4
LINGUIST 140	Language Acquisition I	4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 205A	Phonetics	3-4
LINGUIST 240	Language Acquisition I	4
LINGUIST 241	Language Acquisition II	4

LINGUIST 280	From Languages to Information	3-4
LINGUIST 284	Natural Language Processing	3-4
MATH 113	Linear Algebra and Matrix Theory	3
MUSIC 251	Psychophysics and Music Cognition	1-5
NBIO 206	The Nervous System	7-8
NBIO 218	Neural Basis of Behavior	5
NBIO 220	Central Mechanisms in Vision-based Cognition	2-4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4
PHIL 184	Theory of Knowledge	4
PHIL 184P	Probability and Epistemology	4
PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4
PHIL 188	Personal Identity	4
PHIL 189	Examples of Free Will	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 289	Examples of Free Will	4
PHIL 358	Rational Agency and Intelligent Interaction	3
PSYCH 1	Introduction to Psychology	5
PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 70	Introduction to Social Psychology	4
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 104	Uniquely Human	3
PSYCH 110	Research Methods and Experimental Design	5
PSYCH 131	Language and Thought	4
PSYCH 141	Cognitive Development	3
PSYCH 143	Developmental Anomalies	3
PSYCH 154	Judgment and Decision-Making	3
PSYCH 202	Cognitive Neuroscience	3
PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 204B	Computational Neuroimaging: Analysis Methods	1-3
PSYCH 205	Foundations of Cognition	1-3
PSYCH 221	Applied Vision and Image Systems	1-3
PSYCH 226	Models and Mechanisms of Memory	1-3
PSYCH 232	Brain and Decision Making	3
PSYCH 250	High-Level Vision: Object Representation	3
PSYCH 251	Affective Neuroscience	3
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
PSYCH 262	Language and Thought	4
PSYCH 272	Special Topics in Psycholinguistics	1-3
PSYCH 279	Topics in Cognitive Control	1-3
STATS 191	Introduction to Applied Statistics	3-4
STATS 200	Introduction to Statistical Inference	3

Decision Making and Rationality

		Units		
BIO 150	Human Behavioral Biology	5	MSE 352	Decision Analysis II: Professional Decision Analysis
BIOMEDIN 251	Outcomes Analysis	4	MSE 355	Influence Diagrams and Probabilistics Networks
COMM 106	Communication Research Methods	4-5	PHIL 154	Modal Logic
COMM 172	Media Psychology	4-5	PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence
COMM 206	Communication Research Methods	4-5	PHIL 166	Probability: Ten Great Ideas About Chance
COMM 272	Media Psychology	4-5	PHIL 167B	Philosophy, Biology, and Behavior
CS 74N	Digital Dilemmas	3	PHIL 170	Ethical Theory
CS 147	Introduction to Human-Computer Interaction Design	3-4	PHIL 194C	Time and Free Will
CS 154	Introduction to Automata and Complexity Theory	3-4	PHIL 194R	Epistemic Paradoxes
CS 161	Design and Analysis of Algorithms	3-5	PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence
CS 181	Computers, Ethics, and Public Policy	4	PHIL 266	Probability: Ten Great Ideas About Chance
CS 204	Legal Informatics	3	PHIL 267B	Philosophy, Biology, and Behavior
CS 207	The Economics of Software	2	PHIL 270	Ethical Theory
CS 222	Rational Agency and Intelligent Interaction	3	PHIL 355	Logic and Social Choice
CS 224M	Multi-Agent Systems	3	PHIL 366	Evolution and Communication
CS 226	Statistical Techniques in Robotics	3	PHIL 387	Intention and Normative Judgment
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4	POLISCI 123	Politics and Public Policy
CS 261	Optimization and Algorithmic Paradigms	3	POLISCI 152	Introduction to Game Theoretic Methods in Political Science
CS 364A	Algorithmic Game Theory	3	POLISCI 344U	Political Culture
ECON 50	Economic Analysis I	5	POLISCI 351A	Foundations of Political Economy
ECON 51	Economic Analysis II	5	PSYCH 45	Introduction to Learning and Memory
ECON 102B	Applied Econometrics	5	PSYCH 50	Introduction to Cognitive Neuroscience
ECON 102C	Advanced Topics in Econometrics	5	PSYCH 70	Introduction to Social Psychology
ECON 135	Finance for Non-MBAs	3	PSYCH 75	Introduction to Cultural Psychology
ECON 137	Decision Modeling and Information	5	PSYCH 80	Introduction to Personality and Affective Science
ECON 141	Public Finance and Fiscal Policy	5	PSYCH 110	Research Methods and Experimental Design
ECON 150	Economic Policy Analysis	4-5	PSYCH 152	Mediation for Dispute Resolution
ECON 153	Economics of the Internet	5	PSYCH 154	Judgment and Decision-Making
ECON 155	Environmental Economics and Policy	5	PSYCH 158	Emotions: History, Theories, and Research
ECON 160	Game Theory and Economic Applications	5	PSYCH 167	Seminar on Aggression
ECON 286	Game Theory and Economic Applications	2-5	PSYCH 179	The Psychology of Everyday Morality
ECON 288	Computational Economics	2-5	PSYCH 205	Foundations of Cognition
ECON 289	Advanced Topics in Game Theory and Information Economics	2-5	PSYCH 212	Social Psychology
ECON 290	Multiperson Decision Theory	4	PSYCH 215	Mind, Culture, and Society
EDUC 247	Moral and Character Education	3	PSYCH 223	Social Norms
EDUC 375A	Seminar on Organizational Theory	5	PSYCH 232	Brain and Decision Making
ENGR 60	Engineering Economy	3	PSYCH 245	Social Psychological Perspectives on Stereotyping and Prejudice
ENGR 62	Introduction to Optimization	4	PSYCH 251	Affective Neuroscience
MSE 111	Introduction to Optimization	4	PSYCH 252	Statistical Methods for Behavioral and Social Sciences
MSE 120	Probabilistic Analysis	5	PSYCH 253	Statistical Theory, Models, and Methodology
MSE 121	Introduction to Stochastic Modeling	4	PSYCH 270	The Psychology of Everyday Morality
MSE 180	Organizations: Theory and Management	4	PSYCH 279	Topics in Cognitive Control
MSE 197	Ethics, Technology, and Public Policy	5	PUBLPOL 102	Organizations and Public Policy
MSE 201	Dynamic Systems	3-4	PUBLPOL 202	Organizations and Public Policy
MSE 250A	Engineering Risk Analysis	3	PUBLPOL 302B	Economic Analysis of Law
MSE 250B	Project Course in Engineering Risk Analysis	3	SOC 114	Economic Sociology
MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4	SOC 115	Topics in Economic Sociology
MSE 254	The Ethical Analyst	1-3	SOC 120	Interpersonal Relations
MSE 299	Voluntary Social Systems	1-3	SOC 121	The Individual in Social Structure: Foundations in Sociological Social Psychology
			SOC 126	Introduction to Social Networks

SOC 127	Bargaining, Power, and Influence in Social Interaction	5
SOC 160	Formal Organizations	4
SOC 214	Economic Sociology	4
SOC 220	Interpersonal Relations	4
SOC 226	Introduction to Social Networks	5
SOC 227	Bargaining, Power, and Influence in Social Interaction	5
SOC 260	Formal Organizations	4
STATS 200	Introduction to Statistical Inference	3
STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	3
STATS 217	Introduction to Stochastic Processes	2-3
STATS 218	Introduction to Stochastic Processes	3
STATS 310A	Theory of Probability	2-4
STATS 310B	Theory of Probability	2-3
STATS 310C	Theory of Probability	2-4
SYMSYS Majors must take for 3 or more units		

Natural Language

		Units
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 229	Machine Learning	3-4
CS 276	Information Retrieval and Web Search	3
LINGUIST 105	Phonetics	3-4
LINGUIST 110	Introduction to Phonetics and Phonology	4
LINGUIST 116	Morphology	4
LINGUIST 124	Introduction to Lexical Function Grammar	2-4
LINGUIST 130A	Introduction to Semantics and Pragmatics	4
LINGUIST 130B	Introduction to Lexical Semantics	3-4
LINGUIST 140	Language Acquisition I	4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 181	Grammar Engineering	1-4
LINGUIST 188	Natural Language Understanding	3-4
LINGUIST 205B	Advanced Phonetics	2-4
LINGUIST 210A	Phonology	3-4
LINGUIST 210B	Advanced Phonology	1-4
LINGUIST 221A	Foundations of English Grammar	1-4
LINGUIST 221B	Studies in Universal Grammar	1-4
LINGUIST 222A	Foundations of Syntactic Theory I	3-4
LINGUIST 224	Introduction to Lexical Function Grammar	2-4
LINGUIST 224B	Advanced Topics in Lexical Functional Grammar	1-4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
LINGUIST 230B	Semantics and Pragmatics I	2-4
LINGUIST 232A	Lexical Semantics	2-4
LINGUIST 240	Language Acquisition I	4
LINGUIST 241	Language Acquisition II	4
LINGUIST 280	From Languages to Information	3-4
LINGUIST 281	Grammar Engineering	1-4
LINGUIST 286	Information Retrieval and Web Search	3
LINGUIST 288	Natural Language Understanding	3-4

PHIL 154	Modal Logic	4
PHIL 181	Philosophy of Language	4
PHIL 358	Rational Agency and Intelligent Interaction	3
PSYCH 131	Language and Thought	4
PSYCH 134	Seminar on Language and Deception	3
PSYCH 262	Language and Thought	4

Learning

		Units
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
EDUC 218	Topics in Cognition and Learning: Executive Function	3
EDUC 303X	Designing Learning Spaces	3-4
EDUC 333A	Understanding Learning Environments	3
EDUC 342	Child Development and New Technologies	3
EDUC 366X	Learning in Formal and Informal Environments	3
EE 376A	Information Theory	3
LINGUIST 140	Language Acquisition I	4
LINGUIST 240	Language Acquisition I	4
LINGUIST 241	Language Acquisition II	4
LINGUIST 284	Natural Language Processing	3-4
PSYCH 7Q	Language Understanding by Children and Adults	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 141	Cognitive Development	3
PSYCH 202	Cognitive Neuroscience	3
PSYCH 204	Computation and cognition: the probabilistic approach	3-4
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

Neurosciences

		Units
BIO 20	Introduction to Brain and Behavior	3
BIO 150	Human Behavioral Biology	5
BIO 153	Cellular Neuroscience: Cell Signaling and Behavior	4
BIO 154	Molecular and Cellular Neurobiology	4
BIO 158	Developmental Neurobiology	4
BIO 163	Neural Systems and Behavior	4
BIO 222	Exploring Neural Circuits	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 223A	Introduction to Robotics	3
CS 229	Machine Learning	3-4
EE 373B	Adaptive Neural Networks	3
HUMBIO 21	Introduction to Brain and Behavior	3
HUMBIO 163	Neural Systems and Behavior	4
MATH 113	Linear Algebra and Matrix Theory	3
NBIO 206	The Nervous System	7-8

NBIO 218	Neural Basis of Behavior	5
NENS 220	Computational Neuroscience	4
PHIL 186	Philosophy of Mind	4
PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 110	Research Methods and Experimental Design	5
PSYCH 120	Cellular Neuroscience: Cell Signaling and Behavior	4
PSYCH 121	Ion Transport and Intracellular Messengers	1-3
PSYCH 143	Developmental Anomalies	3
PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 204B	Computational Neuroimaging: Analysis Methods	1-3
PSYCH 221	Applied Vision and Image Systems	1-3
PSYCH 226	Models and Mechanisms of Memory	1-3
PSYCH 232	Brain and Decision Making	3
PSYCH 250	High-Level Vision: Object Representation	3
PSYCH 251	Affective Neuroscience	3
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
PSYCH 279	Topics in Cognitive Control	1-3
STATS 141	Biostatistics	3-5
STATS 191	Introduction to Applied Statistics	3-4
STATS 200	Introduction to Statistical Inference	3

Cognate Courses for the Master's Degree

The following is a list of cognate courses that may be applied to the M.S. in Symbolic Systems. Click on the course or see ExploreCourses for course descriptions and General Education Requirements (GER) information.

		Units
BIO 153	Cellular Neuroscience: Cell Signaling and Behavior	4
BIO 154	Molecular and Cellular Neurobiology	4
BIO 222	Exploring Neural Circuits	3
BIO 250	Human Behavioral Biology	5
BIO 258	Developmental Neurobiology	4
BIO 263	Neural Systems and Behavior	4
BIOMEDIN 251	Outcomes Analysis	4
CME 100	Vector Calculus for Engineers	5
CME 100A	Vector Calculus for Engineers, ACE	6
CME 106	Introduction to Probability and Statistics for Engineers	3-4
CME 108	Introduction to Scientific Computing	3-4
COMM 206	Communication Research Methods	4-5
COMM 220	Digital Media in Society	4-5
COMM 268	Experimental Research in Advanced User Interfaces	1-5
COMM 269	Computers and Interfaces	4-5
COMM 272	Media Psychology	4-5
CS 103	Mathematical Foundations of Computing	3-5
CS 106A	Programming Methodology	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 107	Computer Organization and Systems	3-5
CS 108	Object-Oriented Systems Design	3-4
CS 109	Introduction to Probability for Computer Scientists	3-5
CS 142	Web Applications	3
CS 147	Introduction to Human-Computer Interaction Design	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	3-5
CS 170	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
CS 181	Computers, Ethics, and Public Policy	4
CS 193D		
CS 204	Legal Informatics	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 207	The Economics of Software	2
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 222	Rational Agency and Intelligent Interaction	3
CS 223A	Introduction to Robotics	3
CS 224M	Multi-Agent Systems	3
CS 224N	Natural Language Processing	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 225A	Experimental Robotics	3
CS 225B	Robot Programming Laboratory	3-4
CS 227		
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 228T		
CS 229	Machine Learning	3-4
CS 247	Human-Computer Interaction Design Studio	3-4
CS 261	Optimization and Algorithmic Paradigms	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 294H	Research Project in Human-Computer Interaction	3
CS 303		
CS 326A		
CS 364A	Algorithmic Game Theory	0
CS 376	Human-Computer Interaction Research	3-4
CS 377	Topics in Human-Computer Interaction	2-3
CS 377L		
CS 378		
CS 447		
CS 448B	Data Visualization	3
ECON 102B	Applied Econometrics	5
ECON 102C	Advanced Topics in Econometrics	5
ECON 135	Finance for Non-MBAs	3
ECON 136		
ECON 137	Decision Modeling and Information	5
ECON 138		
ECON 141	Public Finance and Fiscal Policy	5
ECON 153	Economics of the Internet	5
ECON 155	Environmental Economics and Policy	5
ECON 160	Game Theory and Economic Applications	5
ECON 179		
ECON 190	Introduction to Financial Accounting	5

ECON 289	Advanced Topics in Game Theory and Information Economics	2-5	MSE 121	Introduction to Stochastic Modeling	4
EDUC 124			mse 134		
EDUC 218	Topics in Cognition and Learning: Executive Function	3	MSE 180	Organizations: Theory and Management	4
EDUC 247	Moral and Character Education	3	MSE 197	Ethics, Technology, and Public Policy	5
EDUC 298	Seminar on Teaching Introductory Computer Science	1	MSE 201	Dynamic Systems	3-4
EDUC 303X	Designing Learning Spaces	3-4	mse 236		
EDUC 333A	Understanding Learning Environments	3	mse 236h		
EDUC 342	Child Development and New Technologies	3	mse 248		
EDUC 375A	Seminar on Organizational Theory	5	MSE 250A	Engineering Risk Analysis	3
EDUC 391X	Engineering Education and Online Learning	3	MSE 250B	Project Course in Engineering Risk Analysis	3
EE 263	Introduction to Linear Dynamical Systems	3	MSE 251	Stochastic Control	3
EE 364A	Convex Optimization I	3	MSE 252	Decision Analysis I: Foundations of Decision Analysis	3-4
EE 364B	Convex Optimization II	3	MSE 254	The Ethical Analyst	1-3
EE 376A	Information Theory	3	MSE 299	Voluntary Social Systems	1-3
EE 278A			MSE 352	Decision Analysis II: Professional Decision Analysis	3-4
ENGR 155C	Introduction to Probability and Statistics for Engineers	3-4	MSE 355	Influence Diagrams and Probabilistic Networks	3
ENGR 205	Introduction to Control Design Techniques	3	MUSIC 128	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
ENGR 209A	Analysis and Control of Nonlinear Systems	3	MUSIC 220A	Fundamentals of Computer-Generated Sound	2-4
LINGUIST 106	Introduction to Speech Perception	4	MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	2-4
LINGUIST 110	Introduction to Phonetics and Phonology	4	MUSIC 220C	Research Seminar in Computer-Generated Music	2-4
LINGUIST 116	Morphology	4	MUSIC 250A	Physical Interaction Design for Music	3-4
LINGUIST 120	Introduction to Syntax	4	MUSIC 251	Psychophysics and Music Cognition	1-5
LINGUIST 130B	Introduction to Lexical Semantics	3-4	MUSIC 253	Symbolic Musical Information	2-4
LINGUIST 205A	Phonetics	3-4	MUSIC 254	Music Query, Analysis, and Style Simulation	2-4
LINGUIST 205B	Advanced Phonetics	2-4	NBIO 206	The Nervous System	7-8
LINGUIST 210A	Phonology	3-4	NBIO 218	Neural Basis of Behavior	5
LINGUIST 210B	Advanced Phonology	1-4	NBIO 220	Central Mechanisms in Vision-based Cognition	2-4
LINGUIST 221A	Foundations of English Grammar	1-4	NENS 220	Computational Neuroscience	4
LINGUIST 221B	Studies in Universal Grammar	1-4	PHIL 102	Modern Philosophy, Descartes to Kant	4
LINGUIST 222A	Foundations of Syntactic Theory I	3-4	PHIL 184B		
LINGUIST 224	Introduction to Lexical Function Grammar	2-4	PHIL 184P	Probability and Epistemology	4
LINGUIST 224B	Advanced Topics in Lexical Functional Grammar	1-4	PHIL 185	Memory	4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4	PHIL 194C	Time and Free Will	4
LINGUIST 230B	Semantics and Pragmatics I	2-4	PHIL 194R	Epistemic Paradoxes	4
LINGUIST 232A	Lexical Semantics	2-4	PHIL 243	Quine	4
LINGUIST 240	Language Acquisition I	4	PHIL 250	Mathematical Logic	4
LINGUIST 241	Language Acquisition II	4	PHIL 251	Metalogic	4
LINGUIST 280	From Languages to Information	3-4	PHIL 252	Computability and Logic	4
LINGUIST 281	Grammar Engineering	1-4	PHIL 254	Modal Logic	4
LINGUIST 282	Computational Theories of Syntax	3-4	PHIL 257	Topics in Philosophy of Logic	3
LINGUIST 284	Natural Language Processing	3-4	PHIL 262	Philosophy of Mathematics	4
LINGUIST 285			PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
LINGUIST 286	Information Retrieval and Web Search	3	PHIL 265	Philosophy of Physics	4
LINGUIST 288	Natural Language Understanding	3-4	PHIL 266	Probability: Ten Great Ideas About Chance	4
MATH 113	Linear Algebra and Matrix Theory	3	PHIL 267B	Philosophy, Biology, and Behavior	4
MATH 151	Introduction to Probability Theory	3	PHIL 270	Ethical Theory	4
MATH 161	Set Theory	3	PHIL 280	Metaphysics	4
MATH 292A	Set Theory	3	PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
ME 115A	Introduction to Human Values in Design	3	PHIL 281	Philosophy of Language	4
ME 115B	Product Design Methods	3	PHIL 282	Truth	2-4
MSE 111	Introduction to Optimization	4	PHIL 284	Theory of Knowledge	4
MSE 120	Probabilistic Analysis	5	PHIL 284F	Feminist Theories of Knowledge	4

PHIL 286	Philosophy of Mind	4
PHIL 287	Philosophy of Action	4
PHIL 288	Personal Identity	4
PHIL 289	Examples of Free Will	4
PHIL 350A	Model Theory	3
PHIL 351A	Recursion Theory	3
PHIL 354	Topics in Logic	1-3
PHIL 355	Logic and Social Choice	4
PHIL 358	Rational Agency and Intelligent Interaction	3
PHIL 366	Evolution and Communication	4
PHIL 387	Intention and Normative Judgment	2-4
PHIL 391	Research Seminar in Logic and the Foundations of Mathematics	1-3
POLISCI 351A	Foundations of Political Economy	3
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5
PSYCH 104	Uniquely Human	3
PSYCH 110	Research Methods and Experimental Design	5
PSYCH 120	Cellular Neuroscience: Cell Signaling and Behavior	4
PSYCH 134	Seminar on Language and Deception	3
PSYCH 141	Cognitive Development	3
PSYCH 143	Developmental Anomalies	3
PSYCH 152	Mediation for Dispute Resolution	3
PSYCH 154	Judgment and Decision-Making	3
PSYCH 167	Seminar on Aggression	3
PSYCH 202	Cognitive Neuroscience	3
PSYCH 204	Computation and cognition: the probabilistic approach	3-4
PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 204B	Computational Neuroimaging: Analysis Methods	1-3
PSYCH 205	Foundations of Cognition	1-3
PSYCH 212	Social Psychology	1-3
PSYCH 215	Mind, Culture, and Society	3
PSYCH 221	Applied Vision and Image Systems	1-3
PSYCH 223	Social Norms	3
PSYCH 226	Models and Mechanisms of Memory	1-3
PSYCH 228	Ion Transport and Intracellular Messengers	1-3
PSYCH 232	Brain and Decision Making	3
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3
PSYCH 245	Social Psychological Perspectives on Stereotyping and Prejudice	3
PSYCH 250	High-Level Vision: Object Representation	3
PSYCH 251	Affective Neuroscience	3
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
PSYCH 253	Statistical Theory, Models, and Methodology	3
PSYCH 259	Emotions: History, Theories, and Research	1-3
PSYCH 262	Language and Thought	4
PSYCH 270	The Psychology of Everyday Morality	4
PSYCH 272	Special Topics in Psycholinguistics	1-3
PSYCH 279	Topics in Cognitive Control	1-3
PUBLPOL 201	Politics and Public Policy	4-5
PUBLPOL 202	Organizations and Public Policy	4-5
PUBLPOL 204	Economic Policy Analysis	4-5
PUBLPOL 302B	Economic Analysis of Law	4
SOC 121	The Individual in Social Structure: Foundations in Sociological Social Psychology	5
SOC 214	Economic Sociology	4
SOC 220	Interpersonal Relations	4
SOC 226	Introduction to Social Networks	5
SOC 227	Bargaining, Power, and Influence in Social Interaction	5
SOC 315	Topics in Economic Sociology	5
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5
STATS 141	Biostatistics	3-5
STATS 191	Introduction to Applied Statistics	3-4
STATS 200	Introduction to Statistical Inference	3
STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	3
STATS 217	Introduction to Stochastic Processes	2-3
STATS 218	Introduction to Stochastic Processes	3
STATS 310A	Theory of Probability	2-4
STATS 310B	Theory of Probability	2-3
STATS 310C	Theory of Probability	2-4
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3
STS 110		
STS 201		

Theater and Performance Studies

Courses offered by the Department of Theater and Performance Studies are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes TAPS (<https://explorecourses.stanford.edu/search?q=TAPS&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-TAPS=on>) and DANCE (<https://explorecourses.stanford.edu/search?q=DANCE&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-DANCE=on&filter-catalognumber-DANCE=on>).

Mission of the Undergraduate Program in Theater and Performance Studies

The mission of the undergraduate program in Theater and Performance Studies is to provide a strong, non-conservatory program that joins the study and practice of performance within the context of a liberal arts curriculum. The department gives students a strong grasp of historical, cultural, and practical contexts in which live performance develops. With close faculty contact, department majors pursue areas of interest that may include acting, directing, writing, dance, devised theater, design, stage management, performance theory, and cultural studies. During the senior

year students complete a senior project as part of fulfilling the 60 units required for the major.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to achieve the following learning outcomes:

1. the ability to write analytically about theater and performance
2. the ability to put aesthetic and creative skills into practice
3. the ability to find meaningful ways of integrating theory and practice
4. the ability to research effectively
5. the ability to articulate ideas about theater, dance and live arts.

Mission of the Graduate Program in Theater and Performance Studies

The graduate program in Theater and Performance Studies cultivates students who advance the field by working on the leading edge of scholarship and performance. We specialize in combining theoretical research and creative practice. The Ph.D. program includes the study of critical theory, dramatic literature, performance theory, theater history, and performance making. The program provides rich opportunities to collaborate with leading scholars, artists, faculty and visiting fellows. Faculty are committed to helping each student develop a unique portfolio of scholarly and practice-based expertise as well as mentoring students as they pursue their careers.

Learning Outcomes (Graduate)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Theater and Performance Studies. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge and production of Theater and Performance Studies, and to interpret and present the results of such research.

Institute for Diversity in the Arts and Black Performing Arts Division

The Institute for Diversity in the Arts (IDA) is an interdisciplinary program in the humanities that involves students in the study of culture, identity and diversity through artistic expression. The Committee on Black Performing Arts (CBPA) and the Institute for Diversity in the Arts (IDA) merged in Autumn 2005. The mission of IDA/CBPA is to engage artists, students, and the local community collaboratively to create performance and visual art that examines the intersections among race, diversity, and social action through programming that includes artist residencies, classes, workshops, public performances, a lecture series, and symposia. The division produces annual student productions and is a resource for student organizations promoting artistic expression through the exploration of the impact of ethnic representation in the arts, literature, media, and pop culture. The programs prepare students for work in areas including the arts and community development. Students have gone on to graduate-level critical studies, M.F.A. programs, public service, government and politics, arts administration, and teaching. Students can pursue an IDA concentration through the Comparative Studies in Race and Ethnicity major; students can also emphasize Black performance through the African and African American Studies major.

Dance Division

The Stanford Dance Division offers a range of classes that approach dance as a performing art, a cultural practice, a political act and the embodiment of ideology and beliefs. Dance is learned through studying technique, choreographing and performing, and through viewing and critically assessing movement history.

Bachelor of Arts in Theater and Performance Studies

The B.A. degree in Theater and Performance Studies provides students with historical, critical, and practical knowledge about theater and performance. Students are encouraged to declare the major in their sophomore year, if not sooner.

Suggested Preparation for the Major

Prospective majors in the first two years of study at Stanford are encouraged to take part in casting opportunities in department productions.

Degree Requirements - 60 units total for the Major

A course may be listed in more than one area; however, each course can only satisfy one major requirement. There is no double credit for a course. Students may petition the department undergraduate adviser to have additional courses offered by the department count towards requirements in areas 2, 3, and 4. TAPS 1 must be taken for a letter grade.

1. Core — 4 units

		Units
TAPS 1	Introduction to Theater and Performance Studies	4

2. Theater and Dance Studies — 16 units

1. An Identity and Diversity course (4 units, required).

		Units
TAPS 181Q	Alternative Viewpoints: Black Independent Film	4
TAPS 279G	Indigenous Identity in Diaspora: People of Color Art 3-5 Practice in North America	
DANCE 24	Introduction to Dance in the African Diaspora	4

2. Any course between TAPS 150-169, 248 and DANCE 160-161.

		Units
TAPS 150	British Theatre Then and Now: 1890s-present	4-5
TAPS 151A	Theater of the Asia-Pacific Region	4
TAPS 151T	Great Books: Dramatic Traditions	4
TAPS 156T	Movement and Digital Culture	4
TAPS 157	World Drama and Performance	4
TAPS 158L	The Ethics of Storytelling: The Autobiographical Monologue in Theory, in Practice, and in the World	4
TAPS 159	Introduction to Game Studies	4
TAPS 159G	The Theater of War: Art, Violence, and the Technologies of Death	4
TAPS 159M	Movement and Meaning: Dance Studies in Global Comparative Context	4
TAPS 160	Rethinking the Ballerina	4

DANCE 160	Rethinking the Ballerina	
TAPS 160N	Chican@/Latin@ Performance in the U.S.	4
TAPS 167H	The Avant-Garde	4
TAPS 169	Hysteria and Modern Culture	3-5
TAPS 180Q	Noam Chomsky: The Drama of Resistance	4
TAPS 289	Buechner and Wedekind	3-5

3. Performance Practice — 14 units

- Students must complete 4 units of either TAPS 30 How Theater is Designed OR TAPS 101P Intro to Directing and Devising Theatre.
- Students complete the remaining 10 units in Performance Practice from among the areas of Dance, Acting, Directing, Playwriting or Design:

- Any course in DANCE 30-149
- Acting courses between TAPS 20-29, 103-105, 120-129, 201V, 203, 210.

		Units
TAPS 20	Acting for Non-Majors	1-3
TAPS 103	Beginning Improvising	3
TAPS 120A	Acting I: Scene Study	1-3
TAPS 120B	Acting II: Advanced Scene Study	1-3
TAPS 121C	Physical Characterization	3
TAPS 122P	Undergrad Performance Project: Hamlet/R&G are Dead	2-9
TAPS 124D	Acting for Non-Majors	1-3
TAPS 127	Introduction to Movement and Stage Combat	4
TAPS 127X	Advanced Movement for Actors: Conditioning, Improvisation and Composition	4
TAPS 203	Advanced Improvisation	3

- Directing and Playwriting courses between TAPS 70-79, 170-179, 236.

		Units
TAPS 170B	Directing Workshop: The Actor-Director Dialogue	4
TAPS 177	Writing for Performance: The Fundamentals	5
TAPS 178	Page to Stage: Playwriting and Solo Performance	3-5
TAPS 179C	Chroniclers of Desire: Creative Non-Fiction Writing Workshop	3-5
TAPS 273	Directing & Dramaturgy: Composition and Adaptation for Theatre	4

- Design courses between TAPS 28, 30-31, 32F, 34, 39D, 42, 131-133, 136-137, 140, 231-240.

		Units
TAPS 28	Makeup for the Stage	2
TAPS 30	How Theater is Designed	4
TAPS 31	Introduction to Lighting and Production	4
TAPS 131	Lighting Design	4
TAPS 132	Costume Design	4
TAPS 133	Stage Scenery Design	3-4
TAPS 140	Projects in Theatrical Production	1-4

4. Production — 8 units

3 units of TAPS 34, 2 units of TAPS 39, and 3 units of TAPS 134 are required

		Units
TAPS 34	Stage Management Techniques	3
TAPS 39	Theatre Crew	2
TAPS 134	Stage Management Project	3

5. Electives— 14 units

- Any courses in TAPS or DANCE

6. Senior Project — 4 units

TAPS 200	Senior Project	Units
4 units of TAPS 200 are required		2-9

- All TAPS Majors must complete a Senior Project that represents significant work in any area of theater and/or performance. The project must be an original contribution and can consist of any of the following: devising a performance, choreographing a dance, stage managing a production, designing a large theater work, performing a major role, writing a play, directing a show, or researching and writing a senior essay. Work for this project normally begins in Spring Quarter of the junior year and must be completed by the end of the senior year. Students receive credit for senior projects through TAPS 200. A minimum of 4 units is required, but additional units are available for larger projects. Students pursuing senior projects must submit a two-page proposal to a faculty adviser of their choice, which must be approved by the undergraduate adviser and the department faculty no later than the end of Spring Quarter of the junior year.

7. WIM — Writing in the Major.

		Units
TAPS 1	Introduction to Theater and Performance Studies	4
TAPS 151T	Great Books: Dramatic Traditions	4
TAPS 167H	The Avant-Garde	4
TAPS 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	4
or DANCE 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	

Honors Program

For a select number of students, the department confers the degree of Bachelor of Arts with Departmental Honors in Theater and Performance Studies. To be considered for departmental honors, students must meet the following requirements in addition to the other requirements of the TAPS major:

- Application involves a written submission (including transcript) establishing the student's work to date in the department and outlining the area of research that the student wishes to pursue. Students must have at least an overall University GPA of 3.3 and a 3.5 GPA in courses counting towards the major.
- Students must have completed half of the courses in their specialization by the end of their junior year.
- Students complete 4 units in the honors colloquia (TAPS 201A, TAPS 201B, TAPS 201C, TAPS 201D), beginning Spring Quarter of their junior year and continuing the following three regular quarters. Each quarter's colloquium is offered for 1 unit, S/NC. In extenuating circumstances (overseas study, for example), an honors program student may substitute other equivalent work for one quarter of the colloquium, with the approval of the honors adviser.
- By the end of the sixth week of the quarter in which they plan to graduate, students in the honors program must submit an honors thesis (described below), to be read and evaluated by their thesis committee.
- On the basis of a student's work in the TAPS core, in the area of specialization, on the senior project, in the honors colloquia, and on the honors thesis, three faculty readers determine and confer honors on graduating students who have successfully completed the honors program.
- Entry into the honors program does not guarantee an honors degree. The final decision to confer an honors degree is made by the student's

thesis committee, upon evaluating the quality of the senior project and the thesis.

Honors Colloquium

The honors colloquia aim to engage honors program students in important issues in the field focusing on the students' areas of specialization and research. The honors program adviser convenes the colloquia three times per quarter and sets the agenda for meetings and discussion. Students discuss their work in the department and present and discuss their research for their honors thesis.

Honors Thesis

The honors thesis typically consists of a long essay (40-60 pages) presenting the student's research on an important issue or subject, determined by the student. The honors program adviser, the senior project adviser, and another faculty member constitute the student's honors thesis committee. They read and evaluate the thesis, and make recommendations to the faculty at large regarding its strengths and weaknesses. Additionally, students have the option of using their own senior project as a case study. In these situations, the honors thesis will critically analyze the strengths and weaknesses of the creative work. Generally, these essays tend to be shorter (about 20-25 pages) because the creative work constitutes one-half of the honors project.

Minor in Theater and Performance Studies

The TAPS Minor is offered with two distinct concentrations: the Theater and Performance Studies concentration provides students with historical, critical, and practical knowledge about theater and performance, while the Dance concentration examines the field of dance.

Minor Requirements — 30 units total for the minor

A course may be listed in more than one area; however, each course can only satisfy one minor requirement. There is no double credit for a course. A student may petition to the department undergraduate adviser to have additional courses offered by the department count towards the requirements. Upon declaring the Minor, a proposed course of study must be submitted by each student in consultation with Jennifer De Vere Brody (jbrody1@stanford.edu), Chair of Theater & Performance Studies, or Justin Lind (justinmh@stanford.edu), Student Services Officer. TAPS 1 must be taken for a letter grade to satisfy the requirement.

All students pursuing the Minor, whether in the Theater and Performance Studies concentration, or the Dance concentration, complete 5 units worth of Core and Production classes:

1. Core — 4 units

TAPS 1	Introduction to Theater and Performance Studies	4
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2. Production — 1 unit

TAPS 39	Theatre Crew (1 unit, required)	1-3
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Students choose to focus either in the Theater and Performance Studies concentration, or the Dance concentration, for the remaining 25 units:

Theater and Performance Studies Concentration (remaining 25 units):

3. Theater and Dance Studies — 4 units

- Any course between TAPS 150-169 and 248, DANCE 160-161.

		Units
TAPS 150	British Theatre Then and Now: 1890s-present	4-5
TAPS 151A	Theater of the Asia-Pacific Region	4
TAPS 151T	Great Books: Dramatic Traditions	4
TAPS 156T	Movement and Digital Culture	4
TAPS 157	World Drama and Performance	4
TAPS 158L	The Ethics of Storytelling: The Autobiographical Monologue in Theory, in Practice, and in the World	4
TAPS 159	Introduction to Game Studies	4
TAPS 159M	Movement and Meaning: Dance Studies in Global Comparative Context	4
TAPS 160	Rethinking the Ballerina	4
DANCE 160	Rethinking the Ballerina	
TAPS 160N	Chican@/Latin@ Performance in the U.S.	4
TAPS 167H	The Avant-Garde	4
TAPS 169	Hysteria and Modern Culture	3-5
TAPS 180Q	Noam Chomsky: The Drama of Resistance	4
TAPS 181Q	Alternative Viewpoints: Black Independent Film	4
TAPS 279G	Indigenous Identity in Diaspora: People of Color Art Practice in North America	3-5
TAPS 289	Buechner and Wedekind	3-5
DANCE 24	Introduction to Dance in the African Diaspora	4

4. Performance Practice — 7 units

- Acting courses between TAPS 20-29, 103-105, 120-129, 201V, 203, 210.

		Units
TAPS 20	Acting for Non-Majors	1-3
TAPS 103	Beginning Improvising	3
TAPS 120A	Acting I: Scene Study	1-3
TAPS 120B	Acting II: Advanced Scene Study	1-3
TAPS 121C	Physical Characterization	3
TAPS 122P	Undergrad Performance Project: Hamlet/R&G are Dead	2-9
TAPS 124D	Acting for Non-Majors	1-3
TAPS 127	Introduction to Movement and Stage Combat	4
TAPS 127X	Advanced Movement for Actors: Conditioning, Improvisation and Composition	4
TAPS 203	Advanced Improvisation	3

- Directing and Playwriting courses between TAPS 70-79, 170-179, 236. The following courses are offered in 2013-14:

		Units
TAPS 170B	Directing Workshop: The Actor-Director Dialogue	5
TAPS 177	Writing for Performance: The Fundamentals	5
TAPS 178	Page to Stage: Playwriting and Solo Performance	3-5
TAPS 179C	Chroniclers of Desire: Creative Non-Fiction Writing Workshop	3-5

TAPS 273	Directing & Dramaturgy: Composition and Adaptation for Theatre	4
• Design courses between TAPS 28, 30-31, 32F, 34, 39D, 42, 131-133, 136-137, 140, 231-240. The following courses are offered in 2013-14:		
TAPS 28	Makeup for the Stage	2
TAPS 30	How Theater is Designed	4
TAPS 31	Introduction to Lighting and Production	4
TAPS 131	Lighting Design	4
TAPS 132	Costume Design	4
TAPS 133	Stage Scenery Design	3-4
TAPS 140	Projects in Theatrical Production	1-4

5. Electives — 14 units

- Any courses in TAPS or DANCE.

Dance Concentration (remaining 25 units):

3. Dance Studies — 4 units

- Any course between DANCE 160-161, 167, 177, 197

DANCE 23	Movement and Meaning: Dance Studies in Global Comparative Context	4
TAPS 159M	Movement and Meaning: Dance Studies in Global Comparative Context	
DANCE 24	Introduction to Dance in the African Diaspora	4
DANCE 160	Rethinking the Ballerina	4
TAPS 160	Rethinking the Ballerina	
DANCE 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	4
TAPS 197	Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America	

4. Technique — 12 units

Studio Classes: Minimum of six studio dance classes:

- A concentration of at least three classes chosen from a specific dance form (e.g., Contemporary, Modern, Jazz, Hip-Hop, Ballet, Social), and the attainment of intermediate or advanced level (at least two classes) in a style other than the concentration

5. Choreography/Repertory/ Performance — 5 units

- Any courses between DANCE 27, 30, 45, 51, 56-57, 60, 63, 65, 69, 100, 102-103, 108, 120 or TAPS 101P

DANCE 30	Chocolate Heads Movement Band Performance Workshop	1
DANCE 35	Choreography and Textures	1
DANCE 108	Hip Hop Meets Broadway	1

6. Electives — 4 units

- Any courses in TAPS or DANCE.

Doctor of Philosophy in Theater and Performance Studies

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin. The mission of the graduate program in Theater and Performance Studies (TAPS) is to produce students who work in the leading edge of both scholarly and performance practice. The Ph.D. program in TAPS emphasizes the combination of theory and practice. Graduate students complete a program with a rigorous study of critical theory, textual history, elements of production (directing, acting, choreography, writing, and design) and embodied research.

Admission: Applicants for the Ph.D. program can visit our Theater and Performance Studies (<http://drama.stanford.edu>) web site or write directly to the Department of Theater and Performance Studies, Attention: Graduate Admissions, for information. Online graduate applications are available at the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. In addition to the required statement of purpose, applicants must submit an artistic statement, a C.V. or resume that addresses their production experience, and a sample of their written critical work. An invitation to interview may be extended by the end of January. Graduate students in the Department of Theater and Performance Studies begin study in Autumn Quarter of each academic year; there are no mid-year admissions.

The Department of Theater and Performance Studies provides a generous fellowship package to all students admitted to the program.

Degree Requirements

Department requirements 2 through 9 following are in addition to the University's basic requirements for the doctorate.

1. Units and Course Requirements

1. A minimum of 135 units of graduate courses and seminars in support of the degree.
2. Core seminars:

		Units
TAPS 311	Analyzing Performance	4
TAPS 312	The Archive in the Repertoire	4
TAPS 313	Performance and Performativity	1-4
TAPS 314	Performing Identities	4

3. Four additional graduate seminars within the Department of Theater and Performance Studies to be worked out with the adviser.
4. Four workshops in Theater and Performance Studies:

		Units
TAPS 371	Performance Making	4
TAPS 372	Directing Workshop: The Actor-Director Dialogue	4
TAPS 373	Directing & Dramaturgy: Composition and Adaptation for Theatre	4
TAPS 376	Projects in Performance	4

In the first year students take TAPS 371 Performance Making, which focuses on generating original creative work through a range of techniques, as well as TAPS 372 Directing Workshop: The Actor-Director Dialogue, which explores the relationship between acting and directing and actors and directors. In the second year students take TAPS 373 Directing & Dramaturgy: Composition and Adaptation for Theatre which focuses on honing aesthetic and production skills for mounting a piece of work, and leads directly to TAPS 376 Projects in Performance which is the production and performance of creative work

during the Winter quarter of the 2nd year, a project that is approved by the Graduate Studies Committee (GSC) and supervised by a faculty member.

5. One class in Production, TAPS 334 Stage Management Techniques
6. Students are allowed to take up to 6 units of TAPS 390 Directed Reading, to count towards the 135 unit required for graduation.

2. Language Requirement

The student must demonstrate reading knowledge of one foreign language in which there is a major body of dramatic literature. The language requirement must be met before the student can be advanced to candidacy. The language requirement may be fulfilled in any of the following ways:

1. achievement of a sufficiently high score (70th percentile) on the foreign language examination prepared by the Educational Testing Service (ETS). Latin and Greek are not tested by ETS.
2. a reading examination given each quarter by the various language departments, except for Latin and Greek.
3. pass with a grade of 'B' or higher a 100-level or higher foreign language course at Stanford.

3. Examinations

Students must complete three examinations (comprehensive, qualifying, and department oral) by the end of the first three years of study at Stanford.

1. First-Year Comprehensive

The first year exam is based on a reading list of 90 dramatic works. This list is sent to students in the summer before the first quarter of study begins. Students sign up for the 2 unit course TAPS 336 Comprehensive Exam to prepare. The exam is due at the end of the Winter quarter.

2. Second-Year Qualifying

The qualifying examination consists of two 20-25 page essays. Each of these essays should demonstrate knowledge of a historical pre-20th century period. Essay topics are chosen in consultation with a faculty adviser. The reading list for each essay must be approved by the end of the first year. These essays should not duplicate any written work from seminars. The Graduate Studies Committee reads and evaluates these essays. The first essay is due in the autumn quarter. Candidates must choose from the following historical periods:

- Ancient/Classical
- Medieval and Renaissance
- 17th, 18th, or early 19th century

3. Third-Year Department Oral

The department oral examination requires three faculty members, at least two from the Department of Theater and Performance Studies, who most likely form the dissertation reading committee. This exam is based on a 2-3 page summary of the project and several readings of the literature for the dissertation that the student creates in conjunction with the committee. This exam should be taken by the middle of spring quarter in the third year.

4. Admission to Candidacy

At the end of the second year of study, the faculty make a decision whether or not to admit the student to candidacy. Based on its evaluation of the student, the Graduate Studies Committee certifies the student's qualifications for candidacy. Candidacy is an important decision grounded in an overall assessment of a student's ability to complete the Ph.D. program at a high level. As detailed in the department's Graduate Handbook, there are prerequisites for admission to candidacy: the completion of specified coursework, the first-year qualifying exam, the second-year qualifying papers and the language requirement. However, fulfillment of these prerequisites and grades in courses constitute only a

part of the evidence weighed by faculty in making this judgment. Since the Ph.D. is conferred upon candidates who have demonstrated through their dissertation the ability to conduct substantive, original research that contributes to knowledge in theater and performance studies, the candidacy decision also rests upon indicators of the student's ability to conduct work in the field. Upon favorable action, the student files a formal application for candidacy, as prescribed by the University, by the end of Summer Quarter of the second year. By University policy, candidacy is valid for five years unless terminated by the department. : Failure to advance to candidacy results in the dismissal of the student from the program.

5. Dissertation Prospectus

The dissertation prospectus must be approved by the candidate's adviser and by the departmental Graduate Studies Committee two quarters after taking the department oral. This should be done in, or before, the autumn quarter of the fourth year. Within 30 days of approval, a student should schedule a prospectus colloquium with the proposed reading committee (the dissertation director and two other faculty members). The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. The prospectus should be 5-8 pages and minimally cover three things:

1. the research question and context
2. the methodology for research
3. a complete chapter by chapter plan

6. University Oral Examination

The University oral examination is a defense of the dissertation based on a full draft submitted at least 75 days before the proposed degree conferral. The examining committee consists of five faculty members: one faculty chair from outside the department who does not share an appointment with the department of any of the examiners, the student's primary adviser, two additional readers who are familiar with the dissertation project, and a fifth faculty member attending the oral examination.

7. Assistantships

1. Research Assistantship

Three quarters of research assistantship with faculty members are required. Generally, this requirement is fulfilled in the third year.

2. Teaching Assistantship

Four quarters of supervised TA-ship at half time are a required part of the Ph.D. program. The requirement is normally met by serving as a TA for three courses during the fourth year and one course during the fifth year.

8. Dissertation

Normally, the Ph.D. program in Theater and Performance Studies is completed in five years. The first two years should be devoted to full-time graduate study, and the third, fourth, and fifth years to research, teaching, and writing the dissertation.

9. Satisfactory Progress, Annual Review

The program and progress of each student must be evaluated by the Graduate Studies Committee at the end of each academic year. At the end of the first year, the Graduate Studies Committee evaluates the work of each student in classes, seminars, examinations, and performance. Production planning in the spring of each year for the following season is contingent upon students making satisfactory progress. Continuation in the program depends upon the recommendation of this faculty group. At the end of the second year, the committee reviews the student's work in consideration of being admitted to candidacy. At the end of the third year, students are expected to have developed an approved dissertation prospectus. Funding is

contingent upon satisfactory progress. Failure to make satisfactory progress may result in dismissal from the program.

Emeriti: (Professors) Helen W. Schrader, Carl Weber, Alice Rayner; *(Associate Professor)* William S. Eddelman; *(Senior Lecturer)* Patricia Ryan

Chair: Jennifer DeVere Brody

Director of Graduate Studies: Branislav Jakovljevic

Director of Undergraduate Studies: Jisha Menon

Department of Theater and Performance Studies (TAPS)

Professors: Jean-Marie Apostolidès (TAPS; French and Italian), Jennifer DeVere Brody (TAPS; Center for Comparative Studies in Race and Ethnicity), Harry J. Elam, Jr. (Vice Provost for Undergraduate Education), Peggy Phelan (TAPS; English), Rush Rehm (TAPS; Classics), Matthew Smith (TAPS; German Studies)

Associate Professor: Branislav Jakovljevic

Assistant Professors: Jisha Menon; Diana Looser

Professors (Teaching): Michael F. Ramsaur, Janice Ross

Associate Professors (Teaching): Helen Paris, Leslie Hill

Senior Lecturer: Connie Strayer

Lecturers: Linda Apperson, Erik Flatmo Gambatese, Tracy Hazas, Daniel Klein, Josh Kornbluth, Kathryn Kostopoulos, Ryan Purcell, Lisa Rowland, Michael St. Clair, Jonah Willihnganz

Artists in Residence: Amy Freed, Cherrie Moraga

Department Administrator: Patrice O'Dwyer

Student Services Officer: Justin Lind

Administrative Associate: Janet Pineda

Institute for Diversity in the Arts and Black Performing Arts Division

IDA Faculty Director: H. Samy Alim (Education and, by courtesy, Anthropology and Linguistics)

Executive Director: Jeff Chang

Dance Division

Director: Jennifer DeVere Brody

Lecturers: Diane Frank, Aleta Hayes, Alex Ketley, Claudia La Rocco, Richard Powers, Ronnie Reddick, Erik Wagner

Artist in Residence: Robert Moses

Mohr Visiting Artist: Grisha Coleman

Mellon Post-Doctoral Fellow: Joanna Dee Das

Visiting Scholar: Thomas DeFrantz

Administrative Associate: Rosary 'Bee' David

Overseas Studies Courses in Theater and Performance Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students

should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

Urban Studies

Courses offered by the Urban Studies Program are listed under the subject code URBANST on the (<https://explorecourses.stanford.edu/search?q=urbanst&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-urbanst=on&filter-catalognumber-urbanst=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=URBANST&filter-catalognumber-URBANST=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=URBANST&filter-catalognumber-URBANST=on>).

The Urban Studies program treats urbanism as an interdisciplinary field; it brings together students, faculty, and outside specialists concerned with cities, and the impacts of cities on society and people's lives. The Urban Studies major encourages students to inquire deeply into the nature of cities and the techniques used to modify urban environments. It prepares students to address urbanization, and gives students a knowledge base and theoretical, analytical, and practical skills to understand urban social systems and effect social change.

Mission of the Undergraduate Program in Urban Studies

The mission of the undergraduate program in Urban Studies is to develop students' understanding of the nature of cities and their impacts on both the individual and society at large. The program is interdisciplinary in nature drawing from fields in the social sciences, history, and education. Courses in the program focus on issues in contemporary urban society, and on the tools and concepts that can bring about change to improve urban life. Courses also address how cities have changed over time and how they continue to change today in societies around the world. Through a comprehensive program that includes course work, an internship, and independent research, a major in Urban Studies prepares students for careers and advanced academic pursuits in fields including architecture, community service, education, environmental planning, real estate development, urban design, and urban planning; many alumni have obtained graduate degrees in architecture, business, law, public policy, urban design, and urban planning from major universities across the country. Information on careers and graduate programs pursued by Urban Studies alumni is available from the Urban Studies program office.

Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Urban Studies. Students are expected to demonstrate ability:

1. to formulate a research question and assess its significance in relation to one or more relevant scholarly or professional literatures and, where relevant, to theoretical writings.
2. to collect data to answer the proposed research question.
3. to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. to write clearly and persuasively.

Coterminal Programs In Urban Studies

Undergraduates in Urban Studies may enter coterminal master's degree programs in a number of departments and schools in the University. In recent years, Urban Studies majors have developed coterminal programs with the departments of Anthropology, Civil and Environmental Engineering, Communication, Earth Systems and Sociology, and with the School of Education. Information and applications for coterminal degree programs are available at Undergraduate Advising and Research. Students should discuss the coterminal program with a program director during their junior year.

For University coterminal degree program rules and University application forms, see the Publications and Online Guides (<http://registrar.stanford.edu/shared/publications.htm#Coterm>) web site.

Bachelor of Arts in Urban Studies

The Urban Studies major requires students to complete four types of courses totaling at least 70 units:

1. 23 units in the core (for those declaring after August 1, 2014; 19 for those who declared earlier)
2. 9 units (minimum) of skills courses in at least 3 courses of 3 units each (for those declaring after August 1, 2014; 12 units for those declaring between August 1, 2011 and August 1, 2014; 8 units for those who declared earlier than August 1, 2011)
3. 20 units (minimum) in an area of concentration for those declaring after August 1, 2014; 25 for those who declared earlier
4. 13 units in the capstone sequence

If units in these categories total less than 70, the remaining units may be fulfilled by courses in other concentrations or in Urban Studies courses numbered 100 or higher (except URBANST 198 Senior Research in Public Service and URBANST 199 Senior Honors Thesis).

Majors must complete one prerequisite: ECON 1 Principles of Economics; this prerequisite course may be taken S/NC, as the units for this course do not count toward the 70 units required for the major. URBANST 198 Senior Research in Public Service, URBANST 199 Senior Honors Thesis, and prerequisites for required courses and for electives also do not count toward the 70-unit minimum.

Urban Studies students interested in graduate school in business or urban planning are advised to obtain basic quantitative skills by completing MATH 19 Calculus, MATH 20 Calculus, and MATH 21 Calculus, or MATH 41 Calculus and MATH 42 Calculus, preferably before the junior year.

A course in statistical methods, such as STATS 60 Introduction to Statistical Methods: Precalculus, ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists or SOC 181B Sociological Methods: Statistics, is recommended for students interested in business or urban planning.

Urban Studies students are required to engage in a service learning experience as part of their course of study. Students can fulfill their service learning requirement in three ways:

1. enroll in an approved course such as URBANST 164, URBANST 145, and ANTHRO 112;
2. complete an independent internship in an office of a government agency or non-profit/community organization relevant to the major, while enrolled in URBANST 201A Capstone Internship in Urban Studies before Spring Quarter of the junior year; or
3. conduct research with the guidance of a faculty mentor.

Students should arrange their internship in consultation with the Program Manager for Service Learning no later than Winter Quarter of junior year and complete the internship before Winter Quarter of senior year, or two quarters before graduation. Students who intern for a private sector organization may receive credit for URBANST 194, but cannot use URBANST 201A credits to meet the capstone requirement. Urban Studies majors who wish to receive academic credit for additional internship work may enroll in URBANST 194. Students may not count more than 7 units of internship credit, including URBANST 194 Internship in Urban Studies and URBANST 201A Capstone Internship in Urban Studies toward their major. Students can consult the Haas Center for Public Service for other courses with internship placements at community organizations.

Urban Studies students are encouraged to spend at least one quarter studying overseas to learn how cities vary across societies. Some Urban Studies concentration courses, as well as electives, can be satisfied at Stanford overseas campuses. Courses offered overseas vary from year to year, and students should check in advance with Overseas Studies and Urban Studies concerning which courses meet Urban Studies requirements. Students may arrange to fulfill the internship requirement through a placement at one of Stanford's overseas locations.

Courses counted toward the 70-unit graduation requirement for the major must be taken for a letter grade, and a minimum grade of 'C' is required. The only exceptions are Urban Studies courses numbered 100 and higher that are offered only on an S/NC basis, such as URBANST 201A Capstone Internship in Urban Studies. Students may count up to three non-Stanford courses, for a maximum of 15 units, toward the major. These units must first be approved by the Office of Transfer Credit in the Registrar's Office and subsequently approved by the Urban Studies program. Transfer credit is not awarded for internship. Students may not count more than 5 units of URBANST 197 Directed Reading, toward the major without permission of the Director. Qualified students may write a senior honors thesis and graduate with honors; see details in "Honors Program" below. Students interested in declaring Urban Studies as a major are required to meet first with the student services administrator and one of the program's advisers; they then declare the Urban Studies major on Axess.

Urban Studies Core

Urban Studies majors should complete URBANST 110 Utopia and Reality: Introduction to Urban Studies, before Spring Quarter of the junior year. The following courses, totaling 23 units, are required:

		Units
URBANST 110	Utopia and Reality: Introduction to Urban Studies	4
URBANST 111	Political Power in American Cities	5
URBANST 112	The Urban Underclass	4
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	5
URBANST 114	Urban Culture in Global Perspective	5

Skills

A minimum of 9 units in 3 courses of at least 3 units each are required (for those who declare after August 1, 2014; 12 units for those declaring between August 1, 2011, and August 1, 2014, 8 units for those who

declared before August 1, 2011), and should be taken before the end of the junior year. The following courses are recommended for most Urban Studies majors.

		Units
SOC 180A	Foundations of Social Research	4
EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)	3-4

ANTHRO 130D Spatial Approaches to Social Science is an approved substitute for EARTHSYS 144.

The additional skills courses vary depending on a student's needs and interests. Student consult with an adviser to determine the best choice. Courses that fulfill the skills requirement are:

		Units
ANTHRO 91	Method and Evidence in Anthropology	5
ANTHRO 93B	Prefield Research Seminar: Non-Majors	5
ANTHRO 102	Urban Ethnography	5
EARTHSYS 127	GIS for good: Applications of GIS for International Development and Humanitarian Assistance	3-4
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
EDUC 191X	Introduction to Survey Research	3-4
HUMBIO 82A	Qualitative Research Methodology	3
HUMBIO 82B	Advanced Data Analysis in Qualitative Research	3
MED 147	Methods in Community Assessment, Evaluation, and Research	3
OSPCPTWN 22		3
PEDS 202C	Qualitative Research Methods and Study Design	3
POLISCI 155	Political Data Science	5
SOC 180B	Introduction to Data Analysis	4
URBANST 123B	Approaching Research in the Community: Design and Methods	3

Concentrations

Students must complete at least 20 units in one of the following concentrations:

- Cities in Comparative and Historical Perspective,
- Urban Education,
- Urban Society and Social Change
- Urban Sustainability
- Self-Designed

Courses may not be double-counted. Students should consult an adviser to develop a program that meets their intellectual goals; relevant courses not listed here, including research methods courses taken in preparation for the capstone project, may be counted toward the concentration with the prior consent of an adviser.

These concentrations are declared to the department; they are not declared on Axess, and they do not appear on the transcript or the diploma.

Cities in Comparative and Historical Perspective

Focus is on how cities have evolved over time, and how they are continuing to change today in societies around the world, drawing on disciplinary approaches including anthropology, archaeology, art history, geography, and history. By placing urban issues in perspective, students improve their comprehension of the present as well as the past.

Students in this concentration are encouraged to study off campus, and preferably overseas, for at least one quarter. Many courses offered through

the Overseas Studies Program can be counted toward the concentration. Similarly, internships offered at many of Stanford's overseas locations can be used to fulfill the Urban Studies internship requirement.

URBANST 119 Ancient Urbanism (offered alternate years) is required for the cities in comparative and historical perspectives concentration:

The following courses may be counted toward the Cities in Comparative and Historical Perspective concentration:

		Units
AMELANG 177	Middle Eastern Cities in Literature and Film	4-5
ANTHRO 105	Ancient Cities in the New World	3-5
ANTHRO 112	Public Archaeology: Market Street Chinatown Archaeology Project	4
ANTHRO 127	City and Sounds	5
ANTHRO 149	South Asia: History, People, Politics	5
ARTHIST 3	Introduction to World Architecture	5
ARTHIST 107A	St. Petersburg, a Cultural Biography: Architecture, Urban Planning, the Arts	4
ARTHIST 142	Architecture Since 1900	4
ARTHIST 143A	American Architecture	4
ARTHIST 188A	The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism	4
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5
CEE 32Q	Place: Making Space Now	3
CEE 131	Architectural Design Process	4
CLASSICS 83	The Greeks	4-5
CLASSICS 84	The Romans	3-5
COMPLIT 144A	Istanbul the Muse: The City in Literature and Film	3-5
EARTHSYS 112	Human Society and Environmental Change	4
ENGLISH 186	Tales of Three Cities: New York, Chicago, Los Angeles	5
FILMSTUD 150	Cinema and the City	4
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 166	Introduction to African American History - the Modern Freedom Struggle	3-5
HISTORY 232D	Rome: The City and the World, 1350-1750	4-5
HISTORY 260	California's Minority-Majority Cities	4-5
ME 120	History and Philosophy of Design	3
MUSIC 11Q	Art in the Metropolis	2
OSPBER 30	Berlin vor Ort: A Field Trip Module	1
OSPBER 60		
OSPCPTWN 16	South Africa Sites of Memory	2
OSPCPTWN 17		1
OSPCPTWN 22		3
OSPCPTWN 24A & OSPCPTWN 24B	Targeted Research Project in Community Health and Development and Targeted Research Project in Community Health and Development	8
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	3-5
OSPFLOR 75	Florence in the Renaissance: Family, Youth and Marriage in the Fourteenth and Fifteenth Centuries	5

OSPFLO 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADR 60	Integration into Spanish Society: Service Learning and Professional Opportunities	5
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
POLISCI 110C	America and the World Economy	5
URBANST 144	Cities and Citizens in the Middle East	4
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 150	From Gold Rush to Google Bus: History of San Francisco	5
URBANST 160	Environmental Policy and the City in U.S. History	5
URBANST 161	U.S. Urban History since 1920	5
URBANST 166	East Palo Alto: Reading Urban Change	5

Urban Education

The purpose of this concentration is to prepare students for a career in educational policy and practice in diverse settings. This concentration is a useful basis for graduate study in educational policy, law, or business, and for students who have been admitted by the School of Education to pursue a coterminal master's degree in the Stanford Teacher Education Program (STEP) or the Policy, Organization, and Leadership Studies Program (POL). Stanford undergraduates can apply to the Stanford Teacher Education Program (STEP) in their Junior or Senior year.

Coterminal students applying to STEP are encouraged to take EDUC 101 Introduction to Teaching and Learning before applying to the program. Additionally, students interested in STEP Secondary (Single Subject) must demonstrate subject matter competency in their intended teaching area. Transcripts should reflect coursework in the intended teaching subject even if it was not a student's undergraduate major.

For additional information please contact the STEP Admissions Officer at 723-2110, or consult the STEP web site (<http://suse-step.stanford.edu>).

The following course is required for the urban education concentration:

		Units
EDUC 112X	Urban Education	3-4
The following courses may be counted toward the urban education concentration:		
EDUC 101	Introduction to Teaching and Learning	4
EDUC 103A	Tutoring: Seeing a Child through Literacy	3-4
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 148X	Critical Perspectives on Teaching and Tutoring English Language Learners	3
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 178X	Latino Families, Languages, and Schools	3-5
EDUC 201	History of Education in the United States	3-5
EDUC 202	Introduction to Comparative and International Education	4-5
EDUC 203	The Anthropology of Education	3-5
EDUC 204	Introduction to Philosophy of Education	3
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
EDUC 220A	Introduction to the Economics of Education	4

EDUC 220C	Education and Society	4-5
EDUC 220D	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5
EDUC 221A	Policy Analysis in Education	4-5
EDUC 223	Good Districts and Good Schools: Research, Policy, and Practice	3-4
EDUC 233A & EDUC 233B	Counseling Theories and Interventions from a Multicultural Perspective and Adolescent Development and Mentoring in the Urban Context	6-8
EDUC 283	Child Development In and Beyond Schools	2
HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
HUMBIO 142 or PSYCH 60	Adolescent Development Introduction to Developmental Psychology	4
OSPCPTWN 32		
SOC 132	Sociology of Education: The Social Organization of Schools	4

Urban Society and Social Change

Focus is on issues in contemporary urban society and the tools and concepts that planners, policy makers, and citizens use to address those issues. Topics include environmental challenges, racial and class inequality, and the provision of adequate urban infrastructure. Students learn how community action, urban planning and design, and organizations in nonprofit, for-profit, and government sectors address urban social and environmental problems. This concentration prepares students to enter graduate programs concerned with urban affairs, community service, and public policy, and to work with local governmental agencies and for-profit and nonprofit organizations engaged in community service and development.

The following course is required for the urban society and social change concentration:

		Units
POLISCI 133	Ethics and Politics of Public Service	5

The following courses may be counted toward the urban society and social change concentration:

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 106A	Gang Colors: The Racialization of Violence and the American City	5
ASNAMST 146S	Asian American Culture and Community	3-5
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 100	Managing Sustainable Building Projects	4
CEE 115	Goals and Methods of Sustainable Building Projects	3
CEE 124	Sustainable Development Studio	1-5
CEE 129	Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	3
CEE 131	Architectural Design Process	4
CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting	3
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 142A	Negotiating Sustainable Development	3
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3

CEE 246	Entrepreneurship in Civil & Environmental Engineering	3-4
EARTHSYS 49N	Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay	3
EARTHSYS 104	The Water Course	3
EARTHSYS 105	Food and Community: New Visions for a Sustainable Future	3
EARTHSYS 112	Human Society and Environmental Change	4
EARTHSYS 181	Urban Agriculture in the Developing World	3-4
ECON 150	Economic Policy Analysis	4-5
ECON 155	Environmental Economics and Policy	5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
ENGR 150	Data Challenge Lab	1-6
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 255	Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice	5
HISTORY 259A	Poverty and Homelessness in America	4-5
HISTORY 260	California's Minority-Majority Cities	4-5
HUMBIO 116		3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 127A & HUMBIO 127B	Community Health: Assessment and Planning I and Community Health: Assessment and Planning II	8
HUMBIO 128	Community Health Psychology	4
MSE 180 or SOC 160	Organizations: Theory and Management Formal Organizations	4
OSPCTWN 22		3
OSPCTWN 32		3-5
POLISCI 236	Theories of Civil Society, Philanthropy, and the Nonprofit Sector	5
PUBLPOL 102	Organizations and Public Policy	4-5
PUBLPOL 135	Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area	3
PUBLPOL 183	Philanthropy and Social Innovation	4
SOC 14N	Inequality in American Society	3
SOC 16N	African Americans and Social Movements	3
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 140	Introduction to Social Stratification	3
SOC 141	Controversies about Inequality	5
SOC 145	Race and Ethnic Relations in the USA	4
SOC 146	Introduction to Comparative Studies in Race and Ethnicity	5
SOC 160	Formal Organizations	4
SOC 161	The Social Science of Entrepreneurship	4
SOC 164	Immigration and the Changing United States	4
SOC 166	Mexicans, Mexican Americans, and Chicanos in American Society	5
URBANST 107	Introduction to Urban and Regional Planning	3
URBANST 111	Political Power in American Cities	5
URBANST 123	Approaching Research and the Community	2-3

URBANST 126	Spirituality and Nonviolent Urban and Social Transformation	3
URBANST 131	VIP: Very Impactful People - Social Innovation & the Social Entrepreneur	1
URBANST 132	Concepts and Analytic Skills for the Social Sector	4
URBANST 133	Social Entrepreneurship Collaboratory	4
URBANST 137	Innovations in Microcredit and Development Finance	4
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 160	Environmental Policy and the City in U.S. History	5
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
URBANST 163	Land Use Control	4
URBANST 164	Sustainable Cities	4-5
URBANST 166	East Palo Alto: Reading Urban Change	5
URBANST 167	The Automobile and the City	4
URBANST 168	Housing & Community Development--Policy and Practice	3
URBANST 171	Urban Design Studio	5
URBANST 172	(Rethinking Detroit's Infrastructure)	
URBANST 173	The Urban Economy	4

Urban Sustainability

The Urban Sustainability concentration provides the basis for a holistic understanding of cities through the lens of environmental and social sustainability. By combining coursework in urban studies, history, sociology, and design with the STEM fields (science, technology, engineering and mathematics), students in the Urban Sustainability concentration are exposed to both the environmental and infrastructural aspects of cities, as issues of human development, urban societies, public policy, and social equity.

Students in the concentration acquire a foundation in sustainability concepts and skills for research and professional practices. The Urban Sustainability concentration helps prepare students to serve as social change agents in future roles as scholars, urban planners, designers, entrepreneurs, public servants, and advocates, to address the most pressing issues of urban development and its human impacts in cities around the world.

The following course is required for the urban sustainability concentration:

	Units
EARTHSYS 112 Human Society and Environmental Change	4

The following courses may be counted toward the Urban Sustainability Concentration. Students must select at least one course from each of the following categories:

1. environmental sustainability
2. social sustainability
3. project-based courses.

Environmental Sustainability

Environmental sustainability refers to the biosphere, environmental planning and policy, natural resource planning and development, sustainable building design, and urban infrastructure systems.

	Units
CEE 64 Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 100 Managing Sustainable Building Projects	4
CEE 129 Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future	3
CEE 142A Negotiating Sustainable Development	3

CEE 165C	Water Resources Management	3
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 172S	Green House Gas Mitigation	1-3
CEE 173A	Energy Resources	3-5
CEE 176A	Energy Efficient Buildings	3-4
CHEMENG 35N	Renewable Energy for a Sustainable World	3
CHEMENG 60Q	Environmental Regulation and Policy	3
EARTHSYS 10	Introduction to Earth Systems	4
EARTHSYS 41N	The Global Warming Paradox	3
EARTHSYS 101	Energy and the Environment	3
EARTHSYS 175	California Coast: Science, Policy, and Law	3-4
EARTHSYS 188	Social and Environmental Tradeoffs in Climate Decision-Making	1-2
ECON 17N	Energy, the Environment, and the Economy	3
ECON 155	Environmental Economics and Policy	5
ENGR 90	Environmental Science and Technology	3

Social Sustainability

Social sustainability refers to land use planning and its human impacts, distribution of public goods, human-centered design, human and community development, citizen participation, and social equity.

		Units
ANTHRO 183B	Human Mobility and Adaptability	5
BIO 102	Demography: Health, Development, Environment	3
EARTHSYS 37N	Climate Change: Science & Society	3
EARTHSYS 105	Food and Community: New Visions for a Sustainable Future	3
POLISCI 19N	Politics of Energy Efficiency	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
URBANST 107	Introduction to Urban and Regional Planning	3
URBANST 163	Land Use Control	4
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
URBANST 167	The Automobile and the City	4
URBANST 168	Housing & Community Development--Policy and Practice	3

Project-Based Courses

Project-based courses enable students to work on a real-life urban sustainability issue in collaboration with local and international community partners. Students grapple with sustainability concepts while practicing community engagement and capacity building, fluency in crosscultural collaboration, human-centered design thinking, and developing a sense of one's place in relation to global society and the praxis of urban sustainability.

		Units
CEE 124	Sustainable Development Studio	1-5
CEE 177X	Current Topics in Sustainable Engineering	1-3
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 164	Sustainable Cities	4-5
URBANST 171	Urban Design Studio	5

Students interested in pursuing the concentration in urban sustainability should meet with an Urban Studies adviser to determine an appropriate course of study. Consult the Urban Studies website or see an adviser for sample course plans in this concentration.

Self-Designed Concentration

Students who wish to concentrate in an area of urban studies other than one of the above concentrations must complete the Urban Studies core, skills, and capstone requirement, and design additional units to bring the total to at least 70 units. The self-designed portion of the major should concentrate on a particular area of urban study, such as urban health care or urban environmental management. Additional units must be approved by both the Director of Urban Studies and an academic adviser who is a member of the Academic Council and has expertise in the particular area of interest to the student. A proposal for a self-designed concentration should include a list of courses and a description of how each course meets the student's educational objectives. A proposal for a self-designed concentration must be accompanied by a letter to the Director of Urban Studies indicating that the academic adviser has examined and approved the student's plan.

Students pursuing a self-designed concentration must submit proposals for approval by the Director of Urban Studies by the beginning of the third quarter of the student's sophomore year. Applications received after that deadline are not considered. Students interested in designing their own concentration are strongly encouraged to meet with the Director of Urban Studies before the end of fall quarter of their sophomore year.

Capstone

All majors are required to complete an internship and a sequence of two seminars, totaling 13 units, in which students participate in the work of an urban organization related to their area of interest, design a senior project, and write the results of their project. The capstone seminars can be used to satisfy the Writing in the Major requirement and to complete some work on an honors thesis. URBANST 201A Capstone Internship in Urban Studies, must be taken by the spring quarter of their junior year. URBANST 202 Preparation for Senior Research, should be taken in the junior year, and URBANST 203 Senior Seminar in the senior year. Students who plan to be away during Winter Quarter of their junior year are advised to take URBANST 202 Preparation for Senior Research in the Winter Quarter of their sophomore year.

		Units
URBANST 201A	Capstone Internship in Urban Studies	3
URBANST 202	Preparation for Senior Research	5
URBANST 203	Senior Seminar	5

Honors Program

The honors program offers qualified students an opportunity to conduct independent research and to write a thesis summarizing the results. Before being accepted to the honors program in Urban Studies, a student must:

1. declare a major in Urban Studies and complete at least 30 of the 70 required units including all prerequisites and core classes
2. complete URBANST 202 Preparation for Senior Research (offered Winter Quarter)
3. have an overall GPA of 3.3 and a GPA of at least 3.5 in Urban Studies
4. submit an application, including a one-page abstract and the signatures of an adviser and, if applicable, a second reader. If the adviser is not a member of Stanford's Academic Council, the student must have a second reader who is an Academic Council member. The application must be submitted to the program office no later than April 30 of the junior year, and it must then be approved by the Director of the Urban Studies honors program.

Honors students are expected to complete a portion of their honors work in URBANST 203 Senior Seminar, in Autumn Quarter. Additionally, they must register for 5-10 units total in URBANST 199 Senior Honors Thesis, over the course of their senior year. The units of URBANST 199 Senior Honors Thesis are in addition to the 70-units required for the major. Honors

students are required to present their theses at the Senior Colloquium in Spring Quarter of senior year.

To graduate with honors, students must receive a grade of at least 'A-' in the honors work and have a GPA of at least 3.5 in courses for the Urban Studies major at the time of graduation.

Minor in Urban Studies

The minor in Urban Studies is designed to introduce students to several disciplinary approaches to the study of cities, and provides the opportunity to explore one of four specialized options:

- Cities in comparative and historical perspective
- Urban education
- Urban society and social change
- Urban sustainability

The minor in Urban Studies requires completion of seven courses for a letter grade, including the five core courses, the required course in the student's chosen concentration area, and one additional course in that option as listed in the "Bachelor of Arts in Urban Studies (p. 663)" section of this bulletin.

Director: Zephyr Frank (History)

Associate Director: Michael Kahan (Lecturer, Urban Studies)

Executive Committee: Thomas Hansen (Anthropology), Michael Rosenfeld (Sociology), Walter Scheidel (Classics), Jeff Wachtel (President's Office)

Affiliated Faculty: Arnetha Ball (Education), Eric Bettinger (Education), Scott Bukatman (Art and Art History), Albert Camarillo (History), Prudence Carter (Education), Samuel Chiu (Management Science and Engineering), Paulla Ebron (Anthropology), Paula Findlen (History), James Fishkin (Communication), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Richard Ford (Law), Zephyr Frank (History), Leah Gordon (Education), Gary Griggs (Civil and Environmental Engineering), David Grusky (Sociology), Thomas Hansen (Anthropology), Allyson Hobbs (History), Ian Hodder (Anthropology), Miyako Inoue (Anthropology), Sarah Jain (Anthropology), Tomás Jiménez (Sociology), David Labaree (Education), Raymond Levitt (Civil and Environmental Engineering), Carolyn Lougee Chappell (History), Tanya Luhmann (Anthropology), Doug McAdam (Sociology), Raymond McDermott (Education), Daniel McFarland (Education), William McLennan (Office of Religious Life), Ian Morris (Classics), Clayton Nall (Political Science), Josiah Ober (Classics, Political Science), Leonard Ortolano (Civil and Environmental Engineering), Sean Reardon (Education), Rob Reich (Political Science), Jonathan Rodden (Political Science), Michael Rosenfeld (Sociology), Walter Scheidel (Classics), Gary Segura (Political Science), Michael Shanks (Classics), Jennifer Trimble (Classics), Nancy Brandon Tuma (Sociology, Hoover Institution), Fred Turner (Communication), Guadalupe Valdes (Education), Barbara Voss (Anthropology), Steve Zipperstein (History)

Lecturers: Deland Chan, Melanie Edwards, Dennis Gale, Dehan Glanz, Radford Hall, Kevin Hsu, Clayton Hurd, Michael Kahan, Lawrence Litvak, Judith Ned, Marisa Raya, Laura Scher, Frederic Stout

Overseas Studies Courses in Urban Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 30	Berlin vor Ort: A Field Trip Module	1
OSPCPTWN 16	South Africa Sites of Memory	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 24B	Targeted Research Project in Community Health and Development	5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	4
OSPCPTWN 44	South African Urban Challenges in Comparative Context	4
OSPCPTWN 68	Cities in the 21st Century: Urbanization, Globalization and Security	4
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 75	Florence in the Renaissance: Family, Youth and Marriage in the Fourteenth and Fifteenth Centuries	5
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADRD 60	Integration into Spanish Society: Service Learning and Professional Opportunities	5
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5

Stanford in Washington

Director: Adrienne Jamieson

On Campus Coordinator: Jill Vizas

The Bing Stanford in Washington program provides highly-qualified undergraduates with an opportunity to work and study in the nation's capital. In addition to providing students with an understanding of public policy making, the program offers an opportunity to take advantage of the city's unique cultural resources.

Central in the student's educational experience is a full-time internship. Students serve as interns at such institutions and agencies as the Senate, the House of Representatives, the Office of Management and Budget, the White House, the National Institutes of Health, the Smithsonian Institution, CNN, World Bank, the departments of State, Justice, Treasury, Education, and Health and Human Services.

In addition to the internship, students also complete an academic course of study consisting of small courses taught by policy experts, and weekly seminars taught by Stanford faculty members. Seminars are generally 3-5 units. Past topics have included congressional oversight and the press; economic growth and development patterns, policies, and prospects; critical health issues in the U.S. and abroad; policy making in the Washington community; and criminal justice policy. Speakers from the Washington policy community frequently join students and faculty for discussions. Students often write a major paper related to their internship for 3-5 units

of credit. Course and seminar topics vary according to student and faculty interest.

The Bing Stanford in Washington program offers stretch quarters in the Autumn and Spring (early September to mid-December, and late March to the end of June) and a regular quarter in Winter, which focuses on environmental policy, health policy and the arts. The program is designed for students in their junior year or during the first or second quarter of their senior year. Applications must be completed two quarters in advance, and three quarters in advance if a student is overseas or otherwise not on campus during the qualifying quarter.

Students interested in the program should contact the campus office of the Bing Stanford in Washington program; see contact information above.

School of Law

Courses offered by the School of Law are listed on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site under the subject codes LAW (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=LAW&filter-catalognumber-LAW=on>) and LAWGEN (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=LAWGEN&filter-catalognumber-LAWGEN=on>).

The School of Law, established in 1893, provides a legal education for students who are fitted by their maturity and academic training to pursue professional study under University methods of instruction. The curriculum leading to the first professional degree in law, the Doctor of Jurisprudence (J.D.), constitutes an adequate preparation for the practice of law in any English-speaking jurisdiction. Graduate work leading to the degrees of Master of Laws (L.L.M.), Master of the Science of Law (J.S.M.), and Doctor of the Science of Law (J.S.D.), and a non-professional degree, Master of Legal Studies (M.L.S.), is also offered. For the full curriculum, see the Course Schedule & Description on the Law School (<http://www.law.stanford.edu/courses>) web site. Stanford Law School offers joint or dual degree options in combination with other Stanford graduate departments and universities across the country; see the "Joint and Dual Degrees in Law" (<http://www.stanford.edu/dept/registrar/bulletin/5344.htm>) section of this bulletin.

The school is on a three-term academic calendar. For a complete list of academic dates see the Academic Calendar on the Law School (<http://www.law.stanford.edu/calendar>) web site.

For further information about admission, programs, curriculum, and faculty, see the Law School (<http://www.law.stanford.edu>) web site.

Joint and Dual Degrees in Law

Formal admission to both the Law School and to the other cooperating school or department in accordance with the established admission standards of each school or department is required. In addition to the established joint degree programs offered, the school considers requests for a dual program on an individually designed basis. For additional information on Law School joint or dual degree programs, see the Law School (<http://www.law.stanford.edu/program/degrees>) web site. See relevant web sites or department sections of this bulletin for degree requirements.

Graduate School of Business

- See the GSB's M.B.A. web site (<http://www.gsb.stanford.edu/programs/mba>)
- J.D./M.B.A. Master of Business Administration

School of Earth Sciences

- J.D./M.S. Interdisciplinary Program in Environment and Resources (E-IPER)
- J.D./Ph.D. Interdisciplinary Program in Environment and Resources (E-IPER)

School of Education

J.D./M.A. Education

School of Engineering

- J.D./M.S. Bioengineering
- J.D./Ph.D. Bioengineering
- J.D./M.S. Computer Science
- J.D./M.S. Electrical Engineering
- J.D./M.S. Management Science and Engineering (MS&E)
- J.D./Ph.D. Management Science and Engineering (MS&E)

School of Humanities and Sciences

- J.D./M.A. Economics
- J.D./Ph.D. Economics
- J.D./M.A. History
- J.D./Ph.D. History
- J.D./M.A. in degree granting programs in Stanford Global Studies (SGS):
 - African Studies
 - East Asian Studies
 - Latin American Studies
 - Russian, East European and Eurasian Studies
- J.D./M.A. in International Policy Studies
- J.D./Ph.D. Philosophy
- J.D./Ph.D. Political Science
- J.D./Ph.D. Psychology
- J.D./M.P.P. Public Policy
- J.D./Ph.D. Sociology

School of Medicine

- J.D./M.S. Health Research and Policy (HRP)

Cooperative Programs with Other Universities

Stanford J.D. students have also pursued degrees at other universities such as the Harvard Kennedy School, Johns Hopkins School of Advanced International Studies, and Princeton Woodrow Wilson School. The approval process for such a cooperative program begins after the student has been admitted, independently, to both programs. Students may enroll in either a joint degree among schools at Stanford or in a degree from an external university, but a student may not enroll in both a Stanford JDP and a cooperative program with another university.

Courses in Law

Some Law courses have special enrollment instructions and restrictions, but many Law courses are open to qualified graduate students in other departments of Stanford University with instructor consent. Non-Law students may not enroll in courses that are part of the required first-year J.D. curriculum. Stanford non-Law students intending to enroll in any course with a LAW subject code must consult the Office of the Law School Registrar in the Stanford Law School Administration Building, room 100, or see the Stanford Law School, Office of the Registrar (<http://www.law.stanford.edu/organizations/offices/office-of-the-registrar>) web site.

Emeriti: (Professors): Janet Cooper Alexander, Barbara Allen Babcock, Wayne G. Barnett, Paul Brest, Gerhard Casper, William Cohen, Lance E. Dickson, Marc A. Franklin, Jack H. Friedenthal, Ronald J. Gilson, Robert A. Girard, William B. Gould IV, Thomas C. Grey, Thomas C. Heller,

Miguel A. Méndez, John Henry Merryman, Margaret Jane Radin, Kenneth E. Scott, Byron D. Sher, William H. Simon, Michael S. Wald

Dean: M. Elizabeth Magill

Vice Dean: Mark G. Kelman

Associate Dean for Public Interest and Clinical Education: Juliet M. Brodie

Associate Dean for Clinical Education: Juliet M. Brodie

Associate Dean for Curriculum: Jenny Martinez

Associate Dean for Executive Education and Special Programs: F. Daniel Siciliano

Associate Dean for Graduate Studies: Deborah R. Hensler

Associate Dean for Strategic Planning: George Triantis

Senior Associate Dean and Chief Financial Officer: Frank Brucato

Associate Deans: Diane Chin, Faye Deal, Julia Erwin-Weiner, Catherine Glaze, Sabrina Johnson, Susan Robinson

Professors: Michelle Wilde Anderson, Joseph Bankman, R. Richard Banks, Joshua Cohen, G. Marcus Cole, Richard Craswell (on leave), Mariano-Florentino (Tino) Cuéllar, Robert M. Daines, Michele Landis Dauber, John J. Donohue III, George Fisher, Richard T. Ford, Barbara H. Fried, Lawrence M. Friedman, Paul Goldstein, Robert W. Gordon, Henry T. Greely (on leave spring), Joseph A. Grundfest, Deborah R. Hensler, Daniel E. Ho, Pamela S. Karlan (on leave), Mark G. Kelman (on leave autumn), Amalia D. Kessler, Daniel P. Kessler, Michael Klausner (on leave winter/spring), Mark A. Lemley, Robert MacCoun, M. Elizabeth Magill, Lawrence C. Marshall, Jenny S. Martinez, Michael W. McConnell (on leave autumn), Michelle Mello, Bernadette Meyler, Alison D. Morantz, Nathaniel Persily, Joan Petersilia, A. Mitchell Polinsky, Robert L. Rabin, Deborah L. Rhode, Jane Schacter, David A. Sklansky, Norman W. Spaulding, James F. Strnad II, David Studdert, Barton H. Thompson (on leave spring), Jr., George Triantis, Barbara van Schewick, Robert Weisberg

Associate Professor: David Freeman Engstrom, Nora Freeman Engstrom, Michael Wara

Assistant Professors: Lisa Larrimore Ouellette, Shirin Sinnar

Professors (Teaching): Juliet M. Brodie, James Cavallaro, Jeffrey L. Fisher, William S. Koski, Phil Malone, Jay A. Mitchell, Deborah A. Sivas, Jayashri Srikantiah

Associate Professors (Teaching): Ronald C. Tyler

Senior Lecturers: Margaret R. Caldwell, Janet Martinez, Allen S. Weiner

Professors of the Practice of Law: Lucas Guttentag, Erik G. Jensen, David W. Mills, Dan Reicher, F. Daniel Siciliano

Professors (by courtesy): Jennifer Eberhardt, Michael Genesereth, David Larcker, Jose Maldonado, Paul C. Pfleiderer, Madhav Rajan, Jack Rakove, Frank Wolack

Visiting Professors: Michael Asimow, Binyamin Blum, Ryan Bubb, Siegfried Fina, Ariela Gross, Avishai Margalit, Mariana Pargendler, Rogelio Perez-Perdomo, Alan O. Sykes, Chantal Thomas, Beth Van Schaack, Tess Wilkinson-Ryan, Jonathan Zittrain

Distinguished Visitors from Practice: Douglas Melamed, Richard Morningstar, Robert Pozen, Brian Wolfman

Legal Research and Writing Instructors: Abbye Atkinson, Andrew Gilden, Thea Johnson, Courtelyou Kenney, Jeanne Merino, Justin Weinstein-Tull

Lecturers: Simao Avila, Marilyn Bautista, Jeanine Becker, Richard Brand, Viola Canales, Lanhee Chen, Diane Chin, Laurent Cohen-Tanugi, Allison Marston Danner, Michael E. Dickstein, Lisa Douglass, Bonnie Eskanazi, Rande G. Fenner, Bertram Fields, Jay Finkelstein, David Forst, Laurence Franklin, Steven Franklin, Michelle Galloway, Mei Gechlik, Tracy Genesen, Benjamin Ginsberg, Jennifer Granick, Jonathan Greenberg,

Thomas Griffith, Margaret Hagen, Timothy H. Hallahan, Adam Halpern, David Hayes, Jared Haynie, Todd Hinnen, David Johnson, Danielle Jones, Sean Kaneshiro, Julie Matlof Kennedy, Sallie Kim, Jason Kipnis, Jeffery W. Kobrick, Robin John Lee, Stuart Lipton, Goodwin Liu, Paul Lomio, Suzanne Luban, Thomas Lue, Diego Gil McCawley, Beth McLellan, Jeanne Merino, Shawn Miller, Nader Mousavi, Carly Munson, Linda Netsch, Jessica Notini, Jef Pearlman, B. Howard Pearson, Lisa M. Pearson, Vabessa Casado Perez, Galia Phillips, John G. Quigley, Stephan Ray, Susan Robinson, John Rodkin, Dave Rogers, Michael Romano, Stephen Rosenbaum, Tom Rubin, Jacob Russell, Richard Salgado, Rachel Samberg, Matthew Sanders, Ticien Sassoubre, Jeff Schox, Stephanie Smith, James Sonne, Stephan Sonnenberg, Michelle Sonu, Jory Steele, Sergio Stone, Dan Tan, Alicia Thesing, Claret Vargas, Roland Vogl, Lisa Weissman Ward, Erika V. Wayne, Katherine C. Wright, Joseph Yang, James Yoon

Affiliated Faculty: Alexandria (Ali) Boehm (Civil and Environmental Engineering), Kate Bundorf (Health Research and Policy), Amir Goldberg (GSB), Benoit Monin (GSB), Stefan Reichelstein (GSB), Abraham Sofaer (Hoover), Francis "Vic" Stanton (GSB), Leon Szeptycki (Woods Institute)

School of Medicine

The School of Medicine offers courses of study leading to the M.S., Ph.D., and M.D. degrees.

Undergraduate Programs in the School of Medicine

Many courses in the School of Medicine are open to any registered Stanford student who has fulfilled the prerequisites, subject to the usual limits of course enrollment and faculty approval. The school also offers courses specifically for undergraduates, as well as graduate-level courses where advanced undergraduates with backgrounds in the life sciences are welcome. Among the undergraduate offerings are numerous Stanford Introductory Seminars for freshmen and sophomores, the Emergency Medical Technician program, Stanford Immersion in Medicine Physician Shadowing, Pre-Vet Advisory, and courses in Community Health, including participation in the Stanford Free Clinics. The school also offers several undergraduate courses through the Department of Biology and the Interdisciplinary Program in Human Biology in the School of Humanities and Sciences.

M.S. and Ph.D. Programs in the School of Medicine

The School of Medicine is home to graduate programs covering a broad range of disciplines within biomedicine leading to Ph.D. or M.S. degrees. These programs focus on interdisciplinary training with in-depth investigation of an original problem of fundamental importance to the biosciences. Each degree program sets its own curriculum, but many courses are taught by groups of faculty from multiple programs and departments. Flexibility is a priority to ensure that all students obtain the best possible training for pursuing careers in their areas of interest. The school is dedicated to training students from diverse backgrounds, and to the promotion of diversity in graduate education. Admission is through one of about 15 home programs. These home programs enable students to carry out dissertation research and training with School of Medicine faculty, as well as investigators in the departments of Biology and Biophysics in the School of Humanities and Sciences. Detailed information on School of Medicine M.S. and Ph.D. programs, curricula, and research can be found at Stanford's School of Medicine Master's Degree Programs (<http://med.stanford.edu/ms>) and Ph.D. Programs (<http://med.stanford.edu/phd>) web site. Application information can be found at Stanford's Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

M.D. Program in the School of Medicine

The School of Medicine seeks to attract students who are passionate about scholarship and wish to improve the health of the world's people through research, innovation, and leadership. The Stanford M.D. curriculum provides education in biomedical and clinical sciences along with study and independent research through scholarly concentrations. Emphasis is placed on interdisciplinary learning, with streamlined content and melding of basic science and clinical instruction across the curriculum. Blocks of unscheduled time allow for individual or group study, participation in elective courses, research, and reflection. Alternative pathways through the curriculum include an option of a fifth or sixth year of study as well as opportunities for pursuing a second degree, such as an M.P.H., M.B.A., Master's of Science in Epidemiology or Health Services Research, or a Ph.D.

Broad clinical science education occurs throughout the curriculum with exposure to patient care and the practice of medicine beginning on the

first day of medical school. Students begin clinical clerkships in June of the second year. A population health course combines classroom and experiential learning to provide understanding of the socioeconomic determinants of the health of patients and communities.

Scholarly concentrations offer opportunities for developing skills that enhance basic science and clinical training in areas such as bioengineering, biomedical ethics and medical humanities, biomedical informatics, clinical research, community health, health services and policy research, and the molecular basis of medicine. Through the scholarly concentration program, these skills may be applied in clinical areas housed within centers at Stanford such as the Comprehensive Cancer Center, the Cardiovascular Institute, the Neuroscience Institute, the Institute of Immunity, Transplantation, and Infection, and Women's Health at Stanford. Study in a scholarly concentration typically includes course work and research activities. Research for scholarly concentrations is supported through the Medical Scholars program, which funds student research projects at Stanford and overseas.

Students with interests in medical research as a career are encouraged to investigate opportunities available through the Medical Scientist Training Program (MSTP). Stanford also collaborates with the University of California, Berkeley, to offer students opportunities for M.D./M.P.H. training. Details about these programs may be found at Stanford's Dual Degree and Multi-Degree Programs (http://med.stanford.edu/combined_degree) web site.

Stanford is committed to representing the diversity of the U.S. and California populations by seeking a diverse body of students who are interested in the intellectual substance of medicine and committed to advancing the field of health care, broadly defined. Provided an applicant to the school has completed basic courses in physics, chemistry, and biology, the choice of an undergraduate major may reflect other interests, including the arts and humanities. Course work in advanced biology such as biochemistry, molecular biology, or genetics and the behavioral sciences is recommended because of their importance in understanding health care. Breadth of interests and depth of experiences play an important role in the selection of students from among those applicants having superior academic records.

The M.D. degree requires 13 quarters of registration at full Med-MD tuition; the joint M.D./Ph.D. degree requires 16 quarters. Completion of the M.D. degree must be achieved within six years, unless a petition is granted to extend this time frame. For further details on the M.D. degree, including admission requirements, see the Medical Education at Stanford (<http://med.stanford.edu/md>) web site.

Multiple-Degree Programs in the School of Medicine M.D./Ph.D.

Many M.D. students undertake a Ph.D. while they are at Stanford. Popular choices are School of Medicine programs in Bioengineering, Biomedical Informatics, or one of the 13 Biosciences home departments. At the School of Engineering, the Biomechanical Engineering M.D./Ph.D. program also makes a special effort to work with M.D. students.

Medical Scientist Training Program

The Medical Scientist Training Program (MSTP) provides medical students with an opportunity to pursue an individualized program of research and course work leading to both the M.D. and Ph.D. degrees. It is designed to equip students for careers in academic investigative medicine, and emphasizes flexibility of curricular and research programs for each trainee. Training for a combined M.D.-Ph.D. includes the same content encountered by students who pursue each degree separately, but the total training time is less than the sum of the time normally required for each degree. The flexible curriculum at Stanford's School of Medicine allows each

student, in consultation with a preceptor and other advisers, to pursue a plan of study that satisfies the requirements for the M.D. and allows performance of doctoral-level research leading to the Ph.D. Students interested in joining the MSTP are considered for admission at the time of their application to the School of Medicine M.D. program and are asked to provide supplemental information relevant to their research background. Current Stanford M.D. students may also apply for admission to the MSTP.

M.D./M.B.A.

M.D.. students interested in combining their medical training with training in business can take advantage of a dual degree M.D./M.B.A. program that allows students to obtain both degrees after completion of a 5-year curriculum. Students must apply to and be admitted by the Stanford Graduate School of Business, at the time of their admission to the medical school or after beginning their M.D.. studies.

M.D./M.P.H.

A unique collaboration with UC Berkeley allows M.D.. students to pursue and obtain a Master of Public Health degree while still at the Stanford School of Medicine. This dual degree M.D./M.P.H. program is open to M.D. students who participate in the Scholarly Concentration in Community Health. Students must apply to and be admitted by the UC Berkeley program; course work is undertaken at the UC Berkeley campus.

Ph.D./M.S.M.

The Master of Science in Medicine (<http://msm.stanford.edu>) program admits current Stanford Ph.D. students who have a commitment to translational research, but are not interested in becoming clinicians. The goal of the program is to train researchers in human biology and disease to be better equipped to translate new scientific discoveries into useful medical advances. Students offered admission into any Ph.D. program at Stanford may apply for admission to the master's program. During their first five quarters, students take basic biomedical science courses with Stanford M.D. students. The School of Medicine M.D. curriculum is presented in a succinct format that allows time for students to concurrently complete their Ph.D. course requirements and lab rotations. By early in their second year, students choose a lab for their Ph.D. thesis research and complete their medical course work. They also elect a clinical co-mentor to discuss translational research needs and help to arrange a short clinical experience. Upon completion of the Program., participating students receive an M.S. in Medicine.

M.D./M.S. Degrees

Health Services Research (<http://med.stanford.edu/mshsr/degree.html>)

The Master's Degree program in Health Services Research is a research-oriented program with a concentration on economics and statistics, outcomes research, cost-effectiveness, and technology assessment. The program is designed to complement training in the medical and social sciences and prepare students for research careers in health services or health policy analysis. The program provides specialized training in selected areas of health care policy, research methodology, and the application of these skills to a specific research problem. Course work requirements allow students to design a program of study suited to their individual backgrounds and interests.

Epidemiology (<http://med.stanford.edu/epidemiology>)

The Graduate Interdisciplinary Program in Epidemiology is a research oriented program that offers instruction and research opportunities leading to the M.S. degree in Epidemiology - the study of the distribution and determinants of diseases in populations.

Medical Information Sciences (<http://bmi.stanford.edu/prospective-students/dual-degrees>)

An option for anyone who wishes to either perform research in Biomedical Informatics as clinical faculty at a school of medicine or for those who wish to continue into the health care industry or government. There is high need for trained individuals who understand the practice of medicine and who are able to develop and implement applications in biomedical informatics.

Biomechanical Engineering (<http://medcatalog.stanford.edu/php/dept.php?DNo=999>)

Bioengineering is a fusion of engineering and the life sciences that promotes scientific discovery and the invention of new technologies and therapies through research and education. It encompasses both the use of biology as a new engineering paradigm and the application of engineering principles to medical problems and biological systems. The discipline embraces biology as a new science base for engineering.

M.D./M.P.P. Degree

Matriculated M.D. students from Stanford's School of Medicine may apply for admission to the joint M.P.P./M.D. degree program (http://publicpolicy.stanford.edu/jt_mdmp). Applications are accepted anytime after a student has completed one year in the M.D. program. Students must obtain the permission of the School of Medicine to participate in the joint degree program. Students are required to devote two continuous years of full-time study to the completion of the first two years of the core M.D. curriculum. Students then devote one continuous academic year of study to the completion of the M.P.P. core curriculum. At other times, the student may be enrolled in either unit and may take courses from either unit to satisfy the joint degree requirements.

Departmental Dual Degrees Education

The Individually designed M.A. in Education is designed for Stanford doctoral students enrolled outside of the School of Education. Individuals enrolled at the doctoral level at Stanford can be considered for this program.

E-IPER

Stanford's Emmett Interdisciplinary Program in Environment and Resources (E-IPER) gives students a focused science, engineering, and technology background, allowing them to integrate science with law and business to address critical environmental and sustainability issues. http://e-iper.stanford.edu/admissions.jointms_application.php

Public Policy

Stanford University offers two master's programs in Public Policy. A Master's of Public Policy (M.P.P.) is a two-year professional degree and the Masters of Arts in Public Policy (M.A.) is a one-year non-professional degree. Students currently enrolled in other Stanford graduate programs, and applicants to those programs, may apply for either of the Public Policy master's programs. M.D. students are eligible to apply for a dual M.A. degree program See above for the joint M.D./M.P.P. program.

Dean: Lloyd Minor

Senior Associate Dean for Graduate Education and Postdoctoral Affairs: Daniel Herschlag

Senior Associate Dean for Medical Education: Charles Prober

Biochemistry

Courses offered by the Department of Biochemistry are listed under the subject code BIOC on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOC&filter-catalognumber-BIOC=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOC&filter-catalognumber-BIOC=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOC&filter-catalognumber-BIOC=on>).

Biochemistry is a department within the School of Medicine, with offices and labs located in the Beckman Center for Molecular and Genetic Medicine at the Stanford Medical Center. Courses offered by the department may be taken by undergraduates as well as graduate and medical school students.

Advanced courses offered in more specialized areas emphasize recent developments in biochemistry, cell biology, and molecular biology. These courses include the physical and chemical principles of biochemistry, enzyme reaction mechanisms, membrane trafficking and biochemistry, molecular motors and the cytoskeleton, mechanisms and regulation of nucleic acid replication and recombination, the biochemistry of bacterial and animal viruses, the molecular basis of morphogenesis, the molecular and cell biology of yeast, and the structure and function of both eukaryotic and prokaryotic chromosomes.

Opportunities exist for directed reading and research in biochemistry and molecular biology, using the most advanced research facilities, including those for light and electron microscopy, chromatography and electrophoresis, protein and nucleic acid purification, rapid kinetic analysis, synthesis and analysis, single molecule analyses using laser light traps, microarray generation and analysis, and computer graphic workstation facilities for protein and nucleic acid structural analysis. Ongoing research uses a variety of organisms from bacteria to animal cells.

Doctor of Philosophy in Biochemistry

Requirements for the M.S. and Ph.D. degrees are described in the "Graduate Degrees (p. 43)" section of this bulletin. The department does not offer undergraduate degrees.

The Department of Biochemistry offers a Ph.D. program which begins in the Autumn Quarter of each year. The program of study is designed to prepare students for productive careers in biochemistry; its emphasis is training in research, and each student works closely with members of the faculty. In addition to the requirement for a Ph.D. dissertation based on original research, students are required to complete six advanced courses in biochemistry and related areas among the 135 total units required for the Ph.D. Selection of these courses is tailored to fit the background and interests of each student. A second requirement involves the submission of two research proposals which are presented by the student to a small committee of departmental faculty members who are also responsible for monitoring the progress of student curricular and research programs, and a journal club presentation. All Ph.D. students are expected to participate actively in the department's seminar program, and students are encouraged to attend and to present papers at regional and national meetings in cellular biochemistry and molecular biology. Teaching experience is an integral part of the Ph.D. curriculum and is required for the degree.

The Department of Biochemistry offers an M.S. degree only to students already enrolled in the Ph.D. program. Students should contact the Graduate Studies adviser for more details.

Those applying for graduate study should have at least a baccalaureate degree and should have completed work in cell and developmental biology, basic biochemistry and molecular biology, and genetics. Also required are: at least one year of university physics; differential and integral calculus; and organic, inorganic, and physical chemistry. The department is especially interested in those applicants who have research experience in biology or chemistry. Students must submit an application, including transcripts and letters of recommendation, by December for admission in the following Autumn Quarter.

Applications should be submitted at the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. Applicants are notified by March 31 of decisions on their applications. Stanford University requires scores from the Graduate Record Examination (GRE) (verbal, quantitative, and analytical), and applicants are encouraged to submit scores from the GRE Subject Test in biochemistry, biology, or chemistry. Applicants should take the October GRE exam.

All applicants are urged to compete for non-Stanford fellowships or scholarships, and U.S. citizens should complete an application for a National Science Foundation Predoctoral Traineeship. Students are provided with financial support to cover normal living expenses; Stanford tuition costs are paid. Applicants for admission to the department are considered without regard to race, color, creed, religion, sex, age, national origin, or marital status.

Postdoctoral research training is available to graduates who hold a Ph.D. or an M.D. degree. Qualified individuals may write to individual faculty members for further information.

At present, the primary research interests of the department are the structure and function of proteins and nucleic acids, the biochemistry and control of development processes, molecular motors and the cytoskeleton, the trafficking of proteins between membrane-bound organelles, the control and regulation of gene expression, bioinformatics/protein structure design, and the application of microarrays to problems in human health and disease.

Emeriti: (Professors): Robert L. Baldwin, Paul Berg, Douglas L. Brutlag, David S. Hogness, A. Dale Kaiser, I. Robert Lehman

Chair: Suzanne R. Pfeffer

Professors: Steven Artandi, Philip Beachy, Patrick O. Brown, Gilbert Chu, Ronald W. Davis, James E. Ferrell, Jr., Daniel Herschlag, Peter Kim, Mark A. Krasnow, Suzanne R. Pfeffer, James A. Spudich, Julie A. Theriot

Associate Professors: Pehr A. B. Harbury, Aaron F. Straight

Assistant Professors: Onn Brandman, Rhiju Das, Rajat Rohatgi, Julia Salzman, Ellen Yeh

Courtesy Professors: Chaitan S. Khosla, Sharon Long

Biomedical Ethics

The Stanford University Center for Biomedical Ethics (SCBE) is dedicated to interdisciplinary research and education, and provides clinical and research ethics consultation. SCBE serves as a scholarly resource on emerging ethical issues raised by medicine and biomedical research.

SCBE offers a scholarly concentration in Biomedical Ethics and Medical Humanities (BEMH) to medical students. This program allows medical students to study in depth the moral, social, and humanistic dimensions of medicine and biomedical science. Using cross-disciplinary methods such as those from philosophy, social science, film, literature, art, and law, students examine the meaning and implications of medicine and medical research.

Degree Requirements

Students who pursue Biomedical Ethics and Medical Humanities in conjunction with an application area, such as Immunology, are required to complete 6 units including:

		Units
INDE 212	Medical Humanities and the Arts	2
PEDS 251A	Medical Ethics I	2

Students may select the other two core BEMH units from a wide variety of University, Medical School, and Law School courses. Students interested in completing all 12 units in the BEMH scholarly area may do the same. Students are encouraged to go through the various offerings and devise a course plan to present to the director, David Magnus, and Audrey Shafer. Additional information on requirements for the scholarly concentration, is available at the BEMH (<http://bioethics.stanford.edu/education/bemh>) web site.

Director: David C. Magnus

Director Emeritus: Thomas A. Raffin

Associate Director: Mildred K. Cho

Participating Faculty and Staff: Danton S. Char, Julie A. Collier, Steven Goodman, Maren Grainger-Monsen, Henry Greely, Alvan A. Ikoku, Katrina A. Karkazis, Sandra S. Lee, Jose R. Maldonado, Michelle M. Mello, Kelly E. Ormond, Laura W. Roberts, Christopher T. Scott, Audrey Shafer, Abraham C. Verghese, Lawrence I. Zaroff

Biomedical Informatics

Courses offered by the Program in Biomedical Informatics are listed under the subject code BIOMEDIN on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOMEDIN&filter-catalognumber-BIOMEDIN=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOMEDIN&filter-catalognumber-BIOMEDIN=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=BIOMEDIN&filter-catalognumber-BIOMEDIN=on>).

The program in Biomedical Informatics emphasizes research to develop novel computational methods that can advance biomedicine. Students receive training in the investigation of new approaches to conceptual modeling and to development of new algorithms that address challenging problems in the biological sciences and clinical medicine. Students with a primary interest in developing new informatics methods and knowledge are best suited for this program. Students with a primary interest in the biological or medical application of existing informatics techniques may be better suited for training in the application areas themselves.

Graduate Programs in Biomedical Informatics

The Biomedical Informatics Program is interdepartmental and offers instruction and research opportunities leading to M.S. and Ph.D. degrees in Biomedical Informatics. All students are required to complete the core curriculum requirements, and also to elect additional courses to complement both their technical interests and their goals.

The core curriculum is common to all degrees offered by the program but is adapted or augmented depending on the interests and experience of the student. Deviations from the core curriculum must be justified in writing and approved by the student's Biomedical Informatics academic adviser and the chair of the Biomedical Informatics Executive Committee. The program is intended to provide flexibility and to complement other opportunities in applied medical research that exist at Stanford. Although most students are expected to comply with the basic program of study outlined here, special arrangements can be made for those with unusual needs or those simultaneously enrolled in other degree programs within the University. Similarly, students with prior relevant training may have the curriculum adjusted to eliminate requirements met as part of prior training.

The University requirements for the M.S. degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Master of Science in Biomedical Informatics (Academic)

This degree is designed for individuals who wish to undertake in-depth study of biomedical informatics with research on a full-time basis. Normally, a student spends two years in the program and implements and documents a substantial project during the second year. The first year involves acquiring the fundamental concepts and tools through course work and research project involvement. All first- and second-year students are expected to devote 50 percent or more of their time participating in research projects. Research rotations are not required, but can be done with approval of the academic adviser or training program director. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics. This degree requires a written research paper to be approved by two faculty members.

Master of Science in Biomedical Informatics (Professional/Honors Cooperative Program)

This degree is designed primarily for the working professional who already has advanced training in one discipline and wishes to acquire interdisciplinary skills. All classes necessary for the degree are available online. The professional M.S. is offered in conjunction with Stanford Center for Professional Development (SCPD), which establishes the rates of tuition and fees. The program uses the honors cooperative program (HCP) model, which assumes that the student is working in a corporate setting and is enrolled in the M.S. on a part-time basis. The student has up to five years to complete the program. Research projects are optional and the student must make arrangements with program faculty. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics.

Master of Science in Biomedical Informatics (Coterminal)

The coterminal degree program allows Stanford University undergraduates to study for a master's degree while completing their bachelor's degree(s) in the same or a different department. Please refer to the "Coterminal Degrees" section in this bulletin for additional information.

The coterminal Master of Science program follows the same program requirements as the Master of Science (Professional), except for the requirement to be employed in a corporate setting. The coterminal degree

is available only to current Stanford undergraduates. Coterminal students are enrolled full-time and courses are taken on campus. Research projects are optional and the student must make arrangements with program faculty. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/pdf/CotermAppRules.pdf>

Core Curriculum and Program Requirements in Biomedical Informatics

Core Curriculum in Biomedical Informatics

Students are expected to participate regularly in BIOMEDIN 201 Biomedical Informatics Student Seminar and a research colloquium. In addition, all students are expected to fulfill requirements in the following five categories:

1. Core Biomedical Informatics (17 units)

Students are expected to complete the core offerings in biomedical informatics:

- BIOMEDIN 212 Introduction to Biomedical Informatics Research Methodology
- and 4 of the following:

		Units
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOMEDIN 217	Translational Bioinformatics	4
BIOMEDIN 260	Computational Methods for Biomedical Image Analysis and Interpretation	3-4

- Any remaining units must be graduate level courses listed under BIOMEDIN.
- Note that BIOMEDIN 211 is no longer offered, however that course may be used by students who completed it to fulfill a core BMI requirement.

2. Computer Science, Statistics, Mathematics & Engineering (18 units)

Students are expected to create a program of study with a mixture of graduate-level courses in computer science, statistics or other technical informatics-related disciplines that allows them to achieve in-depth mastery of these areas. The programs of study may focus on aspects of these disciplines including (but not limited to): machine learning, artificial intelligence, data mining, image analysis, human-computer interaction, systems engineering, scientific and numerical computing or graphics. In general, this course of study should include no more than 9 units in courses 100-199, and the rest should be 200 or above (unless specifically approved by adviser). CS courses 106A and 106B cannot be counted for this requirement, and all courses should be formal classroom-based courses, unless approved by the executive committee. Up to 6 units of this portion of the core curriculum may be taken on a pass/fail basis, but at least half of the units in this portion of the curriculum must be taken for a grade. BIOMEDIN units above 17 may also be counted for the requirements in this category. Students may

petition for quantitative courses in the Medical School or Humanities and Sciences to be counted in this section of the curriculum.

3. Social and Ethical Issues (4 units)

Students are expected to be familiar with issues regarding ethical, legal, social, organizational and behavioral aspects of the impact of biomedical informatics technologies on society in general. They should select courses broadly from University offerings to explore one or more of these aspects more deeply. Choose courses that fulfill this requirement by entering bmi::ethics in the Explore Courses search box. Students are required to take MED 255 The Responsible Conduct of Research, or the equivalent.

		Units
BIOE 131	Ethics in Bioengineering	3
BIOE 450	Advances in Biotechnology	3
BIOMEDIN 256	Economics of Health and Medical Care	5
BIOMEDIN 432	Analysis of Costs, Risks, and Benefits of Health Care	4
BIOS 224	Big Topics in Stem Cell Ethics	2
CS 181	Computers, Ethics, and Public Policy	4
CS 181W	Computers, Ethics, and Public Policy	4
GENE 210	Genomics and Personalized Medicine	3
HRP 209	Health Law: The FDA	2-3
HRP 210	Health Law and Policy	3
HRP 211	Law and the Biosciences: Neuroscience	3
HRP 221	Law and the Biosciences: Genetics	3
HRP 256	Economics of Health and Medical Care	5
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4
HUMBIO 174	Foundations of Bioethics	3
INDE 212	Medical Humanities and the Arts	2
LAW 654	Law and Biosciences Workshop	1
ME 208	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
MED 242	Physicians and Human Rights	1
MED 255	The Responsible Conduct of Research	1
MED 255C	The Responsible Conduct of Research for Clinical Researchers	1
MSE 256	Technology Assessment and Regulation of Medical Devices	3
MSE 278	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
PEDS 251A	Medical Ethics I	2
PEDS 251B	Medical Ethics II	2
PUBLPOL 222	Biosecurity and Bioterrorism Response	2-5
SURG 222	Biosecurity and Bioterrorism Response	2-5

4. Unrestricted Electives (6 units)

Students may fulfill this requirement with any Stanford course, including courses taken to satisfy core curriculum prerequisites.

5. For PhD Students only

Domain Biology/Medicine, Pedagogy, Electives (9 units): In order to reach a total of 54 units of core curriculum, PhD students should take an additional 9 units; this should include 6 units of biology or medicine classes relevant to their research interests, 2 units of BIOMEDIN 290 Biomedical Informatics Teaching Methods and one additional unit of unrestricted elective.

The core curriculum generally entails a minimum of 45 units of course work for master's students and 54 units of course work for Ph.D. students,

but can require substantially more or less depending upon the courses chosen and the previous training of the student.

The following courses may be taken for satisfactory/no credit (S/NC):

		Units
BIOMEDIN 200	Biomedical Informatics Colloquium	1
BIOMEDIN 201	Biomedical Informatics Student Seminar	1
BIOMEDIN 205	Precision Practice with Big Data	1
BIOMEDIN 206	Informatics in Industry	1
BIOMEDIN 207	Smart Health through Digital Medicine	1
BIOMEDIN 290	Biomedical Informatics Teaching Methods	1-6
BIOMEDIN 299	Directed Reading and Research	1-18
BIOMEDIN 801	TGR Master's Project	0
BIOMEDIN 802	TGR PhD Dissertation	0
MED 255	The Responsible Conduct of Research	1

The varying backgrounds of students are well recognized and no one is required to take courses in an area in which he or she has already been adequately trained; under such circumstances, students are permitted to skip courses or substitute more advanced work using a formal annual process administered by the BMI executive committee, in which students demonstrate satisfaction of core curriculum prerequisites, and request permission to receive core curriculum credit for classes taken previously in areas of the core curriculum. Students design appropriate programs for their interests with the assistance and approval of their Biomedical Informatics academic adviser. At least 27 units of formal graded course work are expected for the core curriculum.

Program Requirements for the Academic M.S., HCP Professional M.S., and Coterminal M.S. Degrees

Students enrolled in any of the M.S. degrees must complete the program requirements in order to graduate. Programs of at least 45 Stanford units that meet the following guidelines are normally approved:

1. Completion of the core curriculum with overall GPA of 3.0.
2. Students are expected to participate regularly in BIOMEDIN 201 Biomedical Informatics Student Seminar and a research colloquium. HCP professional masters candidates who are able to attend classes on campus should also participate regularly.
3. Electives: additional courses to bring the total to 45 or more units taken at Stanford to fulfill the University's residency requirement.
4. Masters candidates should sign up for BIOMEDIN 801 TGR Master's Project for their project units after completing their 45-unit residency requirement.

Doctor of Philosophy in Biomedical Informatics

The University's basic requirements for the doctorate (residence, dissertation, examination, and so on) are discussed in the "Graduate Degrees (p. 43)" section of this bulletin. The Core Curriculum in Biomedical Informatics is outlined in the Master's section (p. 675).

Individuals wishing to prepare themselves for careers as independent researchers in biomedical informatics, with applications experience in bioinformatics, clinical informatics, or imaging informatics, should apply for admission to the doctoral program. The following are additional requirements imposed by the Biomedical Informatics Executive Committee:

1. A student plans and completes a coherent program of study including the core curriculum and additional requirements as for the master's program. In the first year, two or three research rotations are

encouraged. The master's requirements should be completed by the end of the second year in the program.

2. Doctoral students are generally advanced to Ph.D. candidacy after passing the qualifying exam, which takes place during the end of the second year of training. A student's academic adviser has primary responsibility for the adequacy of the program, which is regularly reviewed by the Biomedical Informatics Executive Committee.
3. To remain in the Ph.D. program, each student must attain a grade point average (GPA) of 3.0 for the core curriculum. The student must fulfill these requirements and apply for admission to candidacy for the Ph.D. by the beginning of the third year. In addition, reasonable progress in the student's research activities is expected of all doctoral candidates.
4. During the third year of training, each doctoral student is required to give a preproposal seminar that describes evolving research plans.
5. By the beginning of the fourth year, each student must orally present a written thesis proposal for the written dissertation and must orally defend the thesis proposal before a University oral examination committee that generally includes at least one member of the Biomedical Informatics Executive Committee. The committee determines whether the student's general knowledge of the field and the details of the planned thesis are sufficient to justify proceeding with the dissertation.
6. After application for Terminal Graduate Registration (TGR) status and completion of 135 units, the Ph.D. candidate should register each quarter for BIOMEDIN 802 TGR PhD Dissertation so their research effort may be counted toward the degree.
7. As part of the training for the Ph.D., each student is required to be a teaching assistant for two courses approved by the Biomedical Informatics Executive Committee; one should be completed in the first two years of study.
8. The most important requirement for the Ph.D. degree is the dissertation. Prior to the oral dissertation proposal and defense, each student must secure the agreement of a member of the program faculty to act as dissertation adviser. The principal adviser should be approved by the Biomedical Informatics Executive Committee, and all dissertation reading committees should include at least one BMI participating faculty member.
9. At the completion of training, while still matriculated and shortly prior to deposit of the dissertation, the student gives a final talk describing his or her results. No official additional oral examination is required upon completion of the written dissertation. The oral defense of the dissertation proposal satisfies the University oral examination requirement.
10. The student is expected to demonstrate an ability to present scholarly material and research in a lecture at a formal seminar.
11. The student is expected to demonstrate an ability to present scholarly material in concise written form. Each student is required to write a paper suitable for publication, usually discussing his or her doctoral research project. This paper must be approved by the student's academic adviser as suitable for submission to a refereed journal before the doctoral degree is conferred.
12. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a member of the program faculty, and a third faculty member chosen from anywhere within the University. A fourth reader may be added at the discretion of the student and their adviser.

Ph.D. Minor in Biomedical Informatics

For a Ph.D. minor in Biomedical Informatics (BMI), a candidate must complete a minimum of 20 unduplicated units of biomedical informatics course work, including 12 units in BMI core courses from:

		Units
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 212	Introduction to Biomedical Informatics Research Methodology	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOMEDIN 217	Translational Bioinformatics	4
BIOMEDIN 260	Computational Methods for Biomedical Image Analysis and Interpretation	3-4

The candidate must complete the one-unit MED 255 The Responsible Conduct of Research or an approved substitute.

The remaining units must be courses that would count towards the BMI master's degree, taken from these areas:

- Computer Science, Probability, Statistics, Machine Learning, Mathematics, Engineering
- Biomedicine
- Other BMI courses from the list above

Students are expected to participate regularly in BIOMEDIN 201 (<https://exploreddegrees-nextyear.stanford.edu/schoolofmedicine/biomedicalinformatics>) Biomedical Informatics Student Seminar.

Courses used for the BMI Ph.D. minor may not be double-counted to meet the requirements of a master's or Ph.D. degree.

All courses used for the BMI Ph.D. minor, except MED 255, must be taken for a letter grade and passed with an overall GPA of 3.0 or better.

Stanford students apply using the Application for Ph.D. Minor and must provide an unofficial Stanford transcript as well as a statement of purpose for adding the Ph.D. minor degree.

This degree offering became effective in Autumn Quarter 2010-11. Courses taken at Stanford prior to that date may be counted towards the BMI Ph.D. minor degree. A minor program adviser is assigned from the Biomedical Informatics Executive Committee or advising faculty.

Committee: Russ B. Altman (Chair and Program Director), Mark A. Musen (Co-Director), Steven C. Bagley (Executive Director), Atul Butte, Manisha Desai, Michel Dumontier, Teri Klein, David Paik, Daniel L. Rubin, Nigam Shah, Dennis P. Wall

*Participating Faculty and Staff by Department**

Biochemistry: Douglas L. Brutlag (Professor Emeritus), Rhiju Das (Assistant Professor), Ronald Davis (Professor), James Ferrell (Professor), Julia Salzman (Assistant Professor), Julie Theriot (Professor)

Bioengineering: Russ B. Altman (Professor), Kwabena Boahen (Associate Professor), Markus Covert (Assistant Professor), Ingmar Riedel-Kruse (Assistant Professor)

Biology: Hunter Fraser (Assistant Professor), Dmitri Petrov (Professor), Jonathan Pritchard (Professor)

Chemical and Systems Biology: Joshua Elias (Assistant Professor), James Ferrell (Professor)

Chemistry: Vijay Pande (Professor)

Computer Science: Serafim Batzoglou (Professor), Gill Bejerano (Assistant Professor), David Dill (Professor), Leonidas Guibas (Professor), Anshul Kundaje (Assistant Professor), Daphne Koller (Professor), Terry Winograd (Professor Emeritus)

Developmental Biology: Gill Bejerano (Assistant Professor)

Genetics: Russ B. Altman (Professor), Steven C. Bagley (Senior Research Engineer), Michael Bassik (Assistant Professor), Carlos Bustamante

(Professor), Atul Butte (Associate Professor), J. Michael Cherry (Professor, Research), Stanley N. Cohen (Professor), Ronald Davis (Professor), William Greenleaf (Assistant Professor), Teri E. Klein (Senior Research Scientist), Anshul Kundaje (Assistant Professor), Jin Billy Li (Assistant Professor), Stephen B. Montgomery (Assistant Professor), Jonathan Pritchard (Professor), Gavin Sherlock (Professor), Arend Sidow (Professor), Michael P. Snyder (Professor), Hua Tang (Associate Professor)

Health Research and Policy: Trevor Hastie (Professor), Mark Hlatky (Professor), Richard A. Olshen (Professor), Chiara Sabatti (Associate Professor), Robert Tibshirani (Professor)

Management Science and Engineering: Margaret Brandeau (Professor), Ross D. Shachter (Associate Professor)

Medicine: Russ B. Altman (Professor), Euan Ashley (Assistant Professor), Jayanta Bhattacharya (Associate Professor), Catherine Blish (Assistant Professor), Carol Cain (Consulting Assistant Professor), Stanley Cohen (Professor), Manisha Desai (Associate Professor), Michel Dumontier (Associate Professor), Andrew Gentles (Assistant Professor), Olivier Gevaert (Assistant Professor), Mary Goldstein (Professor), Michael Higgins (Consulting Associate Professor), Mark Hlatky (Professor), Hanlee P. Ji (Assistant Professor), Purvesh Khatri (Assistant Professor), Henry Lowe (Associate Professor), Mark A. Musen (Professor), Douglas K. Owens (Professor), Daniel R. Rubin (Assistant Professor), Robert W. Shafer (Professor, Research), Nigam Shah (Assistant Professor), Samson Tu (Senior Research Scientist), P.J. Utz (Professor)

Microbiology and Immunology: Karla Kirkegaard (Professor), Garry Nolan (Professor), Julie Theriot (Professor)

Operations, Information and Technology: Mohsen Bayati (Assistant Professor)

Pathology: Stephen B. Montgomery (Assistant Professor), Arend Sidow (Professor)

Pediatrics: Atul Butte (Associate Professor), Chris Longhurst (Clinical Associate Professor), Jonathan Palma (Clinical Assistant Professor), Dennis Wall (Associate Professor)

Psychiatry and Behavioral Sciences: Vinod Menon (Professor, Research)

Radiation Oncology: Lei Xing (Professor)

Radiology: Sam (Sanjiv) Gambhir (Professor), Parag Mallick (Assistant Professor, Research), Sandy A. Napel (Professor), David Paik (Assistant Professor), Sylvia Plevritis (Professor), Daniel L. Rubin (Assistant Professor)

Statistics: Trevor J. Hastie (Professor), Susan Holmes (Professor), Art Owen (Professor), Chiara Sabatti (Associate Professor), Robert Tibshirani (Professor)

Structural Biology: Michael Levitt (Professor)

Surgery: Thomas Krumel (Professor)

* Research opportunities are not limited to faculty and departments listed.

Cancer Biology

Courses offered by the Cancer Biology Program are listed under the subject code CBIO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CBIO&filter-catalognumber-CBIO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CBIO&filter-catalognumber-CBIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CBIO&filter-catalognumber-CBIO=on>).

The Cancer Biology Program at Stanford University is an interdisciplinary program leading to the Ph.D. degree. During the past three decades, understanding of cancer has increased with the discovery of oncogenes, tumor suppressor genes, pathways of DNA damage and repair, chromatin remodeling, cell cycle regulation, angiogenesis, and responses to hypoxia, and recent glimpses into the molecular basis of metastasis and cancer stem cell biology. In addition, methods of parallel analysis including gene expression arrays, protein arrays, and tissue arrays have begun to refine and redefine the taxonomy of cancer diagnosis. This explosion of basic and clinical science has resulted in the first successful cancer chemotherapies and immunotherapies based on the knowledge of specific molecular targets. Stanford presents a unique environment to pursue interdisciplinary cancer research because the schools of Medicine, Humanities and Sciences, and Engineering are located on a single campus.

The goal of the Cancer Biology Ph.D. program is to provide students with education and training that enables them to make significant contributions to this field. Course work during the first year is designed to provide a broad understanding of the molecular, genetic, cell biological, and pathological aspects of cancer. Students also learn about the current state of the epidemiology, clinical diagnosis, treatment, and prevention of human cancers. Equally important during the first year is a series of three rotations in research laboratories chosen by each student. By the beginning of the second year, each student chooses a research adviser and begins work on the dissertation project. A qualifying examination must be completed by the end of the second year. An annual Cancer Biology conference at Asilomar in Pacific Grove, California, provides students with an opportunity to present their research to one another and to faculty. The expected time to degree is four to five years.

Students are not limited to a single department in choosing their research adviser. The Cancer Biology Ph.D. program currently has approximately 65 graduate students located in basic science and clinical departments throughout the School of Medicine and the School of Humanities and Sciences.

Doctor of Philosophy in Cancer Biology

University requirements for the Ph.D. are described under the "Graduate Degrees (p. 43)" section of this bulletin.

A small number of applicants are admitted to the program each year. Applicants should have completed an undergraduate major in the biological sciences; applicants with undergraduate majors in physics, chemistry, or mathematics may be admitted if they complete background training in biology during the first two years of study. During the first year, each student is required to complete a minimum of three, one quarter laboratory rotations. Students must choose a dissertation adviser prior to the end of Summer Quarter, first year, but not before the end of Spring Quarter, first year.

The requirements for the Ph.D. degree are as follows:

1. Training in biology equivalent to that of an undergraduate biology major at Stanford.
2. Completion of the following courses:

		Units
BIOS 200	Foundations in Experimental Biology (for students entering in 2012 or later. Students who entered in 2011 or earlier took GENE 203, Advanced Genetics.)	6
CBIO 241	Molecular, Cellular, and Genetic Basis of Cancer (Offered in Autumn Quarter)	4
BIO 214	Advanced Cell Biology	4

Select one of the following:

BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	
BIOMEDIN 217	Translational Bioinformatics	
CBIO 243	Principles of Cancer Systems Biology (Not offered 2014-15)	
CSB 210	Cell Signaling	
GENE 211	Genomics	
GENE 212	Introduction to Biomedical Informatics Research Methodology	
SBIO 241	Biological Macromolecules	
CBIO 280	Cancer Biology Journal Club (required for first- and second-year graduate students in Autumn, Winter, and Spring quarters, totaling 6 units)	1
MED 255	The Responsible Conduct of Research	1

3. At least 6 units of additional cancer biology-related, graduate-level courses. Course work taken is determined in consultation with the student's adviser and/or the Program Director.
4. Presentation of research results at the annual Cancer Biology Conference on at least three occasions, at least one being an oral presentation.
5. Completion of a qualifying examination in Cancer Biology is required for admission to Ph.D. candidacy. The exam consists of an NIH-style written grant proposal not to exceed ten pages (excluding references) and an oral examination. The examining committee consists of three faculty members from the Cancer Biology Program and does not include the student's dissertation adviser. The composition of this committee is chosen by the student and dissertation adviser and must be submitted to and approved by the program director prior to the end of Autumn Quarter, second year. The qualifying examination must be taken prior to the end of Spring Quarter, second year. If necessary, one retake is permitted prior to the end of Summer Quarter, second year. After the qualifying examination has been completed, the student is required to form a dissertation reading committee that includes the student's adviser and three other members of the Academic Council with appropriate expertise. Each student is required to arrange annual meetings (more frequently, if necessary) of the dissertation reading committee, at which time progress during the past year and a plan of study for the coming year are presented orally and discussed. Completion of each annual committee meeting must be communicated in writing to the program director by the adviser by the end of Spring Quarter each year.

The major accomplishment of each successful Ph.D. student is the presentation of a written dissertation resulting from independent investigation that contributes to knowledge in the area of cancer biology. An oral examination is also required for the Ph.D. degree. In the Cancer Biology Program, a public seminar (one hour) is presented by the Ph.D. candidate, followed by a closed-door oral examination. The oral examination committee consists of at least four examiners (the members of the doctoral dissertation reading committee) and a chair. The oral examination chair must be from outside the Cancer Biology Program faculty and may not have a full or joint appointment in the adviser's or student's home department. However, a courtesy appointment does not affect eligibility. The oral examination chair may be from the same department as any other member(s) of the examination committee. All members of the oral examination committee are normally members of the Academic Council, as the oral examination chair must be. With the prior approval of the program director or school dean, one of the examiners may be a person who is not a member of the Academic Council if that individual contributes expertise not otherwise available. Official responsibility for selecting the oral examination chair rests with the program. Cancer Biology delegates this to the student and dissertation adviser.

Program Director: Amato Giaccia (Radiation Oncology)

Committee on Cancer Biology: Steven Artandi (Medicine, Hematology), Jeffrey Axelrod (Pathology), Katrin Chua (Medicine, Endocrinology), Max Diehn (Radiation Oncology), Edward Graves (Radiation Oncology), Ashby Morrison (Biology), Sylvia Plevritis (Radiology), Jonathan Pollack (Pathology), Alejandro Sweet-Cordero (Pediatrics), Monte Winslow (Genetics)

Participating Departments and Faculty

Biochemistry: Philip Beachy (Professor), Patrick O. Brown (Professor), Julia Salzman (Assistant Professor)

Bioengineering: Jennifer Cochran (Associate Professor), Jan Liphardt (http://med.stanford.edu/profiles/Jan_Liphardt), (Associate Professor)

Biology (School of Humanities and Sciences): Martha Cyert (Professor), Scott J. Dixon (Assistant Professor), Judith Frydman (Professor), Or Gozani (Associate Professor), Ashby Morrison (Assistant Professor), W. James Nelson (Professor), Tim Stearns (Professor), Virginia Walbot (Professor)

Chemical And Systems Biology: James K. Chen (Associate Professor), Karlene Cimprich (Professor), James E. Ferrell (Professor), Tobias Meyer (Professor), Daria Mochly-Rosen (Professor), Mary Teruel (Assistant Professor)

Dermatology: Howard Y. Chang (Professor), Paul A. Khavari (Professor), M. Peter Marinkovich (Associate Professor), Anthony Oro (Professor), Kevin Wang (Assistant Professor)

Developmental Biology: Margaret Fuller (Professor), Seung Kim (Professor), Stuart Kim (Professor), Roeland Nusse (Professor), Matthew Scott (Professor), Lucy Shapiro (Professor)

Genetics: Michael Bassik (Assistant Professor), Anne Brunet (Associate Professor), Michele Calos (Professor), Stanley Cohen (Professor), Monte M. Winslow (Assistant Professor)

Medicine/Blood and Marrow Transplantation: Robert Negrin (Professor)

Medicine/Endocrinology/Gerontology/Metabolism: Katrin Chua (Associate Professor), Andrew R. Hoffman (Professor)

Medicine/Gastroenterology and Hepatology: Christine Cartwright (Professor), Anson Lowe (Associate Professor)

Medicine/Hematology: Steven Artandi (Professor), Calvin Kuo (Professor), Ravindra Majeti (Assistant Professor)

Medicine/Oncology: Ash Alizadeh (Assistant Professor), Gilbert Chu (Professor), Michael Clarke (Professor), Dean Felsher (Associate Professor), James Ford (Associate Professor), Ronald Levy (Professor), Shoshana Levy (Professor, Research), Beverly S. Mitchell (Professor; Director, Stanford Cancer Institute), Mark Pegram (Professor), Rajat Rohatgi (Assistant Professor), Branimir Sikic (Professor)

Microbiology and Immunology: Helen M. Blau (Professor), Peter Jackson (Professor), Garry Nolan (Professor)

Neurology and Neurological Sciences: Thomas Rando (Professor)

Neurology and Neurosurgery: Yoon-Jae Cho (Assistant Professor)

Neurosurgery: Albert J. Wong (Professor)

Obstetrics and Gynecology: Renee A. Reijo Pera (Professor)

Orthopaedic Surgery: Nidhi Bhutani (Assistant Professor)

Otolaryngology: John Sunwoo (Assistant Professor)

Pathology: Jeff Axelrod (Professor), Matthew Bogoy (Professor), Michael Cleary (Professor), Gerald Crabtree (Professor), Edgar Engleman (Professor), Andrew Fire (Professor), Isabella Graef (Assistant Professor), Joseph Lipsick (Professor), Bingwei Lu (Associate Professor), Jonathan Pollack (Associate Professor), Arend Sidow (Associate Professor), Irving Weissman (Professor; Virginia & D.K. Ludwig Professor for Clinical

Investigation in Cancer Research, Professor of Developmental Biology), Marius Wernig (Assistant Professor)

Pediatrics/Cancer Biology: Matthew Porteus (Associate Professor), Julien Sage (Associate Professor), Alejandro Sweet-Cordero (Associate Professor)

Pediatrics/Cardiology: Marlene Rabinovitch (Professor)

Pediatrics/Endocrinology: Brian Feldman (Assistant Professor)

Pediatrics/Hematology/Oncology: Kathleen Sakamoto (Professor)

Pediatrics/Neonatal & Developmental Medicine: Christopher Contag (Professor)

Radiation Oncology/Radiation Biology: Laura Attardi (Associate Professor), J. Martin Brown (Professor), Amato Giaccia (Professor; Director, Stanford University Cancer Biology Program)

Radiation Oncology/Radiation Physics: Edward Graves (Associate Professor)

Radiation Oncology/Radiation Therapy: Max Diehn (Assistant Professor), Susan Knox (Associate Professor), Albert Koong (Professor), Quynh-Thu Le (Professor)

Radiology/Diagnostic Radiology: Parag Mallick (Assistant Professor, Research), Sylvia Plevritis (Associate Professor), Jianghong Rao (Associate Professor)

Structural Biology: William Weis (Professor)

Urology: Donna Peehl (Professor, Research), Zijie Sun (Associate Professor)

Chemical and Systems Biology

Courses offered by the Department of Chemical and Systems Biology are listed under the subject code CSB on the (<https://explorecourses.stanford.edu/search?q=CSB&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CSB=on&filter-catalognumber-CSB=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CSB&filter-catalognumber-CSB=on>) ExploreCourses web site. (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=CSB&filter-catalognumber-CSB=on>)

The department emphasizes individualized training at the interface of physical science and biomedical science. The program encourages students to draw upon a variety of modern scientific techniques, ranging from recent advances in molecular biology and protein biochemistry to synthetic organic chemistry and single cell imaging. Graduate students in the department take courses in signal transduction networks, chemical biology, and other areas of importance to their research goals.

Master of Science in Chemical and Systems Biology

Students in the Ph.D. program may apply for an M.S. degree after having satisfactorily completed the course and laboratory requirements of the first two years. The degree also requires a written thesis based on literature or laboratory research. Postdoctoral research training is available to graduates having the Ph.D. or M.D. degree.

Doctor of Philosophy in Chemical and Systems Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/schoolofmedicine/chemicalandsystemsbiology/%20/graduatedegrees>)" section of this bulletin.

The Department of Chemical and Systems Biology offers interdisciplinary training to prepare students for independent careers in biomedical science. The main focus of the program is cell signaling, chemical biology, and systems biology.

The program leading to the Ph.D. degree includes formal and informal study in chemical biology, systems biology, drug discovery, biochemistry, and other areas of relevance to the interests of particular students. First-year students spend one quarter in each of three different laboratories, working closely with other graduate students, a professor, and postdoctoral fellows on various research projects. During the fourth quarter, the student chooses a faculty mentor with whom to undertake thesis research, based on available positions and the student's interest. During or before the eighth quarter of study, students must pass a qualifying exam which consists of an oral exam on general knowledge and a defense of a research proposal. Course requirements are fulfilled during the first two years of study; the later years of the four- to six-year program are devoted to full-time dissertation research. Close tutorial contact between students and faculty is stressed throughout the program.

Research opportunities also exist for medical students and undergraduates. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department participates in the four quarter Health and Human Disease and Practice of Medicine sequence which provides medical students with a comprehensive, systems-based education in physiology, pathology, microbiology, and pharmacology.

Emeriti: (Professors) Robert H. Dreisbach, Avram Goldstein, Dora B. Goldstein, Tag E. Mansour, Oleg Jardetzky, Richard A. Roth, James P. Whitlock

Chair: Tobias Meyer

Professors: Karlene A. Cimprich, James E. Ferrell, Jr., Tobias Meyer, Daria Mochly-Rosen

Associate Professors: James K. Chen, Thomas J. Wandless, Joanna K. Wysocka

Assistant Professors: Joshua Elias, Daniel F. Jarosz, Mary Teruel

Consulting Professor: Kevin Grimes

Courtesy Professors: Matthew Bogyo, Stuart Kim, Brian Kobilka, Beverly S. Mitchell, Paul A. Wender

Courtesy Associate Professors: Markus W. Covert, Justin Du Bois, Aaron F. Straight,

Courtesy Assistant Professors: Michael Z. Lin, Jan M. Skotheim, Marius Wernig

Comparative Medicine

Courses offered by the Department of Comparative Medicine are listed under the subject code COMPMED on the ([http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPAMED&filter-](http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPAMED&filter-catalognumber-COMPAMED=on)

<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPAMED&filter-catalognumber-COMPAMED=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=COMPAMED&filter-catalognumber-COMPAMED=on>).

The Department of Comparative Medicine is a clinical department that offers residency training in laboratory animal medicine for veterinarians. Its faculty offer courses at the undergraduate and graduate levels. Clinical faculty and basic science faculty in the Department of Comparative Medicine accept students to participate in research projects.

The discipline of Comparative Medicine studies the differences and similarities among species to elucidate biological and disease mechanisms. The research interests of faculty include neuroscience, infectious diseases, tick-borne bacterial infections, neuropathology, cancer, molecular genetics, hematopoiesis, comparative hematology, and laboratory animal science.

Chair: Sherril Green

Professors: Donna M. Bouley, Paul Buckmaster, Sherril Green, Shaul Hestrin

Associate Professors: Corinna Darian-Smith, Joseph Garner

Assistant Professors: Megan Albertelli, Stephen Felt, Jennifer Johns, Claude Nagamine, Cholawat Pacharinsak

Courtesy Professor: Hannes Vogel

Courtesy Associate Professor: Mehrdad Shamloo

Developmental Biology

Courses offered by the Department of Development Biology are listed under the subject code DBIO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=DBIO&filter-catalognumber-DBIO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=DBIO&filter-catalognumber-DBIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=DBIO&filter-catalognumber-DBIO=on>).

A fundamental problem in biology is how the complex set of multicellular structures that characterize an adult animal is generated from the fertilized egg. Recent advances at the molecular level, particularly with respect to the genetic control of development, have been explosive. These advances represent the beginning of a major movement in the biological sciences toward the understanding of the molecular mechanisms underlying developmental decisions and the resulting morphogenetic processes. This new thrust in developmental biology derives from the extraordinary methodological advances of the past decade in molecular genetics, immunology, and biochemistry. However, it also derives from groundwork laid by the classical developmental studies, the rapid advances in cell biology and animal virology, and from models borrowed from prokaryotic systems. Increasingly, the work is directly related to human diseases, including oncogene function and inherited genetic disease.

The Department of Developmental Biology includes a critical mass of scientists who are leading the thrust in developmental biology and who can train new leaders in the attack on the fundamental problems of development. Department labs work on a wide variety of organisms from microbes to worms, flies, and mice. The dramatic evolutionary conservation

of genes that regulate development makes the comparative approach of the research particularly effective. Scientists in the department labs have a very high level of interaction and collaboration. The discipline of developmental biology draws on biochemistry, cell biology, genetics, molecular biology, and genomics. People in the department have a major interest in regenerative medicine and stem cell biology.

The department is located in the Beckman Center for Molecular and Genetic Medicine within the Stanford University Medical Center.

Master of Science in Developmental Biology

University requirements for the M.S. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Students in the Ph.D. program in Developmental Biology may apply for an M.S. degree, assuming completion of their course requirements and preparation of a written proposal. The master's degree awarded by the Department of Developmental Biology does not include the possibility of minors for graduate students enrolled in other departments or programs.

Students are required to take, and satisfactorily complete, at least three lecture courses offered by the department, including DBIO 210 Developmental Biology. In addition, students are required to take three courses outside the department. Students are also expected to attend Developmental Biology seminars and journal clubs. In addition, the candidate must complete a research paper proposing a specific experimental approach and background in an area of science relative to developmental biology.

Doctor of Philosophy in Developmental Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The graduate program in Developmental Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program (MSTP (<http://mstp.stanford.edu>)) in which individuals are candidates for both the M.D. and Ph.D. degrees.

Students are required to complete at least five courses, including:

DBIO 210	Developmental Biology	4
DBIO 215	Frontiers in Biological Research (1 unit per quarter; students are required to take at least two quarters)	2

An advanced graduate course in genetics or genomics;

An advanced graduate course in cell biology of biochemistry;

A course in quantitative or computational biology.

Students are expected to attend Developmental Biology seminars and journal clubs.

Completion of a qualifying examination is required for admission to Ph.D. candidacy. The examination consists of an off-topic proposal on a subject different from the dissertation research. The final requirements of the program include presentation of a PhD dissertation as the result of independent investigation and constituting a contribution to knowledge in the area of developmental biology. The student must pass the University oral examination, taken only after the student has substantially completed research. The examination is preceded by a public seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

Emeriti: (Professors) David S. Hogness, A. Dale Kaiser, Ellen Porzig

Chair: William Talbot

Associate Chair: David Kingsley

Professors: Ben Barres, Philip Beachy, Gerald Crabtree, Margaret Fuller, Seung Kim, Stuart Kim, David Kingsley, Roeland Nusse, Matthew Scott, Lucy Shapiro, William Talbot, Anne Villeneuve, Irving Weissman

Associate Professors: Gill Bejerano, James Chen, Joanna Wysocka

Assistant Professors: Maria Barna, Daniel Jarosz

Professor (Research): Harley McAdams

Genetics

Courses offered by the Department of Genetics are listed under the subject code GENE on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GENE&filter-catalognumber-GENE=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GENE&filter-catalognumber-GENE=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=GENE&filter-catalognumber-GENE=on>).

An underlying theme in the department is that genetics is not merely a set of tools but a coherent and fruitful way of thinking about biology and medicine. To this end, the department emphasizes a spectrum of approaches based on molecules, organisms, populations, and genomes. It provides training through laboratory rotations, dissertation research, seminar series, didactic and interactive course work, and an annual three-day retreat of nearly 200 students, faculty, postdoctoral fellows, and research staff.

The mission of the department includes education and teaching as well as research; graduates from our program pursue careers in many different venues including research in academic or industrial settings, health care, health policy, and education. The department is especially committed to increasing diversity within the program, and to the training of individuals from traditionally underrepresented minority groups.

Master of Science in Human Genetics

Units The University requirements for the M.S. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

The Department of Genetics offers an M.S. in Human Genetics, which is accredited by the American Board of Genetic Counseling. This program prepares students to practice in the healthcare profession of genetic counseling. The program is a full time two-year program, and accepts students to begin the program only in Autumn Quarter. Students must be admitted directly into this program, and cannot automatically transfer from the Ph.D. programs within the department, or vice versa. While courses are oriented primarily towards genetic counseling students, they may also be taken by medical students, other graduate students, residents or post-doctoral fellows, and (with permission) undergraduates.

The degree requires the completion of clinical rotations and an approved research project.

Students must also complete:

- required course work:

		Units
•		
GENE 271	Human Molecular Genetics	4
GENE 272	Introduction to Medical Genetics	2-3
GENE 273	Introduction to Clinical Genetics Testing	1
GENE 274A	A Case Based Approach to Clinical Genetics	2

GENE 274B	A Case Based Approach to Clinical Genetics	2
GENE 275	Role Play and Genetic Counseling Observations	2
GENE 276	Genetic Counseling Clinical Rotations	4-7
GENE 278	Prenatal Genetic Counseling	1
GENE 279	Pediatric and Adult Genetic Counseling	1
GENE 280	Metabolic Genetic Counseling	1
GENE 281	Cancer Genetic Counseling	1
GENE 282A	Genetic Counseling Research Seminar	1
GENE 282B	Genetic Counseling Research Seminar	1
GENE 283	Genetic Counseling Research	1-8
GENE 284	Medical Genetics Seminar	1-2
GENE 285A	Genetic Counseling Seminar	2-3
GENE 285B	Genetics Counseling Seminar	2
GENE 285C	Genetic Counseling Seminar	2
GENE 286	Advanced Genetic Counseling Seminar	2

- several additional required courses (bioethics, research ethics and developmental biology),
- and are encouraged to take 2-4 elective courses of their choice, including a research methods elective.

Faculty members include members of the Stanford faculty from Genetics, Pediatrics, Obstetrics, Pathology, Developmental Biology, Biomedical Ethics, Law, and Psychology, and practicing genetic counselors and clinical geneticists in various medical centers across the Bay Area.

Applications are due in December (see web site) for admission in the following Autumn Quarter. Applicants should demonstrate a combination of academic preparation, exposure to genetic counseling, and counseling and/or laboratory experiences. Exposure to persons with disabilities or chronic illness is also helpful. Additional information about the program is available at Stanford's Master's Program in Human Genetics (<http://www.med.stanford.edu/genetic-counseling>) web site.

Doctor of Philosophy in Genetics

University requirements for the Ph.D. degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The Ph.D. program in the Department of Genetics offers graduate students the opportunity to pursue a discipline that encompasses both a set of tools and a coherent way of thinking about biology and medicine. All major areas of genetics and genomics are represented in the department, including human genetics (molecular identification of Mendelian traits and the pathophysiology of genetic disease, gene therapy, genetic epidemiology, analysis of complex traits, genome functional analysis and human evolution), and application of model organisms such as bacteria, yeast, flies, worms, and mice to basic and translational areas of biomedical research. The department is especially strong in genomic and bioinformatic approaches to genome biology and evolution, and includes several genome-scale databases and Centers such as the Center for Genomics and Personalized Medicine (SCGPM), Saccharomyces Genome Database (SGD), the Stanford Microarray Database (SMD), and the Pharmacogenetics and Pharmacogenomics Knowledge Base (PharmGKB), the ENCODE project and the Stanford Genome Technology Center (SGTC).

Exposure to the intellectual scope of the department is provided by laboratory rotations, dissertation research, advanced courses in genetics and other areas of biomedical science, seminar series, journal clubs, and an annual three-day retreat of faculty, students, postdoctoral fellows, and staff scientists. Emphasis is placed on interactions and collaborations among students, postdoctoral students, and faculty within the department and throughout the campus.

During their first year, graduate students in the department take graduate courses and sample areas of research by carrying out rotations in three or four laboratories. At the end of the first three quarters, students may select a laboratory in which to do their dissertation research. While the dissertation research is generally performed in one laboratory, collaborative projects with more than one faculty member are encouraged. In addition to interacting with their faculty adviser, graduate students receive advice regularly from other faculty members who serve as members of their dissertation committee. Study for the Ph.D. generally requires between four and five years of graduate work, most of which is focused on dissertation research.

Students are generally enrolled in the program to receive the Ph.D. degree, although a limited number of M.D. candidates can combine research training in genetics with their medical studies. Ph.D. candidates who have passed the qualifying exam in the second year can opt to receive the M.S. as a terminal degree.

There are opportunities for graduate students to teach in graduate-level and professional-school courses. In addition, students have the opportunity to participate in educational outreach activities coordinated by the department, which include opportunities to interact with secondary school students and teachers, lay groups, and local science museums.

Students who have recently received a bachelor's, master's, M.D., or Ph.D. degree in related fields may apply for graduate study. Prospective students must have a background in biology, mathematics, physics, and chemistry. Decisions for admission are based on comparison of the relative merits of all the candidates' academic abilities and potential for research and the department's interest in promoting a diverse learning environment. Interviews take place in late February or early March and successful applicants are offered admission by early spring. Students who wish to pursue a combined M.D./Ph.D. degree are considered for admission into the graduate program in the department after they have been admitted to the M.D. program in the School of Medicine.

Students begin graduate studies in Autumn Quarter. Prospective students are encouraged to start the application process early to ensure that they are able to submit a complete application by the December deadline. All students accepted into the Ph.D. program in the Department of Genetics are provided with full tuition and a stipend. Two training grants from the National Institutes of Health provide major support for the graduate training program in the department. Other student support is provided by departmental funds and from research grants, both federal and private, of the faculty. In addition, a number of graduate students are funded by fellowships, including those from the National Science Foundation and the Stanford Graduate Fellows program.

Emeritus: (Professor) Greg Barsh, Leonard Herzenberg, Uta Francke

Chair: Michael Snyder

Professors: Russ Altman, Carlos Bustamante, Michele Calos, Stanley Cohen, Ronald Davis, Andrew Fire, Margaret Fuller, Mark Kay, Stuart Kim, Joseph Lipsick, Hiromitsu Nakauchi, Jonathan Pritchard, John Pringle, Matthew Scott, Tim Stearns, Lars Steinmetz, Anne Villeneuve

Associate Professors: Euan Ashley, Laura Attardi, Julie Baker, Anne Brunet, Atul Butte, James Ford, Gavin Sherlock, Aaron Gitler, Arend Sidow, Julien Sage, Zijie Sun, Hua Tang, Douglas Vollrath

Assistant Professors: Maria Barna, Michael Bassik, William Greenleaf, Anshul Kundaje, Jin Billy Li, Stephen Montgomery, Alex Urban, Monte Winslow

Professor (Research): Leonore Herzenberg, J. Michael Cherry

Associate Professor (Teaching): Kelly Ormond

Assistant Professor (Clinical): Andrea Kwan

Courtesy Professor: Hank Greely, Alexander Urban

Health Research and Policy

Courses offered by the Department of Health Research and Policy are listed under the subject code HRP on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HRP&filter-catalognumber=HRP=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HRP&filter-catalognumber=HRP=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HRP&filter-catalognumber=HRP=on>).

The Department of Health Research and Policy has three principal areas of scholarly interest:

1. Biostatistics deals with scientific methodology in the medical sciences, emphasizing the use of statistical techniques.
2. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. Epidemiology training provides analytic tools for clinical and translational research, including studies of disease etiology, prevention, and therapy.
3. Health Services Research is concerned with many aspects of health policy analysis in the public and private sectors

Graduate Programs in Health Research Policy

The Program in Epidemiology and the Program in Health Services Research are housed in the Department of Health Research and Policy. These programs offer M.S. degrees in Epidemiology and in Health Services Research. Students with an interest in pursuing advanced degrees with an emphasis on biostatistics can do so through programs offered by the Department of Statistics. Division of Biostatistics faculty participate in these programs.

For additional information, address inquiries to the Educational Coordinator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T-152F, Stanford, California 94305-5405.

Master of Science in Health Policy

The master's degree program in Health Policy seeks to train students in the quantitative analysis of issues in health and medical care. The program emphasizes an individually designed program of course work and completion of a master's project under the mentorship of a faculty member. The typical student in the program is either a physician who has completed residency training and is preparing for a research career, or a student with a strong background in policy analysis who wishes to focus on problems in health or medical care. Faculty interests include outcomes research, health economics, health care organization, health care access, quality of care, decision analysis, clinical guidelines, and assessment of patient preferences and quality of life.

University requirements for the M.S. degree are described in the "Graduate Degrees (p. 43)" section of this bulletin.

To receive the degree, students are expected to demonstrate knowledge of issues in health policy and the quantitative skills necessary for research in this area. Students must take at least 45 units of course work and write a University thesis. The course work requirements are:

1. At least 8 units from the following group of Health Research and Policy (HRP) core courses:

		Units
HRP 256	Economics of Health and Medical Care	5
HRP 391	Health Law: Finance and Insurance	3
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4
Total Units		12

2. At least 6 units of graduate-level statistics courses.

		Units
HRP 261 & HRP 262	Intermediate Biostatistics: Analysis of Discrete Data and Intermediate Biostatistics: Regression, Prediction, Survival Analysis (strongly recommended)	6
Total Units		6

3. At least 3 units of:

		Units
HRP 283	Health Services Research Core Seminar	1
Total Units		1

4. At least 15 units:

		Units
HRP 299 or HRP 399	Directed Reading in Health Research and Policy Graduate Research	1-18
Total Units		1-18

5. An additional set of approved elective courses to complete the program total of at least 45 units.

For additional information, address inquiries to the Educational Coordinator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T138C, Stanford, California 94305-5405.

Master of Science in Epidemiology

The Graduate Program in Epidemiology offers instruction and interdisciplinary research opportunities leading to the M.S. degree in Epidemiology. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. It is important in its own right, and epidemiologic methods are used by clinical investigators and by other scientists who conduct observational and experimental research on the identification, prevention, and treatment of human disorders.

Core and affiliated faculty come from the Department of Health Research and Policy; other Stanford University departments, and notable Bay Area research facilities. The Program has particular strengths in cancer epidemiology, cardiovascular disease epidemiology, infectious disease epidemiology, musculoskeletal disease epidemiology, neuroepidemiology, and aspects of epidemiologic methods, genetic epidemiology, and reproductive epidemiology and women's health.

The mission of the Stanford University School of Medicine is to be a premier research-intensive medical school that improves health through leadership and collaborative discoveries and innovation in patient care, education and research. With support from a NIH Clinical and Translational Science Award, the graduate program in Epidemiology fosters this mission through the training of physician investigators in techniques of clinical research. The department also considers students from other disciplines who would benefit from formal training in epidemiologic methods.

A typical student has the M.D. degree and is in the fellowship stage of his or her postgraduate training, or in an early stage of faculty development. Other students may not have prior clinical training. These may include behavioral, social, and life scientists; law students; and students with the baccalaureate degree. They may wish to bring an epidemiologic orientation to their research or practice, or they may be considering careers in epidemiology or a related discipline.

University requirements for the M.S. degree are described in the "Graduate Degrees (p. 43)" section of this bulletin. Other programmatic requirements are in Graduate Program in Epidemiology, Information and Guidelines, available from the educational coordinator in the Department of Health Research and Policy.

To receive the M.S. degree, students are expected to obtain a grounding in epidemiologic methods and applied biostatistics and to demonstrate research skills through the completion of a thesis. Students must complete at least 45 units of course work:

1. Epidemiologic methods:

		Units
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Advanced Epidemiologic and Clinical Research Methods	3-4
HRP 251	Design and Conduct of Clinical Trials	3

2. Biostatistics:

		Units
HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP 261	Intermediate Biostatistics: Analysis of Discrete Data	3
HRP 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	3

3. Research seminars:

		Units
HRP 236	Epidemiology Research Seminar (at least 3 units)	1

4. Research:

		Units
HRP 399	Graduate Research (at least 12 units)	1-18

5. Research conduct:

		Units
MED 255	The Responsible Conduct of Research	1
	Attend a Human Subjects Institutional Review Board meeting.	

6. Additional approved selective and elective courses to complete the program total of at least 45 units.

Students are assigned a methodology mentor from the Department of Health Research and Policy, and they also select a research mentor, who may be from another department. For physicians, the research mentor is often an affiliated faculty member from the department of the student's clinical specialty.

Ph.D. in Health Policy

A Ph.D. program in Health Policy has been approved to be effective in 2014-15. Degree requirements will appear here shortly.

Ph.D. in Epidemiology and Clinical Research Overview

The field of epidemiology is poised to undergo major changes, and this Ph.D. program offers a cutting-edge curriculum that reflects this shift. Driven by technological advancements, the availability of very large datasets, and the omics revolution, epidemiology is moving toward what some have called Big Epidemiology, where epidemiologists partner with other scientists to study vast amounts of data. Thus, this program will train epidemiologists and clinical researchers to be savvy in technology, computing, data mining, bioinformatics, and genomics. The curriculum capitalizes on Stanford's unique strengths in these disciplines.

After matriculating, students will meet with their academic advisers to plan out an individually tailored curriculum. Students who matriculate with prior training in epidemiology and statistics may replace introductory core courses with more advanced courses, subject to approval. Beyond core course requirements, students select electives that delve deeper into a particular area of specialization of their choosing. Innovative online learning approaches will help meet the needs of physician-students, who will also be busy with clinical duties.

Students will take core courses in epidemiology and biostatistics. In addition to these core courses, Ph.D. students must additionally take 3 "big epidemiology" elective courses in three key areas:

1. an advanced quantitative course (encompassing statistics, computer science, or economics)
2. a big data course
3. a genetics/genomics/bioinformatics course.

Degree Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Ph.D. students must complete a minimum of 135 units (as per University requirements), including 45 course units exclusive of HRP 236 Epidemiology Research Seminar, HRP 299 Directed Reading in Health Research and Policy, and HRP 399 Graduate Research .

		Units
Epidemiologic methods sequence		
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Advanced Epidemiologic and Clinical Research Methods	3-4
HRP 251	Design and Conduct of Clinical Trials	3
Biostatistics sequence		
HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP/STATS 261	Intermediate Biostatistics: Analysis of Discrete Data	3
"Big Epidemiology" elective course		
Take one of the following advanced quantitative courses		3-4
Any 200-level STATS course (other than STATS 260)		
STATS 116	Theory of Probability	
HRP 216	Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research	
HRP/STATS 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	
HRP 252	Outcomes Analysis	

HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	
HRP/MED 206/STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	
Big data course		
Take one of the following big data courses		3-4
BIOMEDIN 215	Data Driven Medicine	
CS 246	Mining Massive Data Sets	
STATS 202	Data Mining and Analysis	
CS 229A		
Genetics/genomics/bioinformatics course		
Take one of the following genetics/genomics/bioinformatics courses		3-4
HRP 228	Genetic Epidemiology	
BIOMEDIN 217/CS 275	Translational Bioinformatics	
GENE 244	Introduction to Statistical Genetics	
BIOMEDIN 258	Genomics, Bioinformatics and Medicine	
GENE 224	Principles of Pharmacogenomics	
CS 262	Computational Genomics	
BIOMEDIN/DBIO/CS 273A	A Computational Tour of the Human Genome	
GENE 210/DBIO 220	Genomics and Personalized Medicine	
STATS 345	Statistical and Machine Learning Methods for Genomics	
GENE 245	Statistical and Machine Learning Methods for Genomics	
STATS 166		
Other core courses/requirements		
HRP 236	Epidemiology Research Seminar ((take at least 6 quarters))	6
MED 255	The Responsible Conduct of Research	1
Electives		
Take electives chosen in consultation with the academic adviser to total 135 units.		64-71
Total Units Required		135

Additional Requirements

- Attendance at one meeting of the Human Subjects Panel (Institutional Review Board).
- Attendance at one meeting of the GCRC Protocol Review Committee.
- R Proficiency: students must show proficiency in the computing language R or must take an approved course in R.
- Each doctoral student must also serve as a teaching assistant for at least one quarter in either an epidemiology core course, a biostatistics course, or an approved elective course.
- Doctoral students fulfill the remaining University unit requirements through doctoral dissertation work.

Health Research and Policy

Emeriti: (Professors) Dan Bloch, John Farquhar, Victor R. Fuchs

Chair: Phil Lavori

Co-Chair: Robert Tibshirani

Professors: Laurence Baker, Bradley Efron, Trevor Hastie, Victor W. Henderson, Mark Hlatky, John Ioannidis, Iain M. Johnstone, Abby C. King, Philip W. Lavori, Ying Lu, Yvonne Maldonado, Richard A. Olshen, Julie Parsonnet, Robert Tibshirani, Alice S. Whittemore, Dee W. West, Wing Wong

Associate Professor: M. Kate Bundorf, Lorene M. Nelson, Chiara Sabatti

Assistant Professors: Marc Coram, Allison Kurian, Mei-Chiung Shih, Weiva Sieh, Lu Tian

Assistant Professors (Clinical): Rita Papat, Kristin Sainani

Courtesy Professors: Mary Goldstein, Paul Heidenreich, Daniel Kessler, Alex Macario, Douglas Owens, Paul Wise

Courtesy Associate Professors: Jay Bhattacharya, David R. Rogosa

Courtesy Assistant Professors: Grant Miller

Senior Lecturer: Irene Corso

Lecturers: Raymond Balise, Scarlett Gomez, Laurel Habel, De Kun Li, David Lilienfeld, Cynthia O'Malley, Caroline Tanner, Stephen Van Den Eeden

Consulting Professors: Gary Friedman, Elizabeth Holly, Marion Lee, George Lundberg, Peggy Reynolds

Consulting Associate Professors: Paul Barnett, Sally Glaser, Pamela Horn-Ross, Esther John, Ciaran Phibbs

Consulting Assistant Professors: Ellen Chang, Christina Clarke-Dur, Theresa Keegan, Bang Nguyen, Ingrid Oakley-Girvan, Rudy Rull, Todd Wagner

Health Services Research

Director: Mark Hlatky (Professor, Health Research and Policy, and Medicine)

Executive Committee: Laurence Baker (Professor, Health Research and Policy), M. Kate Bundorf (Associate Professor, Health Research and Policy), Mary Goldstein (Professor, Medicine), Mark Hlatky (Professor, Health Research and Policy, and Medicine), Douglas Owens (Professor, Medicine)

Participating Faculty and Staff by Department:

Anesthesia: Alex Macario (Professor)

Business: Alain Enthoven (Professor, emeritus)

Health Research and Policy: Laurence Baker (Professor), Paul Barnett (Consulting Associate Professor), M. Kate Bundorf (Associate Professor), Victor Fuchs (Professor, emeritus), Trevor Hastie (Professor), Mark Hlatky (Professor), Philip Lavori (Professor), Richard Olshen (Professor), Ciaran Phibbs (Consulting Associate Professor), Joseph Selby (Consulting Professor), Robert Tibshirani (Professor)

Law: Henry Greely (Professor), Daniel Kessler (Professor)

Management Science and Engineering: Margaret Brandeau (Professor)

Medicine: Jay Bhattacharya (Associate Professor), Jeremy Goldhaber-Fiebert (Assistant Professor), Mary Goldstein (Professor), Michael Gould (Associate Professor), Paul Heidenreich (Associate Professor), Mark Hlatky (Professor), Grant Miller (Assistant Professor), Douglas Owens (Professor), Wolfgang Winkelmayr (Associate Professor)

Pediatrics: Paul Wise (Professor)

Psychiatry: Rudolph Moos (Professor, emeritus)

Sociology: Richard Scott (Professor, emeritus)

Epidemiology

Director: Victor W. Henderson (Professor, Health Research and Policy, and Neurology and Neurological Sciences)

Core Faculty and Academic Teaching Staff: Raymond R. Balise (Lecturer, Health Research and Policy), Gary D. Friedman (Consulting Professor, Health Research and Policy), Victor W. Henderson (Professor, Health Research and Policy, and Neurology and Neurological Sciences), Abby C. King (Professor, Health Research and Policy, and Medicine), Allison Kurian (Assistant Professor, Medicine, and Health Research and Policy), Philip Lavori (Professor, Health Research and Policy), Yvonne A. Maldonado (Professor, Pediatrics), Lorene M. Nelson (Associate Professor, Health Research and Policy), Julie Parsonnet (Professor, Medicine, and Health Research and Policy), Rita A. Popat (Clinical Assistant Professor, Health Research and Policy), Kristin L. Sainani (Clinical Assistant Professor, Health Research and Policy), Weiva Sieh (Assistant Professor, Health Research and Policy), Dee W. West (Professor, Health Research and Policy), Alice S. Whittemore (Professor, Health Research and Policy)

Immunology

Courses offered by the Immunology Program are listed under the subject code IMMUNOL on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=IMMUNOL&filter-catalognumber=IMMUNOL=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=IMMUNOL&filter-catalognumber=IMMUNOL=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=IMMUNOL&filter-catalognumber=IMMUNOL=on>).

Stanford Immunology is home to faculty, students, postdocs, and staff who work together to produce internationally recognized research in many areas of immunology. The long tradition of collaboration among the immunology laboratories at Stanford fosters productive interdisciplinary research, with an emphasis on the application of current approaches to problems in cellular, molecular and clinical immunology. Faculty research interests include both bench-to-bedside and basic science research. Graduate students and postdoctoral scholars receive outstanding training through their participation in research, teaching, seminars, journal clubs, and the annual Stanford Immunology Scientific Conference.

Mission of the Graduate Program in Immunology

The Immunology graduate program offers instruction and research opportunities leading to a Ph.D. in Immunology. Two tracks are offered:

1. Track 1: Molecular, Cellular, and Translational Immunology
2. Track 2: Computational and Systems Immunology

The goal of the Graduate Program in Immunology is to develop investigators who have a strong foundation in Immunology and related sciences in order to carry out innovative research. The program features a flexible choice of courses and seminars combined with extensive research training in the laboratories of participating Immunology faculty. Specifically, immunology graduate students:

1. acquire a fundamental, broad, and comprehensive body of knowledge and skills through an extensive curriculum.
2. identify important scientific questions, design, and conduct experiments using the most appropriate methods.
3. read and critically analyze current literature in immunology and other relevant fields.

4. present research findings and communicate ideas effectively to a variety of audiences.
5. prepare manuscripts that will be published in leading journals.
6. learn to teach effectively.

Master of Science in Immunology

Students in the Ph.D. program in Immunology may apply for an M.S. degree in Immunology only under special circumstances, assuming completion of appropriate requirements. Students must complete:

1. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 36 units of which must be at or above the 200 level.
2. 3 quarters of graduate research (IMMUNOL 399 Graduate Research), consisting of rotations in the labs of three faculty members.
3. Participation in the Immunology journal club (IMMUNOL 305 Immunology Journal Club), and attendance at the Immunology seminar series and at the annual Stanford Immunology Scientific Conference.
4. First Year Rotations Presentations and General Advising Sessions, June. Students present on one of three lab rotations.
5. Students must submit a master's thesis paper on one of their rotations. This requirement may be waived under special circumstances.

Course work in Immunology as follows:

Track: Molecular, Cellular and Translational Immunology

		Units
BIOS 200	Foundations in Experimental Biology	6
BIO 230A	Molecular and Cellular Immunology Literature Review	1
IMMUNOL 201	Advanced Immunology I	3
IMMUNOL 202	Advanced Immunology II	3
IMMUNOL 203	Advanced Immunology III	2
IMMUNOL 311	Seminar in Immunology	1
IMMUNOL 311A	Discussions in Immunology	1
IMMUNOL 305	Immunology Journal Club	1
IMMUNOL 215	Principles of Biological Technologies	3
IMMUNOL 399	Graduate Research	1-15
BIO 141	Biostatistics	3-5
MED 255	The Responsible Conduct of Research	1
Take one of the following courses:		4
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	
BIO 214	Advanced Cell Biology	

Track: Computational and Systems Immunology

		Units
BIOS 200	Foundations in Experimental Biology	6
BIO 230A	Molecular and Cellular Immunology Literature Review	1
IMMUNOL 201	Advanced Immunology I	3
IMMUNOL 202	Advanced Immunology II	3

IMMUNOL 206	Introduction to Applied Computational Tools in Immunology	1-2
IMMUNOL 207	Essential Methods in Computational and Systems Immunology	3
IMMUNOL 209	Translational Immunology	1
IMMUNOL 310	Seminars in Computational and Systems Immunology	1
BIOMEDIN 212	Introduction to Biomedical Informatics Research Methodology	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
IMMUNOL 399	Graduate Research	1-15
MED 255	The Responsible Conduct of Research	1

Doctor of Philosophy in Immunology

Courses offered by the Stanford Graduate Program in Immunology are listed under the subject code IMMUNOL on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/search?q=IMMUNOL&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&filter-departmentcode-IMMUNOL=on&collapse=&filter-catalognumber-IMMUNOL=on&filter-catalognumber-IMMUNOL=on>) web site.

Admissions

Students seeking admissions to the Immunology Graduate Program typically have an undergraduate major in biological sciences, but majors from other areas are acceptable if the applicants have sufficient coursework in biology, chemistry, general physics, and mathematics (through calculus). Applications are evaluated by the Immunology Graduate Program committee based upon: GRE scores; grades; evidence of research experience; letters of recommendation, including letters from research sponsor(s); and commitment to a career in biomedical research. The GRE Subject test is not required. Applicants should plan on taking the GRE at least one month prior to the application deadline of December 2nd to ensure that official scores are available when applications are evaluated. Interested Stanford medical students are welcome to apply to the program and should also submit a formal application by December 2.

Prospective graduate students must apply via Stanford's online graduate application.

Financial Aid

Students admitted to the program are offered financial support for tuition, a living stipend, insurance coverage, and a small allowance for books/travel. Applicants are urged to apply for independent fellowships such as from the National Science Foundation or National Defense Science and Engineering Graduate Fellowships. NSF Fellowship applications are due in November of the year prior to matriculation in the graduate program, but Immunology graduate students may continue to apply for outside fellowships after matriculation. Admitted students are typically offered financial support in the form of Stanford Graduate Fellowships, NIH traineeships, or research assistantships.

General Requirements

Immunology Startup and the First-Year Advising Process

Since students enter with differing backgrounds, each student is assisted by the first-year adviser in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. In addition, the

Immunology Startup, a six-day long introduction to immunology in the second week of September, exposes incoming Immunology Ph.D. students to a variety of techniques and concepts. Students learn basic laboratory techniques in immunology and participate in in-depth discussions with faculty.

All students must be enrolled in exactly 10 units during Autumn, Winter, Spring, and Summer quarters until reaching TGR status in the spring quarter of their fourth year. Students are required to pass all courses in which they are enrolled; required and elective courses must be taken for a letter grade. Students must earn a grade of 'B-' or better in all courses applicable to the degree that are taken for a letter grade. Satisfactory completion of each year's general and track specific requirements listed below is required. During the first year, degree progress is monitored closely by the first-year adviser in quarterly meetings and by the Stanford Graduate Program Committee in a final advising session in June.

First-year students are required to complete three rotations in at least two immunology labs. In the spring quarter, two mini-rotations of six weeks each may be arranged.

A specific program of study for each student is developed individually with the first-year adviser.

Core Courses:

All students in the two tracks, Molecular, Cellular, and Translational Immunology (MCTI) and Computational and Systems Immunology (CSI) are required to enroll in the following core courses:

		Units
BIOS 200	Foundations in Experimental Biology	6
BIO 230A	Molecular and Cellular Immunology Literature Review	1
IMMUNOL 201	Advanced Immunology I	3
IMMUNOL 202	Advanced Immunology II	3
IMMUNOL 305	Immunology Journal Club	1
IMMUNOL 311	Seminar in Immunology	1
IMMUNOL 311A	Discussions in Immunology	1
BIO 141	Biostatistics	3-5
IMMUNOL 399	Graduate Research	1-15
IMMUNOL 290	Teaching in Immunology	1-15
MED 255	The Responsible Conduct of Research	1

In the third week of June, first-year immunology graduate students are required to give a presentation on one of their three rotations to the Immunology Graduate Program Committee (Qualifying Examination Process, Part I). After the rotation presentation, the first-year student will meet with the Stanford Graduate Program Committee in a one-on-one advising session to review degree progress and choice of a PhD thesis lab. The first-year graduate student is asked to complete a "Big Picture" advising document, which takes stock of the first year student's accomplishments in the past year, discusses near- and long-term plans, and serves as a transitional document for the PhD thesis adviser.

Once a dissertation adviser has been selected, a dissertation committee, including the dissertation adviser and two additional Immunology faculty, is constituted to guide the student during the dissertation research. The student must meet with the dissertation committee at least once a year. In the first through third years, the student must meet with the dissertation committee at least once a year. In the 4th and 5th years, students are expected to meet twice a year with their thesis committees. For students in their 5th years and above, a member of the Immunology Graduate Program Committee will also attend these bi-annual thesis committee meetings. In addition, a secondary adviser is assigned who can provide additional advice on issues such as career path choices and other non-academic issues.

Individual Development Plan: Graduate students are required to meet with their faculty mentors once a year to discuss an "Individual Development

Plan (IDP)." The IDP is intended to help the students take ownership of their training and professional development. The goals of the IDP are to: 1) pause, reflect and intentionally think on short-, mid- and long-term goals; 2) identify resources that will help achieve these goals; 3) have open and direct dialogue with the PhD thesis adviser and establish clear expectations and steps.

Track Specific Requirements

In addition to the general requirements listed above, students must also complete requirements within their track. Written petitions for exemptions to core curriculum and lab rotation requirements are considered only in the first year by the advising committee and the chair of the Graduate Program committee. Approval is contingent upon special circumstances and is not routinely granted.

Molecular, Cellular, and Translational Immunology

MCTI first-year students are required to take the following courses in their first year for a letter grade:

	Units
IMMUNOL 203 Advanced Immunology III	2
IMMUNOL 215 Principles of Biological Technologies	3
Take one of the following courses:	4
MI 210 Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	
BIO 214 Advanced Cell Biology	

Electives:

One elective (see elective list below)

	Units
IMMUNOL 260 HIV: The Virus, the Disease, the Research	3-4
IMMUNOL 275 Tumor Immunology	3
CSB 210 Cell Signaling	4
SBIO 241 Biological Macromolecules	3-5
DBIO 210 Developmental Biology	4
CBIO 241 Molecular, Cellular, and Genetic Basis of Cancer	4
IMMUNOL 204 Innate Immunology	3
IMMUNOL 205 Immunology in Health and Disease	4
IMMUNOL 206 Introduction to Applied Computational Tools in Immunology	1-2

Computational and Systems Immunology

The CSI curriculum trains students to be computational and experimental scientists who are expected to identify important problems in immunology and to devise integrated computational/ experimental plans for addressing them.

CSI students are required to take the following courses in their first and second years.

First Year:

	Units
CS 106A Programming Methodology	3-5
CS 109 Introduction to Probability for Computer Scientists	3-5
CS 161 Design and Analysis of Algorithms	3-5

IMMUNOL 206 Introduction to Applied Computational Tools in Immunology	1-2
IMMUNOL 310 Seminars in Computational and Systems Immunology	1
BIOMEDIN 212 Introduction to Biomedical Informatics Research Methodology	3

Second Year:

	Units
IMMUNOL 207 Essential Methods in Computational and Systems Immunology	3
STATS 216 Introduction to Statistical Learning	3
BIOMEDIN 214 Representations and Algorithms for Computational Molecular Biology	3-4

Electives:

Two electives (see elective list below)

	Units
STATS 116 Theory of Probability	3-5
CME 206 Introduction to Numerical Methods for Engineering	3
CME 263 Introduction to Linear Dynamical Systems	3
CME 309 Randomized Algorithms and Probabilistic Analysis	3
CME 334 Advanced Methods in Numerical Optimization	3
BIOMEDIN 260 Computational Methods for Biomedical Image Analysis and Interpretation	3-4
BIOMEDIN 262 Computational Genomics	3
BIOMEDIN 374 Algorithms in Biology	2-3
STATS 201 Design and Analysis of Experiments	3-5
STATS 202 Data Mining and Analysis	3
STATS 217 Introduction to Stochastic Processes	2-3
EE 376A Information Theory	3
CME 364A Convex Optimization I	3
CME 372 Applied Fourier Analysis and Elements of Modern Signal Processing	3
EE 278 Introduction to Statistical Signal Processing	3
EE 378A Statistical Signal Processing	3
Other	

Qualifying Exam and Admission to Candidacy

Second-year students are required to pass a general orals examination and write a thesis dissertation proposal, which will be presented to and evaluated by a committee of three faculty members (the dissertation advising committee). All students must be admitted to candidacy by the end of their second year. This is contingent upon satisfactory completion of course work, all first and second year requirements, the dissertation proposal, and the University's requirements for candidacy outlined in the Candidacy section of this bulletin. If a student does not meet the requirements for admission to candidacy by the end of the second year, the student is subject to dismissal from the PhD program.

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research. At least 3 units must be taken with each of four different Stanford faculty members. All core course requirements must be completed by the end of the second year.

Journal Clubs

Both MCTI and CSI students are required to attend the IMMUNOL 305 Immunology Journal Club for their first through third years. Attendance is optional for fourth year and above graduate students.

Immunology and CSI Seminar Series

Graduate seminars are an important means of attaining a broad and comprehensive exposure to all areas in immunology as well as gaining a professional perspective and competence in the field. First-year students are required to attend all immunology seminars (IMMUNOL 311 Seminar in Immunology, Tuesdays, 4:15 pm) and the companion immunology seminar discussions course (IMMUNOL 311A Discussions in Immunology, Mondays, 10:00 am); in the latter, the seminar speakers' papers are discussed. Students in their second year and above are required to attend 50% of the seminar series each academic year. Students in the CSI track are required to attend the IMMUNOL 311 Seminar in Immunology for the Autumn and Winter quarters of their first year. In the Spring quarter, attendance in IMMUNOL 311 Seminar in Immunology is optional so that graduate students in the CSI track may attend IMMUNOL 310 Seminars in Computational and Systems Immunology for the Spring and Summer quarters.

Immunology Scientific Retreat

The annual Retreat is held at the Asilomar Conference Grounds, Pacific Grove, CA, and is attended by students, staff, postdocs and faculty of the Stanford immunology community. All immunology graduate students are required to attend. In the third through fifth years, students will present a poster and give a talk on their graduate research.

Teaching Assistantships

Teaching experience and training are part of the graduate curriculum. Each student assists in teaching two courses in the immunology core or electives. A TA match process is held in summer quarter in order to match the graduate student's research and teaching preferences to the appropriate courses.

First Author Paper Submission

By the 4th or 5th year, graduate students are expected to submit a first author paper for publication. This milestone, the submission of a first author paper, should be completed before defending a PhD thesis.

Doctoral Dissertation

Before embarking on the dissertation defense process, the graduate student must submit a Petition to Defend to the Chair of the Immunology Graduate Program. Important milestones and degree requirements must be met before proceeding to the oral examination. A substantial draft of the dissertation must be turned in to the student's oral examination committee at least one month before the oral exam is scheduled to take place. In addition, the final written dissertation must be approved by the student's reading committee, and submitted to the Registrar's Office. Upon completion of this final requirement, a student is eligible for conferral of the degree.

The Reading Dissertation Committee must be comprised of at least four faculty members. The minimum number of faculty members in the immunology program may be 2, but typically, 3 of the 4 Reading Dissertation Committee members are from the Graduate Program in Immunology. At the time of the PhD orals defense, an Orals Chair is

chosen to lead the Orals Committee (distinct from the Reading Dissertation Committee), and the minimum number for this committee is 5.

Faculty

Director, Executive Committee for the Immunology Program: Patricia Jones (Professor, Biology)

Chair for Immunology Graduate Program: Olivia Martinez (Professor, Research, Surgery, Transplantation)

Participating Departments and Faculty (Molecular, Cellular, Translational Immunology)

Biochemistry: Peter Kim (Professor)

Biology: Patricia P. Jones (Professor)

Cardiothoracic Surgery: Burt Bryan (Assistant Professor)

Genetics: Leonore A. Herzenberg (Professor, Research)

Medicine/Blood and Bone Marrow Transplantation Program: Everett Meyer (Assistant Professor), David Miklos (Assistant Professor), Robert Negrin (Professor), Judith Shizuru (Associate Professor)

Medicine/Cardiovascular Medicine: Joseph Wu (Associate Professor, and Radiology and Institute for Stem Cell and Regenerative Medicine)

Medicine/Endocrinology: Joy Wu (Assistant Professor)

Medicine/Gastroenterology and Hepatology: Aida Habtezion (Assistant Professor)

Medicine/Hematology: Ravi Majeti (Assistant Professor, and Institute for Stem Cell and Regenerative Medicine)

Medicine/Immunology and Rheumatology: C. Garrison Fathman (Professor), Jorg Goronzy (Professor), William Robinson (Associate Professor), Samuel Strober (Professor), Paul J. Utz (Professor), Cornelia Weyand (Professor)

Medicine/Infectious Diseases: Catherine Blish (Assistant Professor), Paul Bollyky (Assistant Professor)

Medicine/Oncology: Ash Alizadeh (Assistant Professor), Gilbert Chu (Professor, and Biochemistry), Dean Felsher (Professor, and Pathology), Holbrook Kohrt (Assistant Professor), Ronald Levy (Professor), Shoshana Levy (Professor, Research)

Medicine/Pulmonary and Critical Care Medicine: Mark Nicolls (Associate Professor)

Microbiology and Immunology: John Boothroyd (Professor), Yueh-Hsiu Chien (Professor), Mark M. Davis (Professor, and Director, Institute for Immunity, Transplantation and Infection), Holden Maecker (Associate Professor, Research), Juliana Idoyaga (Assistant Professor), Hugh McDevitt (Professor,emeritus), Denise Monack (Assistant Professor), Garry P. Nolan (Professor), David Schneider (Associate Professor)

Molecular and Cellular Physiology: K. Christopher Garcia (Professor, and Structural Biology), Richard S. Lewis (Professor)

Neurology and Neurological Sciences: May Han (Assistant Professor), Lawrence Steinman (Professor, and Pediatrics), Tony Wyss-Coray (Professor)

Neurosurgery: Theo Palmer (Associate Professor)

Otolaryngology/Head and Neck Surgery (ENT): Jayankar Nayak (Assistant Professor), John B. Sunwoo (Assistant Professor)

Pathology: Sean Bendall (Assistant Professor), Scott Boyd (Assistant Professor), Eugene C. Butcher (Professor), Michael Cleary (Professor), Gerald R. Crabtree (Professor, and Developmental Biology), Edgar G. Engleman (Professor, and Medicine/Immunology and Rheumatology), Andrew Fire (Professor, and Genetics), Stephen Galli (Professor and Chair), Sara Michie (Professor), Raymond A. Sobel (Professor), Irving Weissman (Professor, and Director, Stem Cell Institute)

Pediatrics: Manish Butte (Assistant Professor), Christopher Contag (Professor, Research, and Microbiology and Immunology, and Radiology), David B. Lewis (Professor), Maria Grazia Roncarolo (Professor, and Medicine/Blood and Marrow Transplantation), Elizabeth Mellins (Professor), Kari Nadeau (Associate Professor)

Psychiatry and Behavioral Sciences: Firdaus Dhabhar (Associate Professor), Emmanuel Mignot (Professor)

Radiology: Parag Mallick (Assistant Professor and Diagnostic Radiology)

Structural Biology: Peter Parham (Professor, and Microbiology and Immunology), Theodore Jardetzky (Professor)

Surgery/Multi-Organ Transplantation: Sheri Krams (Associate Professor, Research), Olivia Martinez (Professor, Research)

Participating Departments and Faculty (Computational and Systems Immunology)

Bioengineering: Stephen Quake (Professor, and Applied Physics and Physics)

Genetics: Michael Snyder (Professor)

Health and Research Policy - Biostatistics: Richard Olshen (Professor)

Med/Biomedical Informatics: Purvesh Khatri (Assistant Professor)

Med/Immunology and Rheumatology: Paul J. Utz (Associate Professor)

Med/Oncology: Ash Alizadeh (Assistant Professor)

Microbiology and Immunology: John Boothroyd (Professor), Mark M. Davis (Professor, and Director, Institute for Immunity, Transplantation and Infection), Karla Kirkegaard (Professor), Holden Maecker (Associate Professor, Research), Garry Nolan (Professor)

Pathology: Sean Bendall (Assistant Professor), Scott Boyd (Assistant Professor), Andrew Fire (Professor, and Genetics)

Radiology: Parag Mallick (Assistant Professor, and General Radiology)

Affiliate Members:

Biochemistry: Ron Davis (Professor, and Genetics)

Bioengineering: Russ Altman (Professor, and Genetics and Computer Science)

Health and Research Policy - Biostatistics: Robert Tibshirani (Professor, and Statistics)

Microbiology and Immunology

Courses offered by the Department of Microbiology and Immunology are listed under the subject code MI on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MI&filter-catalognumber-MI=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/>

[search?view=catalog&catalog=&page=0&q=MI&filter-catalognumber-MI=on](http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MI&filter-catalognumber-MI=on)) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MI&filter-catalognumber-MI=on>).

Graduate Programs in Microbiology and Immunology

The Department of Microbiology and Immunology offers a program of training leading to the Ph.D. degree, as well as research training, courses, and seminars for medical students and postdoctoral fellows. Research interests focus on two broad areas: host/parasite interactions, and the function of the immune system. Laboratories investigate mechanisms of pathogenesis and the physiology of viruses, bacteria, and protozoan parasites, as well as the lymphocyte function in antigen recognition, immune response, and autoimmunity.

Master of Science

A regular M.S. program is not offered, although this degree is awarded under special circumstances. Candidates for master's degrees are expected to have completed the preliminary requirements for the B.S. degree, or the equivalent. In addition, the candidate is expected to complete 45 quarter units of work related to microbiology; at least 25 of these units should concern research devoted to a thesis. The thesis must be approved by the student's committee.

Doctor of Philosophy in Microbiology and Immunology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

Application, Admission, and Financial Aid

Prospective Ph.D. candidates should have completed a bachelor's degree in a discipline of biology or chemistry, including course work in biochemistry, chemistry, genetics, immunology, microbiology, and molecular biology. The deadline for receipt of applications with all supporting materials is December 3.

Applicants must file a report of scores on the general subject tests of the Graduate Record Examination (GRE). It is strongly recommended that the GRE be taken before October so that scores are available when applications are evaluated.

In the absence of independent fellowship support, entering predoctoral students are fully supported with a stipend and tuition award. Highly qualified applicants may be honored by a nomination for a Stanford Graduate Fellowship. Successful applicants have been competitive for predoctoral fellowships such as those from the National Science Foundation.

Program for Graduate Study

The Ph.D. degree requires course work and independent research demonstrating an individual's creative, scholastic, and intellectual abilities. On entering the department, students meet an advisory faculty member; together they design a timetable for completion of the degree requirements. Typically, this consists of first identifying gaps in the student's undergraduate education and determining courses that should be taken. Then, a tentative plan is made for two to four lab rotations (one rotation per quarter). During the first year of graduate study in the

department, each student also takes six or seven upper-level (200-series) courses.

Course requirements:

BIOS 200	Foundations in Experimental Biology	6
BIO 214	Advanced Cell Biology	4
MED 255	The Responsible Conduct of Research	1
MI 204	Innate Immunology	3
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	4
MI 215	Principles of Biological Technologies	3
MI 250	Frontiers in Microbiology and Immunology (Taken once in the first year and once in the second year for a total of 2 units.)	1

Recommended courses:

BIO 230 Molecular and Cellular Immunology

One Elective from the following:

DBIO 210	Developmental Biology	4
CSB 210	Cell Signaling	4
CSB 220	Chemistry of Biological Processes	4
MCP 202	Advanced Immunology II	3
MI 211	Advanced Immunology I	3
MI 245	Computational Modeling of Microbial Communities	4
SBIO 241	Biological Macromolecules	3-5
GENE 205	Advanced Genetics	3
MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	4

Prior approval from the student's adviser and department Graduate Program Director is required for courses not from the elective list.

In Autumn Quarter of the second year, each student defends orally a formal research proposal on a topic outside the intended thesis project. This qualifying examination proposal is due to the graduate program steering committee by September 1. Based on successful performance on this proposal, the student is admitted to candidacy. In Spring Quarter of the second year, a research proposal based on the student's own thesis topic is defended to the thesis committee. The written thesis proposal is due May 1 and the oral defense will be presented and completed by the end of the Spring quarter. Teaching experience and training are also part of the graduate curriculum. Graduate students are required to act as teaching assistants for two courses. In addition, first- and second-year graduate students are required to participate in a bi-weekly journal club. Full program requirements can be found at <http://microimmuno.stanford.edu/education/>.

Emeriti: (Professors) Stanley Falkow, Hugh O. McDevitt, Edward S. Mocarski, Sidney Raffel

Chair: Peter Sarnow

Associate Chair: David Schneider

Professors: Ann Arvin, Helen Blau, Matthew Bogoy, John C. Boothroyd, Yueh-Hsiu Chien, Christopher Contag, Mark M. Davis, Stephen J. Galli, Harry B. Greenberg, Peter Jackson, Karla Kirkegaard, A. C. Matin, Garry Nolan, Peter Parham, Phillip Pizzo, Charles Prober, David Relman, Peter Sarnow, Gary K. Schoolnik, Julie Theriot, Lucy S. Tompkins

Associate Professors: Manuel Amieva, Jeffrey Glenn, Denise Monack, David Schneider, Upinder Singh

Assistant Professors: Jan Carette, Shirir Einav, K.C. Huang, Juliana Idoyaga, Justin Sonnenburg, Ellen Yeh

Associate Professor (Teaching): Robert D. Siegel

Units *Institute for Immunity, Transplantation and Infection*

Director, Human Immune Monitoring Center and Associate Professor (Research): Holden Maecker

Molecular and Cellular Physiology

Courses offered by the Department of Molecular and Cellular Physiology are listed under the subject code MCP on the

<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MCP&filter-catalognumber-MCP=on> Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MCP&filter-catalognumber-MCP=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MCP&filter-catalognumber-MCP=on>).

The Department of Molecular and Cellular Physiology is located in the Beckman Center for Molecular and Genetic Medicine.

A central goal of physiology in the post-genomic era is to understand how thousands of encoded proteins serve to bring about the highly coordinated behavior of cells and tissues. Research in the department approaches this goal at many levels of organization, ranging from single molecules and individual cells to multicellular systems and the whole organism. The faculty share common interests in the molecular mechanisms of cell signaling and behavior, with a special focus on structure/function analysis of ion channels and G-protein coupled receptors, and their roles at the cellular, organ, and whole-organism levels; the molecular basis of sensory transduction, synaptic transmission, plasticity and memory; the role of ion channels and calcium in controlling gene expression in neural and immune cells; and the regulation of vesicle trafficking and targeting, cell polarity, and cell-cell interactions in the nervous system and in epithelia. Research programs employ a wide range of approaches, including molecular and cell biology, biochemistry, genetics, biophysics, x-ray crystallography and solution NMR, electrophysiology, and in vitro and in vivo imaging with confocal and multi-photon microscopy.

Graduate Programs in Molecular and Cellular Physiology

The department offers required and elective courses for students in the School of Medicine and is also open to other qualified students with the consent of the instructor. Training of medical, graduate, and postdoctoral students is available. The program offers a course of study leading to the Ph.D. degree. No B.S. is offered, and an M.S. is offered only in the unusual circumstance where a student completes the course work, rotation, and the written section of the qualifying exam, but is unable to complete the requirements for the Ph.D.

Doctor of Philosophy in Molecular and Cellular Physiology

Students with undergraduate or master's degrees who have completed a year each of college chemistry (including lectures in organic and physical chemistry), physics, calculus, and biology are considered for admission to graduate study. Applicants submit a report of scores from the Graduate Record Examination (verbal, quantitative, analytical, and an advanced subject test in one of the sciences) as part of the application. Students who do not speak English as their native language must submit scores from TOEFL unless waived by Graduate Admissions.

Study toward the Ph.D. is expected to occupy five years, including summers. A minimum of six quarter-long courses is required, including:

- MCP 221 Advanced Cell Biology or MCP 256 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
- BIOS 200 Foundations in Experimental Biology
- two graduate-level courses (200-300 series)
- a choice of any of the two courses:
 - MCP 202 Advanced Immunology II. 3 Units.
 - MCP 216 Genetic Analysis of Behavior. 3 Units.
- MED 255 Responsible Conduct of Research, if funded on NSF or NIH training grants

Students are also required to participate in the Molecular and Cellular Physiology Seminar Series and attend Department Scientific Meeting. Grades for course work must be a minimum of 'B', and at least two grades equal to 'A-' or above are necessary but not sufficient for continuation in the program. In addition, students in the program must maintain a grade point average of at least 3.3 for their required courses as a whole.

Qualifying Examination

At the beginning of the second year in residence as a graduate student, each Ph.D. candidate presents a written thesis proposal to be defended at an oral comprehensive examination. The examination should be taken prior of all course work completed by the required standard. Students undertake individual research studies as early as possible after consultation with their preceptor. Upon passing this exam, the student is advanced to candidacy for the Ph.D.

Dissertation and University Oral Examination

The results of independent, original work by the students are presented in a dissertation. The oral examination is largely a defense of the dissertation.

Advisers and Advisory Committees

A graduate advisory committee, currently professors Kobilka, Lewis, Nachury and Madison, advises students during the period before the formation of their qualifying committees.

Financial Aid

Students may be funded by their advisers' research grants, by training grants, by department funds, or by extramural funds. Students are encouraged to obtain funding from outside sources such as NIH and NSF.

Chair: Axel T. Brunger

Associate Chair: Miriam B. Goodman

Professors: Axel T. Brunger, K. Christopher Garcia, Brian K. Kobilka, Richard S. Lewis, Thomas C. Sudhof

Associate Professors: Miriam B. Goodman, V. Daniel Madison, Merritt C. Maduke

Assistant Professors: Liang Feng, Maxence V. Nachury, Lucy E. O'Brien

Joint Professors: Steve Chu, W. James Nelson, William Weis

Courtesy Professors: John Huguenard, Beth Pruitt, Anthony J. Ricci

Courtesy Associate Professor: Ron Dror, Michael McConnell, Richard J. Reimer

Courtesy Assistant Professor: Gregory Scherrer

Emeritus Faculty: Stephen J. Smith, Richard W. Tsien

Neurobiology

Courses offered by the Department of Neurobiology are listed under the subject code NBIO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=NBIO&filter-catalognumber-NBIO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=NBIO&filter-catalognumber-NBIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=NBIO&filter-catalognumber-NBIO=on>).

Graduate Program in Neurobiology

Graduate students in the Department of Neurobiology obtain the Ph.D. degree through the interdepartmental Neurosciences Ph.D. program (p. 694). Accepted students receive funding for tuition and a living stipend. Applicants should familiarize themselves with the research interests of the faculty and, if possible, indicate their preference on the application form which is submitted directly to the Neurosciences Program.

Medical students also are encouraged to enroll in the Ph.D. program. The requirements of the Ph.D. program are fitted to the interests and time schedules of the student. Postdoctoral training is available to graduates holding Ph.D. or M.D. degrees, and further information is obtained directly from the faculty member concerned.

Research interests of the department include information processing in vertebrate retina; structure, function, and development of auditory and visual systems; development and regeneration in the central and peripheral nervous system; neural mechanisms mediating higher nervous system functions, including perception, learning, attention and decision making.

Faculty

Emeritus: Denis Baylor, Uel J. McMahan, Eric Shooter, Lubert Stryer

Chair: Ben Barres

Professors: Eric I. Knudsen, William T. Newsome

Associate Professors: Stephen Baccus, Thomas Clandinin, Ricardo Dolmetsch, Lisa Giocomo, Tirin Moore, Jennifer Raymond

Neurosciences

Courses offered by the Neurosciences Program are listed under the subject code NEPR on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=NEPR&filter-catalognumber->

NEPR=on) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=NEPR&filter-catalognumber=NEPR=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=NEPR&filter-catalognumber=NEPR=on>).

Doctor of Philosophy in Neurosciences

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The interdepartmental Neurosciences Program offers instruction and research opportunities leading to a Ph.D. in Neurosciences. The requirements for a Ph.D. degree follow those of the University and in addition are tailored to fit the background and interests of the student. Accepted students receive an award covering tuition, a basic health plan, and a living stipend. Qualified applicants should, where possible, apply for the predoctoral fellowships in open competition, especially those from the National Science Foundation. Applications and all supporting material are due in early-December each year.

Applicants should familiarize themselves with the research interests of the faculty and indicate their preferences clearly on the application form.

Since students enter with differing backgrounds, and the labs in which they may elect to work cover several different disciplines, the specific program for each student is developed individually with an advisory committee. All students are required to complete the basic introduction to neurobiology (NBIO 206 The Nervous System or equivalent). All students must complete nine quarters of Professional Development and Integrity in Neuroscience (NBIO 300 Professional Development and Integrity in Neuroscience). Lastly, students must also take five courses within (and at least one course in each of) the following three areas:

1. Molecular, Cellular and Developmental Neuroscience
2. Systems, Computational, Cognitive and Behavioral Neuroscience
3. Translational Neuroscience

Courses from outside the neuroscience core can satisfy the elective requirement.

Students rotate through several labs during their first year, although they may choose to begin thesis research upon entry. After the first rotation, students may rotate both within and outside the Neurosciences Program. Required course work should be completed by the end of the second year. Passing of a comprehensive oral preliminary examination given by the student's advisory committee is required for admission to Ph.D. candidacy. This examination is usually taken by the end of the second year. The student is required to present a Ph.D. dissertation, which is the result of independent investigation contributing to knowledge in an area of neuroscience, and to defend his or her dissertation in a University oral examination, which includes a public seminar.

Medical students may participate in this program provided they meet the prerequisites and satisfy all the requirements of the graduate program as listed above. The timing of the program may be adjusted to fit their special circumstances.

Director: Anthony J. Ricci (Edward C. and Amy H. Sewall Professor in the School of Medicine and, Professor, by courtesy, of Molecular and Cellular Physiology)

Steering Committee: Katrin Andreasson, Paul Buckmaster, Marion Buckwalter, Aaron Gitler, John R. Huguenard, Merritt Maduke, Michelle Monje-Deisseroth, Giles Plant, Anthony Ricci, Thomas Sudhof

Participating Faculty:

Anesthesia: Rona Giffard (Professor), Sean Mackey (Professor), Gregory Scherrer (Assistant Professor), David Yeomans (Associate Professor)

Applied Physics: Surya Ganguli (Assistant Professor), Mark Schnitzer (Associate Professor)

Bioengineering: Kwabena Boahen (Professor), Karl Deisseroth (Professor), Jin Hyung Lee (Assistant Professor), Michael Lin (Assistant Professor), Matthew Scott (Professor)

Biology: Xiaoke Chen (Assistant Professor), Russell Fernald (Professor), H. Craig Heller (Professor), Ron Kopito (Professor), Liqun Luo (Professor), Susan McConnell (Professor), Robert Sapolsky (Professor), Mark Schnitzer (Associate Professor), Carla Shatz (Professor), Kang Shen (Professor),

Comparative Medicine: Paul Buckmaster (Professor), Corinna Darian-Smith (Associate Professor), Joseph Garner (Associate Professor), Shaul Hestrin (Professor)

Computer Science: Fei-Fei Li (Associate Professor)

Developmental Biology: Ben Barres (Professor), Seung Kim (Professor), David Kingsley (Professor), Matthew Scott (Professor)

Electrical Engineering: Krishna Shenoy (Professor)

Genetics: Anne Brunet (Associate Professor), Aaron Gitler (Associate Professor), Matthew Scott (Professor)

Microbiology and Immunology: Helen Blau (Professor)

Molecular and Cellular Physiology: Axel Brunger (Professor), Miriam Goodman (Associate Professor), Brian Kobilka (Professor), Richard S. Lewis (Professor), Daniel V. Madison (Associate Professor), Merritt Maduke (Associate Professor), Anthony Ricci (Professor), Stephen Smith (Professor), Thomas Sudhof (Professor)

Neurobiology: Stephen Baccus (Associate Professor), Ben Barres (Professor), Tom Clandinin (Associate Professor), Ricardo Dolmetsch (Associate Professor), Lisa Giacomo (Assistant Professor), Eric Knudsen (Professor), Tirin Moore (Associate Professor), William Newsome (Professor), Jennifer Raymond (Associate Professor), Carla Shatz (Professor)

Neurology and Neurological Sciences: Katrin Andreasson (Professor), Ben Barres (Professor), Paul Buckmaster (Professor), Marion Buckwalter (Assistant Professor), Yoon-Jae Cho (Assistant Professor), Jun Ding (Assistant Professor), May Han (Assistant Professor), Ting-Ting Huang (Associate Professor, Research), John R. Huguenard (Professor), Jin Hyung Lee (Assistant Professor), Frank Longo (Professor), Michelle Monje-Deisseroth (Assistant Professor), Josef Parvizi (Associate Professor), Kathleen Poston (Assistant Professor), Thomas A. Rando (Professor), Richard Reimer (Associate Professor), Robert Sapolsky (Professor), Tony Wyss-Coray (Professor), Yanmin Yang (Associate Professor)

Neurosurgery: Marion Buckwalter (Assistant Professor), Lu Chen (Associate Professor), EJ Chichilnisky (Professor), Theo Palmer (Associate Professor), Giles Plant (Associate Professor), Gary K. Steinberg (Professor), Xinnan Wang (Assistant Professor), Heng Zhao (Associate Professor, Research)

Ophthalmology: EJ Chichilnisky (Professor), Yaping Joyce Liao (Assistant Professor)

Otolaryngology: Mirna Mustapha (Assistant Professor), Anthony Ricci (Professor)

Pathology: Bingwei Lu (Associate Professor), Marius Wernig (Assistant Professor)

Pediatrics: Michael Lin (Assistant Professor)

Philosophy: Patrick Suppes (Professor, emeritus)

Psychiatry and Behavioral Sciences: Lu Chen (Associate Professor), Luis de Lecea (Professor), Karl Deisseroth (Professor), Firdaus Dhabhar (Associate Professor), Amit Etkin (Assistant Professor), Craig Garner

(Professor), David Lyons (Professor, Research), Robert Malenka (Professor), Vinod Menon (Professor, Research), Karen Parker (Assistant Professor), Allan Reiss (Professor), Jamie Zeitzer (Assistant Professor)

Psychology: Ian Gotlib (Professor), Kalanit Grill-Spector (Associate Professor), James Gross (Professor), Brian Knutson (Associate Professor), James McClelland (Professor), Samuel McClure (Assistant Professor), Anthony Norcia (Professor), Anthony Wagner (Professor), Brian Wandell (Professor)

Radiology: Gary Glover (Professor)

Obstetrics and Gynecology

Courses offered by the Department of Obstetrics and Gynecology are listed under the subject code OBGYN on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OBGYN&filter-catalognumber-OBGYN=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OBGYN&filter-catalognumber-OBGYN=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=OBGYN&filter-catalognumber-OBGYN=on>).

The Department of Obstetrics and Gynecology does not offer degrees; however, qualified medical, graduate, or undergraduate students with an interest in basic research in reproductive biology may apply to arrange individual projects under the supervision of the faculty. The focus for the Division of Reproductive, Stem Cell and Perinatal Biology is the study of the molecular and cellular biology of male and female reproductive organs.

Faculty

Chair: Jonathan S. Berek, M.D., M.M.S., Professor, Laurie Kraus Lacob Professor

Vice Chair: Maurice L. Druzin, M.D., Professor

Division of Gynecology

Paul Blumenthal, M.D., M.P.H., Professor; Director

Paula Hillard, M.D., Professor; Associate Chair; Director, Pediatric/Adolescent

Leah Millheiser, M.D., Clinical Assistant Professor

Kate Shaw, M.D., Clinical Assistant Professor

Deirdre Lum, M.D., Clinical Assistant Professor

Linh Tran-Ito, M.D., Clinical Instructor

Kamilee Christenson, M.D., Clinical Assistant Professor

Division of Family Planning

Paul Blumenthal, M.D., M.P.H., Professor; Director

Kate Shaw, M.D., Clinical Assistant Professor; Assistant Director, Family Planning

Amy Voedisch, M.D., Clinical Assistant Professor

Fred Hopkins, M.D., M.P.H., Clinical Associate Professor

Division of Gynecologic Oncology

Oliver Dorigo, M.D., Ph.D., Associate Professor; Director

Jonathan Berek, M.D., M.M.S., Professor

Nelson N.H. Teng, M.D., Ph.D., Associate Professor

Mickey C-T Hu, Ph.D., Associate Professor

Amer Karam, M.D., Clinical Associate Professor; Associate Director, Director of Outreach

Shannon MacLaughlan, M.D., Clinical Assistant Professor

Division of Reproductive Endocrinology and Infertility

Valerie Baker, M.D., Associate Professor; Director

Barry Behr, Ph.D., H.C.L.D., Professor (non-clinical)

Amin Milki, M.D., Professor

Lynn Westphal, M.D., Associate Professor

Ruth Lathi, M.D., Associate Professor

Steven Nakajima, M.D., Clinical Professor

Jack Huang, M.D., Ph.D., Clinical Assistant Professor

Division of Urogynecology

Bertha Chen, M.D., Professor; Co-Director

Eric Sokol, M.D., Associate Professor; Co-Director

Lisa Rogo-Gupta, M.D., Clinical Assistant Professor

Division of Maternal-Fetal Medicine

Yasser El-Sayed, M.D., Professor; Director

Maurice Druzin, M.D., Professor

Usha Chitkara, M.D., Professor Emerita

Deirdre Lyell, M.D., Associate Professor

Yair Blumenfeld, M.D., Assistant Professor

Jane Chueh, M.D., Clinical Professor

M. Mark Taslimi, M.D., Clinical Professor

Mark Boddy, M.D., Clinical Associate Professor

Martha Rode, M.D., Clinical Associate Professor

Amen Ness, M.D., Clinical Associate Professor

Natali Aziz, M.D., Clinical Assistant Professor

Kristina Milan, M.D., Clinical Assistant Professor

Gaea Moore, M.D., Clinical Assistant Professor

Sara Osmundson, M.D., Clinical Assistant Professor

Division of General Obstetrics

Yasser El-Sayed, M.D., Professor; Director

Kay Daniels, M.D., Clinical Professor

Jeffrey Faig, M.D., Clinical Professor

Laura Brodzinsky, M.D., Clinical Associate Professor

Kimberly Harney, M.D., Clinical Associate Professor – (Co-clerkship director)

Caroline Bowker, M.D., Clinical Associate Professor

Virginia Winn, M.D., Ph.D., Associate Professor

Susan Crowe, M.D., Clinical Assistant Professor

Cynthia DeTata, M.D., Clinical Assistant Professor – (Co-clerkship director)

Sylvie Blumstein, M.D., Clinical Assistant Professor

Division of Reproductive, Stem Cell, and Perinatal Biology (Research)

Virginia Winn, M.D., Ph.D., Associate Professor; Director

Bertha Chen, M.D., Professor

Aaron J. Hsueh, Ph.D., Professor

Vittorio Sebastiano, Ph.D., Instructor

Pathology

Courses offered by the Department of Pathology are listed under the subject code PATH on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PATH&filter-catalognumber-PATH=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PATH&filter-catalognumber-PATH=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=PATH&filter-catalognumber-PATH=on>).

Programs of Study in Pathology

The Department of Pathology offers advanced courses in aspects of pathology. The department does not offer advanced degrees in pathology, but qualified graduate students who are admitted to department-based or interdepartmental graduate programs may elect to pursue their thesis requirements in the department's research laboratories. The discipline of pathology has served as a bridge between the preclinical and clinical sciences and is focused on the application of advances in the basic biological sciences, both to the diagnosis of human disease and the elucidation of the mechanisms of normal molecular, cellular, and organ structure and function that manifest themselves in clinical disease. Accordingly, the department's research interests extend from fundamental molecular biology to clinical-pathological correlations, with an emphasis on experimental oncology.

Investigation in the department includes basic studies in areas using molecular biological, biochemical, and genetic cell biological techniques: DNA replication in yeast and cultured eukaryotic cells, cell cycle control in animal cells and yeast, identification and pathogenetic role of chromosomal aberrations in human malignancies and mechanisms of activation of oncogenes in human and animal cells, lymphocyte and neutrophil-interactions with endothelial cells, cell type specification and signal transduction pathways leading to specific gene expression or modulation of cytoskeletal behavior; cytoskeletal architecture, cell-matrix interaction, developmental biology of hematopoietic stem cells and thymus, regulation

of the immune system, mechanisms of immune and other responses in the central nervous system, and neuro-degenerative diseases. Various studies focus on the development of novel diagnostic and immunotherapeutic treatment modalities and techniques for solid tumors, lymphomas, HIV, and genetic diseases. Research training in all of these areas is available for qualified medical and graduate students by individual arrangement with the appropriate faculty member. A summary of the research interests of the department faculty is available at Sanford's School of Medicine (<http://pathology.stanford.edu>) web site.

Emeriti: (Professor) Ellen Jo Baron, Susan Gabel, Sharon Geaghan, Michael Hendrickson, Richard L. Kempson, Jon Kosek, Roger Warnke

Chair: Stephen J. Galli

Professors: Daniel Arber, Jeffrey D. Axelrod, Gerald J. Berry, Matt Bogyo, Eugene C. Butcher, Athena Cherry, Michael L. Cleary, Gerald R. Crabtree, Edgar G. Engleman, Dean Felsher, Marcelo Fernandez-Vina, Andrew Fire, Steven Fung, Stephen J. Galli, Lawrence Tim Goodnough, John Higgins, Neeraja Kambham, Teri Longacre, Joseph S. Lipsick, Sara Michie, Yasodha Natkunam, Donald P. Regula, Robert V. Rouse, Kang Shen, Iris Schrijver, Richard K. Sibley, Raymond Sobel, Howard H. Sussman, Elizabeth Trachtenberg, Dolly Tyan, Matt van de Rijn, Hannes Vogel, Irving L. Weissman, Eduardo Zambano, James Zehnder

Associate Professors: Jeffrey D. Axelrod, Matt Bogyo, Andrew Connolly, Tina Cowan, Christina Kong, Bingwei Lu, Jonathan R. Pollack, Arend Sidow, Robert West

Assistant Professors: Kimberly Allison, Niaz Banaei, Sean Bendall, Scott Boyd, Ann Folkins, Isabella Graef, Dita Gratzinger, F. Kim Hazard, Kristin Jensen, Jinah Kim, Jason Merker, Stephen Montgomery, Benjamin Pinsky, Ed Plowey, Erich Schwartz, Uma Sundram, Marius Wernig, Monte Winslow, Ellen Yeh

Courtesy Professors: Euan Ashley, Donna Bouley, John Day, Bertil Glader, Daphne Koller, Lucy Tompkins

Courtesy Associate Professor: Atul Butte, Robert Shafer

Clinician Educators: Jennifer Andrews, Raffick Bowen, Susan Atwater, David Bingham, James Faix, Steven Long, Melanie Manning, Roberto Novoa, David On, Robert Ohgami, Tho Pham, Kerri Rieger, Darren Salmi, Neil Shah, Run Shi, Carlos Suarez, Brent Tan

Instructors: Marissa Juntilla, Franklin Mullins, Justin Odegaard, Gerlinde Wernig, Kitchener Wilson

Adjunct Clinical Faculty: Robert Archibald, Jerome S. Burke, Glenn Cockerham, Seth Haber, Maie K. Herrick, Paul W. Herrmann, Michelle Jordan, Charles Lombard, Robert Luo, Gregory Moes, Joseph O'Hara, Girish Putcha, Matrina Schmidt, Thomas W. Rogers

Radiation Oncology

Courses offered by the Department of Radiation Oncology are listed under the subject code RADO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RADO&filter-catalognumber-RADO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RADO&filter-catalognumber-RADO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RADO&filter-catalognumber-RADO=on>).

Radiation Oncology focuses on the use of radiation for cancer therapy and research. The department does not offer degrees; however, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Graduate students in Biophysics and Cancer Biology

may perform their thesis research in the department. Undergraduates may arrange individual research projects under supervision of faculty.

At the present time, the major areas of basic research investigation in the department include: DNA repair in mammalian cells after ionizing irradiation; studies of the mechanism of tumor hypoxia in animal tumors; development of new anti-cancer drugs to exploit tumor hypoxia; cytogenetic and molecular methods of predicting the sensitivity of individual tumors to cancer therapy; radiolabeled monoclonal antibodies for cancer detection and treatment; studies of oxygen levels in human tumors using polarographic electrodes; clinical trials of a new hypoxic cytotoxic agent (tirapazamine); studies of the late effects of cancer therapy; and techniques of conformal and intensity modulated radiation therapy.

Faculty

Emeriti: Malcolm A. Bagshaw, Peter Fessenden, Don R. Goffinet, George M. Hahn, Kendric Smith

Chair: Richard T. Hoppe

Professors: J. Martin Brown, Sarah S. Donaldson, Amato J. Giaccia, Steven L. Hancock, Richard T. Hoppe, Quynh-Thu Le, Daniel S. Kapp, Steven A. Liebeld

Associate Professors: Iris C. Gibbs, Paul Keall, Christopher R. King, Susan J. Knox, Gary Luxton, Lei Xing

Assistant Professors: Laura Attardi, Daniel Chang, Nicholas Denko, Edward Graves, Albert C. Koong

Consulting Professor: Robert M. Sutherland

Radiology

Web Site: <http://www-radiology.stanford.edu>

Courses offered by the Department of Radiology are listed under the subject code RAD on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RAD&filter-catalognumber-RAD=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RAD&filter-catalognumber-RAD=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=RAD&filter-catalognumber-RAD=on>).

The Department of Radiology does not offer degrees; however, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Undergraduates may also arrange individual research projects under the supervision of the department's faculty. This discipline focuses on the use of radiation, ultrasound, and magnetic resonance as diagnostic, therapeutic, and research tools. The fundamental and applied research within the department reflects this broad spectrum as it relates to anatomy, pathology, physiology, and interventional procedures. Original research and development of new clinical applications in medical imaging is supported within the Radiological Sciences Laboratory.

Faculty

Emeriti: (Professors) Herbert L. Abrams, Ronald Castellino, Barton Lane, Gerald Friedland, David A. Goodwin, Michael L. Goris, Henry H. Jones, William Marshall, I. Ross McDougall, Robert E. Mindelzun, Matilde Nino-Murcia, William H. Northway, Bruce R. Parker, Lewis Wexler, Leslie M. Zatz

Chair: Sanjiv Sam Gambhir

Professors: Patrick Barnes, Richard A. Barth, Christopher F. Beaulieu, Bruce Daniel, Huy M. Do, Michael Federle, Nancy Fischbein, Dominik Fleischmann, Sanjiv Sam Gambhir, Gabriela Gayer, Gary H. Glover, Garry E. Gold, Robert J. Herfkens, Lawrence Hofmann, Dave Hovsepian, Debra M. Ikeda, R. Brooke Jeffrey, Peter Kane, Ralph Lachman, Barton Lane, Ann Leung, Craig Levin, Michael Marks, Tarik Massoud, Michael Moseley, Peter Moskowitz, Sandy Napel, Beverley Newman, Norbert J. Pelc, Allan Reiss, Brian Rutt, George Segall, F. Graham Sommer, Daniel Spielman, Daniel Y. Sze, Volney Van Dalsem, Joseph Wu

Professor (Research): R. Kim Butts-Pauly, Sylvia Plevritis

Associate Professors: Sandip Biswal, Francis Blankenberg, Frandics P. Chan, Terry Desser, Andrei H. Iagaru, Nishita Kothary, William Kuo, David Larson, John Louie, Eric W. Olcott, Sunita Pal, Andrew Quon, Geoffrey Riley, Erika Rubesova, Kathryn J. Stevens, Shreyas Vasanawala, Juergen Willmann, Dorcas Yao, Greg Zaharchuk

Associate Professors (Research): Roland Bammer, Zhen Cheng, Heike Daldrop-Link, Rebecca Fahrig, Brian Hargreaves, Sylvia Plevritis, Jianghong Rao

Assistant Professors: Robert Dodd, Pejman Ghanouni, Howard Harvin, Gloria Hwang, Aya Kamaya, Sirisha Komakula, Jafi Lipson, Amelie Lutz, Payam Massaband, Erik Mittra, Zina Payman, Peter Poullos, Jianghong Rao, Daniel Rubin, Lisa Schmelzel, Rajesh Shah, Lewis Shin, Minal Vasanawala, David Wang, Joseph Wu, Kristen Yeom, Michael Zeineh, Ashwini, Zenooz

Assistant Professors (Research): Frederick T. Chin, Parag Mallick, Jennifer McNab, David Paik, Ramasamy Paulmurugan, Sharon Pitteri

Clinical Instructors: Bao Do, H. Henry Guo, Stefan Hura, Linda Morimoto

Stem Cell Biology and Regenerative Medicine

Courses offered by the Program in Stem Cell Biology and Regenerative Medicine are listed under the subject code STEMREM on the Stanford Bulletin's Explore Courses web site.

Graduate Program in Stem Cell Biology and Regenerative Medicine

The Stanford Stem Cell Biology and Regenerative Medicine (SCBRM) program is dedicated to doctoral education that translates basic science to clinical applications, typically referred to as Translational Science, and of intense interest internationally in medical schools and universities. Our doctoral program provides exceptional didactic education and research experience in the basic sciences underlying stem cell biology. In addition, program participants will receive specialized training in the development and clinical application of discoveries in the basic sciences to achieve regenerative therapies. Thus, our graduates will be uniquely positioned to develop successful translational careers in Stem Cell Biology and Regenerative Medicine, and will emerge prepared to deliver on their passion to improve the human condition. The core curriculum is combined with unique research and clinical/professional immersion rotations to provide opportunities for doctoral students to specialize in the broad subject of translational medicine and yet focus specifically on fundamentals of SCBRM. The curriculum combines education in genetics and developmental biology with an introductory laboratory-based stem cell

course, an advanced course in stem cell biology and regenerative medicine, and a clinical rotation with alternative opportunities in law, business and/or engineering.

The mission of the SCBRM graduate program is to produce future leaders in translational science through a combination of basic science and clinical/professional immersion. The program aims to be innovative and to change the landscape for graduate education in the biomedical sciences by having the immersion tailored to each student's translational goals. The program accommodates students who wish to focus primarily at the basic science level alongside those who wish to focus specifically on innovation such as a new device to solve a clinical problem. In the former case, the student might seek out a primary mentor affiliated with the basic sciences and take electives that reflect the more basic interest. In the latter case, the student might select an elective with an engineering focus and seek out primary mentorship with a more clinically or engineering focused mentor. In this way, graduates from our doctoral program receive exceptional didactic education and research experience and are well positioned to develop successful translational careers in SCBRM by applying their knowledge and passion to improve human health.

Master of Science in Stem Cell Biology and Regenerative Medicine

University requirements for the M.S. degree are described in the "Graduate Degree (p. 43)s" section of this bulletin.

Students in the Ph.D. program in SCBRM may apply for an M.S. degree in SCBRM, assuming completion of appropriate requirements. The program does not accept applications for a standalone M.S. degree.

To receive an M.S. in Stem Cell Biology and Regenerative Medicine, Students must complete the following:

1. Four full-tuition quarters of residency as a graduate student at Stanford.
2. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 16 units of which must be at or above the 200 level.
3. Four quarters of graduate research, consisting of rotations in the labs of at least three SCBRM faculty members.
4. Course work in Stem Cell Biology and Regenerative Medicine as well as other core requirements:
 - a. STEMREM 201A Stem Cells and Human Development: From Embryo to Cell Lineage Determination and STEMREM 201B Stem Cells and Human Development Laboratory develop a fundamental understanding of introductory stem cell principles in human development, aging, and disease accompanied by a laboratory-based module with immersion in stem cell-based methods (embryology, embryonic stem cells, reprogramming, adult stem cells).
 - b. STEMREM 202 Stem Cells and Translational Medicine, advanced topics related to individual organ systems, cancer stem cells, translational principles of medicine and immunology as related to regenerative medicine, as well as bioengineering and bioinformatics as related to stem cell biology.
 - c. STEMREM 203 Stem Cells Immersion: Applications in Medicine, Business and Law, students specialize and choose a clinical immersion, rotation in a biotechnology company or venture firm, or further delve into cutting edge technologies, bioinformatics, materials and/or engineering approaches for stem cell applications in industry, diagnostics and medicine.
 - d. STEMREM 250 Regenerative Medicine Seminar Series, a forum for researchers to meet and discuss Stem Cell Biology and Regenerative Medicine and to spark collaborations. 6 units of this course is required.

- e. STEMREM 280 Stem Cell Biology and Regenerative Medicine Journal Club, review and discussion of current literature in both basic and translational medicine as it relates to stem cell biology and/or regenerative medicine.

		Units
STEMREM 200	Stem Cell Intensive	1
BIOS 200	Foundations in Experimental Biology	6
STEMREM 201A	Stem Cells and Human Development: From Embryo to Cell Lineage Determination	1-2
STEMREM 201B	Stem Cells and Human Development Laboratory	3
STEMREM 202	Stem Cells and Translational Medicine	3-5
STEMREM 203	Stem Cells Immersion: Applications in Medicine, Business and Law	3
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Biology and Regenerative Medicine Journal Club	2
BIOS 224/BIO 214/MCP 221	Advanced Cell Biology	4
GENE 205	Advanced Genetics	3
MED 255	The Responsible Conduct of Research	1
DBIO 210	Developmental Biology	4
STEMREM 399	Graduate Research	1-18
Total Units		33-53

- f. Students may also take two courses (6 units) of elective course work

5. Participation and attendance at the annual SCBRM Retreat.
6. The qualifying examination process in SCBRM before admission to Ph.D. candidacy has two parts:
 - Part I: a comprehensive written exam in the form of a 5-page NIH grant proposal
 - Part II: a 15-minute oral presentation of the proposal to the thesis committee followed by open questions from the qualifying exam committee on the proposal or encompassing areas of research/academic scholarship that are deemed relevant to the proposal.

Students who do not pass the qualifying exam may retake the full qualifying exam, be retested in a sub-area, or be asked to redo their presentation. Those students who fail the qualifying exam twice may be awarded a master's degree based on completion of course work and rotations. In addition, students who choose to voluntarily leave the program are also awarded a master's degree based on completion of the qualifying exam.

Doctor of Philosophy in Stem Cell Biology and Regenerative Medicine

University requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 43)" section of this bulletin.

The Stem Cell Biology and Regenerative Medicine curriculum, combined with the research and rotation opportunities, provides a flexible educational opportunity for doctoral students to specialize in the broad subject of translational medicine while being focused more specifically on the fundamentals of Stem Cell Biology and Regenerative Medicine while training in the laboratories of participating SCBRM faculty. The goal of the

SCBRM program is to provide an avenue for graduate education to translate the best of basic research into a clinical setting.

Application and Admission

Applications are made through the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Applicants will be assessed based on their undergraduate transcripts, test scores, research experience, statement of purpose and letters of recommendation that document exceptional potential, ability, or achievements.

Students admitted to the program are offered financial support covering tuition, a living stipend, insurance coverage, and an allowance for books/travel. Applicants are urged to apply for independent fellowships such as from the National Science Foundation. Fellowship applications are due in November of the year prior to matriculation in the graduate program, but SCBRM graduate students may continue to apply for outside fellowships after matriculation. Because of the small number of department-funded slots, students who have been awarded an outside fellowship have an improved chance of acceptance into the program. Upon matriculation, each student is assisted in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee is composed to include the dissertation adviser and two additional SCBRM faculty, to guide the student during their dissertation research. The student must meet with the dissertation committee at least once a year.

Degree Requirements

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research.

Requirements for the Ph.D. degree in SCBRM include:

1. Completion of at least 3 research rotations in the labs of SCBRM faculty members.
2. Completion of the following courses:
 - a. STEMREM 201A Stem Cells and Human Development: From Embryo to Cell Lineage Determination and STEMREM 201B Stem Cells and Human Development Laboratory develop a fundamental understanding of introductory stem cell principles in human development, aging, and disease accompanied by a laboratory-based module with immersion in stem cell-based methods (embryology, embryonic stem cells, reprogramming, adult stem cells).
 - b. STEMREM 202 Stem Cells and Translational Medicine, advanced topics related to individual organ systems, cancer stem cells, translational principles of medicine and immunology as related to regenerative medicine, as well as bioengineering and bioinformatics as related to stem cell biology.
 - c. STEMREM 203 Stem Cells Immersion: Applications in Medicine, Business and Law, students specialize and choose a clinical immersion, rotation in a biotechnology company or venture firm, or further delve into cutting edge technologies, bioinformatics, materials and/or engineering approaches for stem cell applications in industry, diagnostics and medicine.
 - d. STEMREM 250 Regenerative Medicine Seminar Series, a forum for researchers to meet and discuss Stem Cell Biology and Regenerative Medicine and to spark collaborations. 6 units of this course is required.
 - e. STEMREM 280 Stem Cell Biology and Regenerative Medicine Journal Club, review and discussion of current literature in both basic and translational medicine as it relates to stem cell biology and/or regenerative medicine.

3. Students have the option to select from the following courses in the first year:

		Units
STEMREM 200	Stem Cell Intensive	1
BIOS 200	Foundations in Experimental Biology (Offered in Autumn and Spring)	6
STEMREM 201A	Stem Cells and Human Development: From Embryo to Cell Lineage Determination	1-2
STEMREM 201B	Stem Cells and Human Development Laboratory	3
STEMREM 202	Stem Cells and Translational Medicine	3-5
STEMREM 203	Stem Cells Immersion: Applications in Medicine, Business and Law	3
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Biology and Regenerative Medicine Journal Club	2
BIOC 224/BIO 214/MCP 221	Advanced Cell Biology	4
GENE 205	Advanced Genetics	3
MED 255	The Responsible Conduct of Research	1
DBIO 210	Developmental Biology	4
STEMREM 399	Graduate Research	1-18
Total Units		33-53

4. Students have the option to select two electives in the second year.
5. Biochemistry proficiency is required by the end of the second year, as well as a total of 80 units and completed qualifying examinations. Students who do not pass the qualifying examination may retake a full qualifying exam, be retested in a few areas, or be asked to redo their presentation.
6. STEMREM 802 TGR Dissertation.

Students unable to meet Ph.D. milestones after remediation are offered a M.S. degree if they have completed all requirements.

*Program Director:*Theo D. Palmer

*Program Co-Directors:*Margaret Fuller, Irving L. Weissman, Joanna Wysocka,

Teaching Faculty:

- Philip A. Beachy (Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Biochemistry and Developmental Biology)
- Michael F. Clarke (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Medicine-Oncology and Member of Bio-X and Stanford Cancer Institute)
- Maximilian Diehn (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Radiation Oncology/Radiation Therapy and Member of the Stanford Cancer Institute)
- Margaret Fuller (Reed-Hodgson Professor in Human Biology and Professor of Genetics, Member of the Stanford Cancer Institute)
- Sarah C. Heilshorn (Assistant Professor, Materials Science and Engineering, Professor (by courtesy), Chemical Engineering and Bioengineering and Member of Bio-X)
- Michael T. Longaker (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Surgery/Plastic and Reconstructive Surgery, Professor (by courtesy), Bioengineering and Materials Science and Engineering/Engineering Materials and Science and Member of Bio-X and Stanford Cancer Institute)
- Ravindra Majeti (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Medicine/Hematology and Member of Bio-X and Stanford Cancer Institute)

- Michelle Monje-Deisseroth (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Neurology and Neurological Sciences and Member of Bio-X and Child Health Research Institute)
- Hiromitsu Nakauchi (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Genetics)
- Roeland Nusse (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Developmental Biology and Member of Bio-X and Stanford Cancer Institute)
- Theo D. Palmer (Associate Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Neurosurgery and Member of Bio-X and Stanford Cancer Institute)
- Maria-Grazia Roncarolo (George D. Smith Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Medicine)
- Vittorio Sebastian (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of OBGyN and Member of the Stanford Cancer Institute)
- Irving L. Weissman (Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Pathology and Developmental Biology, Professor (By courtesy) Department of Biology and Member of Bio-X and Stanford Cancer Institute)
- Marius Wernig (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Pathology and Member of Bio-X)
- Joseph Wu (Stanford Cardiovascular Institute and Professor in the Department of Medicine (Cardiology) and Department of Radiology (Molecular Imaging Program))
- Joanna Wysocka (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Chemical and Systems Biology and Developmental Biology and Member of the Stanford Cancer Institute)

Structural Biology

Courses offered by the Department of Structural Biology are listed under the subject code SBIO on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SBIO&filter-catalognumber-SBIO=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SBIO&filter-catalognumber-SBIO=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=SBIO&filter-catalognumber-SBIO=on>).

The department offers course work and opportunities for research in structural biology. Courses fall into two categories: (1) a series of one quarter courses that treat topics of current interest in structural biology and biophysics at an advanced level; and (2) INDE 216 Cells to Tissues, a course for medical students that includes lectures on structure-function relationships of mammalian cells and tissues and a lab on medical histology.

The emphasis of research in the department is on understanding fundamental cellular processes in terms of the structure and function of biological macromolecules and their assemblies. Techniques used include standard methods of biochemistry, cell culture, single-molecule fluorescence spectroscopy, genetic engineering, and three dimensional structure determination by x-ray diffraction, nuclear magnetic resonance spectroscopy and electron microscopy, coupled with the development of computational methods.

Doctor of Philosophy in Structural Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 43)" section of this bulletin.

The graduate program in Structural Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program (MSTP) in which individuals are candidates for both Ph.D. and M.D. degrees.

The graduate program is intended to prepare students for careers as independent investigators in cell and molecular biology. The principal requirement of a Ph.D. degree is the completion of research constituting an original and significant contribution to the advancement of knowledge. The requirements and recommendations for the Ph.D. degree include:

1. Training in a major with connections to biophysics (e.g., physics, chemistry, or biology, with a quantitative background equivalent to that of an undergraduate physics or chemistry major at Stanford).
2. Completion of the following background courses or their equivalents at other institutions:
3.

		Units
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 171	Physical Chemistry I	3
CHEM 173	Physical Chemistry II	3
CHEM 175	Physical Chemistry III	3
BIOC 200	Applied Biochemistry	2
4. Completion of the following courses or their equivalents:
 - a.

		Units
SBIO 241	Biological Macromolecules	3-5
or BIOE 300A	Molecular and Cellular Bioengineering	
SBIO 242	Methods in Molecular Biophysics	3
MED 255	The Responsible Conduct of Research	1
 - b. At least four additional graduate-level courses in physical or biological science, with at least one in physical science and one as a literature-based biological science course
5. Opportunities for teaching are available during the first nine quarters at the discretion of the advising committee.
6. The student must prepare a dissertation proposal defining the research to be undertaken including methods of procedure. This proposal should be submitted by Autumn Quarter of the third year, and it must be approved by a committee of at least three members including the principal research adviser and at least one member from the Department of Structural Biology. The candidate must defend the dissertation proposal in an oral examination. The dissertation reading committee normally evolves from the dissertation proposal review committee.
7. The student must present a Ph.D. dissertation as the result of independent investigation and expressing a contribution to knowledge in the field of structural biology.
8. The student must pass the University oral examination, taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the research is presented by the candidate.

Applicants to the program should have a bachelor's degree and should have completed at least a year of course work in biology, mathematics, organic chemistry, physical chemistry, and physics. Application forms must be received by the department before December 15 for notification by April 15. Application to the National Science Foundation for fellowship support is also encouraged. Remission of fees and a personal stipend are available to

graduate students in the department. Prospective applicants should contact the Department of Structural Biology for further information.

Current topics of research in the department lie in the areas of gene expression; theoretical, crystallographic, and genetic analysis of protein structure; and cell-cell interaction. See Stanford's School of Medicine (<http://www.med.stanford.edu/school/structuralbio>) web site for further information.

Chair: Joseph D. Puglisi

Associate Chair: Michael Levitt

Professors: K. Christopher Garcia, Theodore Jardetzky, Roger D. Kornberg, Michael Levitt, Peter Parham, Joseph D. Puglisi, Soichi Wakatsuki, William I. Weis

Associate Professor (Research): Yahli Lorch

Assistant Professor (Research): Elizabetta Viani Puglisi

Assistant Professor: Adam de la Zerda

Courtesy Professor: Axel Brunger, Vijay Pande

Courtesy Assistant Professor: Zev Bryant

Other Offices

These pages list various offices, centers, laboratories, and institutes of direct relevance to study at Stanford. The listings are not all-inclusive. Click on the "Expand Menus" link at the top of the right hand menu to show a broad selection of other sites at Stanford University.

- A comprehensive list of Stanford offices is available on the University's A to Z Index page (<http://www.stanford.edu/atoz>).
- A comprehensive list of Independent Labs, Institutes and Centers (<http://doresearch.stanford.edu/research-scholarship/interdisciplinary-laboratories-centers-and-institutes>)

Student Affairs

Web Site: <http://studentaffairs.stanford.edu/>

The Student Affairs division encompasses a broad range of programs and services for undergraduates and graduate students, including the Office of Residential Education, University Registrar, Student Life, Educational Resources, Vaden Health Center, Career Development Center, Office of Accessible Education, Graduate Life Office, Haas Center for Public Service, Office of Community Standards, Bechtel International Center, Asian American Activities Center, Black Community Services Center, El Centro Chicano y Latino, LGBT Community Resources Center, The Markaz: Resource Center, Native American Cultural Center, Women's Community Center, Office of Student Activities and Leadership, Diversity and First Gen Programs, and the Office of Alcohol Policy and Education.

The Vice Provost for Student Affairs reports directly to the Provost and is responsible for providing leadership, policy direction, and administrative support for budget, personnel, facilities, and development, as well as oversight of the efficiency and effectiveness of each of the division's units. The Vice Provost interacts with the President, the Provost, the Vice Provosts, faculty, schools, department representatives, students, and parents. The Vice Provost is a member of the Stanford University Cabinet, and ex officio member of the Stanford Alumni Association Board of Directors, Stanford Athletic Board, and Haas Center for Public Service National Advisory Board. The Vice Provost also attends the Senate meetings of the Academic Council.

Student Services Center

Office: Tresidder Memorial Union, 2nd floor
 Contact via HelpSU: <https://remedyweb.stanford.edu/helpsu/helpsu?pcat=StuAcct&dtag=10772> ([http](http://))
 Phone: (650) 723-7772 or (866) 993-7772 (toll-free)
 Web Site: <http://studentservicescenter.stanford.edu>

AskJane Online Answers Resource: <http://askjane.stanford.edu>

The Student Services Center (SSC) is committed to providing a single point of friendly, professional service for answers to questions concerning administrative and financial issues. The center strives to resolve 90 percent of students' issues upon first contact. The SSC represents Student Financial Services, the Office of the University Registrar, the University Cashier's Office, the Financial Aid Office, and Stanford ID Card Services, and is able to assist students with questions including those related to University billing, financial aid disbursements, refunds, payroll deductions, payment plan, enrollment, Stanford degree policies and procedures, Stanford ID card, and forms pickup and submission.

Dean of Student Life

Dean of Student Life: Chris Griffith
 Office: Old Union
 Phone: (650) 723-2733

Web Site: <http://studentaffairs.stanford.edu/studentlife>

The Dean of Student Life has responsibility for overseeing the development, implementation, and monitoring of comprehensive student life programs. The unit consists of the Graduate Life Office, Office of Student Activities and Leadership, Office of Community Standards (formerly Judicial Affairs), Office of Sexual Assault and Relationship Abuse Education and Response, and Old Union. The Dean reports to the Vice Provost for Student Affairs and is a member of his executive group.

Dean of Educational Resources

Dean of Educational Resources: Sally Dickson

Office: Old Union

Phone: (650) 721-4037

Web Site: <http://studentaffairs.stanford.edu/educationalresources>

The Dean of Educational Resources is responsible for overseeing the development, implementation, and monitoring of comprehensive programs relating to ethnic, gender, career, and learning needs and interests of student groups. The unit is comprised of the Asian American Activities Center, Black Community Services Center, El Centro Chicano y Latino, LGBT Community Resources Center, The Markaz: Resource Center, Native American Cultural Center, Women's Community Center, Diversity and First Gen Programs, Bechtel International Center and the Office of Accessible Education. The Dean also has oversight responsibility for the Haas Center for Public Service, as well as responsibility for the Acts of Intolerance Protocol. The Dean reports to the Vice Provost for Student Affairs and serves as a member of his executive group.

Office of Accessible Education (OAE)

Offices: 563 Salvatierra Walk

Phone: (650) 723-1066; TDD (650) 723-1067

Web Site: <http://studentaffairs.stanford.edu/oae>

The Office of Accessible Education (OAE) is the campus office designated to work with students, faculty, and staff to put in place appropriate accommodations for all Stanford students with disabilities, at both the undergraduate and graduate levels (including the professional schools). The OAE provides a wide array of support services, accommodations, and programs to remove barriers to full participation in the life of the university.

In reaching its determinations about appropriate accommodations, the OAE considers factors such as the documentation from professionals specializing in the area of the student's diagnosed disability, the student's functional limitations, and the student's input and accommodation history in regard to particular needs and limitations. The OAE then works with the student and relevant faculty and staff through an interactive process designed to achieve an accommodation that meets the needs of all parties.

Office of Alcohol Policy and Education (OAPE)

Offices: Rogers House, 581 Capistrano Way

Phone: (650) 723-5947

Web Site: <http://studentaffairs.stanford.edu/alcohol>

<http://studentaffairs.stanford.edu/alcohol>

The Office of Alcohol Policy and Education (OAPE) empowers students to make healthy decisions about drinking behaviors that not only affect them as individuals, but ultimately impact the campus community as a whole. OAPE is focused on reducing the harm of high-risk behaviors while increasing safe, legal, responsible actions. Services offered include individual consultation, educational workshops and seminars, and academic coursework. OAPE also sponsors Cardinal Nights, a program of weekly events that allow students to socialize in an environment free of alcohol.

Career Development Center

Offices: 563 Salvatierra Walk

Web Site: <http://studentaffairs.stanford.edu/cdc>

Counseling Services: Monday–Friday, 9 a.m. to noon, 1 p.m. to 5 p.m.; (650) 725-1789.

Employment Services: Monday–Friday, 8:15 a.m. to 4:30 p.m.; (650) 723-9014.

The Career Development Center (CDC) offers services such as counseling, workshops, presentations, on-campus recruiting, job/internship databases, library resources, and alumni networking, to help students make informed decisions and to plan for life after Stanford.

Services are available to undergraduates and graduate students, and all students are encouraged to visit in person or via the web. Programs and services are free to students; limited services are available to first-year alumni and student spouses/domestic partners.

The following suggestions may assist students in getting the most out of the CDC:

- Visit early in a Stanford career.
- Register with the CDC's Cardinal Career (<http://studentaffairs.stanford.edu/cdc/jobs-internships>) online system to access internships, part-time, and full-time opportunities.
- Gather general career information through the career resource library, jobs, and internship database, handouts, and alumni network.
- Inquire about individual counseling for all stages of career planning and development.
- Participate in workshops and other programs to clarify career goals.

Community Centers

There are seven ethnic and community centers that support students who seek services associated with a particular group or community. Each center has its own site and professional staff who advise and counsel students. In addition, the centers sponsor programs throughout the year that foster intellectual, personal, and cultural growth. Detailed information is available on the following web sites:

- Asian American Activities Center (<http://stanford.edu/group/a3c>)
- Black Community Services Center (<http://stanford.edu/dept/BCSC>)
- El Centro Chicano y Latino (<http://studentaffairs.stanford.edu/elcentro>)
- LGBT Community Resources Center (<http://studentaffairs.stanford.edu/lgbtrc>)
- The Markaz: Resource Center for Engagement with the Cultures and Peoples of the Muslim World (<http://studentaffairs.stanford.edu/markaz>)
- Native American Cultural Center (<http://studentaffairs.stanford.edu/nacc>)
- Women's Community Center (<http://studentaffairs.stanford.edu/wcc>)

The programs offered through the centers are open to all Stanford students.

Diversity and First Gen Programs

Office: Old Union, 520 Lasuen Mall, Suite 206

Phone: (650) 723-2733

Email: tlw@stanford.edu

Web Site: <http://studentaffairs.stanford.edu/diversityandfirstgen>

Established in 2010 to serve first generation and low-income students and help them be successful, the Office of Diversity and First Gen Programs provides:

- a Thrive Guide to publicize the abundance of support available
- contact information for student groups, staff, faculty, and alumni for networking and mentoring
- signature programs and special events to build community
- administrative support and advocacy for diversity programs, especially those highlighting socioeconomic issue

Graduate Life Office

Graduate Life Office: Escondido Village Office, 859 Comstock Circle
Graduate Life Office, Graduate Community Center: 750 Escondido Road
Phone: (650) 736-7078

Email: graduatelife@stanford.edu

Web Site: <http://glo.stanford.edu>

The Graduate Life Office (GLO) works with students on and off campus and with student groups, including Community Associates (student residence staff), the Graduate Student Programming Board, and the Graduate Student Council, to create an inclusive environment through programs in the residences and campus-wide. The Graduate Community Center (GCC) serves as a focal point for meetings and activities in the graduate community.

The GLO staff also works with individual students who need information and support or who may be experiencing personal difficulties. Staff members are knowledgeable about and have access to support and resources available throughout the university. Staff work closely with student services administrators in academic departments to provide consultation and services to students in need.

Graduate Student Residence Program

The university's philosophy of graduate student housing is based on the premise that supporting high quality graduate scholarship and research is central to the mission of the university. By providing affordable housing in proximity to academic resources, the university creates an environment conducive to research and intellectual dialogue among students, their peers, and faculty members. The Community Associate (CA) program in the residences serves as a supportive resource for residents and to connect student neighbors through social events and activities to build a sense of community in the residences.

Haas Center for Public Service

Center Offices: 562 Salvatierra Walk

Mail Code: 8620

Phone: (650) 723-0992

Web Site: <http://haas.stanford.edu>

The Haas Center for Public Service connects academic study with public service to strengthen communities and develop effective public leaders. The center aspires to develop aware, engaged, and thoughtful citizens who contribute to the realization of a more just and humane world.

To accomplish these objectives, the center collaborates with associated units at Stanford to implement programs in the following areas of work.

- Through the center's fellowship programs, undergraduates perform summer internships in nonprofit organizations, foundations, and government agencies locally, nationally, and internationally. Postgraduate fellowships allow graduating seniors to work with a mentor in a nonprofit or public agency for a year.
- The Public Service Leadership Fellows Program provides an opportunity for students who want to be intentional about their leadership development. Center staff also provides leadership development through training, advising, and resources to Stanford

in Government, Alternative Spring Break, and other student groups engaged in service.

- With support from the center, Stanford faculty members have created service-learning courses that involve Stanford students in providing direct service and community-based research efforts in collaboration with local schools and other partner agencies. The center's Public Service Scholars Program supports seniors writing honors theses that combine academic research with service to communities.
- Faculty from Stanford's School of Education collaborate with center staff to provide curriculum guidance and training for tutors and mentors at nearby schools. Another program trains Stanford students to bring results of scientific research to neighborhood programs. The federally supported Community Service Work-Study program, administered in conjunction with the university's Financial Aid Office, allows students to satisfy work-study obligations year-round by working in community organizations and public agencies.
- The postgraduate and alumni programs help students, particularly graduating seniors, identify opportunities to assist in launching their public service careers in nonprofit and government agencies, and in the private sector in service-related positions.

Students interested in public service fellowships, service-learning courses, community-based research, public and community service internships for youth and education, or service organization leadership development should contact the center.

Bechtel International Center

Office: 584 Capistrano Way
Web Site: <http://icenter.stanford.edu>

The Bechtel International Center (I-Center) is a meeting place for students and senior research scholars at Stanford from throughout the world and for internationally oriented U.S. students, faculty, and short-term visitors on the campus. Through a variety of social, cultural, and educational programs, I-Center facilities are used to acquaint students and scholars with the life of the university and the community, and to bring them together in activities of mutual interest.

The Center believes that international educational exchange nurtures a lifelong global perspective, and plays a key role in supporting Stanford's standing as a truly international university in the following ways:

- Provides information about and assistance with obtaining and maintaining legal status in the U.S. to foreign students, scholars, and Stanford departments.
- Advises U.S. students who are pursuing scholarships for study and research abroad.
- Enables foreign students, scholars, and their family members at Stanford to receive maximum academic, cultural, and personal benefit from their stays in the U.S.
- Contributes to international activities at Stanford by helping to create a welcoming and supportive environment that is responsive to the needs of the international community.
- Facilitates professional meetings between visiting international delegations and their Stanford counterparts.
- Provides opportunities for Stanford students, faculty, staff, and members of the local community to broaden their horizons by interacting with people from different cultures through programs to increase international awareness and understanding.

Office of Community Standards

Office: Tresidder Memorial Union, 2nd floor
Mailing Address: 459 Lagunita Drive, Suite 9
Mail Code: 94305-3010

Phone: (650) 725-2485

Fax: (650) 736-0247

Web Site: <http://studentaffairs.stanford.edu/communitystandards>

Email: community_standards@stanford.edu (judicial.affairs@stanford.edu)

The primary codes of conduct for students are the Fundamental Standard and Honor Code. Cases of alleged violations of the university's Honor Code, Fundamental Standard, and other student conduct or university policies proceed through an established student conduct process outlined in the Student Judicial Charter of 1997, which can be found in its entirety at the Office of Community Standards (<https://studentaffairs.stanford.edu/communitystandards>) web site. The web site also contains the policies, rules, and interpretations, as well as the university's Student Conduct Penalty Code, applicable to those students found responsible for violating the Honor Code, the Fundamental Standard, or other university policy or rule.

Allegations of sexual misconduct, sexual harassment, stalking, or dating violence proceed through the Dean's Alternate Misconduct Review Process (<http://studentaffairs.stanford.edu/judicialaffairs/process/alternate-review>).

When a violation of the Fundamental Standard, Honor Code, or other university policy or rule governing student conduct is alleged, or whenever a member of the university community believes such a violation has occurred, he or she should contact the Office of Community Standards.

Fundamental Standard

Students at Stanford are expected to know, understand, and abide by the Fundamental Standard, which is the university's basic statement on behavioral expectations articulated in 1896 by Stanford's first President, David Starr Jordan, as follows:

"Students are expected to show both within and without the University such respect for order, morality, personal honor, and the rights of others as is demanded of good citizens. Failure to do this will be sufficient cause for removal from the University."

The Fundamental Standard is an aspirational statement of Stanford's ideal of civic and moral community. Although the spirit of the Fundamental Standard remains unchanged since 1896, these aspirational learning goals for all Stanford students elaborate its basic values today:

- Students are expected to respect and uphold the rights and dignity of others regardless of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or socioeconomic status.
- Students are expected to uphold the integrity of the university as a community of scholars in which free speech is available to all and intellectual honesty is demanded of all.
- Students are expected to respect university policies as well as state and federal law.
- For the purposes of clarity, students should be aware that they may be subject to discipline at Stanford University for acts of misconduct including:
 - Violation of university policy
 - Violation of a specific university directive
 - Violation of an applicable law
 - Physical assault
 - Sexual misconduct, sexual assault, sexual harassment, stalking
 - Theft of property or services
 - Threats
 - Hazing
 - Hate crimes
 - Alcohol- and drug-related violations, including driving under the influence

- Intentional or reckless property damage
- Seeking a university benefit to which a student is not entitled
- Falsifying a document
- Impersonating another
- Computer violations
- Knowingly or recklessly exposing others to significant danger

There is no standard penalty that applies to violations of the Fundamental Standard. Infractions have led to penalties ranging from formal warning and community service to expulsion. In each case, the nature and seriousness of the offense, the motivation underlying the offense, and precedent in similar cases are considered.

Honor Code

The Honor Code is the University's statement on academic integrity. It is essentially the application of the Fundamental Standard to academic matters. Provisions of the Honor Code date from 1921, when the honor system was established by the Academic Council of the University Faculty at the request of the student body and with the approval of the President. The Honor Code reads:

"1. The Honor Code is an undertaking of the students, individually and collectively:

- a. that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
- b. that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.

2. The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.
3. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work."

Examples of conduct that has been found to be in violation of the Honor Code include:

- Copying from another's examination paper or allowing another to copy from one's own paper
- Unpermitted collaboration
- Plagiarism
- Revising and resubmitting a quiz or exam for regrading without the instructor's knowledge and consent
- Representing as one's own work the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted

For more information, see the Interpretations and Applications of the Honor Code at the Community Standards (<http://studentaffairs.stanford.edu/judicialaffairs>) web site. The standard sanction for a first violation is a one quarter suspension from the University and 40 hours of community service. In addition, many faculty members issue a 'No Pass' for the course in which the violation occurred.

Old Union

Stanford's student union, known as the Old Union, serves as a hub for student activities on campus. The central structure in a three-building complex, the Old Union has administrative offices for ASSU, Office of

Student Activities and Leadership (SAL), Dean of Student Life, Dean of Educational Resources, and Diversity and First Gen Programs. It also houses a multifaith center known as CIRCLE (Center for Inter-Religious Community, Learning, and Experiences), meeting rooms for student use, and the Axe and Palm, which offers casual dining. Adjoining the Old Union, the Nitery houses a black-box theater, El Centro Chicano y Latino, and The Markaz: Resource Center; and the Clubhouse is home to the Asian American Activities Center and the Native American Cultural Center.

Office of Residential Education

Office: Tresidder Memorial Union

Phone: (650) 725-2800

Web Site: <http://studentaffairs.stanford.edu/resed>

The Office of Residential Education is responsible for developing the policies, programs, and staffing which support the intellectual, educational, and community-building activities in student residences. The conviction behind the Stanford residence program is that formal teaching, informal learning, and personal support in residences play an important role in a Stanford education.

Residential Education Program

The Residential Education program provides Stanford undergraduates with a small community experience within a large research university. Residential Education programs extend the classroom into the residences and complement the academic curriculum with activities and experiences that contribute to students' preparation for a life of leadership, intellectual engagement, citizenship, and service. An extensive network of staff, including many who live in the residence halls, supports students during their undergraduate careers.

Residence Deans

Residence Deans provide assistance to on- and off-campus undergraduate students. They can advise students about personal matters, occasionally intervene directly in behavioral problems or mental health concerns, and assist with personal emergencies. Advice is also available on issues of academic probation or suspension, leaves of absence, special concerns of students, and administrative matters. Residence Deans work closely with the Dean of Student Life and other University offices. They are assigned to specific residences and to off-campus students. For further information, undergraduates should call Residential Education at (650) 725-2800. For assistance, graduate students can consult assistant deans in the Graduate Life Office at (650) 736-7078.

Office of Student Activities and Leadership

Office: Old Union, 520 Lasuen Mall, Suite 206

Web Site: <http://studentaffairs.stanford.edu/sal>

The Office of Student Activities and Leadership (SAL), located in Old Union, supports student activities, over 600 student organizations and the ASSU through publications, workshops, one-on-one consultation, advising and major event planning support.

Voluntary Student Organizations

There are over 600 different Voluntary Student Organizations (VSOs) at Stanford. VSOs are organizations

1. in which membership is not mandatory and is nondiscriminatory,
2. in which membership is both open and limited to current Stanford students registered in a degree-granting program,
3. in which students make all organizational decisions, and
4. whose purposes and procedures are consistent with the goals and standards of the University. In order to use University facilities, the Stanford name, or to receive ASSU funding, all voluntary student organizations must register with the University through the Office of Student Activities, Old Union, room 206.

As a condition of registration, each voluntary student organization must file and have approved each of the following:

1. A statement of purpose and organizational constitution.
2. A statement about membership eligibility.
3. Clear procedures for officer elections.
4. Identification of the authorized representatives of the group, who must be a currently registered student, and at least five active members in the organization who are currently registered students.

Each voluntary student organization must renew its registration with the University annually, early in Autumn Quarter, by submitting new registration materials.

If a voluntary student organization that is registered with the University seeks to use University facilities for meetings open to more than its own members and to specifically invited guests, such meetings shall be subject to the policies of the Committee on Public Events. All organization events held in University facilities must receive event approval from the Student Activities and Leadership and Stanford Events.

A voluntary student religious organization may hold open meetings in University facilities only with the approval of the Office of the Dean for Religious Life (as the delegatee of Student Activities and Leadership).

A registered voluntary student organization may advocate publicly a position on a public issue, provided the organization clearly identifies itself, and provided such an organization in any public statement makes clear it does not represent or speak for the University or the Associated Students.

No student group or individual student(s) may use University space or facilities or receive other University support for purposes of supporting candidates for public office. Groups may use White Plaza for tables, speeches, and similar activities and may request to reserve auditoriums and similar space for public events including speeches by political candidates as long as all University guidelines are followed.

Tresidder Memorial Union

Tresidder Memorial Union (TMU) is a center of community activity on the Stanford campus. It houses a variety of restaurants and meeting rooms, a ticket office and campus information center, a convenience store, banking and credit union offices with ATMs, a fitness center, FedEx/Kinkos and a hair salon.

TMU is also the home of several administrative offices: Meeting Services, Office of Community Standards, Residential Education, Student Services Center, Stanford Catering, Stanford Dining (Meal Card program), the LAIR computer center and the Office of the Vice Provost for Student Affairs.

Vaden Health Center

Center Office: 866 Campus Drive
Web Site: <http://vaden.stanford.edu>

The Allene G. Vaden Health Center strictly protects the confidentiality of information obtained in medical care and counseling.

Medical Services

Medical Services (650-498-2336, ext. 1) is the first stop for diagnosis and treatment of illness, injury, and ongoing conditions, as well as preventive counseling and education. Services available without additional charge for students who have paid the Campus Health Service fee include:

- Medical appointments in general medicine and sports medicine.
- Medical advice for routine concerns throughout the day. When Medical Services is closed, advice for urgent conditions is available from the on-call physician.
- Referral to specialists, primarily at Stanford Hospital and Clinics and Menlo Medical Clinic.

Additional services (fees apply):

- Allergy injections, immunizations, travel services, physical exams for employment and scholarships, HIV testing, laboratory, X-rays, drug screening (academic year only).
- Pharmacy (650-498-2336, ext. 3) and physical therapy (650-723-3195) are available on site.

Counseling and Psychological Services (CAPS)

CAPS (650-723-3785) helps students who experience a wide variety of personal, academic, and relationship concerns. Services available without additional charge for students who have paid the Campus Health Service Fee include:

- Evaluation and brief counseling, including personal, couples and group therapy. Students requesting or requiring longer, ongoing therapy incur fees.
- Workshops and groups that focus on students' social, personal and academic effectiveness.
- Crisis counseling for urgent situations 24 hours a day.
- Consultation and outreach to faculty, staff, and student organizations.

Confidential Sexual Assault Counseling (CSAC) Office

Office: Mariposa House, 585 Capistrano Way, 2nd Floor, Rooms 208 and 209

Phone: 650-736-6933

Web Site: <http://vaden.stanford.edu/sexual-assault>

- The Confidential Sexual Assault Counseling (CSAC) Office offers emotional support, consultation and short-term individual counseling to Stanford students impacted by sexual assault and relationship violence.
- After hours hotline: 650-725-9955
- Book an appointment through the Vaden Patient Portal (<https://vadenpatient.stanford.edu/WelcomeNewPatient.aspx>).

YWCA Rape Crisis Hotline

Stanford has contracted with the YWCA to assist students, staff, faculty and other Stanford campus affiliates who are victims of sexual assault. The YWCA also can be reached at its 24-hour campus telephone line (650) 493-7273 or 408-287-3000.

Health Promotion Services

Health Promotion Services (650-723-0821) educates and supports students to help them make informed, healthy decisions about their lifestyle.

Services include:

- Individual preventive counseling and resource referral concerning nutrition, weight management, eating and body image, alcohol, tobacco and other drug use, sexual assault and harassment, relationships, intimacy and gender issues, and sexual health.
- Health education speakers, programs, and events and workshops at student residences, community centers, student organizations, and for new students (such as Real World: Stanford).
- Academic courses and internships.
- Student groups and volunteer opportunities including Peer Health Educators, HIV Peer Anonymous Counseling and Testing (HIV*PACT), Sexual Health Peer Resource Center (SHPRC), and CPR/First Aid classes.

Health Insurance

All registered students are required to have health insurance. Call (650) 723-2135 for more information. Cardinal Care (<http://vaden.stanford.edu/insurance/>), the University-sponsored plan for students, fulfills this requirement. Insured by Aetna Student Health (medical), and ValueOptions (mental health), Cardinal Care features comprehensive, worldwide coverage, services by referral at Stanford University Medical Center and Menlo Medical Clinic, and lowest costs when one initiates care at Vaden Health Center. Stanford does not sponsor a health insurance plan for dependents; for available options, see the Dependent Health Insurance (<http://vaden.stanford.edu/insurance/dependent-coverage>) web site. Options for voluntary dental insurance are also offered.

Under certain circumstances, students with their own health insurance may waive Cardinal Care coverage. Domestic students who choose not to participate in Cardinal Care only have to waive once each academic year and must waive coverage before the first quarter in which they are enrolled for that academic year. At that time, and that time only, they will be able to waive Cardinal Care for the rest of the year by documenting equivalent health insurance in Axess (<http://axess.stanford.edu>) by the applicable deadline listed on Vaden's web site (http://vaden.stanford.edu/insurance/using_your_own.html#waive). International students must have coverage that meets or exceeds minimum standards established by the University in order to opt out of Cardinal Care; for more information see Vaden's web site (http://vaden.stanford.edu/insurance/using_your_own.html#international).

Vice Provost for Student Affairs: Greg Boardman

Associate Vice Provost and University Registrar: Thomas C. Black

Associate Vice Provost and Dean of Career Education: Farouk Dey

Associate Vice Provost and Dean of Educational Resources: Sally Dickson

Associate Vice Provost and Director of Vaden Health Center: Ira Friedman

Associate Vice Provost and Dean of Student Life: Chris Griffith

Associate Vice Provost and Dean of Residential Education: Deborah Golder

Senior Administrative Officer: Lee Connor

Centers, Laboratories, and Institutes

Independent research laboratories, centers, and institutes perform multidisciplinary research that extends beyond the scope of any one of the University's organized schools. The listings are not all-inclusive. A comprehensive list of Stanford offices is available on the University's A to Z Index page (<http://www.stanford.edu/atoz>).

The following tabs contain information on programs for undergraduates:

- Arts Institute (p. 708)
 - Interdisciplinary Honors in the Arts Program
- Center for Spatial and Textual Analysis (CESTA) (<https://cesta.stanford.edu>)
 - Graduate Certificate of Digital Humanities
- Center for the Study of Poverty and Inequality (CPI (p. 709))
 - Certificate Program on Poverty and Inequality
- Freeman Spogli Institute for International Studies (FSI) (p. 711)
 - Interschool Honors Program in Democracy, Development, and the Rule of Law
 - Interschool Honors Program in International Security Studies
- Woods Institute for the Environment (p. 712)
 - Goldman Interschool Honors Program in Environmental Science, Technology, and Policy

Office of Vice Provost and Dean of Research

Vice Provost and Dean of Research: Ann M. Arvin

Office: 450 Serra Mall, Main Quadrangle, Building 60

Mail Code: 94305-2064

Phone: 650-723-8789 / Fax 650-723-0662

Web Site: <http://stanford.edu/dept/DoR>

Office Fax: 650-723-0662

The following independent Laboratories, Centers, and Institutes report to the Vice Provost and Dean of Research:

Biological and Life Sciences

- Bio-X, the interdisciplinary program related to bioengineering, biomedicine, and biosciences, <http://biox.stanford.edu>
- Spectrum (formerly the Stanford Center for Clinical and Translational Education and Research), <http://spectrum.stanford.edu>

Environmental Sciences

- Precourt Institute for Energy, <http://pie.stanford.edu/>
 - Precourt Energy Efficiency Center, <http://peec.stanford.edu>
 - Global Climate and Energy Project (G-CEP), <http://gcep.stanford.edu>
- Woods Institute for the Environment, <http://woods.stanford.edu>

Humanities and Social Sciences

- Center for Advanced Study in the Behavioral Sciences (CASBS), <http://www.casbs.org>

- Center for the Study of Language And Information (CSLI), <http://www-csli.stanford.edu>
- Freeman Spogli Institute for International Studies (FSI), <http://fsi.stanford.edu>
 - Center on Democracy, Development, and the Rule of Law (CDDRL), <http://cddrl.stanford.edu>
 - Stanford Health Policy (Center for Health Policy/Center for Primary Care and Outcomes Research), <http://healthpolicy.stanford.edu>
 - Center for International Security and Cooperation (CISAC) <http://cisac.stanford.edu>
 - Walter H. Shorenstein Asia-Pacific Research Center (Shorenstein APARC), <http://aparc.stanford.edu>
 - The Europe Center, <http://tec.stanford.edu>
 - Program on Food Security and the Environment, <http://fse.stanford.edu>
 - Inter-University Center for Japanese Language Studies (IUC), <http://www.stanford.edu/dept/IUC>
 - Program on Energy and Sustainable Development (PESD), <http://pesd.stanford.edu>
 - Stanford Program on International and Cross-Cultural Education (SPICE), <http://spice.stanford.edu>
- Human-Sciences and Technologies Advance Research Institute (H-STAR), <http://hstar.stanford.edu>
 - Media-X, <http://mediax.stanford.edu>
 - Stanford Center for Innovations in Learning (SCIL), <http://scil.stanford.edu>
- Stanford Center on Longevity (SCL), <http://longevity.stanford.edu>
- Stanford Humanities Center, <http://shc.stanford.edu>
- Stanford Institute for Economic Policy Research (SIEPR), <http://siepr.stanford.edu>

Physical Sciences

- Edward L. Ginzton Laboratory, <http://stanford.edu/group/ginzton>
- Geballe Laboratory for Advanced Materials (GLAM), <http://stanford.edu/group/glam>
- Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), <http://www-group.slac.stanford.edu/kipac>, operated jointly with SLAC National Accelerator Laboratory
- Photon Ultrafast Laser Science and Engineering (PULSE), <http://pulse.slac.stanford.edu>, operated jointly with SLAC National Accelerator Laboratory
- Stanford Institute for Materials and Energy Sciences (SIMES), <http://simes.slac.stanford.edu>, operated jointly with SLAC National Accelerator Laboratory
- W. W. Hansen Experimental Physics Laboratory (HEPL), <http://hepl.stanford.edu>

Centers Reporting to the Dean of Humanities and Sciences

- Center for Space Science and Astrophysics (<http://www.stanford.edu/group/CSSA>)
- Center for Spatial and Textual Analysis (CESTA) (<https://cesta.stanford.edu>)
 - CESTA offers a graduate Certificate of Digital Humanities program
- Institute for Research in the Social Sciences (<http://iriss.stanford.edu>) (IRiSS)
 - Stanford Center for Population Research (<http://iriss.stanford.edu/scpr>) (SCPR)

- Stanford Center for the Study of Poverty and Inequality (<http://iriss.stanford.edu/CPI>) (CPI)
- Stanford Center for American Democracy (SCAD) (web site in development)
- Stanford Center on Philanthropy and Civil Society (<http://pacscenter.stanford.edu>) (PACS)
- Michelle R. Clayman Institute for Gender Research (<http://gender.stanford.edu>)
- Morrison Institute for Population and Resource Studies (<http://www.stanford.edu/group/morrinst>)
- Stanford Arts Institute (<http://artsinstitute.stanford.edu>)

Contacts

Office: Stanford Arts Institute, Littlefield Center, 2nd Floor

Mail Code: 94305-2255

Email: artsinstitute@stanford.edu

Web Site: <http://artsinstitute.stanford.edu/programs/honors-in-the-arts-program/>

Courses offered by the Stanford Arts Institute are listed under the subject code ARTSINST (<http://http://explorecourses.stanford.edu/search?page=0&q=ARTSINST&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=20142015>) on the Stanford Bulletin's ExploreCourses web site.

The Stanford Arts Institute forges arts connections across the University; gives grants for faculty, staff, and students; presents arts events; incubates new arts projects; and supports artists and cultural groups across campus. Since its founding in 2006, the Stanford Arts Institute has been a catalyst helping the Stanford arts community to grow.

Honors in the Arts

The Stanford Arts Institute offers the interdisciplinary Honors in the Arts program, which is open to undergraduates in all majors.

Stanford students in any major can complete a capstone project integrating their major studies with a broad arts perspective and receive "Honors in the Arts." The program features two tracks:

- *Interdisciplinary honors within the arts*—for students majoring in an arts discipline who wish to incorporate other arts disciplines into their work. Students in this track are typically majors in a department such as Art and Art History (<http://art.stanford.edu>); departments within the Division of Languages, Cultures, and Literatures (<https://dcl.stanford.edu>); English (<https://english.stanford.edu>); Music (<http://music.stanford.edu/Home>); or Theater and Performance Studies (<http://taps.stanford.edu>), who wish to do an honors project involving approaches from another arts field.
- *Interdisciplinary honors for non-arts majors*—for students majoring in a non-arts discipline who complete a capstone project incorporating the arts. Students in this track are typically majors in a department other than those described above, who wish to do an honors project involving an arts element. This project should incorporate themes, discourse, or learning from a student's major.

Admission

A minimum overall GPA of 3.67 (A-) is typically required for admission into the program. Upon petition, exceptions may be granted by the program director in the case of students demonstrating particular strengths relevant to honors in the arts.

Students are required to take at least three courses identified as preparing them to execute an interdisciplinary capstone project. These courses should be in either an art practice area relevant to the capstone project or should explore the methodology of interdisciplinary arts study. A

sample list of courses can be found on the Arts Institute web site (<http://artsinstitute.stanford.edu/program/idhp-recommended-courses>). It is recommended that students complete at least two of these courses prior to entering the program. However, upon approval of the program director, students may take these courses while pursuing their honors project. Courses are typically at least 2 units and must be taken for a letter grade.

Prospective students must submit a brief essay outlining their preparation and proposing a capstone project.

Students interested in pursuing Honors in the Arts can apply for acceptance in the junior year. Students should contact the program coordinator at artsinstitute@stanford.edu to begin the application process.

Requirements

- Prior to Spring Quarter, Junior Year: Two preparatory courses for interdisciplinary study, 4-8 Units
- Prior to Spring Quarter, Junior Year/Concurrent with Capstone: Preparatory course for interdisciplinary study, 2-4 Units
- Winter Quarter, Junior Year: Apply for admission to Interdisciplinary Arts Honors
- Spring Quarter, Junior Year: Confirm preparatory courses with honors program director
- Autumn Quarter, Senior Year: ARTSINST 200A, 2 Units
- Winter Quarter, Senior Year: ARTSINST 200B, 2 Units
- Spring Quarter, Senior Year: ARTSINST 200C, 2 Units

The capstone project is developed during the senior year through three quarters of workshops. To receive Honors in the Arts, students must fulfill all requirements and must receive at least an 'A-' on the capstone project.

Stanford Center on Poverty and Inequality Certificate Program on Poverty and Inequality

The Stanford Center on Poverty and Inequality (CPI) monitors and publicizes trends in poverty and inequality, publishes the country's leading magazine on poverty and inequality (*Pathways Magazine*), supports research on the causes of poverty and inequality, and examines the effects of public policy on poverty and inequality. The center carries out these activities with ten research groups addressing the following topics:

- poverty measurement and trends
- educational access and achievement
- income inequality
- social mobility
- safety net use
- recession and recovery effects
- spatial segregation
- racial and ethnic inequality
- discrimination, poverty, and the labor market
- Hispanic poverty, inequality, and mobility.

The Certificate in Poverty and Inequality recognizes undergraduates who have developed expertise in one or more of these research areas. The certificate is conferred as soon as the coursework and research requirements listed below are completed. Although the certificate does not appear on an official University transcript, it provides formal recognition of a rigorous program of study in the field of poverty and inequality.

Admission

Applications to the CPI certificate program are available on the CPI web site (<http://www.stanford.edu/group/scspi>) and may be filed at any time. Admitted students are assigned an adviser who assists in planning coursework and providing research opportunities within CPI. Contact CPI (inequality@stanford.edu) with any questions.

Requirements

The student's course and research plan, which is submitted with the application, should meet the four requirements listed below.

1. *Core Foundation Course:* (SOC 140 Introduction to Social Stratification. This required introductory course examines the causes and consequences of poverty, inequality, and mobility. It is available as both a regular and online course.
2. *Elective Foundation Course:* The second foundation course is selected from among the normative, empirical, and policy courses listed below. These courses examine the principles by which certain types of living conditions may be deemed unjust or impoverished (i.e., normative analysis), the social processes and forces by which poverty and inequality are generated and maintained (i.e., empirical analysis), and the types of policies and interventions that might reduce or increase poverty and inequality (i.e., policy analysis).

		Units
3. Elective Foundation Courses		
Normative Foundation		
ETHICSOC 136R	Introduction to Global Justice	4
ETHICSOC 171	Justice	4-5
INTNLREL 136R	Introduction to Global Justice	4
PHIL 76	Introduction to Global Justice	4
PHIL 171	Justice	4-5
POLISCI 3P	Justice	4-5
POLISCI 136R	Introduction to Global Justice	4
POLISCI 136S	Justice	4-5
PUBLPOL 103C	Justice	4-5
Empirical Foundation		
SOC 141	Controversies about Inequality	5
SOC 144	Inequality and the Workplace	5
Policy Foundation		
CHEM 24N	Nutrition and History	3
ECON 11N	Understanding the Welfare System	3
SOC 135	Poverty, Inequality, and Social Policy in the United States	3

4. *Research Project:* Students must complete a research paper on poverty or inequality. Students are invited to join one of the ten CPI research groups and become involved in an ongoing CPI research project that might become the basis for their research paper. Alternatively, students write an independent research paper rather than joining a CPI Research Group. The research paper may either take the form of a research proposal or an empirical research project based on quantitative or qualitative methods. This paper should be completed while the student is enrolled in Independent Study with a CPI faculty affiliate (<http://www.stanford.edu/group/scspi>).
5. *Additional Elective:* Students must take an elective course with a poverty or inequality focus. This requirement may be satisfied by taking an additional foundation course from the list provided above or by taking any of the preapproved elective courses listed below. Additionally, other unlisted courses addressing issues of poverty and inequality may also satisfy this requirement, although such courses require CPI approval (which is requested by submitting the

Course Approval Form (<http://www.stanford.edu/group/scspi>). It is recommended that approval be secured in advance of taking an unlisted course. If a new applicant to the certificate program wishes to count a completed course toward the requirements, that should be indicated on the application form and, if necessary, the Course Approval Form (<http://www.stanford.edu/group/scspi>) should be filled out).

		Units
6. Preapproved Elective Courses		
Poverty		
EARTHSYS 106	World Food Economy	5
ECON 11N	Understanding the Welfare System	3
ECON 106	World Food Economy	5
EESS 106	World Food Economy	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	3
Educational Access and Achievement		
ECON 146	Economics of Education	5
EDUC 102	Examining Social Structures, Power, and Educational Access	2-3
EDUC 173	Gender and Higher Education: National and International Perspectives	4
EDUC 181	Multicultural Issues in Higher Education	4
EDUC 221A	Policy Analysis in Education	4-5
EDUC 232	Culture, Learning, and Poverty	2-3
EDUC 253X	Inequality, Society, and Education	3-5
FEMST 173		
SOC 132	Sociology of Education: The Social Organization of Schools	4
SOC 134	Education, Gender, and Development	4
SOC 173	Gender and Higher Education: National and International Perspectives	4
Income Inequality		
AMSTUD 50N	The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era	3
POLISCI 127P	Economic Inequality and Political Dysfunction	5
SOC 14N	Inequality in American Society	4
SOC 117D	Recognizing Inequality	3
SOC 141	Controversies about Inequality	5
Social Mobility		
EDUC 102	Examining Social Structures, Power, and Educational Access	2-3
SOC 144	Inequality and the Workplace	5
Safety Net		
ECON 11N	Understanding the Welfare System	3
PUBLPOL 101	Politics and Public Policy	4-5
Recession and Recovery		
ECON 110	History of Financial Crises	4
SOC 114D	Sociology of the Great Recession	5
Spatial Segregation		
SOC 149	The Urban Underclass	4
Racial and Ethnic Income Inequalities		
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 145	Race and Ethnic Relations in the USA	4
NATIVEAM 139	American Indians in Contemporary Society	4
SOC 45Q	Understanding Race and Ethnicity in American Society	4

SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
SOC 139	American Indians in Contemporary Society	4
SOC 145	Race and Ethnic Relations in the USA	4
SOC 148	Comparative Ethnic Conflict	4
Discrimination and the Labor Market		
ECON 11N	Understanding the Welfare System	3
ECON 118	Development Economics	5
ECON 145	Labor Economics	5
SOC 142	Sociology of Gender	5
SOC 144	Inequality and the Workplace	5
Poverty, Inequality, and Mobility among Hispanics		
CHILATST 125S	Chicano/Latino Politics	5
EDUC 127X	The Wellbeing of Children in Immigrant Families	2
EDUC 178X	Latino Families, Languages, and Schools	3-5
POLISCI 125S	Chicano/Latino Politics	5
SOC 165	Seminar on the Everyday Lives of Immigrants	5
SOC 166	Mexicans, Mexican Americans, and Chicanos in American Society	5

Graduate Certificate in Digital Humanities Overview

The Center for Spatial and Textual Analysis (CESTA) offers a Graduate Certificate in Digital Humanities (GCDH) to meet a growing need among the humanities for training in digital methods by leveraging existing resources at Stanford University. The Graduate Certificate in Digital Humanities allows graduate students to acquire and deepen their technical and conceptual skills as well as to strengthen their position in the competitive job market within and beyond the academy. The certificate program has been established as a pilot program from 2014-17.

Completion of the program results in a Certificate, signed by the CESTA director and the chair of the doctoral student's home department.

The Graduate Certificate in Digital Humanities is issued by the Center for Spatial and Textual Analysis (CESTA) and will not appear on any University record, including the student's transcript.

Contact

Office: Wallenberg Hall, 450 Serra Mall, Building 160

Mail Code: 94305-2084

Phone: (650) 721-1385. Fax: (650) 725-5916

Email: mattbryant.stanford@gmail.com

Web Site: <http://cesta.stanford.edu>

Staff

Core Faculty: Mark Algee-Hewitt, Franco Moretti, Richard White, Dan Edelstein, Paula Findlen, Giovanna Ceserani, Walter Scheidel, Elaine Treharne, Amir Eschel, Zephyr Frank

Affiliated CESTA Faculty: Allyson Hobbs, Edith Scheffer, Caroline Winterer, Mark McGurl, Ana Minian, Mikael Wolfe.

CESTA Staff, Affiliates, and others: Celena Allen (GIS), Erik Steiner (visualization design and cartography), Ryan Heuser (programming), Nicole Coleman (information design and visualization), Jason Heppler (digital

history), Elijah Meeks (information design), Karl Grossner (information design and cartography).

Admission

Admission to the program is on a rolling basis, and students may apply at any time. Submit a letter of interest and any supporting information to CESTA Lab Manager Matt Bryant (mattbryant.stanford@gmail.com) at mattbryant.stanford@gmail.com. For more information about the new GDCH program or CESTA in general, see the program's web site (<http://cesta.stanford.edu/gcdh>) or contact Matt Bryant (mattbryant.stanford@gmail.com) at mattbryant.stanford@gmail.com.

Course work

Students wishing to take part in the first cohort starting in 2014-15 and thereafter are expected to complete one GCDH-approved graduate core course for a letter grade, and one additional approved elective course. The approved core courses for the first year of the program are:

- HISTORY 401A Spatial History: Concepts, Methods, Problems
- ENGLISH 303C The Networks of Enlightenment
- DLCL 396 Humanities+Design: Visualizing the Grand Tour (same as CLASSICS 396, HISTORY 336E)

Students who have completed any of the core courses, or equivalent courses taught by members of the program, in past years are eligible to move to the next step in the GCDH program.

Following or concurrent with the completion of the required core course, students must complete the following two certificate components:

1. Additional course work (1 or more classes, may be taken credit/no credit, and must be approved in advance by the committee in charge) in computer science, information design, statistics, network analysis, linguistics, or other fields approved by the student's supervisor and the CESTA committee in charge. A list of course recommendations is forthcoming.
2. One of the following:
 - a. Independent research project and portfolio including a finished project which is evaluated and approved by an Academic Council supervisor and accepted as an affiliated project in one of CESTA's labs. The duration of such projects must be a minimum of one academic quarter. Students may take up to 5 units of credit of directed reading for the purpose of completing the independent research project. Final projects are included in the student's ePortfolio and published on the CESTA web site.
 - b. Supervised collaborative research in a CESTA lab with the expectation that the student's participation culminates in a digital humanities product substantially of the authorship of the student; this must be a minimum of two quarters in duration. The student's portion of the research is included in the ePortfolio and published on the CESTA web site.

Freeman Spogli Institute for International Studies (FSI)

Contacts

Office: Encina Hall Center, First Floor, 616 Serra Street
 Mail Code: 94305-6055
 Phone: 650-723-4581 / Fax 650-725-2592
 Web Site: <http://fsi.stanford.edu/>

The Freeman Spogli Institute for International Studies (FSI) provides opportunities for undergraduate research through the CDDRL

Undergraduate Honors Program and the CISAC Interschool Honors Program in International Security Studies.

Interschool Honors Program in Democracy, Development, and the Rule of Law

Director: Francis Fukuyama

The Center on Democracy, Development, and the Rule of Law (CDDRL) Undergraduate Senior Honors Program provides students majoring in any Stanford academic department the opportunity to conduct an independent research project focused on the fields of democracy, development, and the rule of law under CDDRL faculty guidance. Students are required to complete a year-long honors research seminar that begins autumn quarter of the junior year. They will spend the last quarter of the senior year working independently with their faculty adviser to complete and submit their honors thesis ahead of their formal defense in mid-May. Upon fulfilling individual department course requirements and completing the honors program, students graduate with a certificate in Honors in Democracy, Development, and the Rule of Law.

Students interested in the program consult with their prospective honors advisers in their junior year to determine the tentative thesis topic, which should have some degree of policy relevance. Prerequisites for the program include; a 3.5 grade-point average at the time they apply; a strong overall academic record; sufficient depth and breadth in the fields of democracy, economic and social development, rule of law, and human rights course work; and demonstrated skills in writing and conducting independent research.

Students are required to attend honors college in Washington, D.C. in September before Autumn Quarter classes begin. Applicants are discouraged from studying abroad during the duration of the CDDRL Undergraduate Honors program.

Required Course Work

Two courses that explore the areas of democracy, development, and the rule of law. CDDRL's flagship undergraduate lecture course taught during Autumn Quarter, which ideally should be completed before the student enters the honors program. DDRL Honors Research Methods Seminars meet on a weekly basis to present their project theses and receive feedback.

Typical Schedule for CDDRL Honors Program

Junior	Units		
	Autumn	Winter	Spring
Select one of the following:	5		
Democracy, Development, and the Rule of Law (INTNLREL 114D)			
Democracy, Development, and the Rule of Law (POLISCI 114D)			
DDRL 189 Honors Research Methods	3		
Year Total:	5		3
Senior	Units		
	Autumn	Winter	Spring
DDRL 190 Honors Research Workshop	3		
DDRL 190 Honors Research Workshop	3		
DDRL 191 Independent Study (Optional) ¹			
Year Total:	3		3
Total Units in Sequence:	14		

¹ Optional any quarter during senior year for 1-5 units, repeatable once for credit.

Admitted students must be able to fulfill all course requirements in their individual majors by the time they graduate, in addition to the units required for the honors program. For more information, contact Alice Kada, CDDRL Administrative Manager at akada@stanford.edu or go to <http://cddrl.stanford.edu/>.

Interschool Honors Program in International Security Studies

Co-Directors: Coit D. Blacker, Martha Crenshaw

The Center for International Security and Cooperation (CISAC) coordinates a University-wide Interschool Honors Program in International Security Studies. Students chosen for the honors program intern with a security-related organization, attend the program's honors college in Washington, D.C., in September, participate in a year-long core seminar, and under the direction of a faculty advisor produce an honors thesis relevant to international security policy. Upon fulfilling individual department course requirements and completing the honors program, students graduate in their major with the award of Honors in International Security Studies. To be considered for the program, students must demonstrate sufficient depth and breadth of international security course work. Successful applicants to the program are expected to have taken:

		Units
MSE 193	Technology and National Security	3
POLISCI 114S	International Security in a Changing World	5
and at least one related course such as		4-5
ECON 106	World Food Economy	5
HISTORY 103F	Introduction to Military History	5
HISTORY 204E	Totalitarianism	4-5
HUMBIO 129S	Global Public Health	4
INTNLREL 114D	Democracy, Development, and the Rule of Law	5
INTNLREL 140A	International Law and International Relations	5
LAW 479	International Law	4
MSE 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	3
MSE 190	Methods and Models for Policy and Strategy Analysis	3
MSE 295	Energy Policy Analysis	3
POLISCI 42Q	The Rwandan Genocide	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 116	The International History of Nuclear Weapons	5
POLISCI 123/ PUBLPOL 101	Politics and Public Policy	5
PUBLPOL 102	Organizations and Public Policy	4-5
SOC 160	Formal Organizations	4

Students in the program enroll in IIS 199 Interschool Honors Program in International Security Studies, in Autumn, Winter, and Spring quarters for 3-5 credits for quarter (9-12 total credits). Information about and applications to this program may be obtained from the Center for International Security and Cooperation, C206-10, Encina Hall Central, telephone (650) 725-5365 or http://cisac.stanford.edu/docs/undergraduate_honors_program.

Center for Space Science and Astrophysics

Emeriti: (Professors) Robert Cannon, (Professors, Research) Donald L. Carpenter, Aldo V. daRosa, Daniel B. DeBra, W. Gary Ernst, Von R. Eshleman, Antony Fraser-Smith, Robert A. Helliwell, Bruce B. Lusignan,

Ronald J. P. Lyon, Laurence A. Manning, Bradford W. Parkinson, J. David Powell, Peter A. Sturrock, G. Leonard Tyler, Robert V. Wagoner

Director: Roger W. Romani

Associate Directors: Umran S. Inan, Philip H. Scherrer

Professors: Roger Blandford (Physics, SLAC), Elliot Bloom (SLAC), Lambertus Hesselink (Electrical Engineering), Umran S. Inan (Electrical Engineering), Steven Kahn (Physics, SLAC), Tune Kame (SLAC), Peter F. Michelson (Physics), Vahé Petrosian (Physics), Roger W. Romani (Physics), Norman H. Sleep (Geophysics), Guenther Walther (Statistics), Howard Zebker (Electrical Engineering, Geophysics)

Associate Professors: Tom Abel (Physics, SLAC), Steve Allen (Physics, SLAC), Sarah Church (Physics),

Assistant Professors: Stefan Funk (Physics, SLAC), Chao-Lin Kuo (Physics, SLAC), Risa Wechsler (Physics, SLAC)

Professors (Research): C-W. Francis Everitt (HEPL), Philip H. Scherrer (Physics)

SLAC Staff Physicist: Grzegorz Madejski

Center Offices: Varian, Room 340

Mail Code: 94305-4060

Phone: (650) 723-1439

Email: danav@stanford.edu

Web Site: <http://www.stanford.edu/dept/astro>

The Center for Space Science and Astrophysics is an interdepartmental organization coordinating research in space science and astrophysics. Its members are drawn from the Department of Geological and Environmental Sciences in the School of Earth Sciences; the departments of Aeronautics and Astronautics, Electrical Engineering, and Mechanical Engineering in the School of Engineering; the departments of Applied Physics, Physics, and Statistics in the School of Humanities and Sciences; the W. W. Hansen Experimental Physics Laboratory; and the SLAC National Accelerator Laboratory. Its membership also includes all faculty and appropriate staff at the Kavli Institute for Particle Astrophysics and Cosmology, located at SLAC and the Physics department.

The facilities of the center are available to any interested and qualified student, who must be admitted by and registered in a department. The departments of Aeronautics and Astronautics, Applied Physics, Electrical Engineering, Mechanical Engineering, and Physics offer opportunities leading to an M.S. or Ph.D. degree for work in space science or astrophysics. The center also offers opportunities to undergraduates who may, for instance, participate in research projects in their junior or senior years, on a part-time basis during the school year or on a full-time basis during the summer. The Astronomy Course Program operates a small student observatory where students may gain practical experience in astronomical observing.

Woods Institute for the Environment

Goldman Interschool Honors Program in Environmental Science, Technology, and Policy

The Woods Institute for the Environment (<http://woods.stanford.edu>) coordinates a University-wide interschool honors program in environmental science, technology, and policy. The Goldman Honors Program aims to

provide a unique capstone experience in environmental solutions. Over the course of the senior year, students select, design, and implement a capstone project that targets understanding or addressing an environmental challenge. Students are required to enroll and participate in three quarters of the weekly Goldman seminar. Students meet as a group with Stanford faculty to discuss a broad range of environmental challenges and potential solutions, and to design and receive feedback on their respective individual capstone projects.

Goldman projects may take the form of a research project mentored by a Stanford faculty member, and targeted at understanding an environmental challenge. In addition, projects may also take the form of creating a solution to an environmental challenge. Such solution projects can be mentored by a Stanford faculty member or by a partner mentor outside of Stanford, and could include design and development of technology, policy, curriculum, or social media. Students should identify a Stanford faculty member (academic council) to serve as their honors adviser prior to applying. Students work with their adviser and Woods staff to find a mentoring partnership either within or outside of Stanford, based on students' respective interests.

For application information, see the Goldman Honors Program (<http://woods.stanford.edu/educating-leaders/education/goldman-honors-program>) web site. Students apply in their junior year, with selections being made before the end of Winter Quarter. Once accepted, students must enroll in a prehonors seminar in the Spring Quarter. Students from all programs across campus are eligible and encouraged to apply. Selections are made based on academic record, creativity and relevance of potential capstone project, and cohort balance.

Other Academic Programs and Centers, and Independent Research Laboratories, Centers, and Institutes

- Hoover Institution on War, Revolution and Peace, <http://www.hoover.org>
- SLAC National Accelerator Laboratory (SLAC), <http://www.slac.stanford.edu>
- Stanford Synchrotron Radiation Laboratory (SSRL), <http://ssrl.slac.stanford.edu>

Libraries and Computing Resources

Stanford University Libraries and Academic Information Resources

University Librarian and Director of Academic Information Resources:
Michael A. Keller

Web Site: <http://libraries.stanford.edu>

Stanford University Libraries and Academic Information Resources (SULAIR) includes more than 30 libraries and programs supporting research, teaching, and learning at Stanford University. SULAIR acquires and delivers library collections in all formats, establishes policies and

standards to guide the use of academic information resources, develops training and support programs for academic uses of computers, and maintains a broad array of electronic information resources, including the online library catalog and several hundred article and indexing databases and electronic journal subscriptions.

In each library unit, knowledgeable professional staff provide assistance in locating and using print and online information resources. Subject specialists and reference librarians are available for individual consultation, group classes, demonstrations, and special workshops by request.

Libraries throughout campus provide group and individual study spaces, public computers, personal laptop connections, photocopy machines, and digital scanners for use by Stanford faculty, staff, and students.

For information about library hours, see the Library Hours (<http://libraryhours.stanford.edu>) web site.

In support of the University's academic mission, Academic Computing Services provides technology expertise, resources and services to students and faculty. Academic Computing Services supports the use of technology in teaching, learning, research, and community; operates and manages technology-enabled teaching and learning environments including classrooms and public study spaces, the Multimedia Studio in Meyer Library, the Digital Language Lab, and computer clusters in Green Library, Tresidder Union, and the student residences; provides technology education, consulting support, and multimedia services at Meyer and in the residences; provides faculty-specific computing resources through the Academic Technology Specialist Program and Academic Technology Lab; and provides technology support to Stanford University Libraries' services.

Information about the library collections, facilities, services, and policies is available at the Libraries & Academic Information Resources (<http://library.stanford.edu>) web site.

Further information about library services and resources is available from the Information Center staff in Cecil H. Green Library (<http://infocenter.stanford.edu>) and from reference staff in all University libraries.

Central Campus Libraries

The Cecil H. Green Library (East and Bing Wings) maintains research collections in the humanities, social sciences, area studies, and interdisciplinary areas. These collections number approximately 2.8 million volumes. Major services in Green Library include: the Information Center, the Media Microtext Center, the Jonsson Reading Room, the Lane Reading Room, the Bender Room, Loan Desk and Privileges, Interlibrary Services, course reserves, the Department of Special Collections, and the University Archives.

The J. Henry Meyer Memorial Library houses the East Asia Library as well as the Academic Computing Services group of SULAIR and provides study, multimedia, consulting, and instructional support services. In addition, Meyer Library houses the University's Digital Language Lab, technology enabled study spaces and classrooms, the Academic Technology Lab, and the central offices of Student Computing and Academic Computing Services.

Branch Libraries

Humanities and Social Sciences Branch Libraries include the Art and Architecture Library, Cubberley Education Library, East Asia Library, Music Library, and Archive of Recorded Sound.

Science Branch Libraries include the Branner Earth Sciences Library, Engineering Library, Falconer Biology Library, Mathematical and Computer Sciences Library, Harold A. Miller Library at the Hopkins Marine Station, Physics Library, and Swain Library of Chemistry and Chemical Engineering.

For a complete list of campus libraries, see the Libraries and Collections (<http://libraries.stanford.edu>) web site.

Coordinate Libraries

J. Hugh Jackson Library (<http://www.gsb.stanford.edu/jacksonlibrary>), Graduate School of Business

Director: Kathy Long

Lane Medical Library (<http://lane.stanford.edu>)

Director: Debra Ketchell

Crown Law Library (<http://www.law.stanford.edu/library>)

Director: Paul Lomio

SLAC Research Library (<http://www-group.slac.stanford.edu/library>)

Director of Technical Information Services: Patricia Kreitz

Hoover Institution Library and Archives

Director: John Raisian

Web Site: <http://www.hoover.org/library-and-archives>

Since its founding by Herbert Hoover in 1919 as a special collection dealing with the causes and consequences of World War I, the Hoover Institution has become an international center for documentation, research, and publication on political, economic, social, and educational change in the 20th and 21st centuries.

The Hoover Library and Archives include one of the largest private archives in the world and contain outstanding area collections on Africa, East Asia, Eastern Europe, Russia and the former Soviet Union, Latin America, the Middle East, North America, and Western Europe.

Holdings include government documents, files of newspapers and serials, manuscripts, memoirs, diaries, and personal papers of men and women who have played significant roles in the events of these centuries, the publications of societies and of resistance and underground movements, the publications and records of national and international bodies, both official and unofficial, and books and pamphlets, many of them rare and irreplaceable. The materials are open to all Stanford students, faculty, and staff, to scholars from outside the University, and to the public at large.

Information Technology Services (IT Services)

Web Site: <http://itservices.stanford.edu>

IT Services manages the University's central information technology infrastructure and provides hundreds of services and applications for use in academic and business activities. Support is provided in four layers:

- Participation and client-focused leadership in institutional IT planning, including strategies for data center expansion, centrally managed storage and backup, and business continuity and disaster recovery.
- Applications and services for departments and end-users including email, calendaring, wireless connectivity, web authentication, and Windows and Linux server hosting. These services are supported by a help desk, contract-support consultants, online self-help, and training.
- Applications and services that support other campus service providers, including the help desk, change management, and network registration systems.
- A communications and collaboration infrastructure robust enough to support advanced network, voice, and web-based services.

To learn about the variety of information technology resources available at Stanford, see the Information Technology Services (<http://computing.stanford.edu>) web site. For assistance with technology services at Stanford, contact the Stanford IT Help Desk at (650) 725-HELP (5-4357) or submit a request through the HelpSU (<http://helpsu.stanford.edu>) web site.

The Continuing Studies Program

The Continuing Studies Program provides adults from the surrounding communities the opportunity to take courses for the purpose of intellectual enrichment. Courses and events are offered in all four academic quarters, with over 400 courses planned throughout the year. The Continuing Studies Program, except for the MLA program, is a non-degree granting program.

The instructors are largely drawn from the ranks of the University's professoriate and academic staff. The program presents a wide variety of courses, with a central concentration in the liberal arts, including literature, history, art and architecture, and music.

Tuition discounts are available to University employees, Stanford students and faculty, Stanford Alumni Association members, educators, and those over age 65.

For a list of offered courses, see the Courses tab the Continuing Studies web site (<http://continuingstudies.stanford.edu>).

Master of Liberal Arts Program

Associate Dean and Director: Linda Paulson

Participating Faculty: Jonathan Berger (Music), Russell Berman (Comparative Literature, German Studies), Marc Bertrand (French and Italian, emeritus), Jay Bhattacharya (Medicine), George Brown (English, emeritus), Eamonn Callan (Education), William Chace (English, emeritus), James Daughton (History), Gerry Dorfman (Hoover Institution, Political Science), William Durham (Anthropology), Michele Elam (English), Martin Evans (English), Paula Findlen (History), Larry Friedlander (English), Kenneth Fields (English), Hester Gelber (Religious Studies), Albert Gelpi (English, emeritus), Barbara Gelpi (English, emerita), Denise Gigante (English), Robert Gregg (Religious Studies, emeritus), Tom Grey (Music), Hans Ulrich Gumbrecht (French and Italian), Van Harvey (Religious Studies, emeritus), Gavin Jones (English), Charles Junkerman (Continuing Studies Program), Nancy Kollmann (History), Herbert Lindenberger (English, emeritus), Marsh McCall (Classics, emeritus), Mark Mancall (History, emeritus), Scotty McLennan (Religious Life), Thomas Mullaney (History), Alexander Nemerov (Arts), David Palumbo-Liu (Comparative Literature), Linda Paulson (English), Grant Parker (Classics), Arnold Rampersad (Humanities, emeritus), Ronald Rebolz (English, emeritus), Rush Rehm (Drama, Classics), John Rick (Anthropology), John

Rickford (Linguistics), David Riggs (English, Emeritus), Paul Robinson (History, emeritus), Jeremy Sabol (SLE), Ramón Saldívar (English), Paul Seaver (History, emeritus), Thomas Sheehan (Religious Studies), Robert Siegel (Microbiology and Immunology), Peter Stansky (History, emeritus), Stephen Stedman (Freeman Spogli Institute for International Studies), Barton Thompson (Law), Peter Vitousek (Biology), Caroline Winterer (History), Yvonne Yarbro-Bejarano (Latin American Cultures), Emlé Young (Medicine, emeritus), Steven Zipperstein (Jewish Culture and History)

Program Offices: 365 Lasuen Street, Littlefield Center, Level G
Mail Code: 2078
Phone: (650) 725-0061 Fax: (650) 725-4248
Email: mlaprogram@stanford.edu
Web Site: <http://mla.stanford.edu>

Courses offered by the Master of Liberal Arts Program are listed under the subject code MLA on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MLA&filter-catalognumber-MLA=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MLA&filter-catalognumber-MLA=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=MLA&filter-catalognumber-MLA=on>).

Program Description

The Master of Liberal Arts (MLA) program aims to provide a flexible, interdisciplinary program for returning adult students who seek a broad education in the liberal arts. The underlying premise of the MLA program is that knowledge gained through an interdisciplinary course of study leads to intellectual independence and satisfaction not always found in discipline-based programs of study. The goals of the MLA program are to develop advanced critical thinking, to foster intellectual range and flexibility, and to cultivate an individual's ability to find the connections among different areas of human thought: art, history, literature, music, philosophy, political science, science, and theology.

The program is designed with part-time students in mind: seminars meet in the evening, and students complete the degree in 4-5 years. All master's seminars are taught by members of the Stanford faculty. Seminar size is limited to 20 students.

Learning Outcomes (Graduate)

The purpose of the Master of Liberal Arts Program is to address subjects that cross disciplinary boundaries; to develop an understanding of the strength and the shortcomings of disciplinary evaluation; to help students to refine their skills in writing, research, critical thinking, collaborative work, and collegial discussion. While students are not being groomed for academic careers, graduates of the program have used their experience to gain acceptance into Ph.D. programs at Stanford and elsewhere. Students who complete the MLA program are well positioned to advance in careers that require the careful analytical and rhetorical training they receive. This training is achieved through the completion of four foundations courses, which together emphasize the program's goals as stated above; seven seminars that offer a more specific engagement with interdisciplinary subject matter; and a master's thesis, accomplished under the direction of a Stanford faculty member who is expert in the subject of the thesis.

Degree Requirements

Candidates for the MLA degree must complete a minimum of 50 units of course work with at least a grade point average of 3.3 (B+). These units must include a three-quarter foundation course (equal to 12 units total), one 4-unit core introductory seminar for second-year students, at least seven 4-unit MLA seminars, and a 6-unit master's thesis. Students must also fulfill

distribution requirements in each of the following areas: humanities; social science or social policy; and science, engineering, or medicine.

Foundation Course

During the Autumn, Winter, and Spring quarters following admission to the program, a three quarter foundation course is required of all students. The purpose of this course is to lay the groundwork for the interdisciplinary, intercultural studies the student will shortly undertake. The foundation course introduces students to the broad framework of history, literature, philosophy, political science, and art.

Core Seminar

During the first quarter of the second year, students take the core introductory seminar, MLA 102 An Introduction to Interdisciplinary Graduate Study. This seminar prepares students for interdisciplinary graduate work at Stanford. Students concentrate on writing a critical graduate paper, conducting library research, presenting the results of their research, and productively participating in a collaborative seminar.

MLA Seminars

Students are required to take at least seven MLA seminars of 4 units each. Each year, at least nine seminars are offered in the MLA program. Each MLA course requires a substantial seminar paper. Students are encouraged to use these papers as a way to investigate new fields of interest, as well as a way to develop different perspectives on issues in which they have an ongoing interest.

Master's Thesis

The MLA program culminates in the master's thesis. Students approaching the end of the program write a thesis, approximately 75-100 pages in length, that evolves out of work they have pursued during their MLA studies. The thesis is undertaken with the prior approval of the MLA program, and under the supervision of a Stanford faculty member. During the process of writing the thesis, students are members of a work-in-progress group, which meets regularly to provide peer critiques, motivation, and advice. Each student presents the penultimate draft of the thesis to a colloquium of MLA faculty and students, in preparation for revising and submitting the final draft to the adviser and to the MLA program.

Enrollment Requirements

MLA students must enroll for each academic year from the time of original matriculation until conferral of the degree. To remain active, students must either:

1. complete a minimum of two courses (eight units) in one academic year, defined as from the beginning of Autumn Quarter through the end of the following Summer Quarter; or,
2. be actively working on their thesis and regularly attend a minimum of three quarters of the work-in-progress meetings from the time the student enrolls in work-in-progress through graduation.

Timeline for Completion

All requirements for the Master of Liberal Arts degree must be completed within five years after the student's first term of enrollment in the program. If extraordinary circumstances prevent completion within five years, a student may submit a written petition for a maximum one-year extension to the Associate Dean and Director. This petition is reviewed by a committee which makes a recommendation to the Director; the final decision is at the discretion of the Director. To be considered, the petition must be submitted on or before May 1 of the student's fifth year in the program.

Registration

Master of Liberal Arts students enroll in courses through Stanford's Axess (<http://axess.stanford.edu>) system.

Summer Session

Associate Dean of Summer Session: Jess Matthews
Assistant Dean of Summer College: John Robichaux

Contact

Program Offices: 365 Lasuen Street
Mail Code: 94305-6079
Phone: (650) 723-3109; Fax: (650) 725-6080
Email: summersession@stanford.edu
Web Site: <http://summer.stanford.edu>

Students attending Stanford Summer Session are either matriculated Stanford students, visiting undergraduate or graduate students, or enrolled in the High School Summer College.

Degree-seeking Stanford students should indicate on Axess during Spring Quarter that they intend to register for Summer Quarter. Separate application is not required.

Visiting undergraduate or graduate students are not presently candidates for a Stanford degree. These are students and adults who have taken at least one course at another college or university. These students must complete a short application, available at <http://summer.stanford.edu>. Qualified high school students who are at least sixteen years old may apply to the High School Summer College (<http://summer.stanford.edu/programs>) program.

Students in Stanford Summer Session, in general, enjoy the privileges of students in the regular degree programs except that work completed cannot be applied toward a Stanford degree or credential unless and until the student has been admitted to regular Stanford student standing. Admission as a visiting student does not imply later admission to matriculated status. However, should the visiting student matriculate at a later date through normal admission procedures, the summer work may be applied toward the requirements for a Stanford degree or credential at the discretion of the University or academic department.

Visiting undergraduate and graduate students and students in the High School Summer College are not matriculated Stanford University students, and not all University student policies apply to such students. The University reserves the right, at its discretion, to withhold registration from or require withdrawal from Stanford Summer Session for these students or applicants.

Individuals who commit violations of University policy, the Honor Code, or the Fundamental Standard are subject to termination. Individuals in non-degree granting programs are subject to removal or discipline according to the program's policies or practices, not through the Office of Community Standards.

For more information, contact Summer Session by email, mail, phone, or fax using the listings above. Information is updated annually in January and may also be found online at <http://summer.stanford.edu>.

Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford

also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

Dean and Associate Provost: Charles Junkerman

Associate Dean and Director: Dan Colman

Other Services and Programs

Bookstore

Web Site: <http://stanfordbookstore.com>

Organized in 1897, Stanford Bookstore, (650) 329-1217, located at 519 Lasuen Mall (White Plaza), provides a diverse selection of books, course materials, and supplies to the students, faculty, staff, and community in and surrounding Stanford. The bookstore carries over 130,000 titles, including a wide selection of medical books and books written by Stanford authors, making it one of the largest bookstores in the nation. The bookstore also carries medical instruments, Stanford logo apparel, gifts and souvenirs, periodicals, and features a café that provides an enhanced shopping experience. The Computer Store, in the main branch, sells academically priced computer hardware and software. Other services include shipping of purchases, gift cards, book buyback, fax service, postage stamp sales, an ATM, and Enterprise Rent-A-Car hotline. There are four branches in addition to the Stanford Bookstore that also serve the community: the Stanford Athletics Shop (formerly the Track House Sports Shop), (650) 327-8870, underneath the Cobb Track and Angell Field bleachers, is the headquarters for Stanford Athletic Gear; Tresidder Express convenience store, (650) 723-9224 in Tresidder Union; the Stanford Shop, (650) 614-0295, at the Stanford Shopping Center, provides Stanford apparel; and the Bookshop, (650) 725-2775, at the Cantor Center for the Arts, carries books on the arts, fine gifts, apparel, and jewelry.

Stanford Conference Services

Phone: (650) 723-3126

Email: conferenceinquiries@stanford.edu

Web Site: <http://conference.stanford.edu>

A conference is defined as any student, youth, or adult group that convenes for part of a day (including a luncheon), overnight, or for several days, outside the regular or summer academic sessions for registered students. Policies concerning conferences are the responsibility of the offices of the President and the Provost.

To make arrangements for hosting a new, academically sponsored residential summer conference during the mid-June through late-August time frame, contact Stanford Conference Services by phone or email as listed above. Stanford Conference Services also offers meeting planning services on a year-round basis for academically sponsored conference groups seeking assistance with planning and managing residential and non-residential conferences. In addition, conference organizers seeking to conduct conferences outside of the late August to early June time frame can also contact the non-academic facilities scheduling in the Office of

the University Registrar, (650) 723-6755 or reg-events@stanford.edu, or contact Stanford Events, (650) 723-2551 or stanfordevents@stanford.edu.

Academic sponsorship by a Stanford dean or department head is required for first time conferences hosted by University departments or by conferences hosted by external organizations interested in meeting at Stanford. Conferences initiated by University departments or external organizations must demonstrate consistency with the University's academic mission. For summer conferences, the sponsoring department submits its proposal to the Director of Stanford Conference Services for review in terms of available facilities and for the approval of the President's Office. At least half of the participants in any summer conference at Stanford hosted by an external organization must be housed in Stanford's campus residences and participate in daily meal plans provided by Stanford Dining. On-campus residential housing and dining services are normally available from the Sunday following Commencement through late August.

Summer conference groups should contact Stanford Conference Services concerning arrangements for tables, chairs, audio-visual aids, signage, janitorial services, trash pick-up and removal, sprinkler shutoffs, and other conference-related products/services. During the academic year, housing arrangements for University-sponsored visitors can be made through the Stanford Guest House (<http://guesthouse.stanford.edu>) web site or call (650) 926-2800.

Ombuds

Stanford University Ombuds: David Rasch
 Ombuds Office: Mariposa House, 585 Capistrano Way, Room 210
 Phone: (650) 723-3682
 Fax: (650) 725-7288
 Mail Code: 94305-8200
 Email: rasch@stanford.edu
 Web Site: <http://stanford.edu/dept/ombuds>

School of Medicine Ombuds: James Laflin
 Office: Medical School Office Building, 1265 Welch Road, Suite X301, MC: 5404
 Phone: (650) 498-5744
 Fax: (650) 498-5865
 Mail Code: 94305-5404
 Email: jlaflin@stanford.edu
 Web Site: <http://med.stanford.edu/ombuds>

The charge to the Ombuds office at Stanford is: "The Ombudsperson's task is to protect the interests and rights of members of the Stanford community from injustices or abuses of discretion, from gross inefficiency, from unnecessary delay and complication in the administration of University rules and regulations, and from inconsistency, unfairness, unresponsiveness, and prejudice in the individual's experience with University activities. The Ombudsperson's office exists to receive, examine, and channel the complaints and grievances of members of the Stanford community, and to secure expeditious and impartial redress."

Any troublesome matter in the University community may be discussed in confidence with the University Ombuds. Services of the office are available to students, staff, and faculty. Although possessing no decision making authority, the Ombuds has wide powers of inquiry. The Ombuds refers matters to the proper person or office expeditiously and also provides conflict resolution services. For the role of the office of the Ombuds in cases of sexual harassment, see the "Non-Academic Regulations (<http://exploreddegrees.stanford.edu/nonacademicregulations>)" section of this bulletin.

Police Services

Department Office: Corner of Campus Drive and Serra Street
 Phone: (650) 723-9633
 Web Site: <http://police.stanford.edu>

The Stanford Department of Public Safety is a full service police department that operates 24 hours a day, 7 days a week. For police, fire, or ambulance response, dial 9-1-1, or 9-9-1-1 from a University phone. Emergency assistance can also be obtained by using one of the nearly 100 Blue Emergency Phone Towers strategically placed around campus.

The department is composed of the following divisions:

The Field Services Division consists of sworn and non-sworn officers who patrol the campus and respond to calls for service. Sworn officers receive their police powers through the Santa Clara County Sheriff's Office. Sworn officers have the legal authority to stop vehicles, make arrests, and enforce all laws. Non-sworn officers assist the sworn officers with security patrols, evidence collection, crime prevention presentations, and other assigned tasks.

Community Service Division: Community Service Officers (CSOs) enforce the parking rules and regulations on campus, and provide traffic control at special events, construction zones, and accident scenes. CSOs also provide building security during emergency or critical incidents.

The Support Services Division provides logistical, technical, and accounting support to the department. Special events are handled through this division as well. Special Events Personnel (SEPs) provide security at campus events including athletic events, concerts, student-sponsored events, and dignitary visits. SEPs are available for hire by groups needing security at their University events. Contact the special events office at (650) 723-4924, or email event_security@stanford.edu, for more information.

The Administrative Support Division supports the department through training, recruiting, payroll, human resources, and other business functions.

For additional safety information or to view the yearly crime statistics, see the Stanford Safety and Security Almanac, available free from the Public Safety (<http://police.stanford.edu>) web site.

Office for Religious Life

Office: Memorial Church
 Phone: (650) 723-1762
 Web Site: <http://religiouslife.stanford.edu>

The mission of the Office for Religious Life (ORL) is to guide and enhance spiritual, religious, and ethical life within the Stanford University community. Multifaith exploration and dialogue, central in Stanford's history from its founding, is a vital part of both its ethos and education.

The ORL is committed to welcoming students of all genders and sexual identities, all religious and non-religious traditions, and all cultural backgrounds, striving to ensure that students, faculty, and staff have access to supportive contexts in which to pursue their spiritual journeys on the Stanford campus.

The ORL oversees and provides support for Stanford Associated Religions (SAR), more than thirty religious organizations that offer their spiritual services to the campus, as well as the Center for Inter-Religious Community, Learning, and Experiences (the CIRCLE). Located on the third floor of the remodeled Old Union, the CIRCLE offers an interfaith sanctuary, a seminar room, a common room, a student lounge, a non-lending library, and offices housing many SAR member groups.

Stanford Alumni Association

Web Site: <http://stanfordalumni.org>
 Phone: (800) 786-2586 or (650) 723-2021

The Stanford Alumni Association (SAA) seeks to serve all Stanford alumni and students by offering programs and services such as reunions, regional events, Stanford Magazine, online services, volunteer and learning opportunities, and the alumni directory.

The Stanford Alumni Association's alumni and student class outreach department (ASCO) provides undergraduates and graduate students with

networking opportunities, celebratory and social events, and programs that enhance their Stanford experience and help connect them to the 200,000 alumni worldwide who make up the Stanford alumni community. ASCO programs bring students and alumni together through Reunion Homecoming Weekend each autumn and Commencement weekend in the spring, along with alumni networking events throughout the year.

For students, SAA sponsors events such as student tailgates, alumni panels, Senior Send-off, Senior Dinner on the Quad, and Class Day. The Alumni Association gives out the J.E. Wallace Sterling Award and the Stanford Award of Excellence annually to honor graduating seniors for exemplary service to the University. For more information on student programs at the Stanford Alumni Association (<http://police.stanford.edu>) web site.

Office of Special Events & Protocol and the Stanford Ticket Office

The Office of Special Events & Protocol (OSEP) (<https://osep.stanford.edu>) and Stanford Ticket Office (STO) (<http://tickets.stanford.edu>) are divisions of the Office of Public Affairs (<http://publicaffairs.stanford.edu>). OSEP manages the University's public ceremonies such as Commencement, Baccalaureate, New Student Orientation Convocation, and the Founders' Celebration. The organization also designs and produces other high-profile university events hosted by the President and Provost, such as the Roundtable at Stanford, international symposia and visits to campus by foreign delegations and heads of state.

OSEP also serves in an advisory capacity and/or can provide direct planning expertise to campus schools, departments, and student groups. The department has final approval authority of Stanford facility and open space use for non-academic events on campus. For information or event planning assistance, information about policies, procedures, and University facilities, see the OSEP (<https://osep.stanford.edu>) web site, or call (650) 724-1387.

The STO is the University's official full-service box office that provides online, in-person and by phone ticketing services, as well as day-of-event staffing support to hundreds of events throughout the year. Important arts organizations and venues it serves include Stanford Live, Stanford Jazz and Music Departments, the Bing Concert Hall, Frost Amphitheater, and Memorial Auditorium. The Stanford Ticket Office also provides professional ticketing and registration services to all academic departments, institutes, and student groups for lectures, festivals, concerts, and various high profile public events. For more information, see the Stanford Ticket Office (<http://tickets.stanford.edu>) web site, or call (650) 725-ARTS (2787).

Diversity and Access Office

Director of the Diversity and Access Office: Rosa Gonzalez

Office: Mariposa House, 585 Capistrano Way

Mail Code: 94305-8230

Phone: (650) 723-0755; TTY: (650) 723-1216

Email: equal.opportunity@stanford.edu, disability.access@stanford.edu

Web Site: <https://diversityandaccess.stanford.edu/>

The Diversity and Access Office ensures compliance with (not limited to the following) Titles VI and VII of the Civil Rights Act, Equal Pay Act, Americans with Disabilities Act (ADA) and Sections 503 and 504 of the Rehabilitation Act, the Age Discrimination in Employment Act and Executive Order 11246, California Fair Employment and Housing Act (FEHA) and Unruh Civil Rights Act.

The Diversity and Access Office was created to advance Stanford University's equal opportunity and affirmative action goals and commitment to diversity. The office also ensures University compliance with federal, state and local regulations concerning nondiscrimination and disability access. The Director of the Diversity and Access Office is responsible for administering the ADA/Section 504 Grievance Procedure (Student

and the student Non-Academic Grievance Procedure. Finally, the office also provides an array of services and resources designed to ensure equal opportunity and address bias and discrimination prohibited by law or official University policy, as well as assists individuals with disabilities who have requests for accommodations in the workplace and access to Stanford facilities, programs, and activities.

Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. The following person has been designated to handle inquiries regarding this nondiscrimination policy: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email). Stanford's Title IX Coordinator, Catherine Criswell Spear, has been designated to handle inquiries regarding sexual harassment and sexual violence: Mariposa House (2nd floor), 585 Capistrano Way, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), titleix@stanford.edu (email).

Awards and Honors Faculty and Staff Awards Kenneth M. Cuthbertson Award

The Kenneth M. Cuthbertson Award was established in 1981 to recognize exceptional service to Stanford University. It was established by members of the faculty who wish to remain anonymous. All members of the Stanford community are eligible for the award; the sole criterion is the quality of the contribution that the recipients have made to the University. The award provides a way of honoring members of the staff and faculty for their efforts on behalf of the University.

Ordinarily, one award is made each year. The award was first presented in 1981 to the person for whom it is named. Kenneth M. Cuthbertson was one of the early architects of Stanford's long-term financial planning and fundraising program. His service to Stanford set an enduring standard for those who will come after him. The award is made annually at the University Commencement Ceremony.

Lloyd W. Dinkelspiel Awards

The Lloyd W. Dinkelspiel Awards recognize distinctive and exceptional contributions to undergraduate education at Stanford University. The two principal awards are made to the faculty or staff members adjudged to have made the most distinctive contribution to the development and enrichment of undergraduate education in its broadest sense. Two awards are also made to graduating seniors who combine academic achievement with effective contributions to undergraduate student life. Preference is given to service in the School of Humanities and Sciences in the area of liberal education. The awards are made from an endowment fund established in memory of Lloyd W. Dinkelspiel, a Stanford alumnus and trustee. The awards are made annually at the University Commencement Ceremony.

Walter J. Gores Awards

The Walter J. Gores Faculty Achievement Awards for excellence in teaching were established by bequest of Walter J. Gores, Stanford Alumnus of the Class of 1917 and a professor at the University of Michigan for

30 years. Teaching is understood in its broadest sense and includes, in particular, lecturing, leading discussions, tutoring, and advising at the undergraduate or graduate levels. Any member of the teaching staff of the University is eligible for an award, including all faculty of professorial rank, instructors, lecturers, teaching fellows, and teaching and course assistants. Ordinarily, awards are made to a senior faculty member (associate or full professor) or senior lecturer; a junior faculty member or member of the teaching staff; and a teaching assistant (graduate or undergraduate student). The awards are made annually at the University Commencement Ceremony.

Allan Cox Medal For Faculty Excellence Fostering Undergraduate Research

The Allan Cox Medal for Faculty Excellence Fostering Undergraduate Research is awarded annually to a faculty member who has established a record of excellence directing undergraduate research over a number of years. It may also go to a faculty member who has done an especially outstanding job with just one or two undergraduates who have demonstrated superior work. The medal was established in memory of the former professor of Geophysics and Dean of the School of Earth Sciences, a strong supporter of faculty-student research collaboration.

Herbert Hoover Medal For Distinguished Service

David Starr Jordan's belief that every academic degree should represent work actually done in or under the direction of the institution granting it has meant that, since its founding, Stanford has awarded no honorary degrees. As a means of recognizing extraordinary individuals who deserve special acknowledgment, the Stanford Alumni Association in 1962 voted to establish the Herbert Hoover Medal for Distinguished Service. The name pays tribute to the former President's example of service to his University, to his country, and to the cause of world humanitarianism. Indeed, Mr. Hoover was the first award recipient. The gold medal is presented following selection by an anonymous committee appointed by the Chair of the Board of Directors of the Alumni Association.

Student Awards

Boothe Prize for Excellence in Writing

Awarded during the freshman year, the Boothe Prize recognizes excellence in writing. Students are selected for this honor on the basis of essays written for courses fulfilling the Introduction to the Humanities or Writing and Rhetoric requirements. The prize is named for Mr. and Mrs. D. Power Boothe, Jr., whose gifts to the University reflect their interest in the humanities.

President's Award for Academic Excellence in the Freshman Year

The President's Award honors students in the top 3% of the class who have exceptionally distinguished academic records that exemplify a strong program of study in the freshman year. Students eligible for the award normally have completed Writing and Rhetoric and Introduction to the Humanities requirements during their first year at Stanford.

Deans' Award for Academic Achievement

The Deans of Earth Sciences, Engineering, and Humanities and Sciences recognize from five to ten undergraduate students each year for their academic endeavors. Honorees are cited for noteworthy accomplishments which represent more than a high grade point average or success in course work. Faculty nominate students who have exceptional tangible

achievements in classes or independent research, national academic competitions, a presentation or publication for a regional or national audience, or exceptional performance in the creative arts.

Firestone Medal for Excellence in Research

The Firestone Medal is awarded to seniors in recognition of excellence in undergraduate research. Departments in the School of Humanities and Sciences nominate students who have completed outstanding honors projects in the social, physical, and natural sciences.

Robert M. Golden Medal for Excellence in the Humanities and Creative Arts

The Golden Medal recognizes outstanding achievement in the humanities and the creative arts. Seniors receive these medals upon nomination by their major department.

Hoefer Prize for Excellence in Undergraduate Writing

The Hoefer Prize recognizes students and faculty for their work in courses that meet the University Writing Requirement for writing in the major. Prizes are awarded in each of the five areas of the undergraduate curriculum: humanities, social sciences, natural sciences, engineering, and earth sciences.

Frederick Emmons Terman Engineering Scholastic Award

The School of Engineering annually presents the Terman Award to seniors for outstanding academic achievement. The awardees share their award with a high school teacher of their nomination.

Phi Beta Kappa

Phi Beta Kappa is a nationwide society honoring students for the excellence and breadth of their undergraduate scholarly accomplishments. Membership in the Stanford Chapter (Beta of California) is open to undergraduates of all majors. To be elected to Phi Beta Kappa at Stanford, a student must achieve academic distinction in the major as well as in courses across a broad range of fields.

Approximately a tenth of the members of a graduating class are elected to Phi Beta Kappa. Of this number, about one fifth are chosen in their junior year, the remainder in their senior year.

The chapter's election guidelines define breadth of study as excellence beyond the major field. To be considered for election, a student must have taken at least three courses of 3 units or more at Stanford by the time elections are held early in the Spring Quarter with a letter grade of 'B-' or better in each of the following three major domains of knowledge: humanities; science, engineering, and math; and social sciences. Students who transfer in their junior year must have taken at least two courses at Stanford in two of the major domains and at least one course in the third domain, and must have completed a minimum of 75 units of academic work at Stanford by the end of Winter Quarter. Students who transfer in their sophomore year must have taken at least two courses at Stanford in each of the major domains.

There is no direct correlation between Stanford University General Education Requirements (GERs) and Phi Beta Kappa breadth requirements. The elections committee analyzes the content of individual courses to determine which major domain requirement they may satisfy. IHUM, PWR, and first-year language courses do not satisfy the PBK breadth criterion.

A grade of '+' or 'CR' is not considered a sign of distinction. Minimally satisfying the breadth criterion is not considered a sign of distinction.

The academic records of eligible students are automatically reviewed, so no special action is required for students wishing to be considered for membership. Anonymity in the election process is ensured by removal of the students' names from their academic records before consideration. Students who desire that their records not be made available for consideration by the Stanford chapter of Phi Beta Kappa should inform the Registrar, 630 Serra Street, Suite 120, Stanford, CA 94305-6032.

Exchange Programs and Cross-enrollment Agreements

Stanford has exchange programs and cross-enrollment agreements with a number of other colleges and universities. The purpose of these programs and agreements is to offer Stanford students courses and training that are not available in the Stanford curriculum.

Undergraduate

Stanford has exchange programs with four colleges and universities that allow students to exchange schools for a quarter/semester or for a year, depending on the school. These programs are best suited to students in their junior year, when the major area of study has been determined. Stanford students register for zero units at Stanford during the quarter(s) in which they are attending another college or university and pay the regular Stanford tuition. Courses taken at the other institution are treated as transfer credit back to Stanford. Students should contact the External Credit Evaluation section of the Office of the University Registrar to determine whether the courses taken through an exchange program may qualify for credit toward a Stanford degree. Only the number of units accepted in transfer, not the course titles or the grades received, are recorded on the Stanford transcript.

Exchange programs are currently available at three historically black institutions: Howard University in Washington D.C.; and Morehouse College and Spelman College in Atlanta, Georgia. The exchange program at Dartmouth College in Hanover, New Hampshire, focuses on Native American Studies. Further information is available at the Undergraduate Advising and Research Center.

Graduate

The Exchange Scholar Program is open to doctoral students in programs other than the Graduate School of Business or Stanford Law School who have completed one full year of study at one of the participating institutions. These students may apply to study at Stanford, and Stanford students may apply to one of these other institutions, for a maximum of one academic year (Autumn, Winter, and Spring quarters) to take advantage of particular educational opportunities not available on the home campus. The participating institutions are Brown University, University of Chicago, Columbia University, Cornell University, Harvard University, Massachusetts Institute of Technology, Princeton University, Stanford University, University of Pennsylvania, and Yale University. Further information on the program may be obtained from the Office of the University Registrar, or the graduate dean's office at participating institutions. Some institutions may place restrictions on specific departments.

Stanford also has separate exchange programs with the University of California, Berkeley, the University of California, San Francisco, and the University of California, Santa Cruz for students in marine sciences. Further information may be obtained at the Office of the University Registrar.

Cross-Enrollment

See the ROTC section (p. 97) of this bulletin for information on ROTC cross-enrollment programs.

Course Descriptions

Courses Courses Courses Accounting Courses

ACCT 210. Financial Accounting. 4 Units.

Financial accounting is the measurement of economic activity for decision-making. Financial statements are a key product of this measurement process and an important component of firms' financial reporting activities. The objective of this course is not to train you to become an accountant but rather to help you develop into an informed user of financial statement information. While financial statement users face a wide variety of decisions, they are often interested in understanding the implications of financial statement information for the future cash flows and earnings potential of a firm. We will focus on understanding the mapping between underlying economic events and financial statements, and on understanding how this mapping affects inferences about future profitability and liquidity. The following learning objectives will be emphasized: (1) familiarity with the transactions businesses engage in, (2) fluency in accounting terminology, (3) understanding the structure that maps transactions into accounting numbers, (4) understanding the rationale for various accounting methods, and (5) awareness of the judgment involved and the discretion allowed in choosing accounting methods, making estimates, and disclosing information in financial statements.

ACCT 212. Managerial Accounting: Base. 2 Units.

This course provides an introduction to the concepts and tools of managerial accounting. The first part of the course covers alternative costing methods and illustrates how the resulting cost information can be used to analyze the profitability of individual products and customers. The second part of the course will examine the role of internal accounting systems in evaluating the performance of individual business segments and divisions of the firm. Included in this part are topics related to the choice of internal pricing methods for transferring goods and services across divisions of the firm and the use of financial metrics for assessing the profitability of these divisions.

ACCT 213. Financial Accounting - Accelerated. 4 Units.

This course develops students' ability to read, understand, and use corporate financial statements. The course is oriented toward the user of financial accounting data (rather than the preparer) and emphasizes the reconstruction and interpretation of economic events from published accounting reports. The course is geared toward students with some familiarity in dealing with financial statement information and allows for deeper coverage and discussion in class.

ACCT 215. Managerial Accounting: Accelerated. 3 Units.

This course provides a comprehensive introduction to the concepts and tools of managerial accounting. The first part of the course demonstrates how management can rely on internal accounting information to measure and manage the profitability of individual products and customers. As part of that analysis, we examine alternative costing methods and illustrate how the resulting cost information can be used for decision making. The second part of the course focuses on the role of the internal accounting system in evaluating managerial performance and in coordinating the activities among business units within the firm. Our focus here will be on performance metrics that enable effective decentralization by aligning the objectives of individual business units with the overall corporate goals.

ACCT 219. MSx: Accounting. 4 Units.

A characteristic of business is the extensive use of accounting data. The financial accounting course has the general objective of developing students' understanding of the nature, scope, and limitations of accounting information. To achieve this objective the course attempts to: (1) develop students' understanding of the conceptual accounting framework, including the objectives of financial reporting, and (2) develop students' ability to understand and critically evaluate the financial disclosures made by corporations. An issue of particular interest will be the managerial incentive aspects of accounting information and disclosures.

ACCT 311. Global Financial Reporting. 4 Units.

This course is designed to enhance students' understanding of current financial reporting issues through a detailed analysis and comparison of U.S. and International Financial Reporting Standards. The course will cover the development of accounting standards, implementation of these standards, and how to interpret output from these standards. The course highlights intermediate and advanced financial reporting topics including fair value accounting, asset securitization, consolidation including special purpose entities, foreign currency translation, derivatives and hedging, leases, revenue recognition, pensions, and equity compensation. The course also focuses on evaluating emerging financial reporting issues such as proposed financial reporting standards put forth by U.S. or international standard setting bodies. This course should help students better understand the environment governing global financial reporting and how firms develop financial statement information within this environment.

ACCT 312. Evaluating Earnings Quality. 4 Units.

This course aims to develop students' understanding of the relation between accounting numbers and underlying economic activity, and to develop students' ability to evaluate the quality of reported accounting numbers. The course will then focus on how to use them in decision contexts including evaluating profitability, forecasting future earnings and cash flows, selecting an appropriate financial reporting strategy, and assessing risk. Accordingly, the course will focus on several factors essential to this goal. These include understanding (1) the business environment a firm operates in, its contracting practices and their implications for what accounting principles are applied and what judgments are required; (2) the process that generates accounting numbers and its implications for the quality of those numbers for decision purposes; (3) approaches for assessing the sustainability and growth of a firm's revenues and earnings using financial statement information; and (4) approaches to evaluate earnings quality, the risk of earnings restatements, liquidity and solvency. This course should be of value to students who will be in senior positions within corporations and will determine financial reporting policies, as well as those outside corporations who will make investment or other decisions at least partially based on financial statement information.

ACCT 313. Accounting-Based Valuation. 4 Units.

This course is designed to develop students' ability to interpret and use financial accounting information in an equity valuation context. The perspective taken is that of an outsider relying on publicly available financial information for investment purposes. The course relies heavily upon financial statement analysis tools and the residual income framework for equity valuation. Through lectures, in-depth case studies, and real-time exercises, the first half of the course covers traditional financial statement analysis-based tools for critically analyzing and assessing a firm's current financial performance and economic condition, including ratio analysis, accounting quality analysis and financial distress / bankruptcy prediction models. The second half of the course introduces the accounting-based valuation framework and develops the link between financial statement analysis, forecasting and equity valuation. The capstone to the course is the completion of a comprehensive, real-time valuation of a publicly traded firm (or registered IPO candidate). The course is structured for students to gain a deeper understanding of the economic pressures behind the valuation creation and valuation process, and will be of useful to those students who anticipate making investment or credit decisions at least partially based on historical and prospective financial statement information.

ACCT 317. Managerial Accounting: Performance Measurement, Compensation, and Governance. 3 Units.

The course will examine the academic and professional controversies surrounding corporate governance and executive compensation. A basic framework will be developed to integrate the many important dimensions of corporate governance in the U.S. and international settings. The institutional features of corporate governance and executive compensation will be documented using the professional business and legal literatures. In addition, the scientific research in accounting, economics, finance, and organizational behavior will be used to provide insights into the measurement and consequences of observed corporate governance and executive compensation choices. After successfully finishing the course, a student should be able to (i) understand the debates about appropriate choices for corporate governance and executive compensation and (ii) critically evaluate the implications of academic and professional research studies on these controversial issues.

ACCT 332. Mergers and Acquisitions. 3 Units.

This course provides a comprehensive overview of accounting, economic, and financial issues related to mergers and acquisitions. Specifically, we review the market for corporate control, discuss strategic and corporate governance issues related to firms' decision to acquire or be acquired, and examine the M&A regulatory environment (e.g., anti-trust). We also review various pricing and deal structure considerations, and identify some of the strategies that underlay a successful negotiation. We also review the financial reporting effects of business acquisitions and the various income tax implications of such deals. In covering these and other related issues, we will discuss both the theory and practice of mergers and acquisitions. To provide some specific context we will analyze several M&A deals (e.g., Google/Motorola, HP/Compaq, UpJohn/Pharmacia, AOL/Time Warner, Oracle/PeopleSoft, and many more). In discussing these cases, we will examine the situation faced by the company, the issues surrounding the transaction, including the financial reporting implications, and focus on the managerial incentives and the judgment applied. We will also review some of the related literature in accounting, economic, and finance, to gain broader perspectives and insights into the financial issues associated with M&A transactions. Class time comprises mini lectures that introduce some of the more technical concepts, case discussions, and guest speakers who will offer additional perspectives on the subject matters. The course is co-taught by Ron Kasznik (GSB) and Safra Catz (Oracle Corporation). Ms. Catz is President of Oracle and a member of its Board of Directors. She has led Oracle through nearly 100 acquisitions in recent years (including PeopleSoft, Siebel, BEA, Sun Microsystems, and many more). Prior to joining Oracle in 1999, Ms. Catz was Managing Director at Donaldson, Lufkin & Jenrette, a global investment bank (now part of CSFB). Ms. Catz also serves on the board of directors for HSBC Holdings plc since 2008.

ACCT 333. Taxes and Business Strategy. 3 Units.

The objective of this course is to develop a framework for understanding how taxes affect business decisions. The key themes of the framework - all parties, all taxes and all costs - are applied to decision contexts such as investments, compensation, and organizational form. The goal of this course is to provide a new approach to thinking about taxes that will be valuable across jurisdictions even as laws change.

ACCT 340. Alphanomics: Informational Arbitrage in Equity Markets. 4 Units.

This is an advanced elective course on the economics of active investing in equity markets. The course is designed as a "start-up kit for an equity hedge fund." We will cover some of the foundational skills needed to select and trade stocks, as well as build and manage a portfolio of public equity. Specifically, the course material is designed to improve student skills in: (1) assessing the relative attractiveness of individual companies, (2) building stock screens to filter and rank firms based on user-specified parameters, (3) trading individual equity positions, and (4) monitoring and managing portfolio risk. This is a hands-on course with an emphasis on experiential learning. Students will make extensive use of the analytical tools in the new "Real-time Analytics and Investment Lab" (R.A.I.L.) facility in the Bass Center. There is no final exam. However, there will be a number of individual cases and a final group project. 25% of the grade will be based on class participation, and 75% will be based on cases and projects. Because it is an advanced elective, students taking this class are expected to be well versed in core economic, accounting, and finance skills. Material covered in a second Financial Modeling course, as well as in Accounting 312 (Evaluating Financial Statement Information) and Accounting 313 (Accounting-based Valuation) will come in handy. However, none of these courses are required.

ACCT 354. Analysis and Valuation for Event-Driven Investing. 3 Units.

This Bass seminar is designed to develop students' ability to interpret and use financial accounting information in credit and equity valuation contexts. The course will focus on valuing the securities of companies undergoing significant changes as a result of litigation, restructuring, regulatory changes, mergers, spin-offs or significant industry shifts. Throughout the course, students will (1) enrich their understanding of how alternative economic, legal, political and regulatory outcomes affect the value of various components of a company's capital structure and (2) develop their ability to apply financial statement analysis to assess the likelihood and valuation implications of the events of interest. Event-driven investing follows the life cycle of companies as they revamp their corporate structures in response to economic and regulatory environments. For example, in rising economic periods companies may undertake acquisitions or spin off divisions to enhance shareholder value. During adverse environments, bankruptcy and reorganizations often reshape the capital structure by offering opportunities to create value through the restructuring process. During economic transitions, debt and equity investors may make significantly different assessments of the quality of a company's earnings, its assets, and its likelihood to meet its debt obligations. To assess the probability of corporate events, investors must make judgments about the quality of a company's earnings and assets and understand how accounting policies may influence management's representations. Investors must also interpret how accounting policies function at various points in a firm's life cycle, influencing the quality of earnings for firms differently in different economic environments. In the first half of the course, we will develop the course framework, and apply it to illustrative cases. Companies featured in the cases include Tyco, AIG, CIT, Fannie Mae, Tesla and Pharmasset and Gilead. Students will interpret information from companies' public financial disclosures to assess the likelihood of different events or outcomes. The course will also feature readings on current accounting standards, articles from the popular press, publicly available financial statement information, and guest speakers with in-depth knowledge of investing strategies vis a vis the case companies. The latter part of the course will be devoted to project work, with students working in teams to develop an event-driven investing strategy. The aim is to allow students to conduct independent research on a company, industry, economic context, or financial reporting environment of particular interest. Students will develop their investment idea, articulate their sense of the possible outcomes for the components of the firm's capital structure, and explain how they have assessed the likelihood and valuation consequences of those outcomes. At the conclusion of the course, students will present their strategies to the class and a panel of expert judges.

ACCT 506. Evaluating Earnings Quality. 2 Units.

This course aims to develop students' understanding of the relation between accounting numbers and underlying economic activity, and to develop students' ability to evaluate the quality of accounting numbers. The course will focus on several skills essential to these goals. These include (1) understanding the process that generates accounting numbers and its implications for the quality of those numbers for decision purposes, (2) understanding the business environment a firm operates in and the firm's financial, accounting and operating strategies, (3) tools for assessing a firm's performance including ratio and cash flow analysis, and (4) identifying patterns that suggest low earnings quality and/or earnings manipulation. This course should be of value to students who expect to be in senior positions within corporations and will determine financial reporting policies, as well as those in investment banking, venture capital, investment management, consulting or public accounting. Class sessions will be devoted to a mix of lecture, discussion, group exercises and cases. The class will conclude with a mini-project where you analyze how a firm manipulated its financial statements or disclosures and identify the key clues that are visible in their financial statements.

ACCT 516. Analysis and Valuation of Emerging Market Firms. 2 Units.

This course examines the unique institutional, governance and transparency issues affecting corporate valuations in emerging markets. Through lectures and the students' real-time analysis of an emerging market firm, this condensed course is structured for students to gain a deeper understanding of the economic pressures behind the value creation, value destruction and valuation process in emerging economies. The course focuses on critically interpreting financial and non-financial information for purposes of assessing firm fundamentals and risk in the presence of weak legal systems, strong political forces, limited investor protections, limited market development, strong macro-economic forces, opacity and resultant business arrangements. The course is beneficial for entrepreneurs, consultants, investors and managers operating in or considering expansion to developing markets.

ACCT 518. Analysis and Valuation of Emerging Market Firms. 2 Units.

The course is designed to introduce students to the unique institutional, corporate governance and transparency issues facing managers and investors in emerging economies, and the impact these issues have on assessment of firm performance and value. The goal of the class is to gain an understanding of how country-level institutional forces interact with firm-level factors to shape firm value in these countries, how to interpret published financial reports in this environment to identify the source of firm-level value creation, and to use your assessment of the firm to identify the primitive sources of the firm's risks and opportunities. Topics covered will include an assessment of related party transactions, importance of political factors and social networks, governance conflicts, and the risk of expropriation. Students will be expected to: (1) make one presentation (most likely as a part of a two-to-three person group) that explores the valuation and value drivers of a specific emerging market firm and (2) attend all four classes. Grades will be on a pass/fail basis. Professor Piotroski teaches the Accounting-based Valuation and Valuation in Emerging Economies courses at the GSB.

ACCT 523. Board Governance. 2 Units.

This course is focused on helping students understand the role boards and board members play in corporate governance and the lives of businesses large and small. This case-driven course is designed to help students who plan to serve on boards as private-equity or venture investors, entrepreneurs who will need to assemble and manage boards, and executives who realize they will need to interact with and answer to boards. The course is designed to help students understand the issues boards face - both routine and non-routine - through the eyes of the board member. By understanding the roles and responsibilities of board members and the mechanisms through which they exercise these duties, students will come away with an understanding of how boards function effectively (and in too many cases fail to function effectively). The course will include examining boards in a variety of contexts with a focus on three types of situations: public for-profit companies, early-stage private companies, and non-for-profit companies of different sizes.

ACCT 533. Taxes and Business Strategy. 2 Units.

The objective of this course is to develop a framework for understanding how taxes affect business decisions. The key themes of the framework - all parties, all taxes and all costs - are applied to decision contexts such as investments, compensation, and organizational form. The goal of this course is to provide a new approach to thinking about taxes that will be valuable across jurisdictions even as laws change.

ACCT 541. Alphanomics II. 2 Units.

This is a 2-credit advanced elective in equity investing that will be offered in the Spring 2013 quarter. This course is open only to students that were enrolled in Alphanomics (ACCT340) in the Fall of 2012. If you complete ACCT340 in the Fall of 2012, your spot in this course will be automatically reserved. However, you still have a chance to opt out of this course at the end of the Fall 2012 quarter. The Fall (ACCT340) course is designed as a "start-up kit for an equity hedge fund". In the Fall quarter, we will cover some of the foundational skills needed to build and manage a portfolio of public stocks. Towards the end of Fall, student who choose to continue onto the Spring course (ACCT541) will form teams (of 4 to 6 each) and submit a proposal for a hedge fund product. Once their proposal is approved, each team will be given a \$1 million paper portfolio. Students then manage this portfolio for the rest of the school year (their trades and portfolio statistics are automatically tracked). Students enrolled in the Spring (ACCT541) will reconvene in the second half of the quarter for a series of class lectures/talks as well as team presentations, summarizing their experience. The ACCT541 portion of the course will require each student group to make a class presentation, as well as turn in a written report. 25% of the grades will be based on class participation, and 75% will be based on the presentations and reports. The overall goal of this course is to improve student skills in assessing the relative attractiveness of individual companies, as well as in managing portfolio risk according to pre-specified targets. This is a hands-on course with an emphasis on experiential learning. Students will make extensive use of analytical tools in the new "Real-time Analytics and Investment Lab" (High-speed R.A.I.L.) facility in the Bass Center. As part of this course, students will be required to design stock screens, conduct back-tests, do detailed company analyses, execute (virtual) trades, and manage portfolio risk.

ACCT 554. Project in Event-Driven Investing. 2 Units.

This project-focused course is designed to develop students' ability to interpret and use financial accounting information in credit and equity valuation contexts. The course will focus on valuing the securities of companies undergoing significant changes as a result of litigation, restructuring, regulatory changes, mergers, spin-offs or significant industry shifts. Students will work in groups to develop a recommendation for an event-driven investment strategy. The project will feature financial statement and valuation analysis to assess the risks and rewards of the proposed strategy. Groups will be mentored by experienced investors. The course will be of value to those students who anticipate making investment decisions using financial statement information.

ACCT 609. Financial Reporting and Management Control. 4 Units.

This course is aimed at doctoral students in accounting and neighboring fields including economics, finance, political economics and operations management. The course seeks to provide an introduction to the role of accounting information in (i) measuring firm performance, (ii) projecting profitability and firm value for external constituents, (iii) and motivating and controlling the firm's management. The main topics covered in this course include: 1. Profitability Measurement and Accrual Accounting. 2. Performance Evaluation and Managerial Incentives. 3. Accounting-based Equity Valuation. 4. The Informational Role of Accounting Numbers 5. Earnings Quality Constructs and Measures. The primary objective of the course is to introduce students to current research paradigms on these topics and to identify promising avenues for future research. The course readings include recent theoretical and empirical papers.

ACCT 610. Seminar in Empirical Accounting Research. 3 Units.

Empirical Research on Financial Reporting: This doctoral-level course covers research on the role of accounting information in capital markets. The focus is on introducing students to key themes in empirical accounting and capital markets research, and to key research designs applied to examine information-related questions. Course topics include market efficiency, the role of accounting in providing information to investors, anomalies, alternative sources of information, accounting measurement attributes, earnings management, earnings quality, and the role of auditors in the provision of information to investors. The course is interdisciplinary in nature. The readings focus on research design, and key theories, themes and approaches from the accounting, finance, economics and psychology literature. Our overall goal is not only to review existing research, but also to identify new research opportunities.

ACCT 611. Applications of Information Economics in Management and Accounting. 3 Units.

This course develops tools from information economics to study the strategic interactions between agents inside a firm and between firm insiders and market participants. Common to these studies is that agents acquire private information that is valuable to other parties. The range of applications includes: the structure of managerial performance measures, buyer-supplier contracting arrangements, earnings management, voluntary and mandatory disclosure and financial analysts.

ACCT 612. Financial Reporting Seminar. 3 Units.

The purpose of this PhD seminar is to facilitate your conception and execution of substantive individual research in financial reporting. It provides a vehicle for supplementing and integrating your knowledge of basic research tools and methods, as well as an exposure to the dimensions of contemporary research in the field of financial reporting. The focus of the research we will discuss in this seminar is on global financial reporting. Such research encompasses studies dealing with contemporary financial reporting issues as well as research addressing issues relating to the globalization of financial reporting. Because these issues are also of concern to financial reporting standard setters, we will discuss whether and how the research we study informs standard setting debates. Prerequisite: Consent of the instructor.

ACCT 615. Selected Topics in Empirical Accounting Research. 3 Units.

This course examines selected topics in accounting research. The course features four faculty who will each give a focused look at a given area, introduce students to important questions in that area, key papers in the related literature, and critical aspects of the research designs applied in the area. The aim is to increase student's familiarity with empirical accounting research, their ability to critically evaluate research and research designs, and to prepare students to conduct independent research.

ACCT 617. Managerial Incentives and Corporate Governance: Concepts and Empirical Methodology. 4 Units.

The course will consist of three set of topics. The first part of the class will examine a set of applied econometric topics that are useful in empirical accounting research. Each of these topics will be illustrated using contemporary examples from accounting, economics, and finance. The second part of the class will cover some of the basic theoretical work in moral hazard agency models and various extensions to this type of research. The final part of the course will discuss the empirical literature on corporate governance and executive compensation. The course will be taught in a seminar style and students will be required to develop a series of research projects on the topics covered in the class.

ACCT 618. Market Efficiency and Informational Arbitrage. 3 Units.

The informational efficiency of stock markets has been a central theme in financial economic research in the past 50 years. Over this period, the focus of academic research has gradually shifted from the general to the more specific. While earlier studies tend to view the matter as a yes/no debate, many recent studies now acknowledge the impossibility of fully efficient markets, and have focused instead on analyses of factors that could materially affect the timely incorporation of information into prices. At the same time, increasing attention is being paid to regulatory and market design issues that could either impede or enhance market pricing efficiency. In this course, we will cover recent research on the role of informational arbitrage in asset pricing. Our starting point is the observation that, with costly information, equilibrium prices will invariably reflect some mispricing. The existence of mispricing introduces a role for informational arbitrage, whereby some traders will invest resources to become informed about the mispricing, with hopes of profiting from it. We review recent academic evidence on this process, and reflect on its implications for future market-related research. We will also discuss how academic research might help lower information/arbitrage costs. This is a doctoral level course. Our goal is not only to review existing research, but also to stimulate new work in the area. As such, I expect it will be of primary interest to Ph.D. students majoring in accounting, finance, and economics. Given our focus on returns prediction and the role of information in arbitrage strategies, this course should be of particular interest to those interested exploring the relation between information flows and market pricing dynamics. The course content is interdisciplinary in nature, spanning finance, economics, and accounting. Most of the readings in the earlier readings derive from finance and economics (market efficiency, limits to arbitrage, and behavioral finance); most of the later readings derive from financial accounting (equity valuation, fundamental analysis, earnings management, and analyst behavior).

ACCT 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

ACCT 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

ACCT 802. TGR Dissertation. 0 Units.

Same as: FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

Aeronautics Astronautics Courses

AA 100. Introduction to Aeronautics and Astronautics. 3 Units.

The principles of fluid flow, flight, and propulsion; the creation of lift and drag, aerodynamic performance including takeoff, climb, range, and landing performance, structural concepts, propulsion systems, trajectories, and orbits. The history of aeronautics and astronautics. Prerequisites: MATH 41, 42; elementary physics.

AA 115N. The Global Positioning System: Where on Earth are We, and What Time is It?. 3 Units.

Preference to freshmen. Why people want to know where they are: answers include cross-Pacific trips of Polynesians, missile guidance, and distraught callers. How people determine where they are: navigation technology from dead-reckoning, sextants, and satellite navigation (GPS). Hands-on experience. How GPS works; when it does not work; possibilities for improving performance.

AA 116Q. Electric Automobiles and Aircraft. 3 Units.

Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues reconsider how we move, finding sustainable transportation solutions. An introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Two opportunities for hands-on experiences with electric cars. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics.

AA 190. Directed Research and Writing in Aero/Astro. 3-5 Units.

For undergraduates. Experimental or theoretical work under faculty direction, and emphasizing development of research and communication skills. Written report(s) and letter grade required; if this is not appropriate, enroll in 199. Consult faculty in area of interest for appropriate topics, involving one of the graduate research groups or other special projects. May be repeated for credit. Prerequisite: consent of student services manager and instructor.

AA 199. Independent Study in Aero/Astro. 1-5 Unit.

Directed reading, lab, or theoretical work for undergraduate students. Consult faculty in area of interest for appropriate topics involving one of the graduate research groups or other special projects. May be repeated for credit. Prerequisite: consent of instructor.

AA 200. Applied Aerodynamics. 3 Units.

Analytical and numerical techniques for the aerodynamic analysis of aircraft, focusing on airfoil theory, finite wing theory, far-field and Trefftz-plane analysis, two-dimensional laminar and turbulent boundary layers in airfoil analysis, laminar-to-turbulent transition, compressibility effects, and similarity rules. Biweekly assignments require MATLAB or a suitable programming language. Prerequisite: undergraduate courses in basic fluid mechanics and applied aerodynamics, AA 210A.

AA 201A. Fundamentals of Acoustics. 3 Units.

Acoustic equations for a stationary homogeneous fluid; wave equation; plane, spherical, and cylindrical waves; harmonic (monochromatic) waves; simple sound radiators; reflection and transmission of sound at interfaces between different media; multipole analysis of sound radiation; Kirchhoff integral representation; scattering and diffraction of sound; propagation through ducts (dispersion, attenuation, group velocity); sound in enclosed regions (reverberation, absorption, and dispersion); radiation from moving sources; propagation in the atmosphere and underwater. Prerequisite: first-year graduate standing in engineering, mathematics, sciences; or consent of instructor.

AA 201B. Topics in Aeroacoustics. 3 Units.

Acoustic equations for moving medium, simple sources, Kirchhoff formula, and multipole representation; radiation from moving sources; acoustic analogy approach to sound generation in compact flows; theories of Lighthill, Powell, and Mohring; acoustic radiation from moving surfaces; theories of Curl, Ffowcs Williams, and Hawkings; application of acoustic theories to the noise from propulsive jets, and airframe and rotor noise; computational methods for acoustics. Prerequisite: 201A or consent of instructor.

AA 202. Hypersonic Flow. 3 Units.

The fundamental principals and equations governing hypersonic flight and high temperature gas dynamics, including chemical and thermal equilibrium and non-equilibrium; statistical thermodynamics; kinetic theory; transport phenomena; radiation; surface heating; and scramjet engines. Prerequisite: understanding of aerodynamics. Recommended: AA 200A.

AA 203. Introduction to Optimal Control Theory. 3 Units.

Basic solution techniques for optimal control problems. Dynamic programming, calculus of variations, and numerical techniques for trajectory optimization. Special cases (chiefly LQR and robotic motion planning); modern solution approaches (such as MPC and MILP); and introduction to stochastic optimal control. Examples in MATLAB. Prerequisites: Linear algebra (EE 263 or equivalent).

AA 206. Bio-Aerodynamics. 3 Units.

Topics: flapping flight, low Reynolds number aerodynamics, wing design, flocks, swarms, and dynamic soaring. Readings from current and historical literature dealing with theoretical and observational studies. Applications in aircraft design, and simulation-based problem sets. Prerequisite: course in aerodynamics such as 100, 200A, or 241A.

AA 208. Aerodynamics of Aircraft Dynamic Response and Stability. 3 Units.

Companion to 200A for those interested in control and guidance. Typical vehicles and the technical tradeoffs affecting their design. Equations of motion, stressing applications to dynamic performance, stability, and forced response. Forms and sources for the required aerodynamic data. Response to small disturbances and stability derivatives. Static stability and trim. Review of aerodynamic fundamentals, leading to airload predictions for wings, bodies, and complete aircraft. Paneling and other methods for derivative estimation. Natural motions of the aircraft, and the influence on them of various configuration parameters. Vehicle behavior in maneuvers of small and large amplitudes. Prerequisites: 200A, 210A, or equivalents (may be taken concurrently).

AA 210A. Fundamentals of Compressible Flow. 3 Units.

Topics: development of the three-dimensional, non-steady, field equations for describing the motion of a viscous, compressible fluid; differential and integral forms of the equations; constitutive equations for a compressible fluid; the entropy equation; compressible boundary layers; area-averaged equations for one-dimensional steady flow; shock waves; channel flow with heat addition and friction; flow in nozzles and inlets; oblique shock waves; Prandtl-Meyer expansion; unsteady one-dimensional flow; the shock tube; small disturbance theory; acoustics in one-dimension; steady flow in two-dimensions; potential flow; linearized potential flow; lift and drag of thin airfoils. Prerequisites: undergraduate background in fluid mechanics and thermodynamics.

AA 210B. Fundamentals of Compressible Flow. 3 Units.

Continuation of 210A with emphasis on more general flow geometry. Use of exact solutions to explore the hypersonic limit. Identification of similarity parameters. Solution methods for the linearized potential equation with applications to wings and bodies in steady flow; their relation to physical acoustics and wave motion in nonsteady flow. Nonlinear solutions for nonsteady constant area flow and introduction to Riemann invariants. Elements of the theory of characteristics; nozzle design; extension to nonisentropic flow. Real gas effects in compressible flow. Flows in various gas dynamic testing facilities. Prerequisite: 210A.

AA 212. Analysis and Design of Multivariable Feedback Systems. 3 Units.

Analysis and design techniques for multivariable feedback systems. Review of basic properties of multi-input, multi-output linear time-invariant systems and of basic concepts from convex analysis. Study of the stability and robustness of feedback loops. Approaches for optimal and robust feedback control design, chiefly H₂ and H-infinity synthesis. Prerequisite: EE 263. Recommended: EE 364A.

AA 214A. Introduction to Numerical Methods for Engineering. 3 Units.

Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B. Same as: CME 206, ME 300C

AA 214B. Numerical Methods for Compressible Flows. 3 Units.

For M.S.-level graduate students. Covers the hierarchy of mathematical models for compressible flows. Introduction to finite difference, finite volume, and finite element methods for their computation. Ideal potential flow; transonic potential flow; Euler equations; Navier-Stokes equations; representative model problems; shocks, expansions, and contact discontinuities; treatment of boundary conditions; time and pseudo-time integration schemes. Prerequisites: basic knowledge of linear algebra and ODEs (CME 206 or equivalent).

AA 214C. Numerical Computation of Viscous Flow. 3 Units.

Numerical methods for solving parabolic sets of partial differential equations. Numerical approximation of the equations describing compressible viscous flow with adiabatic, isothermal, slip, and no-slip wall boundary conditions. Applications to the Navier-Stokes equations in two and three dimensions at high Reynolds number. Computational problems are assigned. Prerequisite: 214B.

AA 215A. Advanced Computational Fluid Dynamics. 3 Units.

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

Same as: CME 215A

AA 215B. Advanced Computational Fluid Dynamics. 3 Units.

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

Same as: CME 215B

AA 218. Introduction to Symmetry Analysis. 3 Units.

Methods of symmetry analysis and their use in the reduction and simplification of physical problems. Topics: dimensional analysis, phase-space analysis of autonomous systems of ordinary differential equations, use of Lie groups to reduce the order of nonlinear ODEs and to generate integrating factors, use of Lie groups to reduce the dimension of partial differential equations and to generate similarity variables, exact solutions of nonlinear PDEs generated from groups. Mathematica-based software developed by the instructor is used for finding invariant groups of ODEs and PDEs.

AA 222. Introduction to Multidisciplinary Design Optimization. 3-4 Units.

Design of aerospace systems within a formal optimization environment. Mathematical formulation of the multidisciplinary design problem (parameterization of design space, choice of objective functions, constraint definition); survey of algorithms for unconstrained and constrained optimization and optimality conditions; description of sensitivity analysis techniques. Hierarchical techniques for decomposition of the multidisciplinary design problem; use of approximation theory. Applications to design problems in aircraft and launch vehicle design. Prerequisites: multivariable calculus; familiarity with a high-level programming language: FORTRAN, C, C++, MATLAB, Python, or Julia.

AA 228. Decision Making under Uncertainty. 3-4 Units.

This course is designed to increase awareness and appreciation for why uncertainty matters, particularly for aerospace applications. Introduces decision making under uncertainty from a computational perspective and provides an overview of the necessary tools for building autonomous and decision-support systems. Following an introduction to probabilistic models and decision theory, the course will cover computational methods for solving decision problems with stochastic dynamics, model uncertainty, and imperfect state information. Topics include: Bayesian networks, influence diagrams, dynamic programming, reinforcement learning, and partially observable Markov decision processes. Applications cover: air traffic control, aviation surveillance systems, autonomous vehicles, and robotic planetary exploration. Prerequisites: basic probability and fluency in a high-level programming language.

Same as: CS 238

AA 229. Advanced Topics in Sequential Decision Making. 3-4 Units.

Survey of recent research advances in intelligent decision making for dynamic environments from a computational perspective. Efficient algorithms for single and multiagent planning in situations where a model of the environment may or may not be known. Partially observable Markov decision processes, approximate dynamic programming, and reinforcement learning. New approaches for overcoming challenges in generalization from experience, exploration of the environment, and model representation so that these methods can scale to real problems in a variety of domains including aerospace, air traffic control, and robotics. Students are expected to produce an original research paper on a relevant topic. Prerequisites: AA 228/CS 238 or CS 221.

Same as: CS 239

AA 236A. Spacecraft Design. 3-5 Units.

The design of unmanned spacecraft and spacecraft subsystems emphasizing identification of design drivers and current design methods. Topics: spacecraft configuration design, mechanical design, structure and thermal subsystem design, attitude control, electric power, command and telemetry, and design integration and operations.

AA 236B. Spacecraft Design Laboratory. 3-5 Units.

Continuation of 236A. Emphasis is on practical application of systems engineering to the life cycle program of spacecraft design, testing, launching, and operations. Prerequisite: 236A or consent of instructor.

AA 236C. Spacecraft Design Laboratory. 3-5 Units.

AA 240A. Analysis of Structures. 3 Units.

Elements of two-dimensional elasticity theory. Boundary value problems; energy methods; analyses of solid and thin walled section beams, trusses, frames, rings, monocoque and semimonocoque structures. Prerequisite: ENGR 14 or equivalent.

AA 240B. Analysis of Structures. 3 Units.

Thin plate analysis. Structural stability. Material behavior: plasticity and fracture. Introduction of finite element analysis; truss, frame, and plate structures. Prerequisite: 240A or consent of instructor.

AA 241A. Introduction to Aircraft Design, Synthesis, and Analysis. 3 Units.

New aircraft systems emphasizing commercial aircraft. Economic and technological factors that create new aircraft markets. Determining market demands and system mission performance requirements; optimizing configuration to comply with requirements; the interaction of disciplines including aerodynamics, structures, propulsion, guidance, payload, ground support, and parametric studies. Applied aerodynamic and design concepts for use in configuration analysis. Application to a student-selected aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance; engine types; environmental problems; performance estimation. Direct/indirect operating costs prediction and interpretation. Aircraft functional systems; avionics; aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

AA 241B. Introduction to Aircraft Design, Synthesis, and Analysis. 3 Units.

New aircraft systems emphasizing commercial aircraft. Economic and technological factors that create new aircraft markets. Determining market demands and system mission performance requirements; optimizing configuration to comply with requirements; the interaction of disciplines including aerodynamics, structures, propulsion, guidance, payload, ground support, and parametric studies. Applied aerodynamic and design concepts for use in configuration analysis. Application to a student-selected aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance; engine types; environmental problems; performance estimation. Direct/indirect operating costs prediction and interpretation. Aircraft functional systems; avionics; aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

AA 241X. Design, Construction, and Testing of Autonomous Aircraft. 3 Units.

Students grouped according to their expertise to carry out the multidisciplinary design of a solar-powered autonomous aircraft that must meet a clearly stated set of design requirements. Design and construction of the airframe, integration with existing guidance, navigation, and control systems, and development and operation of the resulting design. Design reviews and reports. Prerequisites: expertise in any of the following disciplines by having satisfied the specified courses or equivalent work elsewhere: conceptual design (241A,B); applied aerodynamics (200A,B); structures (240A); composite manufacturing experience; guidance and control (208/271, ENGR 205).

AA 242A. Classical Dynamics. 3 Units.

Accelerating and rotating reference frames. Kinematics of rigid body motion; Euler angles, direction cosines. D'Alembert's principle, equations of motion. Inertia properties of rigid bodies. Dynamics of coupled rigid bodies. Lagrange's equations and their use. Dynamic behavior, stability, and small departures from equilibrium. Prerequisite: ENGR 15 or equivalent.

AA 242B. Mechanical Vibrations. 3 Units.

For M.S.-level graduate students. Covers the vibrations of discrete systems and continuous structures. Introduction to the computational dynamics of linear engineering systems. Review of analytical dynamics of discrete systems; undamped and damped vibrations of N-degree-of-freedom systems; continuous systems; approximation of continuous systems by displacement methods; solution methods for the Eigenvalue problem; direct time-integration methods. Prerequisites: AA 242A or equivalent (recommended but not required); basic knowledge of linear algebra and ODEs; no prior knowledge of structural dynamics is assumed. Same as: ME 242B

AA 244A. Introduction to Plasma Physics and Engineering. 3 Units.

Physics and engineering of plasmas, including space and laboratory plasmas. Debye length and distribution functions. Single-particle motion and drifts. Plasmas as fluids and fluid drifts. Waves in plasmas, including electrostatic and electromagnetic. Diffusion and resistivity. Magnetohydrodynamics.

AA 244B. Advanced Plasma Physics and Engineering. 3 Units.

Equilibrium and instability. Turbulent flow in plasmas. Kinetic theory and the Vlasov equation. Nonlinear effects and solutions. Radiation in a plasma. Plasma diagnostics in ground- and space-based experiments.

AA 250. Nanomaterials for Aerospace. 3 Units.

Properties of nanomaterials and current approaches for engineering spacecraft, aircraft, and subsystems with nanotechnology. Manufacturing of nanomaterials; nano-fiber reinforced composites; structural mechanics of nanomaterials; structure-property relationships; and application of nanotechnology for lightweight structures, thermal protection, nanopropellants, and nanoelectronics.

AA 251. Introduction to the Space Environment. 3 Units.

The environment through which space probes and vehicles travel and orbit. Survey of physical phenomena in the sun, solar wind, magnetospheres, ionospheres, and upper atmospheres of objects in the solar system. Introduction to the physical processes governing space plasmas, solar-terrestrial interactions, and ionized and neutral media surrounding the Earth and other solar system bodies. Prerequisite: Introduction to Plasma Physics.

AA 252. Techniques of Failure Analysis. 3 Units.

Introduction to the field of failure analysis, including fire and explosion analysis, large scale catastrophe projects, traffic accident reconstruction, aircraft accident investigation, human factors, biomechanics and accidents, design defect cases, materials failures and metallurgical procedures, and structural failures. Product liability, failure modes and effects analysis, failure prevention, engineering ethics, and the engineer as expert witness.

AA 256. Mechanics of Composites. 3 Units.

Fiber reinforced composites. Stress, strain, and strength of composite laminates and honeycomb structures. Failure modes and failure criteria. Environmental effects. Manufacturing processes. Design of composite structures. Individual design project required of each student, resulting in a usable computer software. Prerequisite: ENGR 14 or equivalent.

AA 260. Sustainable Aviation. 3 Units.

Quantitative assessment of the impact of aviation on the environment including noise, local, and global emissions, and models used to predict it. Current and future technologies that may allow the air transportation system to meet anticipated growth while reducing or minimizing environmental problems. Atmospheric effects of NO_x, CO₂, particulates, unburned hydrocarbons, and water vapor deposition at high altitudes and metrics for assessing global climate effects. Noise sources, measurement, and mitigation strategies. Fundamentals of aircraft and engine performance needed to assess current and future concepts. Major national and international policy implications of existing and future technology choices. Recommended: AA 241B.

AA 270. Distributed Space Systems. 3 Units.

Keplerian orbital mechanics and orbital perturbations; the general relative motion problem; linear formation flying dynamics and control; impulsive station-keeping and reconfiguration; high order relative motion equations; formulation of relative motion using orbital elements; perturbation-invariant formations; nonlinear formation control; low-thrust propulsion for formation flying; relative navigation using GNSS and optical navigation; applications: sparse-aperture imaging, remote sensing, on-orbit servicing, rendezvous, and docking. Prerequisite: AA 279A or equivalent, and familiarity with MatLab (or another mathematical programming language).

AA 271A. Dynamics and Control of Spacecraft and Aircraft. 3 Units.

The dynamic behavior of aircraft and spacecraft, and the design of automatic control systems for them. For aircraft: non-linear and linearized longitudinal and lateral dynamics; linearized aerodynamics; natural modes of motion; autopilot design to enhance stability, control the flight path, and perform automatic landings. For spacecraft in orbit: natural longitudinal and lateral dynamic behavior and the design of attitude control systems. Prerequisites: AA242A, ENGR 105.

AA 271B. Advanced Dynamics and Control of Spacecraft. 3 Units.

Attitude representation and parametrization; unperturbed and perturbed attitude dynamics and stability; attitude sensors and actuators; linear and nonlinear attitude control; optimal attitude maneuvers; dynamics of flexible spacecraft and space tethers; invited lectures from industry. Prerequisites: AA 271A and AA 279A or equivalents, and familiarity with MatLab (or another mathematical programming language).

AA 272C. Global Positioning Systems. 3 Units.

The principles of satellite navigation using GPS. Positioning techniques using code tracking, single and dual frequency, carrier aiding, and use of differential GPS for improved accuracy and integrity. Use of differential carrier techniques for attitude determination and precision position determination. Prerequisite: familiarity with matrix algebra and MatLab (or another mathematical programming language).

AA 279A. Space Mechanics. 3 Units.

Orbits of near-earth satellites and interplanetary probes; relative motion in orbit; transfer and rendezvous; orbit determination; influence of earth's oblateness; sun and moon effects on earth satellites; decay of satellite orbits; invited lectures from industry. Prerequisite: ENGR 15 or equivalent, and familiarity with MatLab (or another mathematical programming language).

AA 279B. Advanced Space Mechanics. 3 Units.

Restricted 3-body problem. Relative motion, Hill's and Clohessy-Wiltshire equations. Lambert's problem. Satellite constellations and optimization. Communications and link budgets. Space debris. High fidelity simulation. Interplanetary mission planning, launch windows and gravity assists. Basic trajectory optimization. Several guest lectures from practitioners in the field. Individual final project chosen in consultation with instructor. Prerequisites: 279A or equivalent with permission of instructor. Fluency with MATLAB (or another mathematical programming language with 2D and 3D plotting capabilities).

AA 280. Smart Structures. 3 Units.

Mechanics of smart materials and current approaches for engineering smart structures to monitor health, self heal, and adapt to environment. Definition of smart structures; constitutive models for smart materials; piezoelectric ceramics; electro-active polymers; shape memory alloys; bio-inspired materials and structures; self-healing materials; sensors and sensor networks; structural health monitoring; and energy harvesting. Prerequisite: AA 240A or consent of instructor.

AA 283. Aircraft and Rocket Propulsion. 3 Units.

Introduction to the design and performance of airbreathing and rocket engines. Topics: the physical parameters used to characterize propulsion system performance; gas dynamics of nozzles and inlets; cycle analysis of ramjets, turbojets, turbofans, and turboprops; component matching and the compressor map; introduction to liquid and solid propellant rockets; multistage rockets; hybrid rockets; thermodynamics of reacting gases. Prerequisites: undergraduate background in fluid mechanics and thermodynamics.

AA 284A. Advanced Rocket Propulsion. 3 Units.

The principles of rocket propulsion system design and analysis. Fundamental aspects of the physics and chemistry of rocket propulsion. Focus is on the design and analysis of chemical propulsion systems including liquids, solids, and hybrids. Nonchemical propulsion concepts such as electric and nuclear rockets. Launch vehicle design and optimization issues including trajectory calculations. Limited enrollment. Prerequisites: 283 or consent of instructor.

AA 284B. Propulsion System Design Laboratory. 3 Units.

Propulsion systems engineering through the design and operation of a sounding rocket. Students work in small teams through a full project cycle including requirements definition, performance analysis, system design, fabrication, ground and flight testing, and evaluation. Prerequisite: 284A and consent of instructor.

AA 284C. Propulsion System Design Laboratory. 3 Units.

Continuation of 284A,B. Prerequisite: 284B, and consent of instructor.

AA 290. Problems in Aero/Astro. 1-5 Unit.

(Undergraduates register for 190 or 199.) Experimental or theoretical investigation. Students may work in any field of special interest. Register for section belonging to your research supervisor. May be repeated for credit.

AA 291. Practical Training. 1-3 Unit.

Educational opportunities in high-technology research and development labs in aerospace and related industries. Internship integrated into a student's academic program. Research report outlining work activity, problems investigated, key results, and any follow-on projects. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own employment and should see department student services manager before enrolling. May be repeated for credit.

AA 294. Case Studies in Aircraft Design. 1 Unit.

Presentations by researchers and industry professionals. Registration for credit optional. May be repeated for credit.

AA 295. Aerospace Structures and Materials. 1 Unit.

Presentations by researchers and industry professionals in aerospace structures and materials. May be repeated for credit.

AA 297. Seminar in Guidance, Navigation, and Control. 1 Unit.

For graduate students with an interest in automatic control applications in flight mechanics, guidance, navigation, and mechanical design of control systems; others invited. Problems in all branches of vehicle control, guidance, and instrumentation presented by researchers on and off campus. Registration for credit optional. May be repeated for credit.

AA 300. Engineer Thesis. 1-15 Unit.

Thesis for degree of Engineer. Students register for section belonging to their thesis adviser.

AA 301. Ph.D. Dissertation. 1-15 Unit.

Prerequisite: completion of Ph.D qualifying exams. Students register for section belonging to their thesis adviser. (Staff).

AA 801. TGR Engineer Thesis. 0 Units.

Engineer's thesis or non-doctoral work for a TGR student.

AA 802. TGR Ph.D. Dissertation. 0 Units.

Doctoral dissertation for a TGR student in PhD program.

African American Studies Courses

AFRICAAM 16N. African Americans and Social Movements. 3 Units.

Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's rights, LGBT rights, environmental movement, and contemporary political conservatism. Same as: CSRE 16N, SOC 16N

AFRICAAM 18A. Jazz History: Ragtime to Bebop, 1900-1940. 3 Units.

From the beginning of jazz to the war years. Same as: MUSIC 18A

AFRICAAM 18B. Jazz History: Bebop to Present, 1940-Present. 3 Units.

Modern jazz styles from Bebop to the current scene. Emphasis is on the significant artists of each style. Same as: MUSIC 18B

AFRICAAM 19. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.)

Same as: AMSTUD 147J, CSRE 147J, MUSIC 147J, MUSIC 247J

AFRICAAM 20A. Jazz Theory. 3 Units.

Introduces the language and sounds of jazz through listening, analysis, and compositional exercises. Students apply the fundamentals of music theory to the study of jazz. Prerequisite: 19 or consent of instructor.

Same as: MUSIC 20A

AFRICAAM 21. African American Vernacular English. 3-5 Units.

The English vernacular spoken by African Americans in big city settings, and its relation to Creole English dialects spoken on the S. Carolina Sea Islands (Gullah), in the Caribbean, and in W. Africa. The history of expressive uses of African American English (in soundin' and rappin'), and its educational implications. Service Learning Course (certified by Haas Center).

Same as: LINGUIST 65

AFRICAAM 24. Introduction to Dance in the African Diaspora. 4 Units.

This course introduces students to dance as an important cultural force in the African Diaspora. From capoeira in Brazil to dance hall in Jamaica to hip hop in the United States and Ghana, we will analyze dance as a form of resistance to slavery, colonialism, and oppression; as an integral component of community formation; and as a practice that shapes racial, gendered, and national identity. We will explore these topics through readings, film viewings, and movement workshops (no previous dance experience required). Students will have the option to do a creative performance as part of their final project.

Same as: CSRE 24D, DANCE 24, TAPS 152D

AFRICAAM 30. The Egyptians. 3-5 Units.

Overview of ancient Egyptian pasts, from predynastic times to Greco-Roman rule, roughly 3000 BCE to 30 BCE. Attention to archaeological sites and artifacts; workings of society; and cultural productions, both artistic and literary. Weekly participation in a discussion section is required.

Same as: CLASSICS 82

AFRICAAM 31. RealTalk: Intimate Discussions about the African Diaspora. 1 Unit.

Students to engage in an intellectual discussion about the African Diaspora with leading faculty at Stanford across departments including Education, Linguistics, Sociology, History, Political Science, English, and Theater & Performance Studies. Several lunches with guest speakers. This course will meet in the Program for African & African American Studies Office in Building 360 Room 362B (Main Quad). This course is limited to Freshman and Sophomore enrollment.

AFRICAAM 32. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations.

Same as: AMSTUD 32, CSRE 32A, EDUC 32X, EDUC 432X, TAPS 32

AFRICAAM 33. From Moments to Movements: New Media, Narrative, and 21st Century Activism. 5 Units.

In this course, taught by leading cultural critic, dream hampton, we'll look at 21st century activism as influenced by both new media and an emphasis on narrative, critically investigating the opportunities and limitations created by #hashtag activism. We'll examine the work and talk to the organizers who are developing new strategies for on and offline activism. In real time, students will track, engage and create metric analytics of certain online activism trends, looking closely at those whose impact and success is measurable. Students will have the opportunity to participate in a day long, youth lead activist training. We will read classic twentieth century media: texts, posters, pamphlets and papers with an emphasis on the intersection of the political and cultural. Students will produce their own low fi zine or help a student organization of their choice develop their online presence.

AFRICAAM 34. Race, Policing, and Mass Incarceration. 1 Unit.

This course is a critical examination of the relationship between race, policing, and mass incarceration. Students will be reading the most important contemporary texts to discuss and deconstruct this relationship, as well as attending lectures and workshops by leading scholars and activists. The course will approach this critical nexus of concerns--race, policing, and mass incarceration--from social scientific, legal, theoretical and activist viewpoints.

Same as: CSRE 34

AFRICAAM 35. On the Meaning of Freedom. 5 Units.

This course will be taught by Professor Angela Davis. This course examines this fundamental question: What is the meaning of freedom? We will read work that explores this question and seeks to end all social hierarchies that deny people their political, economic, cultural, and sexual freedom. We will confront the interconnected issues of race, gender, and class, as well as the on-going problems of incarceration, police violence, and barriers to food access and security. Students will consider the radical notion of freedom as a collective striving for real democracy, not a thing granted by the state, law, proclamation, or policy, but a participatory social process, rooted in difficult dialogues, that demands new ways of thinking and being.

AFRICAAM 36. REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.. 5 Units.

Probably since the first audience formed for the first chalk scrawls in a cave, there have been storytellers to narrate that caveperson's art and life, and critics to troll that caveperson's choice and usage of color. And so it goes. This course is an exploration into how to cover race, culture, and identity in the arts in journalism, such as print, web, video, radio, and podcasting. It is also an arts journalism practicum. During the quarter, we will be working toward creating work that is publishable in various venues and outlets. In this course, we will be discussing exemplary arts writers and their works and interrogating critical questions around race, identity, representation, and ethics. Experienced journalists, editors, and experts from different platforms and backgrounds will also be imparting important skills and training that will help you to navigate today's working media and transmedia environments. Those who enroll in the class will be expected to produce quality content (e.g. articles, blog posts, video reports, podcasts) for media outlets. Some travel outside of class may be required for additional reporting and training. This seminar class will be By Instructor Approval Only. Please submit an application by February 22 at 11:59pm. Starred items are required. The app is available at: <http://bit.ly/RepresentClass36> Those selected for this class will be informed by March 2nd so that they may enroll in the course. Please do not apply for the course if you are unsure about completing it. If you have any questions, you may email the instructor at: jeffc410@stanford.edu. Same as: CSRE 36

AFRICAAM 40SI. Possessive Investment in Whiteness. 1-2 Unit.

An approachable but nuanced way of developing a notion of the construction and maintenance of whiteness in the United States. By focusing on George Lipsitz's book, the class works to challenge and refine the ideas of white privilege and race in the history and contemporary United States. By focusing on the single text, with some outside supplementary material, the course does not contend that Lipsitz is providing the only truth, but the class looks to complicate his notions and expand them with personal and outside understandings. May be repeated for credit.

AFRICAAM 41. Genes and Identity. 3 Units.

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and anthropological works (ethnographies). We will explore several case studies where the use of DNA markers (as proof of heritage, disease risk, or legal standing) has spawned cultural movements that are biosocial in nature. Throughout we will look at how new social movements are organized around gene-based definitions of personhood, health, and legal truth. Several examples include political analyses of citizenship and belonging. On this count we will discuss issues of African ancestry testing as evidence in slavery reparations cases, revisit debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, and hear arguments on whether people with genetic links to Jewish groups should have a right of return to Israel. We will also examine the ways genetic knowledge may shape different health politics at the individual and societal level. On this count we will do close readings of how personal genomics testing companies operate, we will investigate how health disparities funding as well as orphan disease research take on new valences when re-framed in genetic terms, and we will see how new articulations of global health priorities are emerging through genetic research in places like Africa. Finally we will explore social implications of forensic uses of DNA. Here we will examine civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects, and inquire into the use of DNA to generate digital mugshots of suspects that re-introduce genetic concepts of race.

Same as: ANTHRO 41, CSRE 41A

AFRICAAM 43. Introduction to African American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history.

Same as: AMSTUD 143, ENGLISH 43, ENGLISH 143

AFRICAAM 45. Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact. 2 Units.

By learning various dance improvisation forms across cultures, students will develop techniques to gain a deep understanding of generating movement from the inside-out, inspired by conceptual strategies from master improvisors while harnessing that potential for creating dances. Guest dancer/choreographer workshops and Dance Jams enhance the learning experience. All Levels welcome.

Same as: DANCE 45

AFRICAAM 47. History of South Africa. 3 Units.

(Same as HISTORY 147. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: HISTORY 47

AFRICAAM 48Q. South Africa: Contested Transitions. 3 Units.

Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet.

Same as: HISTORY 48Q

AFRICAAM 50B. 19th Century America. 3 Units.

(Same as HISTORY 150B. History majors and others taking 5 units, register in 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: HISTORY 50B

AFRICAAM 54N. African American Women's Lives. 3-4 Units.

Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality.

Same as: AMSTUD 54N, CSRE 54N, FEMGEN 54N, HISTORY 54N

AFRICAAM 64C. From Freedom to Freedom Now!: African American History, 1865-1965. 3 Units.

(Same as HISTORY 164C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music.

AFRICAAM 75E. Black Cinema. 2 Units.

How filmmakers represent historical and cultural issues in Black cinema.

AFRICAAM 101F. Race & Technology. 1-2 Unit.

The program in African & African American Studies will be offering a weekly lecture series to expose and introduce underrepresented groups to the world of technology by creating a space where the idea of starting can lead to a "Start Up". The AAAS "Race & Technology" course endeavors to de-code the language of technology creation, how to build a team, problem solving, pitching an idea, leveraging the work of all disciplines in creating an entrepreneurship mindset. nnnScholars and industry people will cover topics such as the digital divide, women in technology, and social media. Same as: AFRICAAM 201F

AFRICAAM 102. Introduction to Public History and Public Service. 4-5 Units.

Gateway course for the History and Public Service interdisciplinary track. Topics include the production, presentation, and practice of public history through narratives, exhibits, web sites, and events in museums, historical sites, parks, and public service settings in nonprofit organizations, government agencies, and educational institutions. Service Learning Course (certified by Haas Center). Same as: CSRE 201, HISTORY 201, HISTORY 301

AFRICAAM 103. Dance, Text, Gesture: Performance and Composition. 1 Unit.

Students practice, compose and combine the languages of dance, gestural movement, music and text, to render complete expression in performance. Suitable for dancers, actors, spoken word artists and triple threat performers to devise original performance, dance and theater, culminating in an end of quarter showing. Same as: DANCE 103

AFRICAAM 105. Introduction to African and African American Studies. 5 Units.

Interdisciplinary. Central themes in African American culture and history related to race as a definitive American phenomenon. African survivals and interpretations of slavery in the New World, contrasting interpretations of the Black family, African American literature, and art. Possible readings: Frederick Douglass, Harriet Jacobs, Booker T. Washington, W.E.B. DuBois, Richard Wright, Maya Angelou, James Baldwin, Malcolm X, Alice Walker, and Bell Hooks. Focus may vary each year.

AFRICAAM 106. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.

Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

Same as: CSRE 103B, EDUC 103B, EDUC 337

AFRICAAM 107C. The Black Mediterranean: Greece, Rome and Antiquity. 4-5 Units.

Explore problems of race and ethnicity as viable criteria in studying ancient societies and consider the question, What is the Mediterranean?, in relation to premodern evidence. Investigate the role of blackness as a marker of ethnicity; the demography of slavery and its roles in forming social identities; and environmental determinism as a factor in ethnic and racial thinking. Consider Greek and Roman perspectives and behavior, and their impact on later theories of race and ethnicity as well as the Mediterranean as a whole.

Same as: CSRE 107

AFRICAAM 112. Urban Education. 3-4 Units.

(Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: CSRE 112X, EDUC 112X, EDUC 212X, SOC 129X, SOC 229X

AFRICAAM 115. South African Encounters. 1 Unit.

This course is a prerequisite for all those accepted to or on the wait list for the following quarter's BOSP Cape Town term abroad. It will explore issues in contemporary South Africa.

Same as: AFRICAST 115

AFRICAAM 116. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: CSRE 216X, EDUC 216, HISTORY 255E

AFRICAAM 121X. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AMSTUD 121X, ANTHRO 121A, CSRE 121X, EDUC 121X, LINGUIST 155

AFRICAAM 122E. Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces. 4 Units.

This class will introduce students to both historical and contemporary public art practices and the expression of race and identity through murals, graffiti, site-specific works and performative interventions in public spaces. Involving lectures, guest speakers, field trips, and hands-on art practice, students will be expected to produce both an individual and group piece as a final project.

Same as: CSRE 122E

AFRICAAM 123. Great Works of the African American Tradition. 5 Units.

Foundational African and African American scholarly figures and their work from the 19th century to the present. Historical, political, and scholarly context. Dialogues distinctive to African American culture. May be repeated for credit.

AFRICAAM 125V. The Voting Rights Act. 5 Units.

Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena.

Same as: CSRE 125V, POLISCI 125V

AFRICAAM 126B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: CSRE 126B, EDUC 136B, EDUC 236B, PUBLPOL 126B

AFRICAAM 127A. Can't Stop Won't Stop: A History Of The Hip-Hop Arts. 4 Units.

This course explores the history and development of the hip-hop arts movement, from its precursor movements in music, dance, visual arts, literature, and folk and street cultures to its rise as a neighborhood subculture in the Bronx in the early 1970s through its local, regional and global expansion and development. Hip-hop aesthetics, structures, and politics will be explored within the context of the movement; its rise as a post-multicultural form in an era of neoliberal globalization.

Same as: CSRE 127A

AFRICAAM 130. Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms. 3-5 Units.

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Prerequisite: graduate status or consent of instructor.

Same as: CSRE 130, EDUC 123X, EDUC 322

AFRICAAM 131. Genes and Identity. 5 Units.

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and ethnographies. We will explore several case studies where the use of DNA markers (either as proof of heritage or disease risk) has spawned cultural movements that are biosocial in nature. Examples include legal and political analyses of African ancestry testing as evidence; in slavery reparations cases, debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, considerations on whether people with genetic links to Jewish groups should have a right of return to Israel, close readings of The U.S. Food and Drug Administration's crackdown on personal genomics testing companies (such as 23andMe), examinations of genetic identity politics in health disparities funding and orphan disease research, inquiries into new social movements organized around gene-based definitions of personhood, and civil liberties concerns about genetic family searching; in forensic databases that disproportionately target specific minority groups as criminal suspects. Students will engage in a short observational pilot ethnographic project that allows them to further explore issues from the course for their final paper.

Same as: ANTHRO 131, CSRE 131

AFRICAAM 133. Literature and Society in Africa and the Caribbean. 4 Units.

This course aims to equip students with an understanding of the cultural, political and literary aspects at play in the literatures of Francophone Africa and the Caribbean. Our primary readings will be Francophone novels and poetry, though we will also read some theoretical texts, as well as excerpts of Francophone theater. The assigned readings will expose students to literature from diverse French-speaking regions of the African/Caribbean world. This course will also serve as a "literary toolbox," with the intention of facilitating an understanding of literary forms, terms and practices. Students can expect to work on their production of written and spoken French (in addition to reading comprehension) both in and outside of class. Required readings include: Aimee; Ce; saire, "Cahier d'un retour au pays natal," Albert Memmi, "La Statue de Sel," Kaouther Adimi, "L'envers des autres", Maryse Conde; "La Vie sans fards". Movies include "Goodbye Morocco", "Aya de Yopougon", "Rome plutocirc; sue Vous". Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

Same as: FRENCH 133, JEWISHST 143

AFRICAAM 145A. Poetics and Politics of Caribbean Women's Literature. 5 Units.

Mid 20th-century to the present. How historical, economic, and political conditions in Haiti, Cuba, Jamaica, Antigua, and Guadeloupe affected women. How Francophone, Anglophone, and Hispanophone women novelists, poets, and short story writers respond to similar issues and pose related questions. Caribbean literary identity within a multicultural and diasporic context; the place of the oral in the written feminine text; family and sexuality; translation of European master texts; history, memory, and myth; and responses to slave history, colonialism, neocolonialism, and globalization.

AFRICAAM 145B. Africa in the 20th Century. 5 Units.

(Same as HISTORY 45B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans.

Same as: HISTORY 145B

AFRICAAM 146A. African Politics. 4-5 Units.

Africa has lagged the rest of the developing world in terms of economic development, the establishment of social order, and the consolidation of democracy. This course seeks to identify the historical and political sources accounting for this lag, and to provide extensive case study and statistical material to understand what sustains it, and how it might be overcome. Same as: POLISCI 146A

AFRICAAM 147. History of South Africa. 5 Units.

(Same as HISTORY 47. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis. Same as: HISTORY 147

AFRICAAM 148. Africa in Atlantic Writing. 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Adichie, Condeacute;, Olinto), prose poetry (Ceacute;saire, Neto, Walcott), theoretical reflection (Fanon, Glissant), reportage (Gide, Gourevitch), ethnography (Leiris, Ouologuem) and autobiography (Barack Obama). Same as: AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B, FRENCH 345B

AFRICAAM 150B. 19th-Century America. 5 Units.

(Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. Same as: AMSTUD 150B, HISTORY 150B

AFRICAAM 152G. Harlem Renaissance. 5 Units.

Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of "vicious Modernism", as a "BangClash", that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context. Same as: AMSTUD 152G, ENGLISH 152G

AFRICAAM 154. Black Feminist Theory. 5 Units.

This course will examine black feminist theoretical traditions, marking black women's analytic interventions into sexual and pleasure politics and reproduction, critical culture and race theory, citizenship, identity, power and agency, representation, and questions of the body. Exploring concepts such as intersectionality, controlling images, the politics of respectability and the particularities of a black feminist liberation politics, we will look to black feminist scholars, activists, and artists from the 19th century to today. Same as: FEMGEN 154

AFRICAAM 156. Performing History: Race, Politics, and Staging the Plays of August Wilson. 4 Units.

This course purposefully and explicitly mixes theory and practice. Students will read and discuss the plays of August Wilson, the most celebrated and most produced contemporary American playwright, that comprise his 20th Century History Cycle. Class stages scenes from each of these plays, culminating in a final showcase of longer scenes from his work as a final project. Same as: TAPS 156, TAPS 356

AFRICAAM 157P. Allyship: Challenging Privilege and Doing Solidarity in Movements for Collective Liberation. 2-4 Units.

Many activists in the racial justice, immigrant, indigenous, feminist, and LGBTQ movements, are committed to principles of leadership by frontline communities - their goal is to build power in communities that are disempowered by dominant institutions and practices. This makes for complicated relationships with those that are not part of those frontline communities but recognize that their own silence makes them complicit in systems of oppression. In this course, we will examine how power and privilege can undermine attempts to collaborate in social justice work, and then explore principles and practices of solidarity and allyship that attempt to overcome these challenges. We will discuss texts on white privilege and anti-racism as our primary point of reference, but will connect to other kinds of ally work and movements for collective liberation. As a community-engaged learning course, students will work with community partners to establish long-term relationships based in solidarity. Students are encouraged to work with movements and organizations with whom they already have relationships (e.g., through student-activism). Throughout the quarter, we will have guest lectures and workshops with community partners and movement strategy organizations. Same as: AMSTUD 157P, CSRE 157P, FEMGEN 157P

AFRICAAM 158. Black Queer Theory. 5 Units.

This course takes a multifaceted approach to black queer theory, not only taking up black theories of gender and queer sexuality, but queer theoretical interrogations of blackness and race. The course will also examine some of the important ways that black queer theory reads and is intersected with issues like affect, epistemology, space and geography, power and subjectivity, religion, economy, the body, and the law, asking questions like: How have scholars critiqued the very language of queer and the ways it works as a signifier of white marginality? What are the different spaces we can find queer black relationality, eroticism, and kinship? How do we negotiate issues like trans*misogyny or tensions around gender and sexuality in the context of race? Throughout the course, students will become versed in foundational and emerging black queer theory as we engage scholars like Sharon Holland, Cathy Cohen, Hortense Spillers, Marlon B. Ross, Aliyyah Abdur-Rahman, Barbara Smith, Roderick Ferguson, Robert Reid-Pharr, E. Patrick Johnson, and many others. Students will also gain practice applying black queer theory as an interpretive lens for contemporary social issues and cultural production including film, music, art, and performance. Same as: FEMGEN 158

AFRICAAM 165. Race, Athletics and College Achievement. 3 Units.

How does racial group membership affect academic experiences, and how do race and athletic participation intersect with collegiate life? In this class, we will explore the relationships among race, athletic status, and academic experiences, with a focus on social science data and the specific experiences of Stanford students. Readings will draw from psychology, sociology, education, and popular press. This class is a seminar format with no prerequisites. Same as: CSRE 165, CTL 165

AFRICAAM 166. Introduction to African American History - the Modern Freedom Struggle. 3-5 Units.

(AFRICAAM-166/ AMSTUD-166/ HISTORY-166) This course focuses on African-American political movements of the period after 1930, with special emphasis on the contributions of grassroots activists and visionary leaders such as W. E. B. Du Bois, Martin Luther King, Jr., and Malcolm X. The lectures will utilize audio-visual materials extensively, and the exams will cover these materials as well as the content of traditional lectures. Students are encouraged to undertake research projects utilizing the unique resources of the King Research and Education Institute. Same as: AMSTUD 166, HISTORY 166

AFRICAAM 181Q. Alternative Viewpoints: Black Independent Film. 4 Units.

Preference to sophomores. Do you want to learn more about independent film as it was practiced in major urban centers by young filmmakers? This class focuses on major movements by groups such as the Sankofa Film Collective and the L.A. Rebellion. Learn how to analyze film and to discuss the politics of production as you watch films by Spike Lee, Julie Dash, Melvin Van Peebles, Ngozi Onwurah and more. We will discuss representation, lighting, press material, and of course the films themselves. This course includes a workshop on production, trips to local film festivals and time to critique films frame-by-frame. It matters who makes film and how they do so. When you have completed this class you will be able to think critically about "alternative viewpoints" to Hollywood cinema. You will understand how independent films are made and you will be inspired to seek out and perhaps produce or promote new visions. Same as: FILMSTUD 181Q, TAPS 181Q

AFRICAAM 190. Directed Reading. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

AFRICAAM 195. Independent Study. 5 Units.

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AFRICAAM 199. Honors Project. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

AFRICAAM 200X. Honors Thesis and Senior Thesis Seminar. 5 Units.

Required for seniors. Weekly colloquia with AAAS Director and Associate Director to assist with refinement of research topic, advisor support, literature review, research, and thesis writing. Readings include foundational and cutting-edge scholarship in the interdisciplinary fields of African and African American studies and comparative race studies. Readings assist students situate their individual research interests and project within the larger. Students may also enroll in AFRICAAM 200Y in Winter and AFRICAAM 200Z in Spring for additional research units (up to 10 units total).

AFRICAAM 200Y. Honors Thesis and Senior Thesis Research. 3-5 Units.

Winter. Required for students writing an Honors Thesis. Optional for Students writing a Senior Thesis.

AFRICAAM 200Z. Honors Thesis and Senior Thesis Research. 3-5 Units.

Spring. Required for students writing an Honors Thesis. Optional for Students writing a Senior Thesis.

AFRICAAM 201F. Race & Technology. 1-2 Unit.

The program in African & African American Studies will be offering a weekly lecture series to expose and introduce underrepresented groups to the world of technology by creating a space where the idea of starting can lead to a "Start Up". The AAAS "Race & Technology" course endeavors to de-code the language of technology creation, how to build a team, problem solving, pitching an idea, leveraging the work of all disciplines in creating an entrepreneurship mindset. nnnScholars and industry people will cover topics such as the digital divide, women in technology, and social media. Same as: AFRICAAM 101F

AFRICAAM 212. AIDS, Literacy, and Land: Foreign Aid and Development in Africa. 5 Units.

Is foreign aid a solution? or a problem? Should there be more aid, less aid, or none at all? How do foreign aid and local initiatives intersect? A clinic in Uganda that addresses AIDS as a family and community problem. Multiple strategies in Tanzania to increase girls' schooling. These are imaginative and innovative approaches to pressing and contested policy challenges. We will examine several contentious issues in contemporary Africa, exploring their roots and the intense conflicts they engender, with special attention to foreign aid and the aid relationship. As African communities and countries work to shape their future, what are the foreign roles and what are their consequences?. Same as: AFRICAST 112, AFRICAST 212

AFRICAAM 223. Literature and Human Experimentation. 3-5 Units.

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann* and Vivien Spitz's *Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care. Same as: COMPLIT 223, CSRE 123B, HUMBIO 175H, MED 220

AFRICAAM 226. Mixed-Race Politics and Culture. 5 Units.

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? This course approaches issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st-century U.S. Issues surrounding the role of multiculturalism, immigration, acculturation, racial representation, and racial prejudice in American society. Topics include the political and social formation of race; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of census categories and the rise of the multiracial movement. Same as: AMSTUD 152K, CSRE 152K, ENGLISH 152K

AFRICAAM 229. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer. Same as: AFRICAST 229, COMPLIT 229, CSRE 129B, FRENCH 229, HUMBIO 175L, MED 234

AFRICAAM 233A. Counseling Theories and Interventions from a Multicultural Perspective. 3-5 Units.

In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

Same as: CSRE 233A, EDUC 233A

AFRICAAM 245. Understanding Racial and Ethnic Identity Development. 3-5 Units.

African American, Native American, Mexican American, and Asian American racial and ethnic identity development; the influence of social, political and psychological forces in shaping the experience of people of color in the U.S. The importance of race in relationship to social identity variables including gender, class, and occupational, generational, and regional identifications. Bi- and multiracial identity status, and types of white racial consciousness.

Same as: CSRE 245, EDUC 245

AFRICAAM 254D. Law, Slavery, and Race. 5 Units.

(Same as LAW 747.) This course will explore the interaction of law, slavery and race in the United States, as well as from a comparative perspective. We will read original documents, including excerpts of trial transcripts, appellate opinions, treatises, codes, and first-person narratives. We will study the way law, politics and culture interacted to shape the institution of slavery and the development of modern conceptions of race. Course lectures and discussions will focus on questions such as: Did different legal regimes (Spanish, French, British) foster different systems of race and slavery in the Americas? How did/does law work "on the ground" to shape the production of racial hierarchy and creation of racial identities? In what ways did slavery influence the U.S. Constitution? How has race shaped citizenship in the U.S., and how can we compare it to other constitutional regimes? The course will begin with the origins of New World slavery, race and racism, and move chronologically to the present day.

Same as: CSRE 154D, HISTORY 254D, HISTORY 354

AFRICAAM 261E. Mixed Race Literature in the U.S. and South Africa. 5 Units.

As scholar Werner Sollors recently suggested, novels, poems, stories about interracial contacts and mixed race constitute an orphan literature belonging to no clear ethnic or national tradition. Yet the theme of mixed race is at the center of many national self-definitions, even in our U.S. post-Civil Rights and South Africa's post-Apartheid era. This course examines aesthetic engagements with mixed race politics in these trans- and post-national dialogues, beginning in the 1700s and focusing on the 20th and 21st centuries.

Same as: AMSTUD 261E

AFRICAAM 262D. African American Poetics. 5 Units.

Examination of African American poetic expressive forms from the 1700s to the 2000s, considering the central role of the genre--from sonnets to spoken word, from blues poetry to new media performance--in defining an evolving literary tradition and cultural identity.

Same as: AMSTUD 262D

AFRICAAM 267E. Martin Luther King, Jr. - His Life, Ideas, and Legacy. 4-5 Units.

Using the unique documentary resources and publications of Stanford's King Research and Education Institute, this course will provide a general introduction to King's life, visionary ideas, and historical significance. In addition to lectures and discussions, the course will include presentations of documentaries such as *Eyes on the Prize*. Students will be expected to read the required texts, participate in class discussions, and submit a research paper or an audio-visual project developed in consultation with the professor.

Same as: AMSTUD 267E, HISTORY 267E

AFRICAAM 290. Ferguson in a Global Frame: Human Rights and the Arts. 3-5 Units.

This course introduces students to fundamental concepts of international human rights and uses these concepts to frame problems of inequality, marginality, exclusion and injustice that are chronic across the globe; including the United States. Focusing on Ferguson as a point of inflection, this course will consider police repression of political protest in a comparative context. The course will also use the lens of fundamental human rights to explore a state's failure to investigate and prosecute, and its failure to protect its citizens from violations committed by agents or from non-state agents. In each thematic unit, we will examine the United States in a comparative lens, and will consider how we understand, frame, mourn and contest the violations of rights in literature, the visual arts, and in social and political action. We will continuously examine the role of the arts in disseminating, shaping and deepening our understanding of multiple dimensions of human rights violations. At the same time, we will consider how these cultural products reflect on, illuminate, contest or problematize advocacy texts and sources of international law. We will examine texts from the United States, Brazil, South Africa, among other countries, as well as documents from international and regional human rights bodies.

Same as: COMPLIT 290, CSRE 290

AFRICAAM 301. RealTalk: Intimate Discussions about the African Diaspora. 1 Unit.

Students engage in an intellectual discussion about the African Diaspora with leading faculty at Stanford across departments including Education, Linguistics, Sociology, History, Political Science, English, and Theater and Performance Studies. Several lunches with guest speakers. Open graduate students. This course will meet in the Program for African & African American Studies Office in Building 360 Room 362B (Main Quad).

African Middle Eastern Languages Courses

AMELANG 15T. Intermediate to Advanced Turkish Conversation. 2 Units.

Students develop communicative skills while discussing real-life issues, current events and cultural topics. The goal is to use culturally appropriate forms in formal and informal conversations, expressing emotions, feelings, and ideas in social and academic contexts. Pronunciation, vocabulary building, presentational language and daily readings are stressed. Students lead class discussions and prepare short presentations. Prerequisite: consent of instructor.

AMELANG 51A. Reading Biblical Hebrew, First Quarter. 2 Units.**AMELANG 70A. Accelerated First-Year Swahili, Part 1. 5 Units.**

First quarter of the two-quarter accelerated sequence. For students with little or no prior experience studying Swahili. Students acquire beginning proficiency in Swahili at an accelerated pace through intensive listening, speaking, reading, and writing, with special insight into Swahili-speaking cultures. Emphasis is on authentic materials and active use of the language in real-world contexts in order to develop functional abilities. Completion of AMELANG 70B fulfills the University foreign language requirement.

AMELANG 70B. Accelerated first-year Swahili part 2. 5 Units.
Continuation of AMELANG 70A. Completes the first-year sequence in two rather than three quarters. Students develop first-year proficiency in Swahili at an accelerated pace through active language use and participation in Swahili-speaking practices. Emphasis is on development of speaking, listening, reading, and writing through authentic materials and appropriate cultural contexts. Fulfills the University foreign language requirement. Prerequisite: AMELANG 70A or consent of instructor.

AMELANG 84A. Accelerate First-Year Turkish, Part 1. 5 Units.
First part of the accelerated first-year sequence. AMELANG 84A and 84B complete the first year in two quarters rather than three quarters. Fulfills the University Language requirement. Goal is to engage in interactions with Turkish speakers using socially and culturally appropriate forms. Emphasis is on the accelerated development of language proficiency, listening comprehension, reading and writing skills through conversational practice and in-class/online writing activities. Discussion of culture and social life is integrated into daily language learning activities through authentic materials.

AMELANG 84B. Accelerated First-Year Turkish, part 2. 5 Units.
Second part of the accelerated first-year sequence. AMELANG 84A and 84B complete the first year in two rather than three quarters. AMELANG 84B (Accelerated First-Year Turkish, Part 2) fulfills the University language requirement. Goal is to engage in interactions with Turkish speakers using socially and culturally appropriate forms. Emphasis is on the accelerated development of language proficiency, listening comprehension, reading and writing skills through conversational practice and in-class/online writing activities. Discussion of culture and social life is integrated into daily language learning activities through authentic materials.

AMELANG 99. Undergraduate Directed Reading. 1-3 Unit.
This course does not fulfill the University language requirement.

AMELANG 100A. Beginning Amharic, First Quarter. 4 Units.

AMELANG 100B. First-Year Amharic, Second Quarter. 4 Units.
Continuation of AMELANG 100A. Prerequisite AMELANG 100A.

AMELANG 100C. First-Year Amharic, Third Quarter. 4 Units.
Continuation of AMELANG 100B. Prerequisite AMELANG 100B. Fulfills the University Foreign Language Requirement.

AMELANG 101A. Second-Year Amharic, First Quarter. 4 Units.
Continuation of AMELANG 100C. Prerequisite: AMELANG 100C.

AMELANG 101B. Second-Year Amharic, Second Quarter. 4 Units.
Continuation of AMELANG 101A. Prerequisite AMELANG 101A.

AMELANG 101C. Second-Year Amharic, Third Quarter. 4 Units.
Continuation of AMELANG 101B. Prerequisite: AMELANG 101B.

AMELANG 103A. First-Year Hausa, First Quarter. 4 Units.

AMELANG 103B. First-Year Hausa, Second Quarter. 4 Units.
Continuation of AMELANG 103A. Prerequisite: AMELANG 103A.

AMELANG 103C. First-Year Hausa, Third Quarter. 4 Units.
Continuation of AMELANG 103B. Prerequisite: AMELANG 103B.

AMELANG 106A. First-Year Swahili, First Quarter. 5 Units.

AMELANG 106B. First-Year Swahili, Second Quarter. 5 Units.
Continuation of AMELANG 106A. Prerequisite: AMELANG 106A.

AMELANG 106C. First-Year Swahili, Third Quarter. 5 Units.
Continuation of AMELANG 106B. Prerequisite: AMELANG 106B. Fulfills the University foreign language requirement.

AMELANG 107A. Second-Year Swahili, First Quarter. 5 Units.
Continuation of AMELANG 106C. Prerequisite: AMELANG 106C.

AMELANG 107B. Second-Year Swahili, Second Quarter. 5 Units.
Continuation of AMELANG 107A. Prerequisite: AMELANG 107A.

AMELANG 107C. Second-Year Swahili, Third Quarter. 5 Units.
Continuation of AMELANG 107B. Prerequisite: AMELANG 107B.

AMELANG 108A. Third-Year Swahili, First Quarter. 4 Units.
Continuation of AMELANG 107C. Prerequisite: AMELANG 107C.

AMELANG 108B. Third-Year Swahili, Second Quarter. 4 Units.
Continuation of AMELANG 108A. Prerequisite: AMELANG 108A.

AMELANG 108C. Third-Year Swahili, Third Quarter. 4 Units.
Continuation of AMELANG 108B. Prerequisite: amelang 108B or consent of instructor.

AMELANG 110A. First-Year Wolof, First Quarter. 3 Units.

AMELANG 114A. Beginning Afrikaans, First Quarter. 4 Units.

AMELANG 114B. Beginning Afrikaans, Second Quarter. 4 Units.

AMELANG 115A. Second year - Afrikaans, First Quarter. 4 Units.

AMELANG 115B. Second - year Afrikaans, Second Quarter. 4 Units.

AMELANG 115C. Second - Year Afrikaans, Third Quarter. 4 Units.

AMELANG 126. Reflection on the Other: The Jew and the Arab in Literature. 3-5 Units.

How literary works outside the realm of Western culture struggle with questions such as identity, minority, and the issue of the Other. How the Arab is viewed in Hebrew literature, film and music and how the Jew is viewed in Palestinian works in Hebrew or Arabic (in translation to English). Historical, political, and sociological forces that have contributed to the shaping of these writers' views. Guest lectures about the Jew in Palestinian literature and music.

Same as: COMPLIT 145, JEWISHST 106

AMELANG 128A. First-Year Hebrew, First Quarter. 5 Units.

Same as: JEWISHST 101A

AMELANG 128B. First-Year Hebrew, Second Quarter. 5 Units.

Continuation of AMELANG 128A. Prerequisite: Placement Test, AMELANG 128A.

Same as: JEWISHST 101B

AMELANG 128C. First-Year Hebrew, Third Quarter. 5 Units.

Continuation of AMELANG 128B. Prerequisite: Placement Test, AMELANG 128B. Fulfill the University Foreign Language Requirement. Same as: JEWISHST 101C

AMELANG 129A. Second-Year Hebrew, First Quarter. 4 Units.

Continuation of AMELANG 128C. Prerequisite: Placement Test, AMELANG 128C.

Same as: JEWISHST 102A

AMELANG 129B. Second-Year Hebrew, Second Quarter. 4 Units.

Continuation of AMELANG 129A. Prerequisite: Placement Test, AMELANG 129A.

Same as: JEWISHST 102B

AMELANG 129C. Second-Year Hebrew, Third Quarter. 4 Units.

Continuation of AMELANG 129B. Prerequisite: Placement Test, AMELANG 129B.

Same as: JEWISHST 102C

AMELANG 130A. Third-Year Hebrew, First Quarter. 3-4 Units.

Continuation of AMELANG 129C. Prerequisite: Placement Test, AMELANG 129C.

Same as: JEWISHST 103A

AMELANG 131A. Hebrew Forum, 2-4 Units.

Intermediate and advanced level. Biweekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew.
Same as: JEWISHST 104

AMELANG 131B. Hebrew Forum, 2-4 Units.

Intermediate and advanced level. Biweekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew.
Same as: JEWISHST 105

AMELANG 133B. The African Forum, Second Quarter. 1 Unit.

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AMELANG 133C. The African Forum, Third Quarter. 1 Unit.

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AMELANG 134A. First-Year Igbo, First Quarter. 4 Units.

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AMELANG 134B. First-Year Igbo, Second Quarter. 4 Units.

Continuation of AMELANG 134A. Prerequisite: AMELANG 134A.

AMELANG 134C. First-Year Igbo, Third Quarter. 4 Units.

Continuation of AMELANG 134B. Prerequisite: AMELANG 134B. Fulfills University Foreign Language requirement.

AMELANG 135A. Second-Year Igbo, First Quarter. 4 Units.

Continuation of AMELANG 134C. Prerequisite: AMELANG 134C.

AMELANG 136A. First-Year Xhosa, First Quarter. 4 Units.

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AMELANG 136B. First-Year Xhosa, Second Quarter. 4 Units.

Continuation of AMELANG 136A. Prerequisite: AMELANG 136A.

AMELANG 136C. First-Year Xhosa, Third Quarter. 4 Units.

Continuation of AMELANG 136B. Prerequisite: AMELANG 136B. Fulfills the University Foreign Language Requirement.

AMELANG 137A. Second-Year Xhosa, First Quarter. 4 Units.

Continuation of AMELANG 136C. Prerequisite: AMELANG 136C or consent of instructor.

AMELANG 137B. Second-Year Xhosa, Second Quarter. 4 Units.

Continuation of AMELANG 137A. Prerequisite: AMELANG 137A or consent of instructor.

AMELANG 137C. Second-Year Xhosa, Third Quarter. 4 Units.

Continuation of AMELANG 137B. Prerequisite: AMELANG 137B or consent of instructor.

AMELANG 140A. First-Year Yiddish, First Quarter. 4 Units.

Reading, writing, and speaking.
Same as: JEWISHST 104A

AMELANG 140B. First-Year Yiddish, Second Quarter. 4 Units.

Continuation of AMELANG 140A. Prerequisite: AMELANG.
Same as: JEWISHST 104B

AMELANG 140C. First-Year Yiddish, Third Quarter. 4 Units.

Continuation of AMELANG 140B. Prerequisite: AMELANG 140B. Fulfills the University Foreign Language Requirement.
Same as: JEWISHST 104C

AMELANG 141A. Second-Year Yiddish, First Quarter. 4 Units.

Continuation of AMELANG 140C. Prerequisite: AMELANG 140C.

AMELANG 141B. Second-Year Yiddish, Second Quarter. 4 Units.

Continuation of AMELANG 141A. Prerequisite: AMELANG 141A.

AMELANG 141C. Second-Year Yiddish, Third Quarter. 4 Units.

Continuation of AMELANG 141B. Prerequisite: AMELANG 141B.

AMELANG 144A. First-Year Modern Persian, First Quarter. 5 Units.

One-year sequence. Modern Persian for beginners; concentrates on rapidly developing basic skills in speaking, reading, writing, and understanding modern Persian. Strong emphasis is on the links between language and culture. The course is based on a fully integrated multimedia program. Students will learn the language with an emphasis on communicative and interactive classroom activities.

AMELANG 144B. First-Year Modern Persian, Second Quarter. 5 Units.

Continuation of AMELANG 144A. One-year sequence. Modern Persian for beginners; concentrates on rapidly developing basic skills in speaking, reading, writing, and understanding modern Persian. Strong emphasis is on the links between language and culture. The course is based on a fully integrated multimedia program. Students will learn the language with an emphasis on communicative and interactive classroom activities. Prerequisite: Placement Test, AMELANG 144A.

AMELANG 144C. First-Year Modern Persian, Third Quarter. 5 Units.

Continuation of AMELANG 144B. One-year sequence. Modern Persian for beginners; concentrates on rapidly developing basic skills in speaking, reading, writing, and understanding modern Persian. Strong emphasis is on the links between language and culture. The course is based on a fully integrated multimedia program. Students will learn the language with an emphasis on communicative and interactive classroom activities. Fulfills the University Foreign Language Requirement. Prerequisite: Placement Test, AMELANG 144B. Fulfills the University Foreign Language Requirement.

AMELANG 145A. Second-Year Modern Persian, First Quarter. 5 Units.

Continuation of AMELANG 144C. Expands students' proficiency in Persian language and culture at intermediate level through various texts and multimedia. It stresses oral fluency, written expression, and reading comprehension. Students will continue to learn the language with an emphasis on communicative and interactive classroom activities. Students will be introduced to contemporary as well as classical short poems by famous Persian poets like Rumi. Prerequisite: Placement Test, AMELANG 144C.

AMELANG 145B. Second-Year Modern Persian, Second Quarter. 5 Units.

Continuation of AMELANG 145A. Expands students' proficiency in Persian language and culture at intermediate level through various texts and multimedia. It stresses oral fluency, written expression, and reading comprehension. Students will continue to learn the language with an emphasis on communicative and interactive classroom activities. Students will be introduced to contemporary as well as classical short poems by famous Persian poets like Rumi. Prerequisite: Placement Test, AMELANG 144A.

AMELANG 145C. Second-Year Modern Persian, Third Quarter. 5 Units.

Continuation of AMELANG 145B. Expands students' proficiency in Persian language and culture at intermediate level through various texts and multimedia. It stresses oral fluency, written expression, and reading comprehension. Students will continue to learn the language with an emphasis on communicative and interactive classroom activities. Students will be introduced to contemporary as well as classical short poems by famous Persian poets like Rumi. Prerequisite: Placement Test, AMELANG 144B.

AMELANG 146A. Third-Year Persian, First Quarter. 4 Units.

Continuation of AMELANG 145C. Prerequisite: Placement Test, AMELANG 145C.

AMELANG 146B. Third-Year Persian, Second Quarter. 4 Units.

Continuation of AMELANG 146A. Prerequisite: Placement Test, AMELANG 146A.

AMELANG 146C. Third-Year Persian, Third Quarter. 4 Units.

Continuation of AMELANG 146B. Prerequisite: Placement Test, AMELANG 146B.

AMELANG 153. Introduction to Twi. 1 Unit.

Introduction to the Twi language especially designed for Center for African Studies students going to Ghana in the Summer.

AMELANG 153A. First-Year Twi, First Quarter. 4 Units.**AMELANG 153B. First-Year Twi, Second Quarter. 4 Units.**

Continuation of AMELANG 153A. Prerequisite: AMELANG 153A.

AMELANG 153C. First-Year Beginning Twi, Third Quarter. 4 Units.

Continuation of AMELANG 153B. Prerequisite: AMELANG 153B. Fulfills the University Foreign Language Requirement.

AMELANG 154A. Second-Year Twi, First Quarter. 4 Units.

Continuation of AMELANG 153C. Prerequisite: AMELANG 153C.

AMELANG 154B. Second-Year Twi, Second Quarter. 4 Units.

Continuation of AMELANG 154A. Prerequisite: AMELANG 154A.

AMELANG 154C. Second-Year Twi, Third Quarter. 4 Units.

Continuation of AMELANG 154B. Prerequisite: AMELANG 154B.

AMELANG 156A. First-Year Zulu, First Quarter. 4 Units.**AMELANG 156B. First-Year Zulu, Second Quarter. 4 Units.**

Continuation of AMELANG 156A. Prerequisite AMELANG 156A.

AMELANG 156C. First-Year Zulu, Third Quarter. 4 Units.

Continuation of AMELANG 156B. Prerequisite: AMELANG 156B. Fulfills the University Foreign Language Requirement.

AMELANG 157A. Second-Year Zulu, First Quarter. 4 Units.

Continuation of AMELANG 156C. Prerequisite AMELANG 156C.

AMELANG 157B. Second-Year Zulu, Second Quarter. 4 Units.

Continuation of AMELANG 157A. Prerequisite: AMELANG 157A.

AMELANG 157C. Second-Year Zulu, Third Quarter. 4 Units.

Continuation of AMELANG 157B. Prerequisite: AMELANG 157B.

AMELANG 170A. Biblical Hebrew, First Quarter. 2 Units.

Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. Students that are enrolled in this course must also enroll in Beginning Hebrew. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the year, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or own their own. Same as: JEWISHST 107A, RELIGST 170A

AMELANG 170B. Biblical Hebrew, Second Quarter. 1 Unit.

Continuation of 170A.

Same as: JEWISHST 107B

AMELANG 170C. Biblical Hebrew, Third Quarter. 1 Unit.

Continuation of 170B.

AMELANG 171. The Bible in Modern Hebrew Literature. 3-4 Units.

The role of biblical myths in shaping Israeli identity and the development of a secular Hebrew literature. Readings include modern Hebrew poems and novels which offer new meanings to the stories of Genesis, Exodus, David, and the Song of Songs and make them relevant to the context of modern and postmodern Israeli culture. Readings in Hebrew and English. Prerequisite: intermediate Hebrew.

AMELANG 175. Co-Existence in Hebrew Literature. 4-5 Units.

Is co-existence possible? Does pluralism require co-existence? Can texts serve as forms of co-existence? The class will focus on these and other questions related to coexistence and literature. Through reading works mostly by Jewish authors writing in Europe, Israel and the US we will explore attempts for complete equality, for a variety of hierarchical systems and for different kinds of co-dependence. Guest speaker: professor Anat Weisman, Ben Gurion University of the Negev.

Same as: COMPLIT 161, JEWISHST 146

AMELANG 176. Introduction to Ladino: Language, Literature, and Culture. 1-4 Unit.

Prerequisite: two quarters of Spanish.

AMELANG 177. Middle Eastern Cities in Literature and Film. 4-5 Units.

Sources include short stories, novels, and movies about Beirut, Tel Aviv, Jerusalem, Cairo, and Amman. Focus is on a cultural and intellectual history of each city. Issues such as the role that Middle Eastern cities play in the development of the modern Hebrew and Arabic novels, the city as a center of social and political life, and the city as a space of collective memory.

AMELANG 180A. First-Year Kinyarwanda, First Quarter. 4 Units.**AMELANG 180B. First-Year Kinyarwanda, Second Quarter. 4 Units.**

Continuation of AMELANG 180A. Prerequisite: AMELANG 180A.

AMELANG 182A. Intermediate Fulani, First Quarter. 3 Units.

Fulfill the University foreign language requirement.

AMELANG 182B. Intermediate Fulani, Second Quarter. 3 Units.

Continuation of 182A.

AMELANG 182C. Intermediate Fulani, Third Quarter. 3 Units.

Continuation of 182B.

AMELANG 184A. First-Year Turkish, First Quarter. 5 Units.

Designed for students who have interest in learning Turkish language, culture, history, cuisine and social life. Proficiency-based orientation with emphasis on oral comprehension and speaking. The grammar is presented through communicative activities where students are exposed to authentic input.

AMELANG 184B. First-Year Turkish, Second Quarter. 5 Units.

Continuation of AMELANG 184A. Emphasis on speaking, oral comprehension and beginning reading and writing skills. Turkish culture and social life is integrated in daily language learning process through authentic materials. Prerequisite: AMELANG 184A.

AMELANG 184C. First-Year Turkish, Third Quarter. 5 Units.

Continuation of AMELANG 184B. Emphasis is on speaking, oral comprehension, reading and writing skills. Reading simple texts, studying Turkish pop music, viewing short documentaries and communicative writing exercises are part of daily class activities. Prerequisite: AMELANG 184B or consent of instructor. Fulfills the University Foreign Language Requirement.

AMELANG 185A. Second-Year Turkish, First Quarter. 4 Units.

Continuation of AMELANG 184C. Designed for students with previous knowledge of Turkish who wish to learn in depth about Turkish culture, history, social life, literature, cuisine and artistic trends. Emphasis on developing intermediate proficiency in reading, writing, listening and speaking. Class discussions and activities aim to enable students to perform various tasks in the target language. Prerequisite: AMELANG 184C.

AMELANG 185B. Second-Year Turkish, Second Quarter. 5 Units.

Continuation of AMELANG 185A. Main focus is on class discussions and essay writing practices about daily life in Turkey. Prerequisite: AMELANG 185A.

AMELANG 185C. Second-Year Turkish, Third Quarter. 5 Units.
Continuation of AMELANG 185B. Main focus is on class discussions and essay writing practices about daily life in Turkey. End of quarter presentation in Turkish. Prerequisite: AMELANG 185B.

AMELANG 186A. Third-Year Turkish, First Quarter. 3 Units.
Continuation of AMELANG 185C. Prerequisite: AMELANG 185C.

AMELANG 186B. Third-Year Turkish, Second Quarter. 3 Units.
Continuation of AMELANG 186A. Prerequisite: AMELANG 186A.

AMELANG 186C. Third-Year Turkish, Third Quarter. 4 Units.
Continuation of AMELANG 186B. Prerequisite: AMELANG 186B.

AMELANG 187A. First-Year Yoruba, First Quarter. 4 Units.

AMELANG 187B. First-Year Yoruba, Second Quarter. 4 Units.
Continuation of 187A.

AMELANG 187C. First-Year Yoruba, Third Quarter. 4 Units.
Continuation of 187B.

AMELANG 203A. Beginning Hausa, First Quarter. 3 Units.
For grads only.

AMELANG 203B. Beginning Hausa, Second Quarter. 3 Units.
For grads only.

AMELANG 206B. Intensive Beginning Swahili, Part B. 4 Units.

AMELANG 206C. Intensive Beginning Swahili, Part C. 4 Units.

AMELANG 216A. Contemporary Language of Iran, First Quarter. 3 Units.

AMELANG 216B. Contemporary Language of Iran, Second Quarter. 3 Units.

AMELANG 216C. Contemporary Language of Iran, Third Quarter. 3 Units.

AMELANG 250A. Reading Hebrew, First Quarter. 2-4 Units.
Introduction to Hebrew literature through short stories and poetry by notable Israeli writers. In Hebrew. Prerequisite: one year of Hebrew or equivalent.
Same as: JEWISHST 205

AMELANG 297. Directed Reading in African and Middle Eastern Languages. 1-5 Unit.
May be repeated for credit. Prerequisite: consent of instructor.

AMELANG 395. Graduate Studies in African and Middle Eastern Languages. 1-5 Unit.
Prerequisite: consent of instructor.

African Studies Courses

AFRICAST 72SI. Conflict in the Congo. 1-2 Unit.

AFRICAST 109. Running While Others Walk: African Perspectives on Development. 5 Units.

Throughout the history of modern Africa, Africans have specified their desired future; development, understood broadly; and identified the major obstacles in achieving it. Debates about development have intensified in the post-colonial period, especially as African countries have replaced the leaders installed at independence. Amidst the general critique of the imposition of external values and rules, Africans have differed, sometimes sharply, on priorities, process, and programs. While for some the challenge is to catch up with development elsewhere, for others it is essential to leap ahead, to set the pace, to initiate a radical social, economic, and political transformation. To ground and extend the common approaches to studying development that emphasize economics and that rely largely on external commentators, we will explore African perspectives. Our major task will be a broad overview, sampling the analyses of African intellectuals in several domains. Course participants will review, compare, and analyze major contributions, developing an understanding of contemporary intellectual currents.
Same as: AFRICAST 209

AFRICAST 111. Education for All? The Global and Local in Public Policy Making in Africa. 5 Units.

Policy making in Africa and the intersection of policy processes and their political and economic dimensions. The failure to implement agreements by international institutions, national governments, and nongovernmental organizations to promote education. Case studies of crowded and poorly equipped schools, overburdened and underprepared teachers, and underfunded education systems.
Same as: AFRICAST 211

AFRICAST 112. AIDS, Literacy, and Land: Foreign Aid and Development in Africa. 5 Units.

Is foreign aid a solution? or a problem? Should there be more aid, less aid, or none at all? How do foreign aid and local initiatives intersect? A clinic in Uganda that addresses AIDS as a family and community problem. Multiple strategies in Tanzania to increase girls' schooling. These are imaginative and innovative approaches to pressing and contested policy challenges. We will examine several contentious issues in contemporary Africa, exploring their roots and the intense conflicts they engender, with special attention to foreign aid and the aid relationship. As African communities and countries work to shape their future, what are the foreign roles and what are their consequences?
Same as: AFRICAAM 212, AFRICAST 212

AFRICAST 115. South African Encounters. 1 Unit.

This course is a prerequisite for all those accepted to or on the wait list for the following quarter's BOSP Cape Town term abroad. It will explore issues in contemporary South Africa.
Same as: AFRICAAM 115

AFRICAST 127. African Art and Politics, c. 1900 - Present. 4 Units.

This course explores the relationship between art and politics in twentieth century Africa. Artistic production and consumption is considered in the context of various major political shifts, from the experience of colonialism to the struggle against Apartheid. Each week we will look closely at different works of art and examine how artists and designers responded to such challenges as independence, modernization and globalization. We will look at painting, sculpture, religious art, public and performance art, photography and film. How western perceptions and understanding of African art have shifted, and how museums have framed African art throughout the twentieth century will remain important points of discussion throughout the course.
Same as: ARTHIST 127A

AFRICAST 133B. Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims. 3-5 Units.

In this course, students will think critically about how knowledge about Islam, Muslims, and Muslim Societies is produced and circulated. As a class, we will consider why and how certain kinds of ideas about Islam and Muslims become representative (i.e., authoritative discourse) while others ideas do not. This is an interdisciplinary class; course material will draw on readings from anthropology, literary criticism, history, sociology and media and cultural studies. We will also be engaging with other kinds of material, including news articles, editorials, documentaries, and films.

Same as: ANTHRO 133B, CSRE 133B

AFRICAST 135. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 235, EDUC 135X, EDUC 335X, HUMBIO 26, MED 235

AFRICAST 138. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice; structured around international military intervention and criminal trials based on international criminal courts; will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance of balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 238, ANTHRO 138A, ANTHRO 238A

AFRICAST 138B. Urban Africa. 5 Units.

This course explores the production of urban space and the social, cultural, and political significance of cities in sub-Saharan Africa. Topics include: architecture and the built environment; urban planning and colonial public health; migration and rural-urban dynamics; youth, politics, and popular culture; violence, policing, and the privatization of public space; (in)formality in housing, transportation, and employment; class, gender, and mobility in the public sphere; urban citizenship and `right to the city; movements; gentrification, tourism, and the commodification of poverty; and efforts to (re)theorize postcolonial African cities. Readings are drawn from anthropology, history, urban studies, and geography. Discussion will situate struggles over urban forms and the contours of everyday life within broader trends in the political economy of the region from the late colonial period to the present.

Same as: ANTHRO 138B, URBANST 139

AFRICAST 139A. Forgotten Africa: An Introduction to the Archaeology of Africa. 5 Units.

This course provides an introductory survey of Africa's past from prehistoric times through the 19th-century. The course will challenge Western depictions of Africa as a dark continent `without history; by highlighting the continent's vibrant cultures, sophisticated technologies, complex political systems and participation in far-reaching commercial networks, all predating European colonization. In tandem, the course explores how these histories are mobilized in the production of negative ideas about Africa in contemporary discourse.

Same as: ANTHRO 139A, ARCHLGY 139A

AFRICAST 141A. Science, Technology, and Medicine in Africa. 4 Units.

Africa is often depicted as a place simply in need of science, technology, and medicine. This class will introduce students to the culture and politics of science in sub-Saharan Africa: to the diverse and rich traditions, histories and contemporary predicaments of knowledge practices on the continent. We will consider the role of science in the colonial period, covering the expansion of European empires in Africa and the forms of technical knowledge that colonial governments encountered, especially as they relate to health and the environment. We will examine the role of science at African independence and in international development work. Finally, we will discuss the techno-politics of medical training and research, resource extraction, and the internet in contemporary Africa. This course will provide some important background for those with an applied interest in Africa as well as provide an introduction to a growing area of scholarship. Course materials include historical and ethnographic works, as well as primary sources and films emphasizing scientific practice in the context of geopolitical relations of power and inequality.

Same as: ANTHRO 141A

AFRICAST 142. Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice. 3-5 Units.

This seminar is part of a broader program on Social Entrepreneurship at CDDRL in partnership with the Haas Center for Public Service. It will use practice to better inform theory. Working with three visiting social entrepreneurs from developing and developed country contexts students will use case studies of successful and failed social change strategies to explore relationships between social entrepreneurship, gender, democracy, development and justice. It interrogates current definitions of democracy and development and explores how they can become more inclusive of marginalized populations. This is a service learning class in which students will learn by working on projects that support the social entrepreneurs' efforts to promote social change. Students should register for either 3 OR 5 units only. Students enrolled in the full 5 units will have a service-learning component along with the course. Students enrolled for 3 units will not complete the service-learning component. Limited enrollment. Attendance at the first class is mandatory in order to participate in service learning.

Same as: INTNLREL 142

AFRICAST 145B. Africa in Atlantic Writing. 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Adichie, Condeacute;, Olinto), prose poetry (Ceacute;saire, Neto, Walcott), theoretical reflection (Fanon, Glissant), reportage (Gide, Gourevitch), ethnography (Leiris, Ouologuem) and autobiography (Barack Obama).

Same as: AFRICAAM 148, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B, FRENCH 345B

AFRICAST 151. AIDS in Africa. 3 Units.

Medical, social, and political aspects of the HIV epidemic in sub-Saharan Africa including: biology, transmission, diagnosis, and treatment of HIV; mother-to-child transmission and breastfeeding; vaccines; community and activist responses to the HIV epidemic; economics of HIV treatment; governance and health; ethics in research and program implementation.

AFRICAST 190. Madagascar Prefield Seminar. 1-2 Unit.

The purpose of this seminar is to prepare students for their overseas field experience in Madagascar. The seminar will provide an introduction to island biogeography and culture, with emphasis on Madagascar. During the seminar, students will give presentations on specific aspects of biogeography and will also lay the groundwork for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be quite limited. In addition, we will cover logistics, health and safety, cultural sensitivity, geography and politics, and basic language skills. We will also deal with post-field issues such as reverse culture shock, and ways in which participants can consolidate and build up their abroad experiences after they return to campus. Students will have the opportunity to participate pilot study aimed at developing a series of innovative online curriculum based upon their field experience.

AFRICAST 195. Back from Africa Workshop. 1-2 Unit.

For students who conducted research over the summer in Africa. Students reflect on their time in Africa, transform their observations and research into scholarship, and connect as a community. Cape Town fellows and any others who conducted summer research in Africa can use this course to finish their research.

AFRICAST 199. Independent Study or Directed Reading. 1-5 Unit.

May be repeated for credit.

AFRICAST 200. The HIV/AIDS Epidemic in Tanzania: A Pre-Field Seminar. 1 Unit.

Goal is to prepare students for an HIV/AIDS prevention, service-learning experience in Tanzania. Topics include: history of HIV/AIDS epidemic globally and in Tanzania; social and economic impact of AIDS; national and societal responses; ethical issues in crosscultural service learning; teaching for prevention; biology of HIV transmission, disease progression, and prevention; introduction to Tanzanian history and politics; HIV/AIDS and development; social, cultural, and economic context of HIV risk; and strategies for HIV prevention in Tanzania.

AFRICAST 209. Running While Others Walk: African Perspectives on Development. 5 Units.

Throughout the history of modern Africa, Africans have specified their desired future; development, understood broadly; and identified the major obstacles in achieving it. Debates about development have intensified in the post-colonial period, especially as African countries have replaced the leaders installed at independence. Amidst the general critique of the imposition of external values and rules, Africans have differed, sometimes sharply, on priorities, process, and programs. While for some the challenge is to catch up with development elsewhere, for others it is essential to leap ahead, to set the pace, to initiate a radical social, economic, and political transformation. To ground and extend the common approaches to studying development that emphasize economics and that rely largely on external commentators, we will explore African perspectives. Our major task will be a broad overview, sampling the analyses of African intellectuals in several domains. Course participants will review, compare, and analyze major contributions, developing an understanding of contemporary intellectual currents.

Same as: AFRICAST 109

AFRICAST 211. Education for All? The Global and Local in Public Policy Making in Africa. 5 Units.

Policy making in Africa and the intersection of policy processes and their political and economic dimensions. The failure to implement agreements by international institutions, national governments, and nongovernmental organizations to promote education. Case studies of crowded and poorly equipped schools, overburdened and underprepared teachers, and underfunded education systems.

Same as: AFRICAST 111

AFRICAST 212. AIDS, Literacy, and Land: Foreign Aid and Development in Africa. 5 Units.

Is foreign aid a solution? or a problem? Should there be more aid, less aid, or none at all? How do foreign aid and local initiatives intersect? A clinic in Uganda that addresses AIDS as a family and community problem. Multiple strategies in Tanzania to increase girls' schooling. These are imaginative and innovative approaches to pressing and contested policy challenges. We will examine several contentious issues in contemporary Africa, exploring their roots and the intense conflicts they engender, with special attention to foreign aid and the aid relationship. As African communities and countries work to shape their future, what are the foreign roles and what are their consequences?.

Same as: AFRICAAM 212, AFRICAST 112

AFRICAST 224. Memory and Heritage In South Africa Syllabus. 1 Unit.

The focus of this course is to provide a forum in which students examine the role of memory and heritage in South Africa. The course will include visiting speakers, discussion and other activities. The complex relationship between memory and heritage in South Africa will provide the basis for a series of broad conversations about citizenship, national reconciliation, memorialization, justice, modernity and heritage ethics.

AFRICAST 229. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer.

Same as: AFRICAAM 229, COMPLIT 229, CSRE 129B, FRENCH 229, HUMBIO 175L, MED 234

AFRICAST 235. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, EDUC 135X, EDUC 335X, HUMBIO 26, MED 235

AFRICAST 238. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice; structured around international military intervention and criminal trials based on international criminal courts; will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 138, ANTHRO 138A, ANTHRO 238A

AFRICAST 299. Independent Study or Directed Reading. 1-10 Unit.**AFRICAST 300. Contemporary Issues in African Studies. 1 Unit.**

Guest scholars present analyses of major African themes and topics. Brief response papers required. May be repeated for credit.

AFRICAST 301A. The Dynamics of Change in Africa. 4-5 Units.

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: HISTORY 346, POLISCI 246P, POLISCI 346P

AFRICAST 302. Research Workshop. 1 Unit.

Required for African Studies master's students. Student presentations.

American Studies Courses

AMSTUD 1B. Media, Culture, and Society. 5 Units.

The institutions and practices of mass media, including television, film, radio, and digital media, and their role in shaping culture and social life. The media's shifting relationships to politics, commerce, and identity.

Same as: COMM 1B

AMSTUD 2. Introduction to American National Government and Politics. 5 Units.

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. (This course has merged with Political Science 123/PubPol 101).

Same as: POLISCI 2

AMSTUD 15. Global Flows: The Globalization of Hip Hop Art, Culture, and Politics. 1-2 Unit.

This course consists of film screenings, dialogues, and performances that examine and engage Hip Hop Cultures and artists from around the world. We will explore diverse scenes and artists, from the formation of new musical genres such as hiplife in Ghana, to the impact of the first Hip Hop concert in Morocco, to comparative investigations of race and citizenship in Japan, Cuba, Palestine, France, and the United States (including Black, Mexican and Arab-Americans).

AMSTUD 25Q. The Origins of the Modern American City, 1865-1920. 3 Units.

Are we living in a new Gilded Age? To answer this question, we go back to the original Gilded Age, as well as its successor, the Progressive Era. How did urban Americans around the turn of the twentieth century deal with stark inequalities of class, race, ethnicity, gender, and sexuality? And what can we learn from their struggles for our own time? Students use primary and secondary sources in digital and print formats. Possible field trip to San Francisco.

Same as: HISTORY 55Q, URBANST 25Q

AMSTUD 32. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations. Same as: AFRICAAM 32, CSRE 32A, EDUC 32X, EDUC 432X, TAPS 32

AMSTUD 50N. The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era. 3 Units.

Not since the turn of the last century have Americans experienced such a profound gap between those who have and those who do not, between wealthy and working poor, between defacto upper and lower classes, between those of the status quo and those who slip to the social periphery. We will be examining literary and artistic explorations of social and economic inequity, fiction and art that looks at reversals of fortune as well as the possibilities for social change. Readings include Jacob Riis; *How the Other Half Lives*, W.E.B. Du Bois; *The Souls of Black Folk*, Edith Wharton; *House of Mirth*, James Agee & Walker Evans; *Let Us Not Forget Famous Men*, T.C. Boyle; *The Tortilla Curtain*, Julie Otsuka; *When the Emperor Was Divine* and Occupy Movement art.

AMSTUD 51Q. Comparative Fictions of Ethnicity. 4 Units.

We may "know" "who" we "are," but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of "the Self"? After all, don't we tell stories in response to the question, "who are you"? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue ("who am I") become skewed differently when we add a qualifier before it, like "ethnic"?. Same as: COMPLIT 51Q, CSRE 51Q

AMSTUD 54N. African American Women's Lives. 3-4 Units.

Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality.

Same as: AFRICAAM 54N, CSRE 54N, FEMGEN 54N, HISTORY 54N

AMSTUD 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.

This course explores the emergence of concepts of gender equality in world history. It asks how gender inequality relates to racial, ethnicity, and sexual identities, how men engage with feminism, whether gender equality is purely a western cultural tradition, and much more. We approach the long history of ideas about gender and equality by reading primary historical documents from around the world, moving from the 15th century to the present. Topics include education, the body, sexuality, violence, labor, and politics.

Same as: CSRE 63N, FEMGEN 63N, HISTORY 63N

AMSTUD 66. Ten Ways to Study Cars. 1 Unit.

This class is a lunch seminar on the car and auto-mobility in twentieth-century America. We will talk about cars with a guest each week from one of ten disciplines; and topics will range from design and mechanics, to film and literature, the mapping of the United States, a gas dependent economy, social mobility, car collectability, and the history of the driver's license. Guests from Design and the Stanford Revs Digital Archive will also attend. Once a week TBD at Noon. Manzanita Seminar Room. Limited Enrollment. Sophomore Priority. One Unit.

AMSTUD 68N. Mark Twain and American Culture. 4 Units.

Preference to freshmen. Mark Twain has been called our Rabelais, our Cervantes, our Homer, our Tolstoy, our Shakespeare. Ernest Hemingway maintained that all modern American literature comes from one book by Mark Twain called *The Adventures of Huckleberry Finn*. President Franklin D. Roosevelt got the phrase New Deal from *A Connecticut Yankee in King Arthur's Court*. Class discussions will focus on how Twain's work illuminates and complicates his society's responses to such issues as race, technology, heredity versus environment, religion, education, and what it means to be American.

AMSTUD 91. Exploring American Religious History. 4 Units.

This course will trace how contemporary beliefs and practices connect to historical trends in the American religious landscape.

Same as: RELIGST 91

AMSTUD 101. American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations. 3-5 Units.

Movies and the fiction that inspires them; power dynamics behind production including historical events, artistic vision, politics, and racial stereotypes. What images of black and white does Hollywood produce to forge a national identity? How do films promote equality between the races? What is lost or gained in film adaptations of books? Limited Enrollment, Instructor Request; Consent Required. Class meetings held in Manzanita Multipurpose Room.

AMSTUD 103. On the Road: Cars and the Auto-Mobility of Race, Gender, Class, and Age in American Literature. 3-5 Units.

The car in American literature, history, and culture, provides hope and makes it possible to relocate, transcend social status, and reinvent oneself. In this class we will examine how the car allows Americans to navigate identity in new ways. Readings include: Fitzgerald, Stein, Steinbeck, Escovedo-Colton, Nabokov, Barrett, Walker, Murray, Simpson, Wolfe, Kerouac, Davis, Freeman, Gilroy, Lucasi, Hamper, Moore, and Nass.

AMSTUD 105N. Law and Popular Culture. 3 Units.

This seminar focuses on the interface between two important subjects: law and popular culture. Before class, students will see a series of films or television shows relating to law, lawyers, and the legal system. There is also a weekly homework assignment based on materials in the assigned text and the assigned film or TV show. We will discuss the pop culture treatment of subjects such as the adversary system, good and bad lawyers, female and gay lawyers, the work life of lawyers, legal education, ethical issues, the jury system, and criminal and civil justice. The seminar discussions will draw on film theory and film-making technique to deepen understanding of the interrelationship between law and popular culture. The discussions will illuminate the ways in which pop culture products both reflect and change social views about law and lawyers. The assigned text is Michael Asimow & Shannon Mader, "Law and Popular Culture: A Course Book" (Peter Lang 2013).

AMSTUD 107. Introduction to Feminist Studies. 4-5 Units.

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives.

Same as: CSRE 108, FEMGEN 101, TAPS 108

AMSTUD 111. Transnational Reproductive Politics. 3-5 Units.

This course examines the issues and debates surrounding women's reproduction in a transnational framework, including birth control, abortion, surrogacy, prenatal diagnosis, labor and delivery, menstruation, sex trafficking, and the reproductive justice movement. It pays special attention to how knowledge and technology travel across national/cultural borders and how women's reproductive functions are deeply connected to international politics and events abroad.

Same as: FEMGEN 111

AMSTUD 114Q. Visions of the 1960s. 5 Units.

Preference to sophomores. Introduction to the ideas, sensibility, and, to a lesser degree, the politics of the American 60s. Topics: the early 60s vision of a beloved community; varieties of racial, generational, and feminist dissent; the meaning of the counterculture; and current interpretive perspectives on the 60s. Film, music, and articles and books.

AMSTUD 116. American Economic History. 5 Units.

The American economy from colonial times to the present, illustrating the role of history in economic life. Topics: U.S. economic development in global and comparative context; slavery as an economic system; emergence of American technology and business organization; economics of the Great Depression and the New Deal; post-World War II economic performance and social change; globalization, information technology, and inequality. Prerequisite: 1 or 1A or 1V.

Same as: ECON 116, HISTORY 156

AMSTUD 120. Digital Media in Society. 4-5 Units.

(Graduate students register for 220.) Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to Juniors and Seniors.

Same as: COMM 120W, COMM 220

AMSTUD 121. Introduction to American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 121.) An exploration of the diverse political, racial, social, and aesthetic questions which inform works of American literature from the early national period to the late twentieth century.

Same as: ENGLISH 21, ENGLISH 121

AMSTUD 121L. Racial-Ethnic Politics in US. 5 Units.

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. Stats 60 or Econ 1 is strongly recommended.

Same as: CSRE 121L, POLISCI 121L, PUBLPOL 121L

AMSTUD 121X. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AFRICAAM 121X, ANTHRO 121A, CSRE 121X, EDUC 121X, LINGUIST 155

AMSTUD 121Z. Political Power in American Cities. 5 Units.

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

Same as: POLISCI 121, PUBLPOL 133, URBANST 111

AMSTUD 123D. American Literature, 1855 to World War I. 5 Units.

A survey of American writers from Whitman to T.S. Eliot, including Emily Dickinson, Mark Twain, Stephen Crane, Frank Norris, Kate Chopin, Theodore Dreiser, and Henry James. Topics include the tension between romance and realism, the impact of naturalism and modernism, as well as race, gender, and the literary evolution of the American language.

AMSTUD 123G. Mark Twain: A Fresh Look at an Icon and Iconoclast, 100 Years after His Death. 3-5 Units.

The vitality and versatility of a writer who has been called America's Rabelais, Cervantes, Homer, Tolstoy, and Shakespeare. Journalism, travel books, fiction, drama, and sketches by Mark Twain; how Twain engaged such issues as personal and national identity, satire and social justice, imperialism, race and racism, gender, performance, travel, and technology. What are Twain's legacies in 2010, the centennial of his death, the 175th anniversary of his birth, and the 125th anniversary of his most celebrated novel? Guests include actor Hal Holbrook.

AMSTUD 124A. The American West. 5 Units.

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: ARTHIST 152, ENGLISH 124, HISTORY 151, POLISCI 124A

AMSTUD 132. American Art and Culture, 1528-1910. 4 Units.

The visual arts and literature of the U.S. from the beginnings of European exploration to the Civil War. Focus is on questions of power and its relation to culture from early Spanish exploration to the rise of the middle classes. Cabeza de Vaca, Benjamin Franklin, John Singleton Copley, Phillis Wheatley, Charles Willson Peale, Emerson, Hudson River School, American Genre painters, Melville, Hawthorne and others.

Same as: ARTHIST 132, ARTHIST 332

AMSTUD 134. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the iquest;black box;quest; of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores iquest;museum cultures;quest;: representations of iquest;self;quest; and iquest;other;quest; within museums and institutional cultures of the museum world itself.

Same as: ARCHLGY 134, ARCHLGY 234, ARTHIST 284B, CSRE 134, EDUC 214, NATIVEAM 134

AMSTUD 135. Deliberative Democracy and its Critics. 3-5 Units.

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. In spring quarter 2015, this course will have a special focus on deliberative democracy in the the Greater China region. The course will discuss whether a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age. What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Case studies from the Deliberative Polling method and other deliberation methods, its applications, defenders and critics, both normative and empirical, will provide a cases studies for discussion. Some course sessions will utilize the case method to examine public consultations, the media, and civil society. Throughout the course, students will address how public participation is currently conducted around the world. As we have all seen successful, but more likely unsuccessful attempts to consult the public and this course will examine the various ways of consulting the public and how governments, media, and the public have responded and used the results.

Same as: COMM 135, COMM 235, COMM 335, POLISCI 234P, POLISCI 334P

AMSTUD 137. The Dialogue of Democracy. 4-5 Units.

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

Same as: COMM 137W, COMM 237, POLISCI 232T, POLISCI 332T

AMSTUD 139B. American Women Writers, 1850-1920. 5 Units.

The ways in which female writers negotiated a series of literary, social, and intellectual movements, from abolitionism and sentimentalism in the nineteenth century to Progressivism and avant-garde modernism in the twentieth. Authors include Harriet Beecher Stowe, Harriet Jacobs, Rebecca Harding Davis, Emily Dickinson, Kate Chopin, Edith Wharton, Gertrude Stein, Willa Cather, and Charlotte Perkins Gilman.

AMSTUD 140. Stand Up Comedy and the "Great American Joke" Since 1945. 5 Units.

Development of American Stand Up Comedy in the context of social and cultural eruptions after 1945, including the Borscht Belt, the Chitliniquest; Circuit, the Cold War, censorship battles, Civil Rights and other social movements of the 60s and beyond. The artistry of stories, monologues, jokes, impersonations, persona, social satire, scatology, obscenity, riffs, rants, shtick, and more by such artists as Lenny Bruce, Dick Gregory, Richard Pryor, George Carlin, Margaret Cho, Sarah Silverman, Jon Stewart, Stephen Colbert, as well as precursors such as Mark Twain, minstrelsy and vaudeville and related films, TV shows, poems and other manifestations of similar sensibilities and techniques.

Same as: CSRE 140C

AMSTUD 142. The Literature of the Americas. 5 Units.

A wide-ranging overview of the literatures of the Americas in comparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes--the Harlem Renaissance, the Beats, magic realism, Noigandres--in unaccustomed conversation with each other. Same as: COMPLIT 142, CSRE 142, ENGLISH 172E

AMSTUD 143. Introduction to African American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history.

Same as: AFRICAAM 43, ENGLISH 43, ENGLISH 143

AMSTUD 145M. Culture Wars: Art and Social Conflict in the USA, 1890-1950. 4 Units.

This course examines social conflicts and political controversies in American culture through the lens of visual art and photography. We consider how visual images both reflect and participate in the social and political life of the nation and how the terms of citizenship have been represented;and, at times, contested;by artists throughout the first half of the 20th century. The class explores the relation between American art and the body politic by focusing on issues of poverty, war, censorship, consumerism, class identity, and racial division.

Same as: ARTHIST 145, ARTHIST 345, FEMGEN 145

AMSTUD 146. Asian American Culture and Community. 3-5 Units.

This course introduces students to the histories of Asians in America, specifically as these histories are part of a broader Asia-US-Pacific history that characterized the 20th century and now the 21st. We will combine readings in history, literature, sociology, with community-based learning. The course takes place over two quarters. The first quarter focuses on gaining knowledge of Asian America and discussion key topics that students wish to focus on collaboratively. During this first quarter we also learn about community-based learning, set up teams and projects, and develop relationships with community organizations. The second quarter students work with student liaisons (senior students who have experience in service learning) and complete their work with the community;there are no formal class meetings this second quarter. Service Learning Course (certified by Haas Center). Course can be repeated once.

Same as: ASNAMST 146S, COMPLIT 146, CSRE 146S

AMSTUD 146C. Hemingway, Hurston, Faulkner, and Fitzgerald. 5 Units.

While Hemingway and Fitzgerald were flirting with the expatriate avant-garde in Europe, Hurston and Faulkner were performing anthropological field-work in the local cultures of the American South. Focus on the tremendous diversity of concerns and styles of four writers who marked America's coming-of-age as a literary nation with their multifarious experiments in representing the regional and the global, the racial and the cosmopolitan, the macho and the feminist, the decadent and the impoverished.

Same as: ENGLISH 146C

AMSTUD 147J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.)

Same as: AFRICAAM 19, CSRE 147J, MUSIC 147J, MUSIC 247J

AMSTUD 150. American Literature and Culture to 1855. 3-5 Units.

(English majors and others taking 5 units, register for ENGLISH 123 or AMSTUD 150.) A survey of early American writings, including sermons, poetry, captivity and slave narratives, essays, autobiography, and fiction, from the colonial era to the eve of the Civil War.

Same as: ENGLISH 23, ENGLISH 123

AMSTUD 150A. Colonial and Revolutionary America. 5 Units.

(Same as HISTORY 50A. History majors and others taking 5 units, register for HISTORY 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution.

Same as: HISTORY 150A

AMSTUD 150B. 19th-Century America. 5 Units.

(Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: AFRICAAM 150B, HISTORY 150B

AMSTUD 150C. The United States in the Twentieth Century. 5 Units.

(Same as HISTORY 50C. History majors and others taking 5 units, register for 150C.) Major political, economic, social, and diplomatic developments in the U.S. Themes: the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 50s and 60s); the changing status of women since WW II; shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy in WW I and II, and the Cold War.

Same as: HISTORY 150C

AMSTUD 150X. From Gold Rush to Google Bus: History of San Francisco. 5 Units.

This class will examine the history of San Francisco from Native American and colonial settlement through the present. Focus is on social, environmental, and political history, with the theme of power in the city. Topics include Indians and Spanish settlers, the Gold Rush, immigration and nativism, earthquake and fire, progressive reform and unionism, gender, race and civil rights, sexuality and politics, redevelopment and gentrification.

Same as: HISTORY 152E, URBANST 150

AMSTUD 151H. ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities. 4-5 Units.

A quarter-long exploration of improvisation in relationship to identity and race in the 21st century in which students investigate new dynamics of doing and thinking identities through the arts. Panel discussions, performances, and talks that engage critically with the theme, concept, and practice of improvising identity across a variety of contexts and genres such as jazz music, modern dance, contemporary art, race comedy, food, and hip-hop poetry/freestyle. Strategies that artists/scholars have used to overturn essentializing notions of identity in theory and practice.

Same as: CSRE 151H, DANCE 151H, DANCE 251H, TAPS 151H, TAPS 351H

AMSTUD 152A. "Mutually Assured Destruction": American Culture and the Cold War. 5 Units.

The temperature of the early Cold War years via readings of Soviet and U.S. propaganda; documentary film and film noir; fiction by Bellow, Ellison, O'neill; Connor, and Mailer; social theory by Arendt, the New York Intellectuals, and the Frankfurt School; and political texts such as Kennan's *Sources of Soviet Conduct*, the *Truman Doctrine*; speech, and the National Security Council Report 68. Major themes include the discourse of totalitarianism, MacCarthyism, strategies of containment, the nuclear threat, the figure of the *outsider*; and the counterculture, and the cultural shift from sociological to psychological idioms.

AMSTUD 152C. The JFK Era and American Literature. 5 Units.

Few U.S. presidents have exerted so great a fascination on the national and global post-World War II imagination as John F. Kennedy. As the 2013's semi-centennial anniversary of Kennedy's assassination attests, the production of films, television and multimedia programs, biographies, conspiracy theories, academic studies, and literary texts about the iconic JFK and his fabled, thousand-day presidency continues unabated. In this course, we will explore the attention Kennedy has drawn from writers and filmmakers like Norman Mailer, Lorraine Hansberry, Don DeLillo, Oliver Stone, Mario Vargas Llosa, and Stephen King.

Same as: ENGLISH 152C

AMSTUD 152G. Harlem Renaissance. 5 Units.

Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of "vicious Modernism", as a "BangClash", that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context.

Same as: AFRICAAM 152G, ENGLISH 152G

AMSTUD 152K. Mixed-Race Politics and Culture. 5 Units.

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? This course approaches issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st-century U.S. Issues surrounding the role of multiculturalism, immigration, acculturation, racial representation, and racial prejudice in American society. Topics include the political and social formation of race; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of census categories and the rise of the multiracial movement.

Same as: AFRICAAM 226, CSRE 152K, ENGLISH 152K

AMSTUD 154. American Intellectual and Cultural History to the Civil War. 5 Units.

(Same as HISTORY 54. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images.

Same as: HISTORY 154

AMSTUD 154X. The American Civil War: A Visual History. 4 Units.

A painting of men charging across a field, a photograph of dead bodies in a ditch, a fragment of metal, a sliver of bone, and a brass button: how do we make sense of the visual record of the American Civil War (1861-65)? From the Capitol Dome to a skeleton dug up in a highway project a hundred years after the last battle, the course will consider the strange and scattered remnants of a famous era. Drawing on the poetry of Walt Whitman, Emily Dickinson, and Herman Melville, the paintings of Winslow Homer, the photographs of Alexander Gardner, and the oratory of Abraham Lincoln, the course will examine what cannot be portrayed: the trauma of war.

Same as: ARTHIST 154, ARTHIST 354

AMSTUD 155C. Abstract Expressionism: Painting/Modern/America. 4 Units.

The course will focus on American abstract painting from the 1930s to the 1960s, emphasizing the works of art at the Anderson Collection at Stanford. We will focus on looking closely at pictures by Jackson Pollock, Mark Rothko, Willem de Kooning, and other renowned abstract painters, developing skills of speaking and writing about these works of art. We will also place these pictures in their mid-20th century context: World War II and the Cold War; Hollywood and popular culture generally; Beat literature; and locations such as New York and San Francisco.

Same as: ARTHIST 155C

AMSTUD 156H. Women and Medicine in US History: Women as Patients, Healers and Doctors. 5 Units.

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing.

Same as: FEMGEN 156H, HISTORY 156G

AMSTUD 157. The Constitution: A Brief History. 5 Units.

A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime.

Same as: HISTORY 157, POLISCI 128S

AMSTUD 157P. Allyship: Challenging Privilege and Doing Solidarity in Movements for Collective Liberation. 2-4 Units.

Many activists in the racial justice, immigrant, indigenous, feminist, and LGBTQ movements, are committed to principles of leadership by frontline communities - their goal is to build power in communities that are disempowered by dominant institutions and practices. This makes for complicated relationships with those that are not part of those frontline communities but recognize that their own silence makes them complicit in systems of oppression. In this course, we will examine how power and privilege can undermine attempts to collaborate in social justice work, and then explore principles and practices of solidarity and allyship that attempt to overcome these challenges. We will discuss texts on white privilege and anti-racism as our primary point of reference, but will connect to other kinds of ally work and movements for collective liberation. As a community-engaged learning course, students will work with community partners to establish long-term relationships based in solidarity. Students are encouraged to work with movements and organizations with whom they already have relationships (e.g., through student-activism). Throughout the quarter, we will have guest lectures and workshops with community partners and movement strategy organizations.

Same as: AFRICAAM 157P, CSRE 157P, FEMGEN 157P

AMSTUD 157X. Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements. 3-5 Units.

How does a social or political movement gain traction? For example, how did 20th-century movements of the disenfranchised, such as the Civil Rights movement or Women's Suffrage, gain a voice an eventually enact change? In the mediascape of today, where everyone with access to a computer has voice, how does a movement like Occupy Wall Street change the national conversation? How do written and verbal choices of the movements impact their success? In this course, students will write and revise their own arguments in order to best understand the writing in these movements and to best produce future work for social change. We will examine the role of rhetoric; the use of argument to persuade; in social movements working toward social justice.

Same as: FEMGEN 157, FEMGEN 257

AMSTUD 159X. American Photographs, 1839-1971: A Cultural History. 4 Units.

This course concentrates on many important American photographers, from the era of daguerreotypes to near the end of the pre-digital era. We study photographs of the Civil War, western exploration, artistic subjects, urban and rural poverty, skyscrapers, crime, fashion, national parks, and social protest, among other topics. Among the photographers we study: Carleton Watkins, Eadweard Muybridge, Walker Evans, Dorothea Lange, Garry Winogrand, and Diane Arbus. Emphasis on developing students' abilities to discuss and write about photography; to see it.

Same as: ARTHIST 159, ARTHIST 359

AMSTUD 160. Perspectives on American Identity. 5 Units.

Required for American Studies majors. Changing interpretations of American identity and Americanness.

AMSTUD 161. Women in Modern America. 4-5 Units.

This course explores the transition from Victorian to modern womanhood in the U.S. from the 1890s to the end of the 20th century, including the experiences of Native, European, African, Mexican, and Asian American women. It asks how, when, and why the majority of American women become wage earners, gained full citizenship, and enacted political opportunities; how race- and class-specific ideals of womanhood changed in popular culture; and how women have redefined their reproductive and sexual relations.

Same as: CSRE 162, FEMGEN 161, HISTORY 161

AMSTUD 164C. From Freedom to Freedom Now: African American History, 1865-1965. 5 Units.

(Same as HISTORY 64C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music.

Same as: HISTORY 164C

AMSTUD 165. History of Higher Education in the U.S.. 3-5 Units.

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities.

Same as: EDUC 165, EDUC 265, HISTORY 158C

AMSTUD 166. Introduction to African American History - the Modern Freedom Struggle. 3-5 Units.

(AFRICAAM-166/ AMSTUD-166/ HISTORY-166) This course focuses on African-American political movements of the period after 1930, with special emphasis on the contributions of grassroots activists and visionary leaders such as W. E. B. Du Bois, Martin Luther King, Jr., and Malcolm X. The lectures will utilize audio-visual materials extensively, and the exams will cover these materials as well as the content of traditional lectures. Students are encouraged to undertake research projects utilizing the unique resources of the King Research and Education Institute.

Same as: AFRICAAM 166, HISTORY 166

AMSTUD 178. Ethnicity and Dissent in United States Art and Literature. 4 Units.

The role of the visual arts of the U.S. in the construction and contesting of racial, class, and gender hierarchies. Focus is on artists and writers from the 18th century to 1990s. How power, domination, and resistance work historically. Topics include: minstrelsy and the invention of race; mass culture and postmodernity; hegemony and language; memory and desire; and the borderlands.

Same as: ARTHIST 178, ARTHIST 378

AMSTUD 179. Introduction to American Law. 3-5 Units.

For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general.

Same as: POLISCI 122, PUBLPOL 302A

AMSTUD 183. Re- Imagining American Borders. 5 Units.

How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual preference, and class borders in the context of a national discussion about the place of Americans in the world. How Anna Deavere Smith, Sherman Alexie, or Michael Moore consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these American narratives? Course includes examining one's own identity.

Same as: CSRE 183, FEMGEN 183

AMSTUD 185. American Studies Internship. 1-3 Unit.

Restricted to declared majors. Practical experience working in a field related to American Studies for six to ten weeks. Students make internship arrangements with a company or agency, under the guidance of a sponsoring faculty member, and with the consent of the director or a program coordinator of American Studies. Required paper focused on a topic related to the internship and the student's studies. May be repeated for credit.

AMSTUD 186. Tales of Three Cities: New York, Chicago, Los Angeles. 5 Units.

How urban form and experience shape literary texts and how literary texts participate in the creation of place, through the literature of three American cities as they ascended to cultural and iconographical prominence: New York in the early to mid 19th century; Chicago in the late 19th and early 20th centuries; and Los Angeles in the mid to late 20th century.

Same as: ENGLISH 186

AMSTUD 186A. American Hauntings. 5 Units.

Cultural, psychological, social, and political dynamics of haunting in American literature, from the early national period to the late 20th century. Sources include ghost stories and other instances of supernatural, emotional, or mental intervention. Authors include Charles Brockden Brown, Washington Irving, Edgar Allan Poe, Nathaniel Hawthorne, Louisa May Alcott, Charlotte Perkins Gilman, Charles Chesnutt, Henry James, Edith Wharton, Toni Morrison, and Stephen King.

AMSTUD 186B. American Song in the 20th Century and after. 3-4 Units.

Critical and creative exploration of song in the Americas. About twenty-five key examples will guide discussion of the interactions between words, music, performance and culture. Weekly listening, reading and assignments will be organized around central themes: love, sex and romance; war and politics; labor and money; place; identity; society and everyday life. Genres include art song; blues, gospel, jazz and country; pop, soul, rock and hip-hop; bossa nova, nueva canciacute;n and salsa; electronic and experimental. Takehome and in-class assignments will include critical and creative writing, and music composition, production and performance; final projects may emphasize any of the above.

Same as: MUSIC 186B, MUSIC 286B

AMSTUD 195. Individual Work. 1-5 Unit.

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AMSTUD 201. History of Education in the United States. 3-5 Units.

How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching.

Same as: EDUC 201, HISTORY 158B

AMSTUD 214. The American 1960s: Thought, Protest, and Culture. 5 Units.

The meaning of the American 60s emphasizing ideas, culture, protest, and the new sensibility that emerged. Topics: black protest, the new left, the counterculture, feminism, the new literature and journalism of the 60s, the role of the media in shaping dissent, and the legacy of 60s protest. Interpretive materials from film, music, articles, and books.

AMSTUD 226. Race and Racism in American Politics. 5 Units.

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

Same as: CSRE 226, POLISCI 226, POLISCI 326

AMSTUD 226X. Curating Experience: Representation in and beyond Museums. 2-4 Units.

In an age when some 50% of museum visitors only "visit" museums online and when digital technologies have broken open archival access, anyone can be a curator, a critic, an historian, an archivist. In this context, how do museums create experiences that teach visitors about who they are and about the world around them? What are the politics of representation that shape learning in these environments? Using an experimental instructional approach, students will reconsider and redefine what it means to curate experience.

Same as: CSRE 226X, EDUC 226X

AMSTUD 231X. Knowing God: Learning Religion in Popular Culture. 4 Units.

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education.

Same as: EDUC 231X, JEWISHST 291X, RELIGST 231X

AMSTUD 240A. Pre-Honors Seminar. 1-5 Unit.

Methods, interpretations, and issues pertinent to honors work in American Studies. Open to juniors interested in honors.

AMSTUD 244. The Visual Culture of the American Home Front, 1941-1945. 5 Units.

How does home front of WWII look now? What sort of meanings appear with the vantage of more than sixty years' distance? Examining Hollywood films from those years -films made during the war but mostly not directly about the war - the seminar focuses on developing students' abilities to write emotion-based criticism and history. Weekly short papers, each one in response to a film screening, are required. Among the films screened: *Shadow of a Doubt*, *Gaslight*, *I Walked with a Zombie*, *The Best Years of Our Lives*.

Same as: ARTHIST 244

AMSTUD 246B. Pop Art. 5 Units.

A new course on the history and meaning of Pop art in the United States and abroad. The course will feature close study of paintings, photographs, and prints at the Cantor Art Center. The course will be given in the Denning Family Resource Room, located in The Anderson Collection building. If you have any questions regarding the location, please contact Linda Esquivel at lindae@stanford.edu.

Same as: ARTHIST 246B

AMSTUD 250. Senior Research. 1-15 Unit.

Research and writing of senior honors thesis under the supervision of a faculty member. The final grade for the thesis is assigned by the chair based on the evaluations of the primary thesis adviser and a second reader appointed by the program. Prerequisite: consent of chair.

AMSTUD 256. America- China Relations. 4-5 Units.

The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past.

Same as: HISTORY 256, HISTORY 356

AMSTUD 257. Journalism and Imaginative Writing in America. 5 Units.

Walt Whitman spent twenty-five years as a journalist before publishing his first book of poems. Mark Twain was a journalist for twenty years before publishing his first novel. Topics include examination of how writers' backgrounds in journalism shaped the poetry or fiction for which they are best known; study of recent controversies surrounding writers who blurred the line between journalism and fiction. Writers include Whitman, Fanny Fern, Twain, Pauline Hopkins, Theodore Dreiser, Charlotte Perkins Gilman, Ernest Hemingway, Meridel LeSueur.

Same as: COMM 278

AMSTUD 258. Topics in the History of Sexuality: Sexual Violence in America. 4-5 Units.

This undergraduate/graduate colloquium explores recent historical interpretations of the history of sexuality, with a focus on sexual violence. The readings cover changing definitions and laws, cultural representations, and the role of gender, race, and age in the construction of rape and other forms of sexual violence. Topics include slavery; incest, seduction, and statutory rape reform; the racialization of rape and the anti-lynching movement; street harassment; men and boys as victims; war and conquest; and feminist responses to rape.

Same as: CSRE 192E, FEMGEN 258, FEMGEN 358, HISTORY 258, HISTORY 358

AMSTUD 260. Disability, Gender, & Identity. 5 Units.

Course explores visible and invisible disabilities, focusing on issues of gender and identity. The course emphasizes psychological as well as physical health, cross-cultural variables, diversity of disability experiences, legal and political aspects, work and home accommodations, self-labeling, caretaking, stigma and passing, and the difference gender makes to how disabilities are experienced. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of physical assistance.

Same as: FEMGEN 260, FEMGEN 360, HUMBIO 141

AMSTUD 261A. Geography, Time, and Trauma in Asian American Literature. 5 Units.

The notion that homes can be stable locations for cultural, racial, ethnic, and similarly situated identity categories. The possibility that there really is no place like home for Asian American subjects. How geography, landscape, and time situate traumas within fictional Asian American narratives.

Same as: ASNAMST 187

AMSTUD 261E. Mixed Race Literature in the U.S. and South Africa. 5 Units.

As scholar Werner Sollors recently suggested, novels, poems, stories about interracial contacts and mixed race constitute an orphan literature belonging to no clear ethnic or national tradition. Yet the theme of mixed race is at the center of many national self-definitions, even in our U.S. post-Civil Rights and South Africa's post-Apartheid era. This course examines aesthetic engagements with mixed race politics in these trans- and post-national dialogues, beginning in the 1700s and focusing on the 20th and 21st centuries.

Same as: AFRICAAM 261E

AMSTUD 262C. African American Literature and the Retreat of Jim Crow. 5 Units.

After the unprecedented carnage of WWII, the postwar era witnessed the slow decline of the segregated Jim Crow order and the onset of landmark civil rights legislation. What role did African American literature and culture play in this historical process? What does this shift in racial theory and praxis mean for black literary production, a tradition constituted by the experience of slavery and racial oppression? Focus on these questions against the backdrop of contemporaneous developments: the onset of the Cold War, decolonization and the formation of the Third World, and the emergence of the "new liberalism."

AMSTUD 262D. African American Poetics. 5 Units.

Examination of African American poetic expressive forms from the 1700s to the 2000s, considering the central role of the genre--from sonnets to spoken word, from blues poetry to new media performance--in defining an evolving literary tradition and cultural identity.

Same as: AFRICAAM 262D

AMSTUD 265. Writing Asian American History. 5 Units.

Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

Same as: ASNAMST 265, HISTORY 265, HISTORY 365

AMSTUD 267E. Martin Luther King, Jr. - His Life, Ideas, and Legacy. 4-5 Units.

Using the unique documentary resources and publications of Stanford's King Research and Education Institute, this course will provide a general introduction to King's life, visionary ideas, and historical significance. In addition to lectures and discussions, the course will include presentations of documentaries such as *Eyes on the Prize*. Students will be expected to read the required texts, participate in class discussions, and submit a research paper or an audio-visual project developed in consultation with the professor.

Same as: AFRICAAM 267E, HISTORY 267E

AMSTUD 271. Mexicans in the United States. 5 Units.

This course explores the lives and experiences of Mexicans living in the United States, from 1848 to the present. Themes and topics include: the legacies of colonialism, the Mexican-American War, transnational migration, the effects of economic stratification, race and racialization, and the impact of sexual and gender ideologies on the lives of Mexicans residing north of the border.

Same as: CHILATST 171, CSRE 171H, HISTORY 271

AMSTUD 272E. Theories of Citizenship and Sovereignty in a Transnational Context. 4-5 Units.

This course explores the multiple meanings of citizenship and the ways in which they change when examined using different geographic scales (from the local to the transnational). The course will pair theoretical readings on citizenship with case studies that focus on North America. Topics include: definitions of citizenship; the interrelation of ideas of citizenship with those of race, ethnicity, gender, and sexuality; the relationship between sovereignty and territoriality; human and civil rights; and immigration.

Same as: CHILATST 172, CSRE 172H, FEMGEN 272E, HISTORY 272E, HISTORY 372E

AMSTUD 275R. Roads Not Taken, 1880-1960. 4 Units.

This course is intended to illuminate ideas about justice, freedom, equality, democracy, peace, and social conflict, and to raise persisting questions about such topics as the role of violence in politics through looking at the ideas of America writers such as Edward Bellamy, W.E.B. DuBois, Eugene Debs, Jane Addams, Emma Goldman, John Dewey and Reinhold Niebuhr.

Same as: ETHICSOC 275R, PHIL 275R, POLISCI 335L

AMSTUD 279X. American Jewish History: Learning to be Jewish in America. 2-4 Units.

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience.

History students must take course for at least 3 units.

Same as: EDUC 279X, HISTORY 288D, JEWISHST 297X, RELIGST 279X

AMSTUD 281. Asian Religions in America; Asian American Religions. 4 Units.

This course will analyze both the reception in America of Asian religions (i.e. of Buddhism in the 19th century), and the development in America of Asian American religious traditions.

Same as: ASNAMST 281, RELIGST 281, RELIGST 381

Anesthesia Courses

ANES 70Q. The Psychosocial and Economic Ramifications of Critical Illness. 3 Units.

Preference to sophomores. The impact of critical illness on a patient and family members; difficulties involved in the decision making process for the patient, family, and healthcare professionals. Topics include: conventional views of death and dying, epidemiology of critical illness, grief, coping skills, cultural variations, euthanasia and withdrawal of care, palliative care and hospice, advanced directive and legal aspects of medical catastrophe, psychosocial dynamics of family meetings, and emotional ramifications of medical decisions.

ANES 80Q. Researching Strange Things. 3 Units.

Devising and implementing strong scientific research designs to better understand complex and mysterious phenomena. Parapsychology topics include remote viewing, telekinesis, precognition, telepathic communication, and other forms of extrasensory perception. History of parapsychology research, including how science has debunked popular claims of supernatural feats; therapeutic approaches still used today but often discredited (such as homeopathy and crystal healing), as well as commonly-supported but controversial techniques such as hypnosis, acupuncture, and naturopathy. Emphasis on distinguishing between scientific and pseudoscientific research methods and how to properly design experiments regardless of the subject matter. Course format includes lectures, discussion, group projects, and research experimentation.

ANES 199. Undergraduate Research. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

ANES 202. Anesthesiology and Pathophysiologic Implications for the Perioperative Patient. 1 Unit.

Provides participants a patient-care-related review of organ physiology and an in- depth discussion of the pathophysiologic mechanisms at work in the perioperative period that influence outcome in the surgical patient and their management. Organ systems addressed include cardiovascular, respiratory, renal, hematologic, and cerebral. Subject matter including airway management, ventilatory support, transfusion practices and the acute management of shock provides useful information for all students currently or in the future involved in acute care of the critically ill patient. Additional topics specific to anesthesia, including anesthetic pharmacology. Lecturers are Stanford anesthesia faculty and visiting guest faculty. Prerequisite: completion of first year curriculum is strongly encouraged.

ANES 204. Medical Education in the New Millenium: Innovation and Digital Disruption. 1-2 Unit.

Focus is on the unique learning preferences and needs of today's Millennial medical learners (medical students, residents, fellows, practicing physicians, nurses, pharmacists, allied medical professionals) and the role thoughtful learning design and use of technology can play in meeting their unique needs. Grounded in learning theory, colloquium course will provide accessible information for learners at all levels to understand learning design and use of educational technologies in the new Millennium. Features speakers from wide arrange of medical education-related fields, including experts in instructional design, learning theory and medical education technologies. Students enrolling for 2 units prepare a final paper.

ANES 205. Engage and Empower Me: Myths and Truths of Designing for Patient Behavior. 1-2 Unit.

Focus on patient stories and real-life experiences of successful patient engagement from industry leaders in healthcare, wellness and behavior sciences. Topics include the neuroscience behind motivating individuals into healthy behaviors, including patients in the care design process, how health educators, designers, techies and investors can improve success. Students enrolling for 2 units complete a class project.

ANES 206. Design for Health: Applying Design Innovation to Improve Healthcare. 2 Units.

Explores the crucial role design can play in optimizing healthcare. Focuses on principles of design-thinking and patient-centered design, and examines their impact on innovating solutions to healthcare problems. Goal is to understand how healthcare providers might better design for health. Includes presentations from patients and design experts.

ANES 207. Medical Acupuncture. 2 Units.

Acupuncture is part of a comprehensive system of traditional Chinese Medicine developed over the past two millennia. This course reviews the history and theoretical basis of acupuncture for the treatment of various diseases as well as for the alleviation of pain. Issues related to the incorporation of acupuncture into the current health care system and the efficacy of acupuncture in treating various diseases are addressed. Includes practical, hands-on sections.

ANES 215. Journal Club for Neuroscience, Behavior and Cognition Scholarly Concentration. 1 Unit.

Review of current literature in both basic and clinical neuroscience in a seminar format consisting of both faculty and student presentations.

ANES 243. Introduction to Integrative Medicine. 1 Unit.

Presentations by local, national, and international experts in various modalities of integrative medicine commonly used by patients in the US, including mind-body medicine (biofeedback, clinical hypnosis, meditation, yoga); traditional whole systems of medicine (traditional Chinese medicine, Ayurveda); biological therapies (botanical medicine, supplements, herbal medicine); manipulative therapies (chiropractic, massage); and acupuncture. Lectures focus on evidence supporting the potential value of various treatment modalities and explanations of both the traditional and proposed scientific mechanisms of actions. Most classes include an experiential portion.

Same as: FAMMED 243

ANES 280. Early Clinical Experience in Anesthesia. 1-2 Unit.

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

ANES 299. Directed Reading in Anesthesiology. 1-18 Unit.

Prerequisite: consent of instructor.

ANES 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

ANES 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Problems related to metabolism, toxicity, and mechanisms of anesthesia; pharmacologic studies involving pain management; the genetic and molecular basis of hemodynamic insufficiency. Animal studies may be included. Interested students should contact Drs. Trudell, MacIver, Clark, Giffard, Patterson, Angelotti, Drover, Chu, or Angst.

Anthropology Courses

ANTHRO 1. Introduction to Cultural and Social Anthropology. 5 Units.

Crosscultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual, and related topics. Case studies illustrating the principles of the cultural process. Films.

Same as: ANTHRO 201

ANTHRO 1S. Introduction to Cultural and Social Anthropology. 3-5 Units.

Crosscultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual, and related topics. Case studies illustrating the principles of the cultural process. Films.

Same as: ANTHRO 101S

ANTHRO 3. Introduction to Prehistoric Archeology. 3-5 Units.

Aims, methods, and data in the study of human society's development from early hunters through late prehistoric civilizations. Archaeological sites and remains characteristic of the stages of cultural development for selected geographic areas, emphasizing methods of data collection and analysis appropriate to each.

Same as: ARCHLGY 1

ANTHRO 4. Language and Culture. 4-5 Units.

Comparative approach, using examples from many languages. Emphasis is on generally non-Western speech communities. Topics include: the structure of language; the theory of signs; vocabulary and culture; grammar, cognition, and culture (linguistic relativism and determinism); encodability of cultural information in language; language adaptiveness to social function; the ethnography of speaking; registers; discourse (conversation, narrative, verbal art); language and power; language survival and extinction; and linguistic ideology (beliefs about language).

Same as: ANTHRO 204

ANTHRO 6. Human Origins. 5 Units.

The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

Same as: ANTHRO 206, HUMBIO 6

ANTHRO 10A. The Archaeology of Home. 3-5 Units.

Homes evoke powerful emotions about place and also highlight the dynamic and complex nature of people, their relationships, and the broader society they live in. Focus on the ways that material traces from the past shed light on the diversity of domestic life, which includes household organization, economic strategies, diet and status, rituals, and identity. Archaeological case studies to see how archaeologists identify reoccurring patterns in material culture found in homes or domestic dwellings to reconstruct household patterns and social relations.

Same as: ARCHLGY 10

ANTHRO 10SC. Darwin, Evolution, and Galapagos. 2 Units.

The tiny remote islands of Galapagos have played a large and central role in the study of evolution. Not surprisingly, they have also been central to the study of conservation. The fascinating adaptations of organisms to the unique ecosystems of the archipelago have left them particularly vulnerable to outside introductions. This seminar explores evolution, conservation, and their connection in the Galapagos. Using case-study material on finches, iguanas, tortoises, cacti, Scalesia plants, and more, we will explore current theory and debate about adaptation, sexual selection, speciation, adaptive radiation, and other topics in evolution. Similarly, we will explore the special challenges Galapagos poses today for conservation, owing to both its unusual biota and the increasing human impact on the archipelago. The first week is held on-campus, followed by an intensive eleven-day expedition to Galapagos to observe firsthand evolutionary phenomena and conservation issues. A chartered ship will serve as our floating classroom, dormitory, and dining hall as we work our way around the archipelago to visit as many as ten islands. For this portion of the class, undergraduates will be joined by a group of Stanford alumni and friends in a format called a Stanford "Field Seminar." Students are required to complete all course readings over the summer. Students will be asked to lead discussions and carry out literature research on the evolutionary and conservation biology of particular Galapagos species. The final assignment is a seven- to ten-page paper and class presentation as we travel in Galapagos. Travel to Galapagos will be provided and paid by Sophomore College (except incidentals) and is made possible by the support of the Stanford Alumni Association Travel/Study Program and generous donors. Students will return to campus late afternoon Sunday, September 20.

Same as: HUMBIO 17SC

ANTHRO 11SC. Conservation and Development Dilemmas in the Amazon. 2 Units.

This course explores the human dimensions of conservation efforts under way in the Amazon Basin of South America. It has two specific goals: (1) to introduce the human ecology of Amazonia; and (2) to assess the prospects for joint efforts at biodiversity conservation and community development. We will draw on case studies to investigate such topics as the causes and consequences of deforestation, the social impact of parks and protected areas, and the potential for "Integrated Conservation and Development Projects" (ICDPs) such as extractive reserves, natural forest management, biodiversity prospecting, and community-based ecotourism. The course views Amazonia as a microcosm of the challenges facing conservation and development efforts today in the Third World. Part of the course is an intensive 11-day expedition to the Peruvian Amazon, at no extra cost, to observe firsthand the conservation and development dilemmas discussed in class. We will visit ecotopes in the rainforest, walking miles of trails to learn about local flora, fauna, and conservation efforts. We will also visit Machu Picchu in the upper reaches of the rainforest. For the travel portion of the class, undergraduates will be joined by a group of Stanford alumni and friends. Student contributions and presentations are emphasized throughout the course. Students are expected to come well-prepared to each session, to lead discussions, and to carry out literature research. The final assignment is a 6 to 8 page paper on a case study of your own choosing; or an equivalent piece of a longer collaborative paper that offers a critical assessment of one particular conservation and/or development project in or near the region we will visit. Students will present the main findings of their papers in a joint seminar of undergraduates and alumni as we travel in the Peruvian Amazon. Note: Students will arrive on campus and will be housed at Stanford until we leave for the Amazon. Travel to and from Peru; organized by the Travel/Study Program of the Stanford Alumni Association; is included; costs are defrayed by the Stanford Field Seminar Fund and generous donors.

Same as: HUMBIO 18SC

ANTHRO 12. Anthropology and Art. 5 Units.

Modernity. How the concept of art appears timeless and commonsensical in the West, and with what social consequences. Historicizing the emergence of art. Modernist uses of primitive, child art, asylum, and outsider art.

ANTHRO 13A. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization. These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography. Same as: ARCHLGY 13, HISTORY 7E, HISTORY 107E

ANTHRO 13SL. Zombies: Anthropology of the American Undead. 1-2 Unit.

The zombie apocalypse, affectionately known as the iquest;Zombiepocalypse. In this combination class on zombie history, ethnography, biology, and culture, we will explore the origins of zombie legends (or truths?) and how the undead have been represented in American culture for the past 200 years. Classes will include lectures, film clip viewings, literary analysis, medical anthropology components, and disaster survival planning.

ANTHRO 14. Introduction to Anthropological Genetics. 3 Units.

For upper division undergraduates. The extent and pattern of variation among human genomes, the origin of these patterns in human evolution, and the social and medical impact of recent discoveries. Topics include: the Human Genome Project; human origins; ancient DNA; genetic, behavioral, linguistic, cultural, and racial diversity; the role of disease in shaping genetic diversity; DNA forensics; genes and reproductive technology.

ANTHRO 15. Sex and Gender. 3 Units.

Commonality and diversity of gender roles in crosscultural perspective. Cultural, ecological, and evolutionary explanations for such diversity. Theory of the evolution of sex and gender, changing views about men's and women's roles in human evolution, conditions under which gender roles vary in contemporary societies, and issues surrounding gender equality, power, and politics.

ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America. 5 Units.

What does it mean to be a Native American in the 21st century? Beyond traditional portrayals of military conquests, cultural collapse, and assimilation, the relationships between Native Americans and American society. Focus is on three themes leading to in-class moot court trials: colonial encounters and colonizing discourses; frontiers and boundaries; and sovereignty of self and nation. Topics include gender in native communities, American Indian law, readings by native authors, and Indians in film and popular culture.

ANTHRO 19Q. Hauntings, Visions, and Prophecy. 1-3 Unit.

Preference to sophomores. Why do people see ghosts? Why do people believe that stars foretell the future? When do people see demons and angels? Focus is on the conditions under which people experience themselves as having sensory evidence of supernatural phenomena and the role of training and expectation in the process. Intellectual exploration of what is known from the ethnographic, historical, and psychological record. Practical experimental projects involve attempting to induce positive supernatural experience. Prerequisite: consent of instructor.

ANTHRO 21N. The Anthropology of Globalization. 4 Units.

Preference to freshmen. Anthropological approach to how cultural change, economic restructuring, and political mobilization are bound up together in the process of globalization.

ANTHRO 22. Archaeology of North America. 3-5 Units.

Why and how people of N. America developed. Issues and processes that dominate or shape developments during particular periods considering the effects of history and interactions with physical and social environment. Topics include the peopling of the New World, explaining subsequent diversity in substance and settlement adaptations, the development of social complexity, and the impact of European contact.

ANTHRO 22N. Ethnographies of North America: An Introduction to Cultural and Social Anthropology. 3-4 Units.

Preference to freshmen. Ethnographic look at human behavior, including cultural transmission, social organization, sex and gender, culture change, and related topics in N. America. Films.

ANTHRO 23N. Glimpses of Divinity. 3 Units.

Preference to freshmen. How human beings search for and identify the presence of the divine in everyday human life. Sources include spiritual classics in the Christian, Jewish, and Hindu traditions including works by Augustine, Teresa of Avila, Jonathan Edwards, the Bhagavad Gita, the Zohar, and some ethnographies of non-literate traditions.

ANTHRO 24N. Maya Hieroglyphic Writing. 4 Units.

Preference to freshmen. Decipherment of classic Maya writing. Principles of archaeological decipherment. Maya calendrical, astronomical, historical, mythological, and political texts on stone, wood, bone, shell, murals, ceramics, and books (screenfold codices). Archaeology and ethnohistory of Maya scribal practice and literacy. Related Mesoamerican writing systems. The evolution of writing and the relevance of writing to theories of culture and civilization.

ANTHRO 25N. Contemporary Japanese Popular Culture. 3 Units.

This is a seminar focusing on the intersection between politics and popular culture in contemporary Japan. It will survey a range of social and political implications of practices of popular culture. Topics include representations of gender in J-pop, manga, and anime, the otaku culture and its pathologization. Students will be introduced to theories of popular culture in general, and a variety of contemporary anthropological studies on Japanese popular culture in particular as well.

ANTHRO 26N. God and the Supernatural. 3-5 Units.

This course explores the conditions under which people have experiences that they identify as "supernatural": experiences of something that is not physically present. We will explore the cultural and psychological dimensions of this very real phenomenon. We will not, however, make ontological judgments about whether something which is experienced as externally present is in fact externally present: in other words, this is a class about culture and psychology, not about metaphysics. We will do experimental work, using our selves and fellow classmates, as subjects, to understand who, when and how people have experiences that they deem "supernatural."

ANTHRO 27N. Ethnicity and Violence: Anthropological Perspectives. 3-5 Units.

Ethnicity is one of the most compelling and most modern ways in which people - in the midst of considerable global and local uncertainty - all across the world imagine and narrate themselves. This seminar will take an anthropological look at both the modernity and the compulsions of ethnic allegiance, and, why struggles over ethnic identity are so frequently violent. Our questions will be both historical iquest; how, why and when did people come to think of themselves as possessing different ethnic identities - and contemporary iquest; how are these identities lived, understood, narrated, and transformed and what is the consequence of such ethnicisation. We follow this through anthropological perspectives which ask persistently how people themselves locally narrate and act upon their experiences and histories. Through this we will approach some of the really big and yet everyday questions that many of us around the world face: how do we relate to ourselves and to those we define as others; and how do we live through and after profound violence? The seminar will take these larger questions through a global perspective focusing on cases from Rwanda and Burundi, India, Sri Lanka, Northern Ireland, Guatemala, and the countries of Former Yugoslavia among others. These cases cover a broad canvas of issues from questions of historicity, racial purity, cultural holism, and relations to the state, to contests over religious community, indigeneity, minority identities, globalization, gender, and generation.

ANTHRO 28N. Secularism and its Critics. 3-5 Units.

Secularism is often taken to be a necessary prerequisite for democracy in the modern world. The separation of religion and politics is often written into constitutions as a fundamental priority. Yet around the world, growing numbers of religious movements have sought to dispute the legitimacy of secularism. Social scientists, including anthropologists, are beginning to research the forms of domination and political violence that have been justified in the name of secularism. This course seeks to make sense of this global debate about secularism. It does so by taking up an anthropological perspective: much as anthropologists might study culture, religion, or kinship, we will interrogate secularism as a comparative social artifact, constituted by historically specific repertoires of signs, identities, everyday practices, and institutional powers. The course focuses on case studies in the United States, Western Europe, the Middle East, and South Asia.

ANTHRO 30Q. The Big Shift. 4 Units.

Is the middle class shrinking? How do people who live at the extremes of American society- the super rich, the working poor and those who live on the margins, imagine and experience "the good life"? How do we understand phenomena such as gang cultures, addiction and the realignment of white consciousness? This class uses the methods and modes of ethnographic study in an examination of American culture. Ethnographic materials range from an examination of the new American wealth boom of the last 20 years (Richistan by Robert Frank) to the extreme and deadlyworld of the invisible underclass of homeless addicts on the streets of San Francisco (Righteous Dopefiend by Phillipe Bourgois and Jeff Schonberg). The experiences of Hispanic immigrants and the struggle to escape gang life in Los Angeles are highlighted in the story of Homeboy Industries a job creation program initiated by a priest working in LA's most deadly neighborhoods (G-Dog and the Homeboys by Celeste Fremon). Finally in Searching for Whitopia: an improbable journey into the heart of White America, Rich Benjamin explores the creation on ethnic enclaves (whitopias) as fear over immigration and the shrinking white majority redefine race consciousness in the 21st century. Each of these narratives provides a window into the various ways in which Americans approach the subjects of wealth and the good life, poverty and the underclass, and then construction of class, race, and gender in American society. Students will not be required to have any previous knowledge, just curiosity and an open mind.

ANTHRO 31. Ecology, Evolution, and Human Health. 3-5 Units.

Ecology, Evolution, and Human Health Human ecology, environments, adaptation and plasticity, and their relationship to health and well-being considered in the broad comparative context. Topics include human population history, subsistence ecology, demography, reproductive decision making, urbanization, migration, infectious disease, the physiology of stress and the inflammatory response, social capital and social networks, nutrition, nutritional deficiencies, growth, and social inequalities. No prior course work in ecological or medical anthropology required.

ANTHRO 32. Theories in Race and Ethnicity: A Comparative Perspective. 5 Units.

This undergraduate course employs an anthropological and historical perspective to introduce students to ideas and concepts of race and ethnicity that emerged primarily in Europe and the United States in the eighteenth and nineteenth centuries and that continue to shape contemporary racial attitudes, interactions, and inequalities. Ideas about race and ethnicity forged outside the U.S. and case studies from other nations are presented to broaden students' understanding and to overcome the limitations of an exclusive focus on the U.S. This course is geared to sophomores and juniors who have already taken at least one course on race and ethnicity, anthropology, African American Studies, Asian American Studies, Chicana/o Studies, Jewish Studies or Native American Studies.

Same as: CSRE 32

ANTHRO 34. Animals and Us. 5 Units.

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of animals as social actors is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognized as a viable mechanism for understanding our cultural and economic past. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ARCHLGY 34

ANTHRO 41. Genes and Identity. 3 Units.

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and anthropological works (ethnographies). We will explore several case studies where the use of DNA markers (as proof of heritage, disease risk, or legal standing) has spawned cultural movements that are biosocial in nature. Throughout we will look at how new social movements are organized around gene-based definitions of personhood, health, and legal truth. Several examples include political analyses of citizenship and belonging. On this count we will discuss issues of African ancestry testing as evidence in slavery reparations cases, revisit debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, and hear arguments on whether people with genetic links to Jewish groups should have a right of return to Israel. We will also examine the ways genetic knowledge may shape different health politics at the individual and societal level. On this count we will do close readings of how personal genomics testing companies operate, we will investigate how health disparities funding as well as orphan disease research take on new valences when re-framed in genetic terms, and we will see how new articulations of global health priorities are emerging through genetic research in places like Africa. Finally we will explore social implications of forensic uses of DNA. Here we will examine civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects, and inquire into the use of DNA to generate digital mugshots of suspects that re-introduce genetic concepts of race.

Same as: AFRICAAM 41, CSRE 41A

ANTHRO 42. Megacities. 5 Units.

In this course we will examine the meaning, processes, and challenges of urbanization. Through a series of targeted readings across history and geography and through the study of varied means of representation (anthropology, literature, cartography, film, etc), the class will analyze the ways in which urban forms have come into being and created, met, and/or ignored challenges such as disease, water, transport, religious and class conflict, colonialism, labor, and trade. Students will read anthropology in conjunction with other disciplines (literature, urban planning, public health, architecture, and economics) to learn the ways in which ethnographies of immigration, urban poverty, class disparity, economic development and indicators, noise, and transportation substantively augment our understandings of how people live within globalization.

ANTHRO 49. Violence and Belonging in the Middle East. 5 Units.

This course examines politics in the Middle East from an anthropological perspective. We will explore the symbolic expression of political identities, the effects of religious revival on political institutions, and the tumultuous culture of protest in the region. Readings discuss the historical development of rights and citizenship, Islamic politics, sectarian tensions, and imaginings of revolution. Course materials are drawn from ethnographic studies and films, which provide a rich contextualization of social life and cultural politics in the region.

ANTHRO 54A. Central Asia Through Films: A Weekly 3-Hour Seminar. 3-5 Units.

Through films this course explores major issues of contemporary peoples of Central Asia while learning fundamental concepts in cultural anthropology. In this seminar we will consider a wide range of examples, including first of all the new feature films, which will be used as a window into the modern reality and therefore could be served in a certain sense as anthropological fieldwork data. Films are prearranged by the instructor according to certain thematic subjects for in-class discussions.

Same as: REES 54A

ANTHRO 77. Japanese Society and Culture. 5 Units.

Focus is on power, identity, and the politics of knowledge production. How transnational interactions influence Japanese identity. How anthropological knowledge has contributed to understanding Japanese culture and society. Gender, race and class; contemporary ethnographies. Modernity and globalization. Cultural politics, domestic work, labor management, city planning, ad images, anime, martial art, fashion, theater, leisure, and tourism.

Same as: ANTHRO 277

ANTHRO 82. Medical Anthropology. 4 Units.

Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

Same as: ANTHRO 282, HUMBIO 176A

ANTHRO 90B. Theory of Cultural and Social Anthropology. 5 Units.

Preference to Anthropology majors. Anthropological interpretations of other societies contain assumptions about Western societies. How underlying assumptions and implicit categories have influenced the presentation of data in major anthropological monographs. Emphasis is on Karl Marx, Emile Durkheim, Max Weber, and anthropological analyses of non-Western societies.

ANTHRO 90C. Theory of Ecological and Environmental Anthropology. 5 Units.

Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies from Australia, Melanesia, Africa, and S. America.

Same as: HUMBIO 118

ANTHRO 90D. Social Theory in the Anthropological Sciences. 5 Units.

Required of majors. Foundational course in the history of social theory in anthropology from the late 19th century to the present. Major approaches to human culture and society: symbolic, social, material, and psychological. Questions about the role of theory in anthropology and how it can be applied to human issues. (HEF IV).

ANTHRO 91. Method and Evidence in Anthropology. 5 Units.

This course provides a broad introduction to various ways of designing anthropological questions and associated methods for collecting evidence and supporting arguments. We review the inherent links between how a question is framed, the types of evidence that can address the question, and way that data are collected. Research activities such as interviewing, participant observation, quantitative observation, archival investigation, ecological survey, linguistic methodology, tracking extended cases, and demographic methods are reviewed. Various faculty and specialists will be brought in to discuss how they use different types of evidence and methods for supporting arguments in anthropology.

ANTHRO 91A. Archaeological Methods. 5 Units.

Methodological issues related to the investigation of archaeological sites and objects. Aims and techniques of archaeologists including: location and excavation of sites; dating of places and objects; analysis of artifacts and technology and the study of ancient people, plants, and animals. How these methods are employed to answer the discipline's larger research questions. Same as: ARCHLGY 102

ANTHRO 92A. Undergraduate Research Proposal Writing Workshop. 2-3 Units.

Practicum. Students develop independent research projects and write research proposals. How to formulate a research question; how to integrate theory and field site; and step-by-step proposal writing.

ANTHRO 92B. Undergraduate Research Proposal Writing Workshop. 2-3 Units.

Practicum. Students develop independent research projects and write research proposals. How to formulate a research question; how to integrate theory and field site; and step-by-step proposal writing.

ANTHRO 93. Prefield Research Seminar. 5 Units.

For Anthropology majors only; non-majors register for 93B. Preparation for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies of successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Prerequisites: two ANTHRO courses or consent of instructor.

ANTHRO 93B. Prefield Research Seminar: Non-Majors. 5 Units.

Preparation for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies for successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Service Learning Course (certified by Haas Center).

ANTHRO 94. Postfield Research Seminar. 5 Units.

Goal is to produce an ethnographic report based on original field research gathered during summer fieldwork, emphasizing writing and revising as steps in analysis and composition. Students critique classmates' work and revise their own writing in light of others' comments. Ethical issues in fieldwork and ethnographic writing, setting research write-up concerns within broader contexts.

ANTHRO 95. Research in Anthropology. 1-10 Unit.

Independent research conducted under faculty supervision, normally taken junior or senior year in pursuit of a senior paper or an honors project. May be repeated for credit.

ANTHRO 95B. Directed Study in Honors and Senior Papers. 1-10 Unit.

Taken in the final quarter before graduation. Independent study and work on senior paper for students admitted to the program. Prerequisite: consent of program adviser and instructor.

ANTHRO 96. Directed Individual Study. 1-10 Unit.

Prerequisite: consent of instructor.

ANTHRO 97. Internship in Anthropology. 1-10 Unit.

Opportunity for students to pursue their specialization in an institutional setting such as a laboratory, clinic, research institute, or government agency. May be repeated for credit. Service Learning Course (certified by Haas Center).

ANTHRO 98B. Digital Methods in Archaeology. 3-5 Units.

This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods.

Same as: ANTHRO 298B, ARCHLGY 98B

ANTHRO 98E. Catalhoyuk and Neolithic Archaeology. 1-3 Unit.

Catalhoyuk as a case study to understand prehistoric social life during the Neolithic in Anatolia and the Near East. Developments in agriculture, animal domestication, material technology, trade, art, religion, skull cults, architecture, and burial practices. Literature specific to Catalhoyuk and other excavations throughout the Anatolian and Levantine regions to gain a perspective on diversity and variability throughout the Neolithic. The reflexive methodology used to excavate Catalhoyuk, and responsibilities of excavators to engage with larger global audiences of interested persons and stakeholders.

ANTHRO 98F. Field School Training Workshop. 1-3 Unit.

Provides students important preparatory orientation to anthropology as well as the methods, ethics, and logistics of the specific field school each student will be attending in the summer.

ANTHRO 100A. India's Forgotten Empire: The Rise and Fall of Indus Civilization. 3 Units.

How and why cities with public baths, long-distance trade, sophisticated technologies, and writing emerged, maintained themselves, and collapsed in the deserts of present-day Pakistan and India from 2500 to 1900 B.C.

ANTHRO 100B. Lifeways of the Ancient Maya. 5 Units.

This course engages with the world of the pre- and post-contact Maya people through scholarship that explores the material culture of daily life. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, and how interpretations of daily life in the ancient Maya world are formulated. We consider how perceptions of the ancient Maya are marshaled in contemporary politics and policies. The course is designed to provide a broad overview of sites and materials in the Maya area, focusing on the dynamic interplay between the material and the social. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 200B

ANTHRO 100D. Chavin de Huantar Research [Seminar]. 3-5 Units.

Archaeological analytical techniques appropriate for data recovered during archaeological fieldwork in Chavin de Huantar, Peru. Open to all interested students; fieldwork participants are expected to take the course. Students work on data from the previous field season to produce synthetic written reports, focusing on specific methodological issues.

ANTHRO 101. The Aztecs and Their Ancestors: Introduction to Mesoamerican Archaeology. 3-5 Units.

The prehispanic cultures of Mesoamerica through archaeology and ethnohistory, from the archaic period to the Spanish conquest in the 16th century.

ANTHRO 101A. Archaeology as a Profession. 5 Units.

Academic, contract, government, field, laboratory, museum, and heritage aspects of the profession.

Same as: ARCHLGY 107A

ANTHRO 101B. ARCHAEOLOGY OF TECHNOLOGY. 5 Units.

The course is an introduction to the social organization of material production and to the theoretical, ethnographic, and historical frameworks used by archaeologists to link the technologies of the past to salient sociocultural information about the people who employed them. Comparison of metallurgical, ceramic, lithic, and textile industries in different cultural and historical settings will inform critical discussions of how and to what extent analyses of artifacts, workshops, and industrial installations can provide insight into past societies.

Same as: ANTHRO 201B, ARCHLGY 100, ARCHLGY 200

ANTHRO 101S. Introduction to Cultural and Social Anthropology. 3-5 Units.

Crosscultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual, and related topics. Case studies illustrating the principles of the cultural process. Films.

Same as: ANTHRO 1S

ANTHRO 102. Urban Ethnography. 5 Units.

Ethnographic research and writing focuses on the ways our lives are shaped by interacting forces such as history, political economy, and creative cultural practices. In the last fifty years, more and more cultural anthropology has been carried out in urban contexts, due to both urbanization around the world and changes in anthropology as a field. This seminar focuses on careful reading and analysis of book-length ethnographies about urban cultures, people and dynamics to consider what the theory and methodological tools of anthropology have to offer us as we seek to better understand the city. Readings include a variety of approaches to ethnographic research in and/or about cities, with a mix from different eras and about different cities around the world.

Same as: URBANST 140

ANTHRO 102A. Ancient Civilizations: Complexity and Collapse. 3-5 Units.

How archaeology contributes to understanding prehistoric civilizations. How and why complex social institutions arose, and the conditions and processes behind their collapse. The development of monumental architecture, craft specialization, trade and exchange, and social stratification using examples from the archaeological record. (HEF II, III; DA-B).

Same as: ANTHRO 202A

ANTHRO 102B. Aztec Language and Culture. 3 Units.

Introduction to Nahuatl, the language of the Aztecs. Also known as Mexicano, Nahuatl was once used as a lingua franca throughout Mesoamerica, and is today spoken by about 1.5 million people. Emphasis on vocabulary, colonial documents, including Central Mexican codices, and archaeology. Attention also given to modern dialects, the place of Nahuatl in the Uto-Aztecan language phylum, and the relationship between Nahuatl and Aztec culture. Appropriate for students interested in linguistics, anthropology, archaeology, and history, and those desiring to better understand the native linguistic heritage of Mesoamerica and its impact on Spanish.

ANTHRO 102C. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3-5 Units.

This interdisciplinary seminar explores challenges and avenues for furthering protection of the cultural heritage rights enshrined in the UN Declaration on the Rights of Indigenous Peoples. Using an innovative combination of online lectures by Stanford faculty and students, and recorded interviews with Indigenous leaders, artists, performers, scholars and museum professionals, the seminar will explore and problematize: historic and contemporary understandings of "Indigenous cultural heritage" and the impact of colonialism, urbanization and other forces on Indigenous identity and cultural heritage; current and potential domestic and international legal and non-legal frameworks for Indigenous cultural heritage protection and repatriation; past and present museum approaches to Indigenous peoples and their cultural material; and optimal methods of resolving repatriation disputes. While the seminar will cover primarily the situation of Indigenous peoples in North America, comparisons will be drawn with other regions of the globe. The on-campus component of the seminar will involve directed discussions of the online content, the online forum, assigned readings and short writing assignments. Students can choose between a final exam, paper or video project. Lunch is provided. Same as: ARCHLGY 101, ARCHLGY 202, CSRE 102, NATIVEAM 102

ANTHRO 103. The Archaeology of Modern Urbanism. 5 Units.

Seminar. Urbanism as a defining feature of modern life. The perspective of archaeology on the history and development of urban cultures. Case studies are from around the globe; emphasis is on the San Francisco Bay Area megalopolis. Cities as cultural sites where economic, ethnic, and sexual differences are produced and transformed; spatial, material, and consumption practices; and the archaeology of communities and neighborhoods.

ANTHRO 103A. Human Osteoarchaeology. 5 Units.

The course will cover the methodological and theoretical backgrounds to human osteoarchaeology, introduce the student to the chemical and physical characteristics of bone, and to the functional morphology of the human skeleton. Classes will consist of a taught component that outlines how osteoarchaeologists reconstruct individual life-histories based on age, sex etc.; this is combined with hands-on identification of different skeletal elements and the markers used to inform the analytical methods. Additional scientific methodologies are also introduced that increasingly form a major component of human osteoarchaeology.

Same as: ANTHRO 203A

ANTHRO 105. Ancient Cities in the New World. 3-5 Units.

Preindustrial urbanism as exemplified by prehispanic New World societies. Case studies: the central and southern highlands of Mesoamerica, and the Maya region. Comparative material from highland S. America.

Same as: ANTHRO 205

ANTHRO 105A. Archaeological Fieldwork: Critical Analysis and Practical Application. 2-3 Units.

This introduction to archaeological fieldwork involves both field and seminar components, each component meeting once per week. During the field sessions, we will investigate an archaeological site on campus using methods of survey, mapping, testing, and excavation (digging, recording units/features, profile illustration). In seminar, we will critically examine archaeological fieldwork through reading, writing, and discussion, exploring topics such as history of archaeological excavation, production of archaeological knowledge, disjunction between theory and practice, reflexive methodologies, ethics, collaboration, and specialization. No experience necessary, but students with fieldwork experience are welcome. Same as: ANTHRO 205A

ANTHRO 105B. Heritage & Neoliberalism: Theorizations of the Past. 3-5 Units.

This course explores the emergence of heritage from within the broader field of modern historical thought. Readings explore how transformations in economic theory and changes in traditional philosophies of history have shaped how the historical event and historical figures are cast and recast within heritage. The distinctive modes by which archaeological sites and heritage sites are spatialized, linked and narrated are explored as these relate to corresponding turns in the modern concepts of freedom, inequality, personhood, sovereignty, community and culture. Same as: ANTHRO 205B, ARCHLGY 105

ANTHRO 106. Incas and their Ancestors: Peruvian Archaeology. 3-5 Units.

The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred.

Same as: ANTHRO 206A, ARCHLGY 102B

ANTHRO 106A. Gang Colors: The Racialization of Violence and the American City. 5 Units.

Street gangs (e.g. Bloods, Crips, Mara Salvatrucha, M-18, etc.) serve as a window onto the experience of racial, ethnic and economic marginalization under late capitalism. This class explores the context that gives rise to gang violence through a combination of anthropological, sociological, and historical approaches. Students will be familiarized with the macro-social factors that shape both gangs and the politics of violence in the Americas, North and South.

Same as: CSRE 106A

ANTHRO 108E. Catalhoyuk and Neolithic Archaeology. 3 Units.

Catalhoyuk as a case study to understand prehistoric social life during the Neolithic in Anatolia and the Near East. Developments in agriculture, animal domestication, material technology, trade, art, religion, skull cults, architecture, and burial practices. Literature specific to Catalhoyuk and other excavations throughout the Anatolian and Levantine regions to gain a perspective on diversity and variability throughout the Neolithic. The reflexive methodology used to excavate Catalhoyuk, and responsibilities of excavators to engage with larger global audiences of interested persons and stakeholders.

Same as: ARCHLGY 108E

ANTHRO 109. Archaeology: World Cultural Heritage. 5 Units.

Focus is on issues dealing with rights to land and the past on a global scale including conflicts and ethnic purges in the Middle East, the Balkans, Afghanistan, India, Australia, and the Americas. How should world cultural heritage be managed? Who defines what past and which sites and monuments should be saved and protected? Are existing international agreements adequate? How can tourism be balanced against indigenous rights and the protection of the past?.

Same as: ANTHRO 209

ANTHRO 110A. Neandertals and Modern Humans: Origin, Evolution, Interactions. 3 Units.

The expansion out of Africa of our species represents the last spectacular step in the course of Human Evolution. It resulted in the colonization of the whole planet and the replacement of archaic forms of humans in Eurasia. One way to investigate why *Homo sapiens* has been such a successful species is to compare its evolution with that of its closest relative, the Neandertals. Exploring the bio-cultural processes at work in the two lineages leads to examine some of the main issues in Paleanthropology and the most recent methodological advances in the field.

Same as: ANTHRO 210A

ANTHRO 110B. Examining Ethnographies. 5 Units.

Eight or nine important ethnographies, including their construction, their impact, and their faults and virtues.

Same as: ANTHRO 210B

ANTHRO 111. Archaeology of Sex, Sexuality, and Gender. 5 Units.

How archaeologists study sex, sexuality, and gender through the material remains left behind by past cultures and communities. Theoretical and methodological issues; case studies from prehistoric and historic archaeology.

Same as: ANTHRO 211

ANTHRO 111A. Archaeology of the Andes of Argentina. 3-5 Units.

The aim of this course is to provide a panorama of the archaeology of the andean region of Argentina, along some main topics of past and current researches. North andean Argentina has been considered for a long time as subordinated to the major developments in the central Andes and Puna, as if it were in a marginal position that mirrored their history. More than a hundred years of research in the area have produced different insights, which put that affirmation in relative terms. The course will give an overview of major historical contributions and contemporary trends in the archaeological thinking in relation to themes such as time, the space, people, things and nature. An overview of the conceptions and construction of time. Space seen as cultural area; natural environment and built landscape; archaeological areas as national territory. Historical conceptions of people; bodies; social inequality; the past and present others in the archaeological research. Artefacts, classifications and typologies; material archaeological contexts as cultural units; from artefacts to things; past ontologies. Nature and environment; domestication; ecological approaches; agropastoralism; nature/culture. It is expected that by the end of the course students will gain a panorama of the major problems of the archaeology of andean Argentina with historically and theoretically informed perspectives.

Same as: ANTHRO 211A

ANTHRO 111B. Muwékma: Landscape Archaeology and the Narratives of California Natives. 3-5 Units.

This course explores the unique history of San Francisco Bay Area tribes with particular attention to Muwékma Ohlone- the descendent community associated with the landscape surrounding and including Stanford University. The story of Muwékma provides a window into the history of California Indians from prehistory to Spanish exploration and colonization, the role of Missionaries and the controversial legacy of Junipero Serra, Indigenous rebellions throughout California, citizenship and land title during the 19th century, the historical role of anthropology and archaeology in shaping policy and recognition of Muwékma, and the fight for acknowledgement of Muwékma as a federally recognized tribe. We will visit local sites associated with this history and participate in field surveys of the landscape of Muwékma.

Same as: ARCHLGY 111B, NATIVEAM 111B

ANTHRO 112. Public Archaeology: Market Street Chinatown Archaeology Project. 4-5 Units.

This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

Same as: ANTHRO 212, ASNAMST 112

ANTHRO 112B. Advanced Study in Public Archaeology. 2-5 Units.

This service-learning course is offered only to students who have completed Anthro 112a and wish to deepen their scholarship in public archaeology and heritage practice through continued study. Students enrolled in Anthro 112b complete readings, collections management study, public archaeology events, and community-based research oriented towards their specific interests. Prerequisite: Completion of Anthro 112a AND instructor consent.

ANTHRO 113. Faunal Analysis: Animal Remains for the Archaeologist. 5 Units.

The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

Same as: ANTHRO 213, BIO 166, BIO 266

ANTHRO 113B. Religious Practices in Archaeological Cultures. 5 Units.

According to Hawkes (1954), religion or ideology is the most difficult part of social life to access archaeologically. Luckily, not all scholars agree; according to Fogelin (2008) 'religion is not something people think about, but something people do'. Thus, archaeology, an inherently multidisciplinary subject that studies material culture, is well suited to delve into religion and its underpinnings. This course will explore religious practices, as they can be defined and interpreted from archaeological contexts spanning the Paleolithic to historic periods. Definitions of religion differ from author to author but they mostly agree that religion is a fully integrated and thus integral part of human social life. Politics, economics, identity and social class influence religion, and religion influences how these forces play out in society. Thus, the course will also examine the significance of ritual and religion in a variety of social contexts.

Same as: ANTHRO 213B, ARCHLGY 113B

ANTHRO 114. Prehistoric Stone Tools: Technology and Analysis. 5 Units.

Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts.

Same as: ANTHRO 214

ANTHRO 114B. Landscape Archaeology and Global Information Systematics. 3-5 Units.

This course is meant to lay groundwork for analysis of archaeological landscapes using the methods of GIS. Throughout, we consider the various understandings of landscape, from the biographical to the biological. The course explores the history of various typologies of landscape, incorporating the cultural, the topographical, the ecological, and the topological; reviews different types of landscape data and analysis, including aerial imagery, stratigraphic excavations, and specialized analyses; addresses how to integrate different sorts of data sets and carry out analytical assessment of interrelated "layers" as dynamic constituents of landscape; considers implications of landscape studies in modern policy and management. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 214B

ANTHRO 115. The Social life of Human Bones. 3-5 Units.

Skeletal remains serve a primary function of support and protection for the human body. However, beyond this, they have played a range of social roles once an individual is deceased. The processes associated with excarnation, interment, exhumation and reburial all speak to the place that the body, and its parts, play in our cultural as well as physical landscape. This course builds on introductory courses in human skeletal anatomy by adding the social dynamics that govern the way humans treat other humans once they have died. It draws on anthropological, biological and archaeological research, with case studies spanning a broad chronological and spatial framework to provide students with an overview of social practice as it relates to the human body.

Same as: ANTHRO 215, ARCHLGY 115

ANTHRO 115A. The Aegean in the Neolithic and Bronze Age. 3-5 Units.

This course provides a survey of Aegean prehistory (7th-2nd millennium BC), focusing on traditions that were picked up or renegotiated, instead of taking a standpoint that evaluates phenomena as steps leading up to a 'state-like' quest; 'palatial' quest; society. It will draw on the region's; wealth of data, and will be set within a theoretically informed, problem-oriented framework, aiming to introduce students to current interpretations and debates, mainly through discussion of specific case-studies.

Same as: ANTHRO 215A, ARCHLGY 139, ARCHLGY 239

ANTHRO 115B. Peoples and Cultures of Ancient Mesoamerica. 5 Units.

This course engages with the world of ancient Mesoamerica, focusing on the Mixtec, Aztec, Maya, Zapotec, Chichimec, Olmec, and Teotihuacan peoples. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, how interpretations of daily life in the ancient Mesoamerican world are formulated, and how these interpretations are marshaled in contemporary politics and policies. We explore different scales of Mesoamerican communities, and compare the diverse material culture and lifeways represented in Mesoamerica at different time periods. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 215B

ANTHRO 116. Data Analysis for Quantitative Research. 5 Units.

This course allows graduate and advanced undergraduate students in archaeology and anthropology to acquire practical skills in quantitative data analysis. Some familiarity with basic statistical methods is useful but not assumed; the structure of the course will be flexible enough to accommodate a range of student expertise and interests. Topics covered include: statistics and graphics in R; database design, resampling methods, diversity measures, contingency table analysis, and introductory methods in spatial analysis.

Same as: ANTHRO 216

ANTHRO 117. Thinking Through Animals. 5 Units.

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of `animals as social actors' is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognised as a viable mechanism for understanding our cultural and economic past. The module presents an overview covering a broad timespan from the Pleistocene to the modern day. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ANTHRO 217

ANTHRO 118. Heritage, Environment, and Sovereignty in Hawaii. 4 Units.

This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity been shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life.

Same as: EARTHSYS 118

ANTHRO 118A. Digital Heritage: Bringing the Past Online with the Chinese American Historical Museum. 5 Units.

Interpreting the past is no longer just for people like historians and archaeologists, and it's no longer confined to the pages of books. More and more, community-based organizations are gathering stories and perspectives from everyday people, and they're putting them out for the world to see online. With these big changes, what will be the future of thinking about the past? In this course, students will work through the dynamics of digital heritage through readings, discussion, and original research. The course centers around artifacts unearthed at the Market Street Chinatown in San Jose. Each student will analyze and gather stories relating to a single artifact in order to contribute to a multimedia exhibit for the Chinese American Historical Museum in San Jose. Class time will be devoted both to discussion and to work on artifact-based projects, and will also include a fieldtrip to the museum and collaboration time with members of the Chinese Historical and Cultural Project.

Same as: ASNAMST 118A, CSRE 118A

ANTHRO 119. Zooarchaeology: An Introduction to Faunal Remains. 5 Units.

As regularly noted, whether historic or pre-historic, animal bones are often the most commonly occurring artefacts on archaeological sites. As bioarchaeological samples, they offer the archaeologist an insight into food culture, provisioning, trade and the social aspects of human-animal interactions. The course will be taught through both practical and lecture sessions: the `hands-on' component is an essential complement to the lectures. The lectures will offer grounding in the main methodological approaches developed, as well as provide case-studies to illustrate where and how the methods have been applied. The practical session will walk students through the skeletal anatomy of a range of species. It will guide students on the identification of different parts of the animal, how to age / sex individuals, as well as recognize taphonomic indicators and what these mean to reconstructing post-depositional modifications.

Same as: ANTHRO 219, ARCHLGY 119

ANTHRO 119A. Spirits, Selves, and the Social: Histories of Thinking about Religion. 5 Units.

Why do humans worship gods, spirits, and ancestors? What roles do religion, witchcraft, and magic play in everyday life? How does religious action become meaningful in a particular context? In what sense can we know about the religious experiences of others? Focus is on approaches to religion throughout anthropology's history. Each student will carry out a mini-ethnography on a religious community of their choice. Students will not be required to have any previous knowledge in anthropology or the study of religion.

Same as: RELIGST 119X

ANTHRO 120B. Indian Popular Culture. 5 Units.

This course will explore key topics in contemporary India through an analysis of its popular culture. Bollywood and Kollywood films, Hindi soap operas and reality shows, vernacular music in Bihar, Tamil pulp fiction, matchboxes from Bangalore, clothing styles of Kerala college students, advertising in Mumbai, and cell phones used in Varanasi will all be brought together to help us shape an image of India as complex, contested, and changing. As an anthropology course, we will focus on the consumption of these media and discuss what they do in the world. Looking at both the source material itself and the way in which it is used, we will explore topics such as: nationalism, gender and sexuality, middle class aspiration, globalization, neoliberal consumerism, and the postcolonial condition.

ANTHRO 121. Language and Prehistory. 4-5 Units.

Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparison of linguistic and biological classifications. Reconstruction, proto-vocabularies, and culture. Archaeological decipherment and the origins and evolution of writing. Archaeological and genetic evidence for human migrations. (DA-A; HEF II,III)

Same as: ANTHRO 221

ANTHRO 121A. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AFRICAAM 121X, AMSTUD 121X, CSRE 121X, EDUC 121X, LINGUIST 155

ANTHRO 122A. Race and Culture in Mexico and Central America. 3-5 Units.

This course addresses the role of racial ideologies in the historical configuration of multiple hierarchies of inequality that determine the place of everyone in society in Mexico and Central America. Based on readings from the humanities and social sciences, we will discuss the cultural and racial politics of authoritarianism and indigenous insurgency, emphasizing narratives of laziness and vagrancy that have been central to the discipline of labor that shapes local processes of regressive modernization and nation building. We will analyze the hegemony of dictatorship as political necessity, the relationship between local racisms and global Whiteness, and the emergence of new local and transnational contestations to the multiple hierarchies that determine the place of everyone in society.

Same as: ANTHRO 222A

ANTHRO 122C. Research in Maya Hieroglyphic Writing. 1-2 Unit.

Workshop. Current issues in the decipherment and analysis of Maya hieroglyphic writing and literacy.

Same as: ANTHRO 222C

ANTHRO 123. Readings in Linguistic Anthropology. 2 Units.

One or two major related works on language in its cultural context. Works for 2007-08 involve attempts to correlate linguistic and non-linguistic data for analysis of prehistoric human contact and migrations. May be repeated for credit.

Same as: ANTHRO 223

ANTHRO 124. Maya Mythology and the Popol Vuh. 3-5 Units.

The mythology and folklore of the ancient Maya, emphasizing the relationship between the 16th-century Quicheacute; Maya mythological epic *Popol Vuh* (Book of the Council) and classic lowland Maya art, architecture, religion, and politics. General Mesoamerican mythology. Anthropological and other theories of mythology. Class participates in the creation of a web project on the *Popol Vuh*.

ANTHRO 124N. Maya Mythology and the Popol Vuh. 3 Units.

Shortly after the Spanish conquest of Highland Guatemala, an anonymous Quicheacute; Mayan noble translated a sacred text of his people, *Popol Vuh* (iquest;Council Bookiquest;), and committed the Mayan to Spanish letters. His book, with its account of creations and destructions of the world by the gods, the descent of the Hero Twins into the Underworld and their ball games with its lords, and a history of the ruling clan of the Quicheacute; state, is a grand apology for the values and world of the Quicheacute; Maya, but it is no drab political treatise. It relates the daily life of the Quicheacute; to their natural world (including the skies) and to the underworld journey that they expected in death, and is a compilation crafted to instruct and entertain at several levels of interpretation, from those of sophisticated scholars to children. In the 1970iquest;s, we began to realize that many of the ceramic vessels unearthed from the tombs of the Classic Lowland Maya, originally intended to accompany their owners on their perilous journey through the underworld, actually illustrate scenes described in *Popol Vuh*. More recently, it has been possible to relate the mythology to texts newly deciphered from Mayan inscriptions as well as vases. The *Popol Vuh* has thus been shown to be a survival of a much older and more widespread culture. Like most survivals, though, it had been re-crafted in the image of the contemporary Quicheacute; culture. When are mythological similarities sufficient to imply relatedness of the stories through common descent? How can mythical similarities imply universals of mind and culture? How have myths been used as state political instruments? This is an exciting combination of archaeology, linguistics, cultural anthropology, art, and literature. Students will analyze the text critically, examine Mayan art, and help develop a web site. No prerequisites.

ANTHRO 125. Language and the Environment. 4-5 Units.

Lecture course on vocabulary and grammar as keys to peoples iquest; understanding and use of the environment. Ethnobotany, ethnobiology, and ethnosemantics in the analysis of the language of place, plants and animals, the earth, the body, and disease. Terminological gaps and gluts and what they imply. Language as a strategic resource in environmental management. Language contact and conflict in the modern global environment, with particular attention to the vocabularies of capitalism and property. Language extinction and its environmental implications. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 225

ANTHRO 125A. International Criminal Courts and the Question of Global Justice. 3-5 Units.

What are the cultural, legal and political implications of the global extrapolation of our understanding of the rule of law, in general, and criminal law, in particular? This course will look at the theory and practice of the new international criminal courts, the criminalization and individualization (or humanization) of international law, and the broader system of cosmopolitan order that it presupposes, with special reference to how it differs from earlier projects for international order (international law, war crimes, human rights, and the UN system). Case studies will follow the historical development of the key institutions, individuals and legal precedents that have been determinative for the new international criminal jurisdiction, including Nuremberg and Tokyo, the ad hoc (Yugoslavia, Rwanda) and hybrid tribunals (Liberia, Sierra Leone, Lebanon, Cambodia) and now the International Criminal Court (DRC, northern Uganda, Sudan, Libya and Kenya).nn.

ANTHRO 125S. International Criminal Courts and the Question of Global Justice. 3 Units.

What are the cultural, legal and political implications of the globalization of our understanding of the rule of law, in general, and criminal law, in particular? This course will look at the theory and practice of the new international criminal courts, the criminalization and individualization (or humanization) of international law, and the broader system of cosmopolitan order that it presupposes, with special reference to how it differs from earlier projects for international order (international law, war crimes, human rights, and the UN system). Case studies will follow the historical development of the key institutions, individuals and legal precedents that have been determinative for the new international criminal jurisdiction, including Nuremberg and Tokyo, the ad hoc (Yugoslavia, Rwanda) and hybrid tribunals (Liberia, Sierra Leone, Lebanon Cambodia) and now the International Criminal Court (DRC, northern Uganda, Sudan, Libya and Kenya).

ANTHRO 126. Urban Culture in Global Perspective. 5 Units.

Core course for Urban Studies majors. We will study urban space both historically and cross-culturally. Urban Studies, by definition, is an interdisciplinary field, where the methodological approaches draw upon a diverse set of analytic tools. Disciplines that occupy a prominent place in this class are geography, cultural anthropology, sociology, history, media studies, and literature. In this context, we will discuss the importance of cities around the world to the economic, cultural, and political well-being of modern societies and examine how forces such as industrialization, decentralization, and globalization affect the structure and function of cities. Same as: URBANST 114

ANTHRO 127. City and Sounds. 5 Units.

How do people experience modern cities and urban public cultures through auditory channels? How does sound mediate and constitute urban space? How to listen to and write about culture through sound. Students carry out narrative interviews and sound fieldwork in the Bay Area. Readings include urban anthropology, semiotics, art history, social studies of science and technology, media studies, and musicology.

ANTHRO 127A. Cities and the Future: Utopias, Dystopias, and Other Urbanisms to Come. 3 Units.

What sort of futures are being imagined for the cities of the twenty-first century? An interdisciplinary seminar, this course will critically analyze how the future of cities, and the cities of the future, are being thought about and acted upon in the present. It is designed for graduate students and advanced undergraduates with experience in the social sciences and humanities and who also have a keen interest in urban studies. Its primary objective is to develop sophisticated ways of thinking about the future of cities, since doing so has real significance for the kind of city we want to, and eventually will, ourselves inhabit.

ANTHRO 128. Visual Studies. 5 Units.

Drawing on anthropology, art history, cultural studies, and other fields, this course explores how and why one might want to think critically about the politics of visuality, social imagination, the politics of making and consuming images and things, iconophilia and iconophobia, the classification of people and things into objects, artists, and artworks, and cultural production more generally.

ANTHRO 130A. Interpreting Space and Place: An Introduction to Mapmaking. 5 Units.

How mapmaking, geographical information systems (GIS), and spatial tools can be applied in social research. Qualitative and quantitative approaches in the use of geospatial information. Methodologies and case examples.

ANTHRO 130B. Introduction to GIS in Anthropology. 5 Units.

How GIS and spatial tools can be applied in social research. Case studies and student projects address questions of social and cultural relevance using real data sets, including the collection of geospatial data and building of spatial evidence. Analytical approaches and how they can shape a social and cultural interpretation of space and place.

Same as: ANTHRO 230B

ANTHRO 130D. Spatial Approaches to Social Science. 5 Units.

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

Same as: ANTHRO 230D, POLISCI 241S, URBANST 124

ANTHRO 131. Genes and Identity. 5 Units.

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and ethnographies. We will explore several case studies where the use of DNA markers (either as proof of heritage or disease risk) has spawned cultural movements that are biosocial in nature. Examples include legal and political analyses of African ancestry testing as evidence; in slavery reparations cases, debates on whether Black Freedmen should be allowed into the Cherokee and Seminole Nations, considerations on whether people with genetic links to Jewish groups should have a right of return to Israel, close readings of The U.S. Food and Drug Administration's crackdown on personal genomics testing companies (such as 23andMe), examinations of genetic identity politics in health disparities funding and orphan disease research, inquiries into new social movements organized around gene-based definitions of personhood, and civil liberties concerns about genetic familial searching; in forensic databases that disproportionately target specific minority groups as criminal suspects. Students will engage in a short observational pilot ethnographic project that allows them to further explore issues from the course for their final paper.

Same as: AFRICAAM 131, CSRE 131

ANTHRO 132. Religion and Politics in the Muslim World. 5 Units.

This course provides an ethnographic examination of religion and politics in the Muslim world. What is the role of Islam in the political life of modern Muslim societies? Conversely, how do modern political powers shape and constrain the terms of religious life? This course takes an anthropological perspective on the study of Islam: our investigations will not focus on the origins of scriptures and doctrines but rather on the use of religious texts and signs in social context and on the political significance of ritual and bodily practices. A major aim of the course is provide students with analytical resources for thinking critically about the history and politics of modern Muslim societies, with a particular focus on issues of religious authority, gender and sexuality, and the politics of secularism.

ANTHRO 132B. Islam Law in Muslim and Non-Muslim Societies. 3-5 Units.

In this course, students will engage with scholarly material that demonstrates the multiple and varying ways in which Islam is invoked as a legal discourse in Muslim and Non-Muslim societies. In this course, we look at Islam not merely as being in the domain of legislation and adjudication, but as a cultural object; an important signifier in politics, for the state to enforce itself, as well as a technology for people's strategic use. The point of this course is therefore to consider how Islam operates in legal contexts as a 1) discourse of power and of strategy (at personal and political levels) and 2) as a discourse of identity that concerns issues of ethics, rights, gender, kinship, class and nation.

ANTHRO 133A. Anthropology of the Middle East. 3-5 Units.

This course examines social, political, and religious dimensions of various Middle Eastern societies. Key topics include the development of the modern nation-state, the Islamic revival, human rights, and discourses of democracy. Course materials include ethnographic studies, novels, and films, which provide a rich contextualization of social life and cultural politics in the region.

Same as: CSRE 133A

ANTHRO 133B. Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims. 3-5 Units.

In this course, students will think critically about how knowledge about Islam, Muslims, and Muslim Societies is produced and circulated. As a class, we will consider why and how certain kinds of ideas about Islam and Muslims become representative (i.e., authoritative discourse) while others ideas do not. This is an interdisciplinary class; course material will draw on readings from anthropology, literary criticism, history, sociology and media and cultural studies. We will also be engaging with other kinds of material, including news articles, editorials, documentaries, and films.

Same as: AFRICAST 133B, CSRE 133B

ANTHRO 134. Object Lessons. 5 Units.

Human-object relations in the processes of world making. Objectification and materiality through ethnography, archaeology, material culture studies, and cultural studies. Interpretive connotations around and beyond the object, the unstable terrain of interrelationships between sociality and materiality, and the cultural constitution of objects. Sources include: works by Marx, Hegel, and Mauss; classic Pacific ethnographies of exchange, circulation, alienability, and fetishism; and material culture studies.

Same as: ANTHRO 234

ANTHRO 135. Cultural Studies. 5 Units.

Identity, community, and culture; their interactions and formation.

Same as: ANTHRO 235

ANTHRO 135A. The Anthropology of Security. 3-5 Units.

This seminar begins by outlining the main theoretical and empirical challenges in the areas of surveillance studies and security studies. The seminar provides a space wherein students will be able to discuss these inter-disciplinary areas and develop their own Anthropology-informed perspectives. The seminar then discusses the work of Anthropologists who through their ethnographic and theoretical work have helped developed and important and emergent area: The Anthropology of Security. Areas covered include, inter alia, national security, security and war, biometrics, gated-ness, and environmental and bio-security threats.

Same as: ANTHRO 235A

ANTHRO 135H. Conversations in CSRE: Case Studies in the Stanford Community. 1-2 Unit.

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: CSRE 135H

ANTHRO 135I. CSRE House Seminar: Race and Ethnicity at Stanford. 1-2 Unit.

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: CSRE 135I

ANTHRO 136. The Anthropology of Global Supply Chains. 5 Units.

This upper-division undergraduate seminar focuses on recent studies by anthropologists and scholars in related disciplines on global supply chains and consumption practices. The goal of the course is to assess concepts and methods for integrating a cultural analysis of transnational production with a cultural analysis of transnational consumption. We will review ethnographic studies of the production and consumption of commodities linked by transnational and global networks. The class will then pursue collaborative research on the global production, distribution, and consumption of a selected commodity. Prerequisite: junior or senior standing and previous coursework in cultural anthropology or permission of instructor.

Same as: ANTHRO 236

ANTHRO 137. The Politics of Humanitarianism. 5 Units.

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issue generates a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes; or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the quest; cause of humanity; quest;. In the early years of humanitarian intervention, political neutrality was a key principle; it has now come under ever greater analytical and political scrutiny. We will examine the reasons for the politicization and militarization of aid -- be it humanitarian aid in natural disasters or political crises; development programs in the impoverished south (quest; the Third World; quest;), or peace-keeping. We will end with a critical exploration of the concept of human rights, humanity, and personhood. The overall methodological aim of the course is to demonstrate what insights an ethnographic approach to the politics, ethics, and aesthetics of humanitarianism can offer.

Same as: ANTHRO 237

ANTHRO 137A. Traditional Medicine in the Modern World. 3 Units.

This class considers "traditional medicine" in contemporary times. We will survey major systems of traditional medicine while considering their broader social, cultural, and political contexts. The class will study the symbolic uses of traditional medicine, the role of traditional medicines in early modern medical knowledge, the place of indigenous knowledge in bioprospecting, health-seeking behavior and medical pluralism, and the WHO's approach to traditional medicine and how it has affected government health policies. The class emphasizes a critical approach to the concepts of tradition and modernity, and an understanding of traditional medicine as a changing, flexible, and globalized category of healing.

ANTHRO 138. Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise. 5 Units.

This course will explore historical as well as current market transformations of medical ethics in different global contexts. We will examine various aspects of the research enterprise, its knowledge-generating and life-saving goals, as well as the societal, cultural, and political influences that make medical research a site of brokering in need of oversight and emergent ethics. This seminar will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state, the media, and certain publics in shaping scientific research agendas. We will also examine how structural violence, poverty, global standing, and issues of citizenship also influence issues of consent and just science and medicine.

Same as: ANTHRO 238, CSRE 138

ANTHRO 138A. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice; quest; structured around international military intervention and criminal trials based on international criminal courts; quest; will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance of balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 138, AFRICAST 238, ANTHRO 238A

ANTHRO 138B. Urban Africa. 5 Units.

This course explores the production of urban space and the social, cultural, and political significance of cities in sub-Saharan Africa. Topics include: architecture and the built environment; urban planning and colonial public health; migration and rural-urban dynamics; youth, politics, and popular culture; violence, policing, and the privatization of public space; (in)formality in housing, transportation, and employment; class, gender, and mobility in the public sphere; urban citizenship and `right to the city; quest; movements; gentrification, tourism, and the commodification of poverty; and efforts to (re)theorize postcolonial African cities. Readings are drawn from anthropology, history, urban studies, and geography. Discussion will situate struggles over urban forms and the contours of everyday life within broader trends in the political economy of the region from the late colonial period to the present.

Same as: AFRICAST 138B, URBANST 139

ANTHRO 139. Ethnography of Africa. 5 Units.

The politics of producing knowledge in and about Africa through the genre of ethnography, from the colonial era to the present. The politics of writing and the ethics of social imagination. Sources include novels juxtaposed to ethnographies.

Same as: ANTHRO 239

ANTHRO 139A. Forgotten Africa: An Introduction to the Archaeology of Africa. 5 Units.

This course provides an introductory survey of Africa; quest; s past from prehistoric times through the 19th-century. The course will challenge Western depictions of Africa as a dark continent `without history; quest; by highlighting the continent; quest; s vibrant cultures, sophisticated technologies, complex political systems and participation in far-reaching commercial networks, all predating European colonization. In tandem, the course explores how these histories are mobilized in the production of negative ideas about Africa in contemporary discourse.

Same as: AFRICAST 139A, ARCHLGY 139A

ANTHRO 140. Ethnography of Africa. 3 Units.

This course is an exploration of some central themes and issues in contemporary African society through close readings of a selection of recent ethnographies. It aims to understand Africa as a place where many of the most challenging issues of a modern, globalized world are being thought about in exciting and creative ways, both by ethnographers and by the people about whom they write. Among the key issues that the course seeks to address are: the history and politics of colonial domination; the ways that medicine and government intersect; the increasing use of humanitarian frames of reference in understanding African realities; the changing meanings of HIV/AIDS, sex, and love; and the role of mass media in enabling cultural and imaginative production to take form.

ANTHRO 140A. Ethnographic Archaeologies. 4-5 Units.

How have ethnographic and archaeological methods been combined in anthropological research? What methodological and theoretical implications do these kinds of projects generate? Seminar topics will include ethnoarchaeology, ethnographies of archaeological practice, public archaeology and heritage ethics. Lecture and discussion.
Same as: ANTHRO 240A, ARCHLGY 137

ANTHRO 141A. Science, Technology, and Medicine in Africa. 4 Units.

Africa is often depicted as a place simply in need of science, technology, and medicine. This class will introduce students to the culture and politics of science in sub-Saharan Africa: to the diverse and rich traditions, histories and contemporary predicaments of knowledge practices on the continent. We will consider the role of science in the colonial period, covering the expansion of European empires in Africa and the forms of technical knowledge that colonial governments encountered, especially as they relate to health and the environment. We will examine the role of science at African independence and in international development work. Finally, we will discuss the techno-politics of medical training and research, resource extraction, and the internet in contemporary Africa. This course will provide some important background for those with an applied interest in Africa as well as provide an introduction to a growing area of scholarship. Course materials include historical and ethnographic works, as well as primary sources and films emphasizing scientific practice in the context of geopolitical relations of power and inequality.
Same as: AFRICAST 141A

ANTHRO 141B. The Anthropology of Bits and Bytes: Digital Media in the Developing World. 5 Units.

Recent historical developments, including the widespread adoption of the mobile phone across Africa and Southeast Asia, the rise of Arab Spring, and the rise of technology sectors in cities such as Nairobi, Bangalore, and Accra, have turned digital technology in the global South into a topic of growing popular interest and increasing scholarly concern. This course attempts to make sense of these developments by interrogating diverse theoretical approaches to digital technology and assessing what these approaches reveal and obscure in specific cases of technology adoption in Africa, Asia, and Latin America. Students will be introduced to an overview of scholarly approaches to digital technology from anthropology, science and technology studies (STS), critical theory, geography, and communications studies. We will analyze the relative utility of these explanations through case studies of specific instances of technological production and/or use. These case studies will be drawn from both secondary texts and primary materials such as social media, digital maps, videos, blogs, and news reports. At the same time, we will examine how digital discourses and practices both draw upon and inform broader issues of context-specific political and cultural importance. Major topics to be discussed include development and the State, civil society and the public sphere, youth culture, gender politics, mobility, and globalization. Students will come away from the course with a strong understanding of the major issues at stake in the increasing digitalization of the global South and the socio-cultural, political, and technical debates that frame them.

ANTHRO 143. Title Social Change in Contemporary China: Modernity and the Middle Kingdom. 4-5 Units.

Over the last twenty years, residents of the People's Republic of China have experienced dramatic changes in nearly every facet of life. This undergraduate seminar introduces students to contemporary China through an examination of various types of social transformation. We will analyze how PRC residents of different backgrounds are confronting such processes as economic liberalization, migration, kinship transformation, sexual commodification, media proliferation, industrialization, and transnationalism? Priority is placed on reading, discussing and assessing research that uses qualitative methods and that situates political economy in dialogue with lived experience.
Same as: ANTHRO 243

ANTHRO 143B. Anthropology and International Development. 3-5 Units.

International development as a set of projects, policies, and controversies has been a major force in shaping the world over the past seventy years. Throughout, the discipline of anthropology has been involved; both as participant and as critical observer. After a brief overview of development theory and history, this course will discuss (1) the ways in which anthropology has contributed to development projects and ideas and (2) how the discipline has critiqued development practice over the past three decades. What has anthropology offered to those who work towards social and economic development; and how has development shaped the discipline itself? Readings will include detailed ethnographic and historical case studies from across the developing world.

ANTHRO 144A. Practice of Everyday Life in Kazakhstan: From Nomadism to Modernity. 3-5 Units.

An interdisciplinary introduction to the historically nomadic land of Kazakhstan, its peoples and their lifestyles; the practice of everyday life. Ranked as the ninth largest country in the world, Kazakhstan is also the world's largest landlocked country; its territory is greater than Western Europe: it stretches from the fringes of Europe to the borders of Mongolia and China. The seminar surveys language and society, traditional economics and customary law, rituals and folk customs, local dwelling, craft and art, the cultural panorama, the historical relationship between sedentary and nomadic peoples as well as new approaches to the study of nomads in modernity. Speaking of the present time, we will follow the changing nomads in a changing world. The instructor is going to base, to the extent possible, on the extremely rich fieldwork data recently discovered in Kazakhstan -- the data is yet little known in the West. The seminar will make extensive use of audio-visual materials and films.
Same as: REES 244A

ANTHRO 145. Race and Power. 5 Units.

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the construction of race as a literally made phenomenon, where historical, colonial, bodily, market, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race and capital.
Same as: ANTHRO 245, CSRE 145F

ANTHRO 145B. Reinventing the Other: Greeks, Romans, Barbarians. 3-5 Units.

Ancient ethnography was a highly conventionalized tradition stretching from "the father of History," Herodotus, to the last historian of the ancient world, Procopius. We will read selections of these two authors' works as well as of Sallust, Tacitus, and lesser known ones. Within various theoretical frameworks—rhetorical, anthropological, structuralist—we will reconstruct the shifting images of The Other, explore what they tell us about their producers, and reflect on what ancient ethnography contributed to its modern descendant.

ANTHRO 146. Global Mobilities. 5 Units.

In this STS senior capstone seminar, students will study the local and global impacts of the technologies that have increased personal mobility. STS majors must have Senior status to enroll in this Senior Capstone course.
Same as: STS 200B

ANTHRO 146A. Anthropology of Youth. 5 Units.

This course will be a survey of classical texts and contemporary research on youth and generations. We will explore the historical and cultural construction of youth; and youth practices across regions over time. We will pay special attention to the organization of contemporary capitalism, its effect in producing marginality and exclusion, and issues underlying youth political movements.

ANTHRO 146G. Paperwork. 5 Units.

"Paperwork" is an intensive reading course in a seminar format, concerning the production, circulation and mediation of "paperwork" both as a material and symbolic infrastructure for the operation of modern institutions and governance. We will explore diverse techniques and technologies of paperwork, including note-taking, memos, lists, files, and documents, and forms of paperwork such as medical record, petition, passport, ID card, immigration paper, as well as archives and other mnemonic technologies both as cultural practices and reflexive objects. The goal of the course is to understand "bureaucracy" in the fields of law, business, and public administration, as well as in civil society generally, from the vantage point of concrete inscription, circulation, and storage of papers and documents. Readings will include works by Bruno Latour, Jacques Derrida, Michel Foucault, Cornelia Vismann, Friedrich Kittler, and others.
Same as: STS 200G

ANTHRO 147. Nature, Culture, Heritage. 5 Units.

Seminar. Shared histories of natural and cultural heritage and their subsequent trajectories into the present. How thought about archaeological sites and natural landscapes have undergone transformations due to factors including indigenous rights, green politics, and international tourism. The development of key ideas including conservation, wilderness, sustainability, indigenous knowledge, non-renewability and diversity. Case studies draw on cultural and natural sites from Africa, the Americas and Australia.
Same as: ANTHRO 247

ANTHRO 147A. Folklore, Mythology, and Islam in Central Asia. 3-5 Units.

Central Asian cults, myths, and beliefs from ancient time to modernity. Life crisis rites, magic ceremonies, songs, tales, narratives, taboos associated with childbirth, marriage, folk medicine, and calendrical transitions. The nature and the place of the shaman in the region. Sources include music from the fieldwork of the instructor and the Kyrgyz epoch *Manas*. The cultural universe of Central Asian peoples as a symbol of their modern outlook.

Same as: REES 247A

ANTHRO 148. Health, Politics, and Culture of Modern China. 4-5 Units.

One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China.

Same as: ANTHRO 248

ANTHRO 149. South Asia: History, People, Politics. 5 Units.

The South Asian subcontinent (comprising of India, Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka) is one of the most diverse and densely populated regions in the world and increasingly prominent in new global political and cultural economies. South Asia has also provided the inspiration for cutting edge theories about the colonial state, postcolonial studies, democracy, popular culture, and religious conflict. The course will provide an overview of major historical events and social trends in contemporary South Asia and focus on themes such as gender, religion, caste, migration and movement, new technologies, the urban and rural, the state, and new forms of consumption among others. Thus, the course will give students historically and theoretically informed perspectives on contemporary South Asia, as well as how to apply insights learned to larger debates within the political and social sciences.

Same as: ANTHRO 249

ANTHRO 149A. Cities and Citizens in the Middle East. 4 Units.

This course will explore historical formation of cities and citizens in the Eastern Mediterranean since the 19th century. We will explore urban development, economy, social classes and local politics with a focus Egypt and Turkey and in particular two world-historical cities, Cairo and Istanbul. Drawing on history, cultural anthropology, geography and sociology disciplines, we will examine how urban space in Egypt and Turkey have reconfigured through histories of colonialism, nationalism, developmentalism and globalization. Rural to urban immigration, informality, gendered places, consumption, urban regeneration, local politics and branding the city will be the themes of our discussion. We will study these themes in relation to two main questions: How do spatial changes engender new social practices and redefine cultural difference?; How do power struggles at the intersection of local and global interests shape urban change? It will be of interest for urban studies majors and other students at all levels who would like to study urban struggles and change in Turkey, Egypt, the Middle East and the Global South.
Same as: URBANST 144

ANTHRO 150A. Minaret and Mahallah: Women and Islam in Central Asia. 3-5 Units.

Introduction to women's culture and art in Muslim countries of Central Asia. Women, bearers of family rites and folklore, are the key figures in transmission of traditional culture and guardians of folk Islam. Women helped to keep the continuity of Islamic education in Central Asia during the harsh times of Communist dominance. The whole wealth of women's oral tradition will be demonstrated and examined to the extent possible. The course will make broad use of audio-visual materials.

Same as: FEMGEN 150A, REES 250A

ANTHRO 151. Women, Fertility, and Work. 5 Units.

How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using crosscultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places.

Same as: ANTHRO 251, HUMBIO 148W

ANTHRO 151A. Contemporary Chinese Society Through Independent Documentary Film. 3-5 Units.

An overview of social issues in contemporary China as seen through its emerging independent documentary film movement. Topics covered include representations of history, political power and accountability in the reform era, human rights, urbanization, the environment, homelessness and inequality, sexualities, addiction, and the role of media in society. Each viewing is accompanied by readings in media theory or the anthropological/sociological study of contemporary China. Can be taken with or without research component. Films include English subtitles.

Same as: ANTHRO 251A

ANTHRO 152. Ritual, Politics, Power. 5 Units.

Our everyday lives are made up of multiple routines, some consciously staged and imagined and others unconscious and insidious. Anthropologists call these rituals. Rituals shape every aspect of our lives, creating our symbolic universes and governing the most minute of our practices. For early anthropologists and for those interested in religious and symbolic life, rituals and rites were seen as both one of the most universal features of human existence, and, as that which enables us to reflect upon our human existence. A prominent example are that of the rites de passage; found in every culture, from puberty initiation rites, weddings or funerals, which socially signal the change from one status to another. While initially for anthropologists, rituals marked the difference between the sacred and the profane, soon scholars began to see the ubiquity of ritual and the symbolic in shaping even the most mundane activity such as the structure of a meal and why one is not meant to eat dessert before the main course. The first half of the class examines these different debates surrounding the meaning and effects of rituals and rites. The second half of the class takes these debates to think about the question of power and politics. We return to the question of how our symbolic universes are staged and imagined by us through ritual forms such as the annual Presidential pardoning the turkey; at Thanksgiving. The question of power however pushes us even further to ask why it is that we obey particular kinds of authority, consent to particular actions, and find ourselves doing things we haven't consciously decided to do. Many have argued that these kinds of political questions about how we respond and are shaped by power have something to do with our symbolic worlds and ritual, from the most obvious (the monarchy) to the most subtle (listening in a classroom). Throughout the course, these abstract questions will be grounded in cross-cultural examples and analysis.

Same as: SOC 156

ANTHRO 152A. Urban Poverty and Inequality in Contemporary China. 5 Units.

Experiences of poverty and inequality and their relationship to gender, space development, post-socialism, and globalization. How processes of class-making in China's cities are bound up with transformations in the country's sociopolitical landscape.

ANTHRO 153A. Population and social trends in Japan. 3-5 Units.

Anthropological theories and concepts as applied to Japan. Postwar demographic trends. Delayed marriage. Declining nuclear family. Re-structuring of education and workplace. Problems for the seniors. Foreign laborers shaking fundamentals of Japan.

Same as: ANTHRO 253A

ANTHRO 154. Anthropology of Drugs: Experience, Capitalism, Modernity. 5 Units.

This course examines the significant role drugs play in shaping expressions of the self and social life; in the management populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

Same as: ANTHRO 254B, CSRE 154

ANTHRO 155. Research Methods in Ecological Anthropology. 5 Units.

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

Same as: ANTHRO 255

ANTHRO 156B. Environment, Nature and Race. 3-5 Units.

Environment, nature and race: Politics of belonging, exclusion, and embodiment. Scientific and popular understandings of race and ethnicity remain deeply entangled with ideas about "nature" and the "environment". This course will introduce students to some of the many ways that nature, environment, and race have been and remain intertwined, for better or for worse. What does it mean to claim race is "natural"? To what extent is race shaped by environment and vice versa? How are the politics of race linked to the politics of environmentalism? The class will begin with a brief treatment of current critical consensus on the biology of race and the cultural politics of race and nature, and move on to a theoretical discussion of how humans and "nature" interact. From there, the course moves into historical and ethnographic examples of the politics of race and the environment: the racialized and racializing character of particular environments; the ways that racial politics shape natural environments; and the politics of exclusion and belonging in environmental movements. Case studies will be both rural and urban and draw from anthropology, geography, history, and biology. The course will end by considering the recent resurgence of the race concept in biology.

Same as: CSRE 156J

ANTHRO 160. Social and Environmental Sustainability: The Costa Rican Case. 3-5 Units.

Seminar focused on issues of tropical sustainability with a particular emphasis on the Osa Peninsula of Costa Rica. Offered in conjunction with the Osa Initiative in the Woodrow Wilson Institute for the Environment, the course highlights issues of human development in the tropics, through such means as agricultural development, ecotourism, conservation efforts, private and indigenous reserves, and mining. The course will draw from diverse disciplines including anthropology, rural sociology, conservation biology, geosciences, history, political science, and journalism. In addition to weekly discussions, students will develop a research paper throughout the term which will be presented to a panel of selected Faculty during the final week of the term.

Same as: ANTHRO 260

ANTHRO 160A. Tragedy of the Commons: Human Ecology of Communal Resources. 5 Units.

The tragedy of the commons is a classic social dilemma; a situation in which individual interests conflict with collective ones; and key to understanding past, present and future environmental degradation. This course surveys a variety of scientific perspectives on the essence of the tragedy: common property resources will ultimately be destroyed by overexploitation. Major themes include the effects of human population density and social organization on the health and management of commons, self-interest versus collective action, and potential solutions to commons problems. Modern and prehistoric case studies are examined from ecological and evolutionary perspectives.

Same as: ANTHRO 260A

ANTHRO 161. Human Behavioral Ecology. 3-5 Units.

Theory, method, and application in anthropology. How theory in behavioral ecology developed to understand animal behavior is applied to questions about human economic decision making in ecological and evolutionary contexts. Topics include decisions about foraging and subsistence, competition and cooperation, mating, and reproduction and parenting.

Same as: ANTHRO 261, HUMBIO 117H

ANTHRO 161A. Human Ecology: Adaptations to Climate and Climate Change. 5 Units.

Humans face essentially the same adaptive challenges as all organisms but are unique for having successfully adapted to virtually every environment on Earth. The resulting diversity of phenotypes and cultures is key to understanding how interactions with environments shape the economic, social, and cultural lives of hunter-gatherers, pastoralists and agriculturalists. This course surveys the range of human adaptations from an ecological and evolutionary perspective to understand human adaptive capacity and vulnerability to climate change.

Same as: ANTHRO 261A

ANTHRO 162. Indigenous Peoples and Environmental Problems. 3-5 Units.

The social and cultural consequences of contemporary environmental problems. The impact of market economies, development efforts, and conservation projects on indigenous peoples, emphasizing Latin America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas.
Same as: ANTHRO 262

ANTHRO 163. Conservation and Evolutionary Ecology. 5 Units.

Environmental degradation resulting from human behavior, and what can be done about it. Patterns of interaction between people and environments, and why they vary over time and space. Topics include adaptation and behavior, resource acquisition and utilization, conflicts of interest, collective action problems, conspicuous consumption, waste, land management, and public policy.
Same as: ANTHRO 263

ANTHRO 163A. Endangered Languages and Language Revitalization. 3-4 Units.

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages.
Same as: ANTHRO 263A, LINGUIST 163A, LINGUIST 263, NATIVEAM 163

ANTHRO 164. Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes. 3-5 Units.

This interdisciplinary course explores natural resource extraction from multiple conceptual perspectives. Logging and non-timber resource harvesting practices are examined through ecological dynamics of species and community life histories, natural and anthropogenic disturbance regimes and resilience and recovery to diverse perturbations through alternative stable states. Using a political ecology lens, we then examine historical and current policies and practices aimed to manage terrestrial resource use and extraction: maximum sustained yield, community-based forest management, certification systems, payment for ecosystem services and Reducing Emissions from Deforestation and Degradation (REDD). Through problem sets and lab/field exercises, we employ quantitative ecological measurements and experiments coupled with quantitative and qualitative methods and analyses used to assess socio-economic drivers and ecological impacts. Diverse benefits/costs imparted throughout the supply chain - from extraction to consumer request; are explored across temporal and spatial scales with local to global agents. No Prerequisites: course or foundation in Ecology, Community Ecology, and/or Ecosystem Ecology strongly suggested.
Same as: ANTHRO 264

ANTHRO 164A. Anthropology of Ecotourism. 5 Units.

Ecotourism has been touted as a win-win scenario for both biodiversity conservation and the well-being of local residents. In practice, these lofty ideals of ecotourism have proven difficult to implement. The rapid development of ecotourism over the last two decades. Focus is on the scholarly literature relating to ecotourism from both supporting and critical perspectives.

ANTHRO 164B. Anthropology of Tourism. 5 Units.

As iquest;the largest scale movement of goods, services, and people that humanity has ever seen,iquest; tourism is an immense phenomenon and is currently the worldiquest;s most immense industry, reaching some of the most remote people and places on the planet. Yet scholars have only begun to focus on the topic in recent decades. This seminar-style course will focus on the key anthropological and social science literature relating to tourism from both supporting and critical perspectives; however, tourism is an inherently multi-disciplinary subject and students from all disciplines are encouraged to enroll. After providing an initial overview of this phenomenon and field of study, later sections of the course will focus on emerging sub-types of tourism including sustainable tourism, ecotourism, agritourism, and geotourism to name just a few.

ANTHRO 165. Parks and Peoples: The Benefits and Costs of Protected Area Conservation. 5 Units.

Seminar. Emphasis is on the social impact of parks and reserves. Integrated conservation and development projects (ICDPs) based on protected areas; alternative ways to derive local social benefits from them. Cases include Yellowstone, Manu, Galapagos, Ngorongoro, and Guanacaste.

ANTHRO 165A. People and Parks: Management of Protected Areas. 5 Units.

As resources become scarcer, parks increasingly serve as ideological battlegrounds for contested core human values and often put livelihoods at stake. Their historical development and the complex array of present-day issues associated with the formal protection of biodiversity. The ideas behind parks and the evolution of these ideas.

ANTHRO 166. Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness. 3-5 Units.

Seminar. The state, private sector, development agencies, and NGOs in development and conservation of tropical land use. Focus is on the socioeconomic and political drivers of resource extraction and agricultural production. Case studies used to examine the local-to-global context from many disciplines. Are maps and analyses used for gain, visibility, accountability, or contested terrain? How are power dynamics, land use history, state-private sector collusion, and neoliberal policies valued? What are the local and extra-local responses?.
Same as: ANTHRO 266

ANTHRO 167A. A Wilderness Empire: The Political Ecology of California. 5 Units.

This course traverses the historical and geographic space of California to explore the intersection of nature, economy and politics in the making of the contemporary American West. The course links popular historical accounts of the state to related core theoretical literature from anthropology, preparing students to use the analytic tools of anthropology to pursue questions about the people, processes and landscapes that are part of our taken for granted lived experience in California. The class draws theoretically from cultural anthropology, ecological anthropology, cultural and economic geography, and literature to develop a holistic understanding of the historical and social co-production of nature and economy in California and the American West.

ANTHRO 168. Everest: Extreme Anthropology. 3-5 Units.

Using Mt. Everest as a touch point, this class will examine the anthropology of nature, specifically focusing on exploration and adventure travel.

ANTHRO 168A. Risky Environments: The Nature of Disaster. 5 Units.

This seminar explores topics including environmental movements and countercultures, human agency and geoengineering ecotourism, and indigenous perspectives of changing climates to query how humans view `natureiquest; in terms of stability, instability, risk and disaster in the 21st century. Case studies draw upon a broad range of geographical regions including the Arctic, Iceland, Australia, and the Americas. Discussions will draw upon film portrayals and interviews with researchers in addition to readings.
Same as: ANTHRO 268A

ANTHRO 169. The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet. 3-5 Units.

This course is an interdisciplinary approach to understanding human food consumption and nutrition, incorporating biological, evolutionary, ecological and social perspectives. Topics include a broad survey of primate diets and their physiological and behavioral correlates; fossil and archaeological evidence for early human diets; adaptations to dietary shifts since the Neolithic; infant and early child feeding practices and their role in shaping human social arrangements, metabolic syndrome, food security, food taboos; the origins of spices; cultural diversity in the social uses and meanings of food and the sharing of food; gathering, hunting and locavorism as high hipster cuisine. Emphasis is on understanding the diversity of human foodways through time and space: how biology, culture, and ecology interact to shape the food we eat, and how the food we eat shapes us.

Same as: ANTHRO 269

ANTHRO 169A. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: CHILATST 168, CSRE 168, FEMGEN 140H

ANTHRO 170. Australian Ecosystems: Human Dimensions and Environmental Dynamics. 3 Units.

This cross-disciplinary course surveys the history and prehistory of human ecological dynamics in Australia, drawing on geology, climatology, archaeology, geography, ecology and anthropology to understand the mutual dynamic relationships between the continent and its inhabitants. Topics include anthropogenic fire and fire ecology, animal extinctions, aridity and climate variability, colonization and spread of *Homo sapiens*, invasive species interactions, changes in human subsistence and mobility throughout the Pleistocene and Holocene as read through the archaeological record, the totemic geography and social organization of Aboriginal people at the time of European contact, the ecological and geographical aspects of the "Dreamtime", and contemporary issues of policy relative to Aboriginal land tenure and management.

Same as: ANTHRO 270, EARTHSYS 172

ANTHRO 171. The Biology and Evolution of Language. 4-5 Units.

Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 271, HUMBIO 145L

ANTHRO 171A. Linguistic Field Methods. 5 Units.

Workshop applying methods for gathering and analyzing linguistic data in the field, i.e., from consultants who are native speakers of a language essentially unknown to the investigator. Principles of language documentation. Students will do local field projects and work on these both in and out of class. Format involves lectures, discussion, working with native speakers, and student presentations. Topics include: choosing a language; planning the project; computerized collection, storage, and analysis of linguistic data; field recording equipment; interviews and elicitation; diagnostic vocabulary lists and grammatical schedules; field study of everyday communication and discourse; area surveys and the ethnography of communication; ethics, reflexivity, and bias; working with human subjects and governments. Prerequisite: a course in linguistics or in anthropological field methods.

ANTHRO 172. Seminar on Cultural Evolution and Coevolution. 3-5 Units.

Upper division/graduate seminar on recent approaches to the study of cultural evolution and coevolution. Critical evaluation of Darwinian and non-Darwinian theories, with special attention to the interplay of culture, genes, environment and society. Students will undertake projects of their own design to review, test, or improve current theoretical formulations. Prerequisite: a university-level course in evolution, ecology, or human behavioral biology.

Same as: ANTHRO 272

ANTHRO 173. Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice. 3 Units.

The complexity of social and political issues surrounding global environmental change. Emphasis is on synergies precipitated by human-induced climatic change. Case studies and scenarios to explore the vulnerability and resilience in households, communities, regions, and nation-states most affected by extreme weather conditions. Their concerns, livelihood changes, and diverse responses of rural smallholders, indigenous communities, the state, and local and regional migrants. Central theme is environmental justice.

Same as: HUMBIO 111

ANTHRO 174. Beginnings of Social Complexity. 5 Units.

Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archaeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America. (HEF II; DA-B).

Same as: ANTHRO 274

ANTHRO 175. Human Skeletal Anatomy. 5 Units.

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 275, BIO 174, BIO 274, HUMBIO 180

ANTHRO 176. Cultures, Minds, and Medicine. 1 Unit.

This workshop aims to bring together scholars from the social sciences, humanities, medicine and bio-science and technology to explore the ways that health and illness are made through complex social forces. We aim for informal, interactive sessions, full of debate and good will. Dates of meetings will be listed in the notes section in the time schedule.

Same as: ANTHRO 276

ANTHRO 177. Environmental Change and Emerging Infectious Diseases. 3-5 Units.

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 277, HUMBIO 114

ANTHRO 178. Evolution and Conservation in Galapagos. 5 Units.

The contribution of research in the Galapagos Islands to our current understanding of evolution and conservation. Writings from Darwin to Dawkins, as they reveal patterns and processes of evolution including selection, adaptation, speciation, and coevolution. Current conservation strategies in the archipelago, and urgent measures needed today before unique species and adaptations are lost.

Same as: ANTHRO 278

ANTHRO 178A. Culture, Narrative, and Medicine. 5 Units.

This course examines the ways in which medicine is practiced in diverse cultural contexts with narrative skills of recognizing, interpreting and being moved by the stories of illness. It is an examination of the human experience of illness and healing through narratives as presented in literature, film, and storytelling. We explore how cultural resources enable and empower healing and how narrative medicine can guide the practice of culturally competent medical care.

Same as: HUMBIO 177C

ANTHRO 179. Cultures of Disease: Cancer and HIV/AIDS. 5 Units.

History, politics, science, and anthropology of cancer; political and economic issues of disease and health care in the U.S., including the ethics and economics of health care provision, the pharmaceutical industry, carcinogen production, and research priorities.

ANTHRO 179A. Health, Illness, and Healing in South Asia. 5 Units.

This course has three related goals pertinent to medicine and healing in South Asia. The first is to understand the experiences of illness, and therapy in ordinary South Asian communities. How do social and economic inequality, religious commitments, available healing traditions, and community and family contexts shape the experience of illness and healing? The second goal is to think about South Asian medical systems using a broad historical perspective. How had biomedicine been used during the colonial period to manage the health of native populations? What is the legacy of this colonial history on current practices? What happens when South Asian medical traditions (such as Ayurveda) become global? Third, we will explore crucial health problems in South Asia from the perspective of medical anthropology. Possible topics for the third portion of the course include: child birth and maternal health, sex-selection technologies, malnutrition, metabolic diseases, the selling of organs, medical tourism, tuberculosis, HIV, suicide, and schizophrenia.

Same as: ANTHRO 279A

ANTHRO 180. Science, Technology, and Gender. 3-5 Units.

Why is engineering often seen as a masculine profession? What have women's experiences been in entering fields of science and technology? How has gender been defined by scientists? Issues: the struggles of women in science to negotiate misogyny and cultural expectation (marriage, children), reproductive issues (surrogate motherhood, visual representations of the fetus, fetal surgery, breast feeding, childbirth practices), how the household became a site of consumerism and technology, and the cultural issues at stake as women join the ranks of scientists.

ANTHRO 181A. Gender in the Middle East: Iran, Turkey, and Egypt. 4 Units.

This course explores the construction of gender in the Middle East. Drawing on the historical, sociological and anthropological research in the region, the course aims to question the stereotypes about the subordination of Muslim women and to offer students a systematic reading and analytical discussion of the political, economic and cultural structures that inform gender relations and practices in the region. The course starts with an examination of early Islam and religious sources with regard to women's status, then moves on to nationalist and modernization movements in the 19th and 20th centuries, and finally explores women's and men's lives in contemporary Egypt, Turkey and Iran. In this framework, we will pay special attention to Islamist mobilizations, family and sexual relations, as well as women's changing livelihoods and labor.

Same as: FEMGEN 181A

ANTHRO 182. An Anthropology of Annihilation: Tobacco at the Turn of the Millennium. 3-5 Units.

The cigarette as the world's greatest weapon of mass destruction: 100 million dead worldwide from cigarettes during the 20th century, one billion expected to die in the 21st century. How to understand this toll, its production, management, politicization, and depoliticization? What can anthropological and allied perspectives disclose? How does the catastrophic challenge key precepts within anthropology and other branches of the academy?

ANTHRO 182A. Down and Out: Marginal Lives and Institutional Technologies. 5 Units.

This course examines the neglect and management of socially marginalized persons including the mentally ill, youth runaways, child wards of the state, drug addicts and prisoners. In this course, we will approach the concept of marginality by investigating the spaces and institutions of decay, neglect and rehabilitation to which unwanted and indigent individuals are relegated. Readings are focused on qualitative research conducted within institutions of health, welfare, and reform. There will be two comparative public mental health sections in this course: one focused on South Asia and the second on Africa. This course is relevant for students interested in medical anthropology, applied anthropology, public health policy, or clinical careers in medicine, psychology, or social work.

Same as: ANTHRO 282A

ANTHRO 182N. Smoke and Mirrors in Global Health. 3 Units.

A few years ago, health experts began calling out tobacco as engendering a global health crisis, categorizing the cigarette as the world's greatest weapon of mass destruction. A "global health crisis"? What merits that title if not tobacco use? A hundred million people were killed by tobacco in the 20th century, and ten times that number is predicted; a billion people are predicted to die prematurely from exposure to cigarette smoke over the next hundred years. How has tobacco come to be labeled a global health crisis over the last decade and what has been the political response? From whence does activism and ongoing complacency regarding tobacco arise? How are they created in different cultural contexts? This course aims to provide students conceptual tools to tackle two specific thought projects: (1) to understand how institutional actors compete to define a situation in the world today as a problem of global health, and (2) to understand the sociocultural means by which something highly dangerous to health such as the cigarette is made both politically contentious and inert. On both fronts, special attention will be given to the ways global health activism and complacency unfold in the U.S. and China.

ANTHRO 183B. Human Mobility and Adaptability. 5 Units.

Mobility, whether in the form of seasonal or permanent migration, is an ancient practice necessary for many subsistence strategies, including hunting-and-gathering and pastoralism. Many new forms of mobility have emerged and now it is nearly impossible to consider a patch of human society that is not engaged in or directly impacted by habitual, patterned geographic mobility. Today, almost everywhere in the world, people can get farther, faster; urbanization, environmental degradation, and civil unrest are driving groups of people who do not have a cultural tradition of nomadic migration to adopt a mobile lifestyle; sometimes permanently, sometimes temporarily; in search of new economic or resource opportunities. In this seminar course, we will explore modern patterns of human mobility and migration as adaptive strategies for predictably and unpredictably changing environments. Using a framework of biological and cultural adaptation, we will discuss the major types of current human mobility (e.g. nomadism, immigration, migrant labor, displacement) and how they influence and are influenced by social systems, resource access, and health.

Same as: ANTHRO 283B

ANTHRO 184. Spirituality and Healing. 3-5 Units.

The puzzle of symbolic healing. How have societies without the resources of modern medicine approached healing? Why do these rituals have common features around the world? Shamanism, spirit possession, prayer, and the role of placebos in modern biomedicine. Students do ethnographic work and practical explorations along with more traditional scholarly approaches to learning.

Same as: HUMBIO 179S

ANTHRO 185. Medical Anthropology of Contemporary Africa. 5 Units.

In this course we will examine the place of Africa in global health discourses while reading in-depth histories and ethnographies of the varied causes and consequences of some of the most difficult problems facing African countries today. We will study the effects of colonialism and conflict on health, explore the military and humanitarian connections in the fight against HIV/AIDS, weigh the risks and benefits of population genetic studies on African populations, examine biomedical interventions on, and erasures of, local health problems, and query the role of violence, memory, insecurity, and power in daily life on the continent.

Same as: ANTHRO 285

ANTHRO 185A. Race and Biomedicine. 3-5 Units.

Race, identity, culture, biology, and political power in biomedicine. Biological theories of racial ordering, sexuality and the medicalization of group difference. Sources include ethnography, film, and biomedical literature. Topics include colonial history and medicine, the politics of racial categorization in biomedical research, the protection of human subjects and research ethics, immigration health and citizenship, race-based models in health disparities research and policy, and recent developments in human genetic variation research.

Same as: ASNAMST 185A

ANTHRO 186. Culture and Madness. 5 Units.

'Madness' lends insight into the construction of the normal and abnormal; the boundaries of reason and unreason; the epistemological relation of mind and body, and the management of difference and disease. Taking an interdisciplinary perspective, this course explores the fundamental questions madness poses to subjectivity, culture and modernity.

Same as: ANTHRO 286

ANTHRO 186N. The Most Rational People in the World. 4 Units.

Humans, broadly construed, emerged as bipedal apes in the African mixed savanna-woodlands approximately two million years ago. From humble beginnings, humans have gone on to become the ecologically dominant species in most biomes and grown to a global population in excess of seven billion. This dominance arises from a combination of features of the human organism including its extreme degree of behavioral flexibility and flexible social organization. The prima facie evidence of human evolutionary and ecological success raises a paradox with respect to recent work in economics and psychology which increasingly argues for pervasive irrationality in human decision-making in a wide array of behavioral contexts. How is it possible for an organism with such seemingly flawed software supporting decision-making to become the globally dominant species? We will use this contradiction as the launching point for understanding what rationality means in a broad ecological and cross-cultural context. What do we mean by 'rationality'? How do different disciplines conceive of rationality in different ways? Is there such a thing as a rationality that transcends cultural differences or is the very idea of rationality a cultural construction that is used to justify imperialism and other modes of paternalism? Are there systematic factors that promote or impede rational decision-making? The seminar will provide a gentle introduction to the formal approaches of decision theory which we will apply to an unusual array of topics centered on the subsistence and reproductive decisions of hunter-gatherers, horticulturalists, pastoralists, and agrarian peasants, in short, people living in face-to-face, subsistence societies. In addition to doing reading from a broad array of social and natural science disciplines around the topic of rationality, students will regularly engage in exercises to assess their own approaches to decision-making.

ANTHRO 187. Nuclear Cultures. 5 Units.

This course examines the new cultural forms that arose out of the use of nuclear technology. Subjects covered will include: The Manhattan Project, nuclear activism, nuclear experimentation in medicine, pre-nuclear history, nuclear energy, and nuclear waste and trade.

ANTHRO 187A. The Anthropology of Race, Nature, and Animality. 5 Units.

As recently as the 40s, the S. Africa government labeled indigenous San people part of the animal landscape. Using the San example as a starting point, course examines socially, culturally, and politically constructed ideas about race, animality, and nature in the cultural and geographic settings of N. America, Australia, and Africa. How connections between race and nature have served as terrains of power through which people and governments have claimed territories and justified violence. Classic texts by nature writers and philosophers and current social science works that focus on race and ethnicity. Concepts such as gender, sex, and nature; environmental tourism; natural resource development; and indigeneity and animality. How ideas about race and nature have come together around concepts such as the myth of wilderness and the violence of considering certain people to be less-than-human. Issues of environmental politics and activism.

Same as: CSRE 187A

ANTHRO 193. Anthropology Capstone: Contemporary Debates in Anthropology. 5 Units.

Do you know what an anthropological perspective is? Can you describe some of the key assumptions and questions within the discipline? A major in Anthropology is composed of many specialized courses in different tracks, different emphases and seemingly a never-ending multiplication of perspectives and ethnographies. However, Anthropology is also an ongoing intellectual conversation with foundational questions, some of longstanding and some new. These foundational questions have stimulated different responses and answers and thus have also led to constant renewal of the discipline in the midst of profound disagreement. In this Anthropology Capstone course students across tracks and emphases will address some of the critical debates that have been central to the discipline as it has developed. We will feature three debate questions in the class. Preparation for each debate will be through class discussion of critical readings as well as extra-mural reading and preparation with one's debating partners.

ANTHRO 199. Senior and Master's Paper Writing Workshop. 1-2 Unit.

Techniques of interpreting data, organizing bibliographic materials, writing, editing and revising. Preparation of papers for conferences and publications in anthropology. Seniors register for 199; master's students register for 299.

Same as: ANTHRO 299

ANTHRO 200B. Lifeways of the Ancient Maya. 5 Units.

This course engages with the world of the pre- and post-contact Maya people through scholarship that explores the material culture of daily life. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, and how interpretations of daily life in the ancient Maya world are formulated. We consider how perceptions of the ancient Maya are marshaled in contemporary politics and policies. The course is designed to provide a broad overview of sites and materials in the Maya area, focusing on the dynamic interplay between the material and the social. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 100B

ANTHRO 200C. STS Senior Capstone. 5 Units.

Genetics, Ethics and Society. This course will explore three socially transforming components of genetics research that hold simultaneously liberating and constraining possibilities for populations and publics, both locally and globally. Typically the course will be divided into three sections. First, we will examine past and present issues dealing with the study of human subjects, as well as recent proposals to eventually bring full genome scans to every individual (personal genomics). Next we will learn of large-scale projects that aim to map the presence of environmental pathogens by their genetic signatures on a planetary scale and how different global populations may be affected. The last section of the course will focus on still other projects and policies that aim to expand the scope and capacity of state and international law enforcement through DNA-based forensics (the FBI CODIS database and the UKiquest;s Human Provenance Pilot Project). Projects like the latter also overlap with theories about community, families, and citizens who may or may not be linked through DNA. New concepts, such as the forensic "genetic informant" within a family unit, human DNA and isotope iquest;country matchesiquest; in cases of state asylum, and DNA based kinship rules for family reunification in many Western countries, will be explored. In all three sections we will also examine scientific ethics when subject populations are minorities, or somehow structurally disadvantaged globally.n This capstone course will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state and certain publics in shaping scientific research agendas that promise to reorganize critical aspects of human life. Students will be encouraged to explore these dynamics within such important societal domains as health, law, markets of bio-surveillance, and the growing industry of disease and heritage DNA identity testing among others. We will read works from social scientists of science practice, ethicists, medial humanists and scientists. This course will equip students with tools to write about the intersection of science and society and to engage in a research project that relates to the topical foci of the course, broadly conceived. Same as: STS 200C

ANTHRO 201. Introduction to Cultural and Social Anthropology. 5 Units.

Crosscultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual, and related topics. Case studies illustrating the principles of the cultural process. Films.

Same as: ANTHRO 1

ANTHRO 201B. ARCHAEOLOGY OF TECHNOLOGY. 5 Units.

The course is an introduction to the social organization of material production and to the theoretical, ethnographic, and historical frameworks used by archaeologists to link the technologies of the past to salient sociocultural information about the people who employed them. Comparison of metallurgical, ceramic, lithic, and textile industries in different cultural and historical settings will inform critical discussions of how and to what extent analyses of artifacts, workshops, and industrial installations can provide insight into past societies.

Same as: ANTHRO 101B, ARCHLGY 100, ARCHLGY 200

ANTHRO 202A. Ancient Civilizations: Complexity and Collapse. 3-5 Units.

How archaeology contributes to understanding prehistoric civilizations. How and why complex social institutions arose, and the conditions and processes behind their collapse. The development of monumental architecture, craft specialization, trade and exchange, and social stratification using examples from the archaeological record. (HEF II, III; DA-B).

Same as: ANTHRO 102A

ANTHRO 203A. Human Osteoarchaeology. 5 Units.

The course will cover the methodological and theoretical backgrounds to human osteoarchaeology, introduce the student to the chemical and physical characteristics of bone, and to the functional morphology of the human skeleton. Classes will consist of a taught component that outlines how osteoarchaeologists reconstruct individual life-histories based on age, sex etc.; this is combined with hands-on identification of different skeletal elements and the markers used to inform the analytical methods. Additional scientific methodologies are also introduced that increasingly form a major component of human osteoarchaeology.

Same as: ANTHRO 103A

ANTHRO 204. Language and Culture. 4-5 Units.

Comparative approach, using examples from many languages. Emphasis is on generally non-Western speech communities. Topics include: the structure of language; the theory of signs; vocabulary and culture; grammar, cognition, and culture (linguistic relativism and determinism); encodability of cultural information in language; language adaptiveness to social function; the ethnography of speaking; registers; discourse (conversation, narrative, verbal art); language and power; language survival and extinction; and linguistic ideology (beliefs about language).

Same as: ANTHRO 4

ANTHRO 205. Ancient Cities in the New World. 3-5 Units.

Preindustrial urbanism as exemplified by prehispanic New World societies.

Case studies: the central and southern highlands of Mesoamerica, and the Maya region. Comparative material from highland S. America.

Same as: ANTHRO 105

ANTHRO 205A. Archaeological Fieldwork: Critical Analysis and Practical Application. 2-3 Units.

This introduction to archaeological fieldwork involves both field and seminar components, each component meeting once per week. During the field sessions, nwe will investigate an archaeological site on campus using methods of survey, nmapping, testing, and excavation (digging, recording units/features, profilenillustration). In seminar, we will critically examine archaeological fieldworknthrough reading, writing, and discussion, exploring topics such as history ofnarchaeological excavation, production of archaeological knowledge, disjuncturebetween theory and practice, reflexive methodologies, ethics, collaboration, andnspecialization. No experience necessary, but students with fieldwork experientenare welcome.

Same as: ANTHRO 105A

ANTHRO 205B. Heritage & Neoliberalism: Theorizations of the Past. 3-5 Units.

This course explores the emergence of heritage from within the broader field of modern historical thought. Readings explore how transformations in economic theory and changes in traditional philosophies of history have shaped how the historical event and historical figures are cast and recast within heritage. The distinctive modes by which archaeological sites and heritage sites are spatialized, linked and narrated are explored as these relate to corresponding turns in the modern concepts of freedom, inequality, personhood, sovereignty, community and culture.

Same as: ANTHRO 105B, ARCHLGY 105

ANTHRO 206. Human Origins. 5 Units.

The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

Same as: ANTHRO 6, HUMBIO 6

ANTHRO 206A. Incas and their Ancestors: Peruvian Archaeology. 3-5 Units.

The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred.

Same as: ANTHRO 106, ARCHLGY 102B

ANTHRO 209. Archaeology: World Cultural Heritage. 5 Units.

Focus is on issues dealing with rights to land and the past on a global scale including conflicts and ethnic purges in the Middle East, the Balkans, Afghanistan, India, Australia, and the Americas. How should world cultural heritage be managed? Who defines what past and which sites and monuments should be saved and protected? Are existing international agreements adequate? How can tourism be balanced against indigenous rights and the protection of the past?.

Same as: ANTHRO 109

ANTHRO 210A. Neandertals and Modern Humans: Origin, Evolution, Interactions. 3 Units.

The expansion out of Africa of our species represents the last spectacular step in the course of Human Evolution. It resulted in the colonization of the whole planet and the replacement of archaic forms of humans in Eurasia. One way to investigate why Homo sapiens has been such a successful species is to compare its evolution with that of its closest relative, the Neandertals. Exploring the bio-cultural processes at work in the two lineages leads to examine some of the main issues in Paleoanthropology and the most recent methodological advances in the field.

Same as: ANTHRO 110A

ANTHRO 210B. Examining Ethnographies. 5 Units.

Eight or nine important ethnographies, including their construction, their impact, and their faults and virtues.

Same as: ANTHRO 110B

ANTHRO 211. Archaeology of Sex, Sexuality, and Gender. 5 Units.

How archaeologists study sex, sexuality, and gender through the material remains left behind by past cultures and communities. Theoretical and methodological issues; case studies from prehistoric and historic archaeology.

Same as: ANTHRO 111

ANTHRO 211A. Archaeology of the Andes of Argentina. 3-5 Units.

The aim of this course is to provide a panorama of the archaeology of the andean region of Argentina, along some main topics of past and current researches. North andean Argentina has been considered for a long time as subordinated to the major developments in the central Andes and Puna, as if it were in a marginal position that mirrored their history. More than a hundred years of research in the area have produced different insights, which put that affirmation in relative terms. The course will give an overview of major historical contributions and contemporary trends in the archaeological thinking in relation to themes such as time, the space, people, things and nature. An overview of the conceptions and construction of time. Space seen as cultural area; natural environment and built landscape; archaeological areas as national territory. Historical conceptions of people; bodies; social inequality; the past and present others in the archaeological research. Artefacts, classifications and typologies; material archaeological contexts as cultural units; from artefacts to things; past ontologies. Nature and environment; domestication; ecological approaches; agropastoralism; nature/culture. It is expected that by the end of the course students will gain a panorama of the major problems of the archaeology of andean Argentina with historically and theoretically informed perspectives.

Same as: ANTHRO 111A

ANTHRO 212. Public Archaeology: Market Street Chinatown Archaeology Project. 4-5 Units.

This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

Same as: ANTHRO 112, ASNAMST 112

ANTHRO 213. Faunal Analysis: Animal Remains for the Archaeologist. 5 Units.

The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

Same as: ANTHRO 113, BIO 166, BIO 266

ANTHRO 213B. Religious Practices in Archaeological Cultures. 5 Units.

According to Hawkes (1954), religion or ideology is the most difficult part of social life to access archaeologically. Luckily, not all scholars agree; according to Fogelin (2008) 'religion is not something people think about, but something people do'. Thus, archaeology, an inherently multidisciplinary subject that studies material culture, is well suited to delve into religion and its underpinnings. This course will explore religious practices, as they can be defined and interpreted from archaeological contexts spanning the Paleolithic to historic periods. Definitions of religion differ from author to author but they mostly agree that religion is a fully integrated and thus integral part of human social life. Politics, economics, identity and social class influence religion, and religion influences how these forces play out in society. Thus, the course will also examine the significance of ritual and religion in a variety of social contexts.

Same as: ANTHRO 113B, ARCHLGY 113B

ANTHRO 214. Prehistoric Stone Tools: Technology and Analysis. 5 Units.

Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts.

Same as: ANTHRO 114

ANTHRO 214B. Landscape Archaeology and Global Information Systematics. 3-5 Units.

This course is meant to lay groundwork for analysis of archaeological landscapes using the methods of GIS. Throughout, we consider the various understandings of landscape, from the biographical to the biological. The course explores the history of various typologies of landscape, incorporating the cultural, the topographical, the ecological, and the topological; reviews different types of landscape data and analysis, including aerial imagery, stratigraphic excavations, and specialized analyses; addresses how to integrate different sorts of data sets and carry out analytical assessment of interrelated "layers" as dynamic constituents of landscape; considers implications of landscape studies in modern policy and management. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 114B

ANTHRO 215. The Social life of Human Bones. 3-5 Units.

Skeletal remains serve a primary function of support and protection for the human body. However, beyond this, they have played a range of social roles once an individual is deceased. The processes associated with exhumation, interment, exhumation and reburial all speak to the place that the body, and its parts, play in our cultural as well as physical landscape. This course builds on introductory courses in human skeletal anatomy by adding the social dynamics that govern the way humans treat other humans once they have died. It draws on anthropological, biological and archaeological research, with case studies spanning a broad chronological and spatial framework to provide students with an overview of social practice as it relates to the human body.

Same as: ANTHRO 115, ARCHLGY 115

ANTHRO 215A. The Aegean in the Neolithic and Bronze Age. 3-5 Units.

This course provides a survey of Aegean prehistory (7th-2nd millennium BC), focusing on traditions that were picked up or renegotiated, instead of taking a standpoint that evaluates phenomena as steps leading up to a 'state-like' quest; 'palatial' quest; society. It will draw on the region's quest; wealth of data, and will be set within a theoretically informed, problem-oriented framework, aiming to introduce students to current interpretations and debates, mainly through discussion of specific case-studies.

Same as: ANTHRO 115A, ARCHLGY 139, ARCHLGY 239

ANTHRO 215B. Peoples and Cultures of Ancient Mesoamerica. 5 Units.

This course engages with the world of ancient Mesoamerica, focusing on the Mixtec, Aztec, Maya, Zapotec, Chichimec, Olmec, and Teotihuacan peoples. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, how interpretations of daily life in the ancient Mesoamerican world are formulated, and how these interpretations are marshaled in contemporary politics and policies. We explore different scales of Mesoamerican communities, and compare the diverse material culture and lifeways represented in Mesoamerica at different time periods. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 115B

ANTHRO 216. Data Analysis for Quantitative Research. 5 Units.

This course allows graduate and advanced undergraduate students in archaeology and anthropology to acquire practical skills in quantitative data analysis. Some familiarity with basic statistical methods is useful but not assumed; the structure of the course will be flexible enough to accommodate a range of student expertise and interests. Topics covered include: statistics and graphics in R; database design, resampling methods, diversity measures, contingency table analysis, and introductory methods in spatial analysis.

Same as: ANTHRO 116

ANTHRO 217. Thinking Through Animals. 5 Units.

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of 'animals as social actors' is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognised as a viable mechanism for understanding our cultural and economic past. The module presents an overview covering a broad timespan from the Pleistocene to the modern day. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ANTHRO 117

ANTHRO 219. Zooarchaeology: An Introduction to Faunal Remains. 5 Units.

As regularly noted, whether historic or pre-historic, animal bones are often the most commonly occurring artefacts on archaeological sites. As bioarchaeological samples, they offer the archaeologist an insight into food culture, provisioning, trade and the social aspects of human-animal interactions. The course will be taught through both practical and lecture sessions: the 'hands-on' component is an essential complement to the lectures. The lectures will offer grounding in the main methodological approaches developed, as well as provide case-studies to illustrate where and how the methods have been applied. The practical session will walk students through the skeletal anatomy of a range of species. It will guide students on the identification of different parts of the animal, how to age / sex individuals, as well as recognize taphonomic indicators and what these mean to reconstructing post-depositional modifications.

Same as: ANTHRO 119, ARCHLGY 119

ANTHRO 221. Language and Prehistory. 4-5 Units.

Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparison of linguistic and biological classifications. Reconstruction, proto-vocabularies, and culture. Archaeological decipherment and the origins and evolution of writing. Archaeological and genetic evidence for human migrations. (DA-A; HEF II,III).

Same as: ANTHRO 121

ANTHRO 222A. Race and Culture in Mexico and Central America. 3-5 Units.

This course addresses the role of racial ideologies in the historical configuration of multiple hierarchies of inequality that determine the place of everyone in society in Mexico and Central America. Based on readings from the humanities and social sciences, we will discuss the cultural and racial politics of authoritarianism and indigenous insurgency, emphasizing narratives of laziness and vagrancy that have been central to the discipline of labor that shapes local processes of regressive modernization and nation building. We will analyze the hegemony of dictatorship as political necessity, the relationship between local racisms and global Whiteness, and the emergence of new local and transnational contestations to the multiple hierarchies that determine the place of everyone in society.

Same as: ANTHRO 122A

ANTHRO 222C. Research in Maya Hieroglyphic Writing. 1-2 Unit.

Workshop. Current issues in the decipherment and analysis of Maya hieroglyphic writing and literacy.

Same as: ANTHRO 122C

ANTHRO 223. Readings in Linguistic Anthropology. 2 Units.

One or two major related works on language in its cultural context. Works for 2007-08 involve attempts to correlate linguistic and non-linguistic data for analysis of prehistoric human contact and migrations. May be repeated for credit.

Same as: ANTHRO 123

ANTHRO 225. Language and the Environment. 4-5 Units.

Lecture course on vocabulary and grammar as keys to peoples' quest; understanding and use of the environment. Ethnobotany, ethnobiology, and ethno-semantics in the analysis of the language of place, plants and animals, the earth, the body, and disease. Terminological gaps and gluts and what they imply. Language as a strategic resource in environmental management. Language contact and conflict in the modern global environment, with particular attention to the vocabularies of capitalism and property. Language extinction and its environmental implications. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 125

ANTHRO 230B. Introduction to GIS in Anthropology. 5 Units.

How GIS and spatial tools can be applied in social research. Case studies and student projects address questions of social and cultural relevance using real data sets, including the collection of geospatial data and building of spatial evidence. Analytical approaches and how they can shape a social and cultural interpretation of space and place.

Same as: ANTHRO 130B

ANTHRO 230D. Spatial Approaches to Social Science. 5 Units.

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

Same as: ANTHRO 130D, POLISCI 241S, URBANST 124

ANTHRO 234. Object Lessons. 5 Units.

Human-object relations in the processes of world making. Objectification and materiality through ethnography, archaeology, material culture studies, and cultural studies. Interpretive connotations around and beyond the object, the unstable terrain of interrelationships between sociality and materiality, and the cultural constitution of objects. Sources include: works by Marx, Hegel, and Mauss; classic Pacific ethnographies of exchange, circulation, alienability, and fetishism; and material culture studies.

Same as: ANTHRO 134

ANTHRO 235. Cultural Studies. 5 Units.

Identity, community, and culture; their interactions and formation.

Same as: ANTHRO 135

ANTHRO 235A. The Anthropology of Security. 3-5 Units.

This seminar begins by outlining the main theoretical and empirical challenges in the areas of surveillance studies and security studies. The seminar provides a space wherein students will be able to discuss these inter-disciplinary areas and develop their own Anthropology-informed perspectives. The seminar then discusses the work of Anthropologists who through their ethnographic and theoretical work have helped developed and important and emergent area: iquest;The Anthropology of Securityquest;.

Areas covered include, inter alia, national security, security and war, biometrics, gated-ness, and environmental and bio-security threats.

Same as: ANTHRO 135A

ANTHRO 236. The Anthropology of Global Supply Chains. 5 Units.

This upper-division undergraduate seminar focuses on recent studies by anthropologists and scholars in related disciplines on global supply chains and consumption practices. The goal of the course is to assess concepts and methods for integrating a cultural analysis of transnational production with a cultural analysis of transnational consumption. We will review ethnographic studies of the production and consumption of commodities linked by transnational and global networks. The class will then pursue collaborative research on the global production, distribution, and consumption of a selected commodity. Prerequisite: junior or senior standing and previous coursework in cultural anthropology or permission of instructor.

Same as: ANTHRO 136

ANTHRO 237. The Politics of Humanitarianism. 5 Units.

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issue generis a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes iquest; or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the iquest;cause of humanityquest;. In the early years of humanitarian intervention, political neutrality was a key principle; it has now come under ever greater analytical and political scrutiny. We will examine the reasons for the politicization and militarization of aid -- be it humanitarian aid in natural disasters or political crises; development programs in the impoverished south (iquest;the Third Worldquest;), or peace-keeping. We will end with a critical exploration of the concept of human rights, humanity, and personhood. The overall methodological aim of the course is to demonstrate what insights an ethnographic approach to the politics, ethics, and aesthetics of humanitarianism can offer.

Same as: ANTHRO 137

ANTHRO 238. Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise. 5 Units.

This course will explore historical as well as current market transformations of medical ethics in different global contexts. We will examine various aspects of the research enterprise, its knowledge-generating and life-saving goals, as well as the societal, cultural, and political influences that make medical research a site of brokering in need of oversight and emergent ethics.nThis seminar will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state, the media, and certain publics in shaping scientific research agendas. We will also examine how structural violence, poverty, global standing, and issues of citizenship also influence issues of consent and just science and medicine.

Same as: ANTHRO 138, CSRE 138

ANTHRO 238A. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice; structured around international military intervention and criminal trials based on international criminal courts; will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 138, AFRICAST 238, ANTHRO 138A

ANTHRO 239. Ethnography of Africa. 5 Units.

The politics of producing knowledge in and about Africa through the genre of ethnography, from the colonial era to the present. The politics of writing and the ethics of social imagination. Sources include novels juxtaposed to ethnographies.

Same as: ANTHRO 139

ANTHRO 240A. Ethnographic Archaeologies. 4-5 Units.

How have ethnographic and archaeological methods been combined in anthropological research? What methodological and theoretical implications do these kinds of projects generate? Seminar topics will include ethnoarchaeology, ethnographies of archaeological practice, public archaeology and heritage ethics. Lecture and discussion.

Same as: ANTHRO 140A, ARCHLGY 137

ANTHRO 241. The State in Africa. 5 Units.

Postcolonial African states in historical and ethnographic context. Focus is on contemporary African states not as failures, but as the products of distinctive regional histories and political rationalities.

ANTHRO 243. Title Social Change in Contemporary China: Modernity and the Middle Kingdom. 4-5 Units.

Over the last twenty years, residents of the People's Republic of China have experienced dramatic changes in nearly every facet of life. This undergraduate seminar introduces students to contemporary China through an examination of various types of social transformation. We will analyze how PRC residents of different backgrounds are confronting such processes as economic liberalization, migration, kinship transformation, sexual commodification, media proliferation, industrialization, and transnationalism? Priority is placed on reading, discussing and assessing research that uses qualitative methods and that situates political economy in dialogue with lived experience.

Same as: ANTHRO 143

ANTHRO 245. Race and Power. 5 Units.

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the construction of race as a literally made phenomenon, where historical, colonial, bodily, market, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race and capital.

Same as: ANTHRO 145, CSRE 145F

ANTHRO 245A. Evolutionary Theory in Archaeology. 3-5 Units.

The ability of scientific evolutionary theory to explain human behavior as represented in the archaeological record. Past attempts to apply evolutionary theory in archaeology are compared to more recent Darwinian efforts, as are current evolutionary approaches to human behavior in related fields. The ontological underpinnings and methodological requirements of a Darwinian archaeology and its potential contribution to archaeology as an explanatory system. (HEF I).

ANTHRO 247. Nature, Culture, Heritage. 5 Units.

Seminar. Shared histories of natural and cultural heritage and their subsequent trajectories into the present. How thought about archaeological sites and natural landscapes have undergone transformations due to factors including indigenous rights, green politics, and international tourism. The development of key ideas including conservation, wilderness, sustainability, indigenous knowledge, non-renewability and diversity. Case studies draw on cultural and natural sites from Africa, the Americas and Australia.

Same as: ANTHRO 147

ANTHRO 248. Health, Politics, and Culture of Modern China. 4-5 Units.

One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China.

Same as: ANTHRO 148

ANTHRO 249. South Asia: History, People, Politics. 5 Units.

The South Asian subcontinent (comprising of India, Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka) is one of the most diverse and densely populated regions in the world and increasingly prominent in new global political and cultural economies. South Asia has also provided the inspiration for cutting edge theories about the colonial state, postcolonial studies, democracy, popular culture, and religious conflict. The course will provide an overview of major historical events and social trends in contemporary South Asia and focus on themes such as gender, religion, caste, migration and movement, new technologies, the urban and rural, the state, and new forms of consumption among others. Thus, the course will give students historically and theoretically informed perspectives on contemporary South Asia, as well as how to apply insights learned to larger debates within the political and social sciences.

Same as: ANTHRO 149

ANTHRO 251. Women, Fertility, and Work. 5 Units.

How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using crosscultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places.

Same as: ANTHRO 151, HUMBIO 148W

ANTHRO 251A. Contemporary Chinese Society Through Independent Documentary Film. 3-5 Units.

An overview of social issues in contemporary China as seen through its emerging independent documentary film movement. Topics covered include representations of history, political power and accountability in the reform era, human rights, urbanization, the environment, homelessness and inequality, sexualities, addiction, and the role of media in society. Each viewing is accompanied by readings in media theory or the anthropological/sociological study of contemporary China. Can be taken with or without research component. Films include English subtitles.

Same as: ANTHRO 151A

ANTHRO 253A. Population and social trends in Japan. 3-5 Units.

Anthropological theories and concepts as applied to Japan. Postwar demographic trends. Delayed marriage. Declining nuclear family. Re-structuring of education and workplace. Problems for the seniors. Foreign laborers shaking fundamentals of Japan. Same as: ANTHRO 153A

ANTHRO 254B. Anthropology of Drugs: Experience, Capitalism, Modernity. 5 Units.

This course examines the significant role of drugs; play in shaping expressions of the self and social life; in the management populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

Same as: ANTHRO 154, CSRE 154

ANTHRO 255. Research Methods in Ecological Anthropology. 5 Units.

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

Same as: ANTHRO 155

ANTHRO 260. Social and Environmental Sustainability: The Costa Rican Case. 3-5 Units.

Seminar focused on issues of tropical sustainability with a particular emphasis on the Osa Peninsula of Costa Rica. Offered in conjunction with the Osa Initiative in the Woodquist; Institute for the Environment, the course highlights issues of human development in the tropics, through such means as agricultural development, ecotourism, conservation efforts, private and indigenous reserves, and mining. The course will draw from diverse disciplines including anthropology, rural sociology, conservation biology, geosciences, history, political science, and journalism. In addition to weekly discussions, students will development a research paper throughout the term which will be presented to a panel of selected Woodquist; Faculty during the final week of the term.

Same as: ANTHRO 160

ANTHRO 260A. Tragedy of the Commons: Human Ecology of Communal Resources. 5 Units.

The tragedy of the commons; is a classic social dilemma; a situation in which individual interests conflict with collective ones; and key to understanding past, present and future environmental degradation. This course surveys a variety of scientific perspectives on the essence of the tragedy: common property resources will ultimately be destroyed by overexploitation. Major themes include the effects of human population density and social organization on the health and management of commons, self-interest versus collective action, and potential solutions to commons problems. Modern and prehistoric case studies are examined from ecological and evolutionary perspectives.

Same as: ANTHRO 160A

ANTHRO 261. Human Behavioral Ecology. 3-5 Units.

Theory, method, and application in anthropology. How theory in behavioral ecology developed to understand animal behavior is applied to questions about human economic decision making in ecological and evolutionary contexts. Topics include decisions about foraging and subsistence, competition and cooperation, mating, and reproduction and parenting.

Same as: ANTHRO 161, HUMBIO 117H

ANTHRO 261A. Human Ecology: Adaptations to Climate and Climate Change. 5 Units.

Humans face essentially the same adaptive challenges as all organisms but are unique for having successfully adapted to virtually every environment on Earth. The resulting diversity of phenotypes and cultures; past and present; is key to understanding how interactions with environments shape the economic, social, and cultural lives of hunter-gatherers, pastoralists and agriculturalists. This course surveys the range of human adaptations from an ecological and evolutionary perspective to understand human adaptive capacity and vulnerability to climate change.

Same as: ANTHRO 161A

ANTHRO 262. Indigenous Peoples and Environmental Problems. 3-5 Units.

The social and cultural consequences of contemporary environmental problems. The impact of market economies, development efforts, and conservation projects on indigenous peoples, emphasizing Latin America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas.

Same as: ANTHRO 162

ANTHRO 263. Conservation and Evolutionary Ecology. 5 Units.

Environmental degradation resulting from human behavior, and what can be done about it. Patterns of interaction between people and environments, and why they vary over time and space. Topics include adaptation and behavior, resource acquisition and utilization, conflicts of interest, collective action problems, conspicuous consumption, waste, land management, and public policy.

Same as: ANTHRO 163

ANTHRO 263A. Endangered Languages and Language Revitalization. 3-4 Units.

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages.

Same as: ANTHRO 163A, LINGUIST 163A, LINGUIST 263, NATIVEAM 163

ANTHRO 264. Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes. 3-5 Units.

This interdisciplinary course explores natural resource extraction from multiple conceptual perspectives. Logging and non-timber resource harvesting practices are examined through ecological dynamics of species and community life histories, natural and anthropogenic disturbance regimes and resilience and recovery to diverse perturbations through alternative stable states. Using a political ecology lens, we then examine historical and current policies and practices aimed to manage terrestrial resource use and extraction: maximum sustained yield, community-based forest management, certification systems, payment for ecosystem services and Reducing Emissions from Deforestation and Degradation (REDD). Through problem sets and lab/field exercises, we employ quantitative ecological measurements and experiments coupled with quantitative and qualitative methods and analyses used to assess socio-economic drivers and ecological impacts. Diverse benefits/costs imparted throughout the supply chain - from extraction to consumer; are explored across temporal and spatial scales with local to global agents. No Prerequisites: course or foundation in Ecology, Community Ecology, and/or Ecosystem Ecology strongly suggested.

Same as: ANTHRO 164

ANTHRO 266. Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness. 3-5 Units.

Seminar. The state, private sector, development agencies, and NGOs in development and conservation of tropical land use. Focus is on the socioeconomic and political drivers of resource extraction and agricultural production. Case studies used to examine the local-to-global context from many disciplines. Are maps and analyses used for gain, visibility, accountability, or contested terrain? How are power dynamics, land use history, state-private sector collusion, and neoliberal policies valued? What are the local and extra-local responses?.

Same as: ANTHRO 166

ANTHRO 268A. Risky Environments: The Nature of Disaster. 5 Units.

This seminar explores topics including environmental movements and countercultures, human agency and geoengineering ecotourism, and indigenous perspectives of changing climates to query how humans view nature; in terms of stability, instability, risk and disaster in the 21st century. Case studies draw upon a broad range of geographical regions including the Arctic, Iceland, Australia, and the Americas. Discussions will draw upon film portrayals and interviews with researchers in addition to readings.

Same as: ANTHRO 168A

ANTHRO 269. The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet. 3-5 Units.

This course is an interdisciplinary approach to understanding human food consumption and nutrition, incorporating biological, evolutionary, ecological and social perspectives. Topics include a broad survey of primate diets and their physiological and behavioral correlates; fossil and archaeological evidence for early human diets; adaptations to dietary shifts since the Neolithic; infant and early child feeding practices and their role in shaping human social arrangements, metabolic syndrome, food security, food taboos; the origins of spices; cultural diversity in the social uses and meanings of food and the sharing of food; gathering, hunting and locavorism as high hipster cuisine. Emphasis is on understanding the diversity of human foodways through time and space: how biology, culture, and ecology interact to shape the food we eat, and how the food we eat shapes us.

Same as: ANTHRO 169

ANTHRO 270. Australian Ecosystems: Human Dimensions and Environmental Dynamics. 3 Units.

This cross-disciplinary course surveys the history and prehistory of human ecological dynamics in Australia, drawing on geology, climatology, archaeology, geography, ecology and anthropology to understand the mutual dynamic relationships between the continent and its inhabitants. Topics include anthropogenic fire and fire ecology, animal extinctions, aridity and climate variability, colonization and spread of *Homo sapiens*, invasive species interactions, changes in human subsistence and mobility throughout the Pleistocene and Holocene as read through the archaeological record, the totemic geography and social organization of Aboriginal people at the time of European contact, the ecological and geographical aspects of the "Dreamtime", and contemporary issues of policy relative to Aboriginal land tenure and management.

Same as: ANTHRO 170, EARTHSSYS 172

ANTHRO 271. The Biology and Evolution of Language. 4-5 Units.

Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 171, HUMBIO 145L

ANTHRO 272. Seminar on Cultural Evolution and Coevolution. 3-5 Units.

Upper division/graduate seminar on recent approaches to the study of cultural evolution and coevolution. Critical evaluation of Darwinian and non-Darwinian theories, with special attention to the interplay of culture, genes, environment and society. Students will undertake projects of their own design to review, test, or improve current theoretical formulations. Prerequisite: a university-level course in evolution, ecology, or human behavioral biology.

Same as: ANTHRO 172

ANTHRO 274. Beginnings of Social Complexity. 5 Units.

Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archaeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America. (HEF II; DA-B).

Same as: ANTHRO 174

ANTHRO 275. Human Skeletal Anatomy. 5 Units.

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, BIO 174, BIO 274, HUMBIO 180

ANTHRO 276. Cultures, Minds, and Medicine. 1 Unit.

This workshop aims to bring together scholars from the social sciences, humanities, medicine and bio-science and technology to explore the ways that health and illness are made through complex social forces. We aim for informal, interactive sessions, full of debate and good will. Dates of meetings will be listed in the notes section in the time schedule.

Same as: ANTHRO 176

ANTHRO 277. Environmental Change and Emerging Infectious Diseases. 3-5 Units.

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 177, HUMBIO 114

ANTHRO 278. Evolution and Conservation in Galapagos. 5 Units.

The contribution of research in the Galapagos Islands to our current understanding of evolution and conservation. Writings from Darwin to Dawkins, as they reveal patterns and processes of evolution including selection, adaptation, speciation, and coevolution. Current conservation strategies in the archipelago, and urgent measures needed today before unique species and adaptations are lost.

Same as: ANTHRO 178

ANTHRO 279A. Health, Illness, and Healing in South Asia. 5 Units.

This course has three related goals pertinent to medicine and healing in South Asia. The first is to understand the experiences of illness, and therapy in ordinary South Asian communities. How do social and economic inequality, religious commitments, available healing traditions, and community and family contexts shape the experience of illness and healing? The second goal is to think about South Asian medical systems using a broad historical perspective. How had biomedicine been used during the colonial period to manage the health of native populations? What is the legacy of this colonial history on current practices? What happens when South Asian medical traditions (such as Ayurveda) become global? Third, we will explore crucial health problems in South Asia from the perspective of medical anthropology. Possible topics for the third portion of the course include: child birth and maternal health, sex-selection technologies, malnutrition, metabolic diseases, the selling of organs, medical tourism, tuberculosis, HIV, suicide, and schizophrenia.

Same as: ANTHRO 179A

ANTHRO 282. Medical Anthropology. 4 Units.

Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

Same as: ANTHRO 82, HUMBIO 176A

ANTHRO 282A. Down and Out: Marginal Lives and Institutional Technologies. 5 Units.

This course examines the neglect and management of socially marginalized persons including the mentally ill, youth runaways, child wards of the state, drug addicts and prisoners. In this course, we will approach the concept of marginality by investigating the spaces and institutions of decay, neglect and rehabilitation to which unwanted and indigent individuals are relegated. Readings are focused on qualitative research conducted within institutions of health, welfare, and reform. There will be two comparative public mental health sections in this course: one focused on South Asia and the second on Africa. This course is relevant for students interested in medical anthropology, applied anthropology, public health policy, or clinical careers in medicine, psychology, or social work.

Same as: ANTHRO 182A

ANTHRO 283. Ecology, Evolution, and Human Health. 3-5 Units.

Human ecology, human environments, adaptation and plasticity, and their relationship to health and well-being. Comparative context. Topics include human population history, subsistence ecology, demography, reproductive decision making, migration, infectious disease, risk management, and social inequalities. Particular attention will be paid to small-scale subsistence populations. Small-scale societies demonstrate an enormous range of variation in both environmental challenges faced and adaptations thereto. The process of human adaptation cannot be understood in the absence of a grounding in this range of challenge and adaptation.

ANTHRO 283B. Human Mobility and Adaptability. 5 Units.

Mobility, whether in the form of seasonal or permanent migration, is an ancient practice necessary for many subsistence strategies, including hunting-and-gathering and pastoralism. Many new forms of mobility have emerged and now it is nearly impossible to consider a patch of human society that is not engaged in or directly impacted by habitual, patterned geographic mobility. Today, almost everywhere in the world, people can get farther, faster; urbanization, environmental degradation, and civil unrest are driving groups of people who do not have a cultural tradition of nomadic migration to adopt a mobile lifestyle; sometimes permanently, sometimes temporarily; in search of new economic or resource opportunities. In this seminar course, we will explore modern patterns of human mobility and migration as adaptive strategies for predictably and unpredictably changing environments. Using a framework of biological and cultural adaptation, we will discuss the major types of current human mobility (e.g. nomadism, immigration, migrant labor, displacement) and how they influence and are influenced by social systems, resource access, and health.

Same as: ANTHRO 183B

ANTHRO 285. Medical Anthropology of Contemporary Africa. 5 Units.

In this course we will examine the place of Africa in global health discourses while reading in-depth histories and ethnographies of the varied causes and consequences of some of the most difficult problems facing African countries today. We will study the effects of colonialism and conflict on health, explore the military and humanitarian connections in the fight against HIV/AIDS, weigh the risks and benefits of population genetic studies on African populations, examine biomedical interventions on, and erasures of, local health problems, and query the role of violence, memory, insecurity, and power in daily life on the continent.

Same as: ANTHRO 185

ANTHRO 286. Culture and Madness. 5 Units.

'Madness' lends insight into the construction of the normal and abnormal; the boundaries of reason and unreason; the epistemological relation of mind and body, and the management of difference and disease. Taking an interdisciplinary perspective, this course explores the fundamental questions madness poses to subjectivity, culture and modernity.

Same as: ANTHRO 186

ANTHRO 293B. Master's Thesis Writing Seminar. 2-4 Units.

May be repeated for credit.

ANTHRO 298B. Digital Methods in Archaeology. 3-5 Units.

This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods.

Same as: ANTHRO 98B, ARCHLGY 98B

ANTHRO 299. Senior and Master's Paper Writing Workshop. 1-2 Unit.

Techniques of interpreting data, organizing bibliographic materials, writing, editing and revising. Preparation of papers for conferences and publications in anthropology. Seniors register for 199; master's students register for 299. Same as: ANTHRO 199

ANTHRO 300. Reading Theory Through Ethnography. 5 Units.

Required of and restricted to first-year ANTHRO Ph.D. students. Focus is on contemporary ethnography and related cultural and social theories generated by texts. Topics include agency, resistance, and identity formation, and discourse analysis. Prerequisite: consent of instructor.

ANTHRO 301. History of Anthropological Theory, Culture and Society. 5 Units.

Required of Anthropology Ph.D. students. The history of cultural and social anthropology in relation to historical and national contexts and key theoretical and methodological issues as these inform contemporary theory and practices of the discipline. Enrollment limited to 15. Prerequisite: consent of instructor.

ANTHRO 301A. Foundations of Social Theory. 5 Units.

The purpose of this course is to introduce key themes in social theory - the social, the modern subject, reason, autonomy, civility, interests, exchange, morality, life, the senses - through a reading of classic texts from Descartes up to psychoanalysis and phenomenology. Each section has original texts, commentaries, and background readings that place these texts in their deeper historical setting. Many of these commentaries trace how practical theories of 'lower' or minor selves - the subject people of the colonies, slaves, and other - were integral to the very development of ideas of the modern, autonomous and reasonable self in the western world. Prerequisite, by instructor consent.

ANTHRO 302. History of Anthropological Theory, Ecology and Environment. 5 Units.

Evolutionary and ecological theory from the 19th century to present. Theory and concepts from evolution and ecology, emphasizing anthropological applications. Evolutionary theories of human behavior, culture, and societies. Ecological theory behind carrying capacity, sustainable yield, and population growth. Emphasis is on tools of analysis and formulating research questions in anthropology today. Upper division undergrads require consent of instructor.

ANTHRO 303. Introduction to Archaeological Theory. 5 Units.

The history of archaeological thought emphasizing recent debates. Evolutionary theories, behavioral archaeology, processual and cognitive archaeology, and approaches termed feminist and post-processual archaeology in the context of wider debate in adjacent disciplines. The application and integration of theory on archaeological problems and issues. Prerequisite: consent of instructor.

ANTHRO 304. Data Analysis for Quantitative Research. 5 Units.

Univariate, multivariate, and graphical methods used for analyzing quantitative data in anthropological research. Archaeological and paleobiological examples. Recommended: algebra. Prerequisite: consent of instructor.

ANTHRO 305. Research Methods in Ecological Anthropology. 5 Units.

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

ANTHRO 306. Anthropological Research Methods. 5 Units.

Required of ANTHRO Ph.D. students; open to all graduate students. Research methods and modes of evidence building in ethnographic research. Prerequisite: consent of instructor.

ANTHRO 307. Archaeological Methods. 5 Units.

Methodological aspects of field and laboratory practice from traditional archaeological methods to the latest interdisciplinary analytical techniques. The nature of archaeological data and inference; interpretive potential of these techniques. Prerequisite: consent of instructor.

ANTHRO 308. Proposal Writing Seminar in Cultural and Social Anthropology. 5 Units.

Required of second-year Ph.D. students in the culture and society track. The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor.

ANTHRO 308A. Proposal Writing Seminar in Archaeology. 5 Units.

Required of second-year Ph.D. students in the archaeology track. The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor.

ANTHRO 309. Advanced Evolutionary Theory in Anthropological Sciences. 5 Units.

History of evolutionary theory from the 19th century to present, emphasizing anthropological applications. Theory and concept in evolutionary biology; evolutionary theories of culture; and interactions of genetic, social, and cultural evolution and their implications. Emphasis is on tools of analysis and the value of evolutionary thinking for formulating research questions in anthropology today. Prerequisite: graduate standing or consent of instructor. (HEF II, III).

ANTHRO 310C. Intersections. 5 Units.

Themes of materiality and visuality, aesthetic and other forms of cultural production, and the meanings of creativity and convention. Ethnographic and archaeological material and case studies from worldwide cultural contexts. Prerequisite: consent of instructor.

ANTHRO 310G. Introduction to Graduate Studies. 2 Units.

Required graduate seminar. The history of anthropological theory and key theoretical and methodological issues of the discipline. Prerequisite: consent of instructor.

ANTHRO 311. Ethnographic Writing. 3-5 Units.

For graduate students writing or planning to write a dissertation using ethnographic methods. The choices made by the authors of ethnographies in constructing an argument, using data and speaking to an audience of readers. Readings include chapters written by class members currently writing dissertations. Prerequisite: consent of instructor.

ANTHRO 311G. Introduction to Culture and Society Graduate Studies in Anthropology. 2 Units.

Required graduate seminar for CS track. The history of anthropological theory and key theoretical and methodological issues in cultural anthropology. Prerequisites: this course is open only to Ph.D. students in anthropology or by permission of the instructor.

ANTHRO 312. Writing Across Audiences: Styles and Methods. 5 Units.

This course examines the way anthropologists and others write to different audiences. What do you need to do communicate to a mainstream anthropology audience? How does that change when you write an editorial or place something in a popular venue? When you try to capture a non-anthropological medical audience? What methods might you consider adding to enable that cross-talk? We will examine a series of examples of people who have written across. Prerequisite: consent of instructor.

ANTHRO 313. Anthropology of Neoliberalism. 5 Units.

How is the recent worldwide restructuring under the name neoliberalism understood as a social, cultural, and economic phenomenon? Focus is on interrogation of analytic categories, and ethnographic explorations of social and political processes. Prerequisite: graduate standing or consent of instructor.

ANTHRO 316. Politics of the Mass Subject. 5 Units.

Harbinger of democracy or arbiter of tyrannous rule? Source of collective agency or threat to political order? Over the past century, notions of the masses, the multitudes, and the people have served as volatile focal points for political theory and for institutions of governance. Drawing on historical, ethnographic, and theoretical readings, this course explores how tensions haunting these concepts continue to animate, as much as beleaguer, contemporary discussions of democratic citizenship and political modernity.

ANTHRO 317. Colonial Archives and Archaeology: Models and Methods of Analysis. 5 Units.

This course details the methodological challenges associated with using primary historical documents, ethnographic methods and sources and archaeological data. How do archaeologists deal with multiple sources of data, primary texts (translated and original) and ethnographic materials? This course examines archaeological monographs as models for individual student projects leading to dissertation research and publishing beyond the dissertation. Students will be required to present materials, research questions and primary source materials to the class in order to expand our understanding of the challenges and insights provided by archival and archaeological studies.

ANTHRO 318. Democracy and Political Authority. 5 Units.

Democracy is commonly defined in formalist terms as a form of government (involving the consent of the governed) and a procedure of governance (involving the rule of law). In place of a formalist definition, this course examines democracy as a historical and discursive form. In what ways have the rights of citizenship for some been premised on the domination of others (workers, women, the colonized, etc.)? What forms of violence are not only tolerated as practical necessity in the contemporary order of democratic states but sanctioned as morally just? What mechanisms of political authority operate by defining the boundaries between the tolerable and the intolerable, between citizenly belonging and terrorism; in short, between democracy and its others (e.g., an arbitrary despot, a feudal economy, a religious fundamentalism)? These questions require urgent interrogation in the present day: the past thirty years have witnessed a virtual explosion of new constitutions proclaiming democratic sovereignty across the world. What forms of global power and institutional domination are constitutive of the contemporary era of liberty, freedom, and equality? Readings are drawn from a variety of disciplines, including anthropology, political theory, and political philosophy. Prerequisite: consent of instructor.

ANTHRO 319. South Asia: History, People, Politics. 5 Units.

The South Asian subcontinent (comprising of India, Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka) is one of the most diverse and densely populated regions in the world and increasingly prominent in new global political and cultural economies. South Asia has also provided the inspiration for cutting edge theories about the colonial state, postcolonial studies, democracy, popular culture, and religious conflict. The course will provide an overview of major historical events and social trends in contemporary South Asia and focus on themes such as gender, religion, caste, migration and movement, new technologies, the urban and rural, the state, and new forms of consumption among others. Thus, the course will give students historically and theoretically informed perspectives on contemporary South Asia, as well as how to apply insights learned to larger debates within the political and social sciences. Prerequisite: consent of instructor.

ANTHRO 320A. Race, Ethnicity, and Language. 3-4 Units.

This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations participate in similar, yet different, ways of "doing race" through language, interaction and culture. Readings draw heavily from perspectives in (linguistic) anthropology and sociolinguistics. Prerequisite: consent of instructor.

Same as: EDUC 389X, LINGUIST 253

ANTHRO 321. Reading Marx, Reading Weber. 5 Units.

This advanced graduate seminar is devoted to a critical reading of selected writings by two nineteenth century social theorists who continue to shape anthropology and social analysis more broadly. Prerequisites: Graduate standing in Anthropology or permission of the instructor. Previous graduate level coursework in cultural or social anthropology, social theory or cultural studies is required. No auditing is permitted. Maximum enrollment 12.

ANTHRO 321A. Anthropology and Literature: Problems of Representation, Power, and Textuality. 5 Units.

How are literary and social scientific forms of cultural description, evocation, and interpretation related? The seminar reads classic texts as well as recent experiments, addressing issues of genre, rhetoric, epistemology, translation, authority, and collaboration. The emphasis is on writing as a situated practice; embodied, relational, and historically circumscribed. Authors may include Malinowski, Mead, Benedict, Leacock, Vi-Strauss, Geertz, Taussig, Leiris, Conrad, Achebe, Said, Barthes, Kroeber, Le Guin, and selected contemporary ethnographies. Examples from film, visual culture, and performance art may also be included.

Same as: COMPLIT 321B

ANTHRO 322. From Biopolitics to Necropolitics and Beyond. 5 Units.

Scholarship produced and informed by Michel Foucault. Focus is on the final period of Foucault's life; how his discussions of biopolitics, subjectification, governmentality, and death have served as touchstones for recent empirical research. Key interventions initially made under these rubrics; how anthropologists and others have applied, challenged, and extended them. Prerequisite: consent of instructor.

ANTHRO 324. Political Anthropology. 5 Units.

An anthropological approach to politics through bringing anthropological ways of thinking and modes of analysis to bear on key presuppositions of modern Western political thought. Ideas of rights, the individual, society, liberty, democracy, equality, and solidarity; ethnographic accounts used to identify the limits of conventional analytical approaches and to document the forms of politics that such approaches either ignore or misunderstand. Prerequisite: consent of instructor.

ANTHRO 326. Postcolonial and Indigenous Archaeologies. 5 Units.

The role of postcolonial and Indigenous archaeologies as emergent disciplinary activities within contemporary society. Community based archaeologies; the roles of oral history, landscape, and memory; archaeology as political action; and history in archaeological projects. The emergence of Indigenous archaeology within N. America in relation to limitations imposed by processual or new archaeology; and NAGPRA, Kennewick, essentialism, and terminal narratives within this context. Prerequisite: consent of instructor.

ANTHRO 327. Language and Political Economy. 5 Units.

Theories of language: Saussure, Jakobson, Hymes, Marx, Foucault, Butler, and Derrida. The theorization of language in its linkages to power, social relations, and history. Prerequisites: Linguistics or Anthropology course work. Prerequisite: consent of instructor.

ANTHRO 328. Visual Culture. 5 Units.

The politics of visuality, social imagination, and the ethics of visual production and consumption in the current moment. Sources include anthropology, art history, and philosophy. Prerequisite: consent of instructor.

ANTHRO 331. The Anthropology of Technology. 5 Units.

Iconic discipline-building works of the last three decades; readings that lay out and intervene in contemporary debates. Prerequisite: consent of instructor.

ANTHRO 332. Transformative Design. 3-5 Units.

Project-based. How interactive technologies can be designed to encourage behavioral transformation. Topics such as self-efficacy, social support, and mechanism of cultural change in domains such as weight-loss, energy conservation, or safe driving. Lab familiarizes students with hardware and software tools for interaction prototyping. Students teams create functional prototypes for self-selected problem domains. Prerequisite: consent of instructor. Design Institute class; see <http://dschool.stanford.edu>.

Same as: ENGR 231

ANTHRO 332A. The Anthropology of Heritage: Concepts, Contexts and Critique. 3-5 Units.

This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice.

Same as: ARCHLGY 132, ARCHLGY 232, ARCHLGY 332

ANTHRO 333. Anthropologies of Evidence. 5 Units.

Drawing on literature in Anthropology and Science and Technology Studies, this course will examine what kinds of artifacts and arguments count as evidence in intellectual and scientific debate.

ANTHRO 333A. The Cultural Politics of Ambiguity. 5 Units.

Contemporary conceptual approaches to understanding the politics and production of certainty, ambiguity, and doubt. The seemingly ambiguous nature of the science of industrial pollution and contamination exonerate corporate and government polluters from rising rates of cancer, while the science of liberal economic models seems to create no alternative to massive economic subsidies of the financial sector. How culpability, exoneration, transformative action, institutional stasis, and political rely on the production of certainty, ambiguity, and doubt. Prerequisite: consent of instructor.

ANTHRO 334. Trauma and Healing. 5 Units.

This course considers class and recent work on culture and psychiatry with an emphasis on trauma. We consider work on the main diagnostic categories like depression and schizophrenia, but also the work on dissociation, war combat, PTSD, and psychosis.

ANTHRO 335A. Animism and Alter-Native Modernities. 5 Units.

For many years indigenous knowledges were treated as a field of research for anthropologists and as "mistaken epistemologies," i. e., unscientific and irrational folklore and childish worldviews. This old view of animism was a product of the evolutionist and anthropocentric worldview of the Enlightenment. However within the framework of ecological humanities, current interest in posthumanism, postsecularism and discussions on building altermodernity (Michael Hardt and Antonio Negri), indigenous thought is used to critique modern epistemology and develop an alternative to the Western worldview. Treating native thought as an equivalent to Western knowledge is presented as a decolonizing and liberating practice. The term alter-native modernities as response to the challenges of Euromodernity and suggests modernities that might emerge out of indigenous ways of being in the world. Comparison between literature on indigenous cultures from Latin America and from Russia (animism in Amazonia and Siberia). Following recent works by anthropologists and archaeologists such as Nurit Bird-Rose, Philippe Descola, Graham Harvey, Tim Ingold and Viveiros de Castro, new animism is treated as an alternative (relational) ontology that allows rethinking the problem of matter and agency, goes beyond human exceptionalism and embraces non-humans. Topics include: alternative and alter-native modernities; Jean Piaget's theory of childhood animism; problem of anthropomorphism and personification; indigenous knowledge and the problem of epistemic violence; vitalist materialism (Jane Bennett, Rosi Braidotti); connectedness as the principle of life (relational epistemologies and ontologies); non-human agency (Bruno Latour).

Same as: FRENCH 335A, REES 335A

ANTHRO 336. Anthropology of Rights. 5 Units.

Ideas of rights at the center of contemporary politics around the world. An anthropological perspective on how rights are invoked, claimed, and translated into institutional policies in ethnographic cases. The limitations of liberal notions of rights and innovative forms of politics emerging within and against rights talk. Prerequisite: consent of instructor.

ANTHRO 337. The Politics of Humanitarianism. 5 Units.

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issues a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes iquest; or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the iquest;cause of humanityquest;. In the early years of humanitarian intervention, political neutrality was a key principle; it has now come under ever greater analytical and political scrutiny. We will examine the reasons for the politicization and militarization of aid -- be it humanitarian aid in natural disasters or political crises; development programs in the impoverished south (iquest;the Third Worldquest;), or peace-keeping. We will end with a critical exploration of the concept of human rights, humanity, and personhood. The overall methodological aim of the course is to demonstrate what insights an ethnographic approach to the politics, ethics, and aesthetics of humanitarianism can offer.

ANTHRO 338. Anthropological Approaches to Religion. 5 Units.**ANTHRO 339. Anthropology of Religion. 5 Units.**

This course presents classic and contemporary work on the anthropology of religion: Durkheim *Elementary Forms of the Religious Life*; Levy-Bruhl; *Primitive Mentality*; Douglas *Purity and Danger*; Evans Pritchard *Nuer Religion*; and recent ethnographies/scholarly work by Robbins, Keane, Keller, Boyer, Barrett, and others.

ANTHRO 339A. Technologies of Extinctions: Ecocides and Genocides. 5 Units.

This course will explore the relationship between history, ecological evolution and mass killing in the age of humanly caused species extinction. It will explore the universalization of the notion of the Jewish Holocaust, its use to integrate into genocide studies the Native American "spiritual" holocaust, the Japanese nuclear holocaust and the Rwandan genocide, and the ethical dilemmas posed by the ideas of biotic, animal and ecological holocausts. Anthropology and history of genocides and extinctions as well as posthumanist, multispecies theories will provide theoretical frames for the course.

Same as: FRENCH 339A

ANTHRO 341. The Archaeology of Religious Crusading in Medieval Europe. 5 Units.

This course will present a chronologically framed outline of the three main regions that witnessed the greatest impact of the crusading period. Commencing with the initial capture of Jerusalem and the subsequent establishment of a crusader kingdom in the Middle East in AD1099, till its eventual end in 1291, this will be followed by the `pagan conversionsquest; of the Northern Baltic. Centred on Poland (Prussia) and Latvia (Livonia) from the 13th to 15th c., this example will also be compared with neighbouring Lithuania, which never fell under the political hegemony of the Monastic Orders. Finally, the course covers the Iberian case, where the Reconquista iquest; or `reconquestquest; - of lands from Muslim groups concluded with the fall of Granada and the unification of Spain in 1492. Through archaeological and historical evidence, the materials, technologies and ideas of the crusading groups will be compared and contrasted, with a particularly emphasis on bioarchaeological datasets. Ultimately, the course deals with the economic, social and practical mechanisms used by the religious orders to `colonisequest;, once the initial conquest had been achieved. Prerequisite: graduate standing or consent of instructor.

ANTHRO 343. Culture as Commodity. 5 Units.

Focus is on theories of commodification, interests in tourism, national cultures as marketable objects, and how identities are constituted through production and consumption. The formation of global style and taste. Prerequisite: consent of instructor.

ANTHRO 344. Graphic Medicine. 5 Units.

In this course students will study medical cultures through visual communication ranging from x-rays and PET scans to graphic novels. Course will also include literature on visual theory.

ANTHRO 345. New Visions in Medical Anthropology. 5 Units.

Recent experimental histories of the field. Emphasis is on how, working within anthropology's classic format, the ethnographic monograph, authors have innovatively responded to the challenges of representing amorphous, unspoken, and often violent relationships between the body and social change. The authors' expository techniques, and how they engage and extend theoretical debate. How to assess works within medical anthropology and its allied fields. Prerequisite: consent of instructor.

ANTHRO 346. The Social Imagination. 5 Units.

The imagination as such has not been an accustomed object of ethnographic fieldwork or theoretical debate in anthropology. This seminar consists of a cluster of thematic explorations including: the spatial imagination of states; the imagination of race, colonialism, and domination; the social imagination of evil and of the good; and conceptualizations of the creative imagination.

ANTHRO 346A. Sexuality Studies in Anthropology. 5 Units.

Current research on sexuality from perspectives including paleoanthropology, archaeology, ethnography, and linguistic anthropology. Readings paired with case studies that explore theoretical and methodological issues. Prerequisite: consent of instructor.

ANTHRO 347. Religion and Modernity. 5 Units.

What role has the category of religion played in the development of the modern state, both colonial and national? How have central concepts of liberal political thought, such as freedom, progress, and history, depended on certain normative ideas of religion? Through various genealogical, historical, and ethnographic inquiries, this course examines how the category of religion has both subtended and disturbed formations of colonial and post-colonial modernity.

Same as: RELIGST 332X

ANTHRO 348. Representing Medicine. 5 Units.

The seminar will offer the opportunity to discuss the recent work of a series of 9 scholars known for their innovation in writing and research. The seminar will offer professional networking as well as the opportunity to engage authors in questions of writing, approaches to fieldwork, strategies for career advancement, and brainstorming on how to structure relevant arguments. Prerequisite: graduate standing or consent of instructor.

ANTHRO 349. Anthropology of Capitalism. 5 Units.

This advanced graduate seminar explores capitalism as an historically-situated and culturally-mediated articulation of practices rather than as an economic system or social structure governed by an internal logic. It draws on poststructural theories of culture, society and subjectivity to investigate the processes through which diverse capitalist practices are produced. Prerequisite: Graduate standing in Anthropology or permission of the instructor. Previous graduate level coursework in cultural anthropology, social theory or cultural studies is required. No auditing is permitted. Enrollment limited to 12.

ANTHRO 350. Topics in Linguistic Anthropology. 5 Units.

Reading seminar; restricted to Anthropology graduate students. The anthropology of language and semiotics. Focus is on the limits of textualism, and alternative semiotic and epistemic bases for theorizing language and representation. No linguistic anthropology course work required.

ANTHRO 352. Foucault: The Question of Method. 5 Units.

Foucault as methodological exemplar for historical and social research. Emphasis is on his historical studies of clinical medicine, prisons, and sexuality, and on applying his methods to empirical studies of topics such as colonialism, race, and liberal governmental rationality.

ANTHRO 353. Landscape. 5 Units.

This seminar offers an interdisciplinary approach to the study of landscape, noting the various processes and projects that have help create them. Readings draw together a broad range of theoretical approaches that are attentive to human-non-human interactions and the overlapping and divergent spatial and temporal questions of the exchanges between landscapes and humans. The readings will also draw attention to representational and non-representational ways that material and symbolic aspects of landscapes help constitute the making of place. The aim of the seminar is to explore the various methodologies for what they offer for the study of place.

ANTHRO 355. Cities in Global Perspective. 5 Units.

Interdisciplinary approach to examining global cities. The concept of the global city, and the interdependent processes that help produce urban spaces. Situating the transformation of urban spaces within globalization and its differential effects; current explanatory frameworks that pay attention to multiple scales of spatial and economic articulation. Prerequisite: graduate standing. Prerequisite: consent of instructor.

ANTHRO 356. The Anthropology of Development. 5 Units.

Multidisciplinary. Topics vary annually. Areas include Africa, S. Asia, and Latin America. Prerequisite: consent of instructor.

ANTHRO 357. Other Minds: Puzzles in Psychiatric and Psychological Anthropology. 5 Units.

Problems in the way anthropologists explore other minds anthropologically and the ways in which anthropologists seek to understand the models of other minds held by the people observed. Topics include theory of mind, witchcraft, belief, empathy, psychosis, trauma, Freud, Vygotsky, and cognitive dissonance. Prerequisite: consent of instructor. Under grads cannot take this class without permission of the instructor.

ANTHRO 358. Anthropology and the Limit of Experience. 5 Units.

In this course, we will examine the concept of the limit; in relation to questions of experience. Taking an interdisciplinary perspective, we will explore how the limit (as border, threshold, other, transgression, liminality, etc.) frames and disrupts discourses of experience in ethnography, philosophy and literature.

ANTHRO 359. Copies, Collections, and Commodities. 5 Units.

In this class we will grapple with multiple questions that arise with reproduction. On the one hand, reproducibility is good: we want generic drugs to work as well as the originals, we want trial subjects to adequately stand in for the people likely to be having a treatment, and we want a cartographic map to describe the landscape that unfolds before us. On the other hand, the copy threatens the value the object it is meant to imitate or represent, and to take on a life of its own. A series of classic and new ethnographies will be organized around these issues.

ANTHRO 360. Social Structure and Social Networks. 5 Units.

In this course, we will explore social network analysis, a set of methods and theories used in the analysis of social structure. The fundamental conceit underlying social network analysis is that social structure emerges from relationships between individuals. We will therefore concentrate in particular on the measurement of relationships, emphasizing especially practical methodology for anthropological fieldwork. This is a somewhat unusual course because of its focus on social network research coming out of anthropological and ethological traditions. While most current practitioners of social network analysis are (probably) sociologists, many of both the methodological antecedents and theoretical justifications for the field can be found in these two traditions. A major goal of this course is to understand how the methods and perspectives of social network analysis can be usefully incorporated into contemporary approaches to ethnography and other anthropological modes of investigation. Prerequisite: graduate standing or consent of instructor.

ANTHRO 361. Life and Death in Contemporary Latin America: An Anthropological Inquiry. 5 Units.

This seminar explores life and death in contemporary Latin America. We will address anthropological understanding of the role of colonialism, migration, violence, urbanization, democratic transition and neoliberalism as they configure the experience of, and threshold between, vital and deadly processes. This is not a standard survey course, covering the region as a whole however. Instead, we will critically engage several recent ethnographies that explore, for example: the politics and practices of memory; border thinking and living; the political economy of death and desire; state violence and social movements; the relationship between the laboring city and body. We will supplement ethnographies with contemporary Latin American critical theory, film, and literary texts. Prerequisite: consent of instructor.

ANTHRO 362. Human Spatial Dynamics: Seminar in Communicating Contemporary Science. 5 Units.

This seminar is designed to bring together all students and faculty currently working on issues related to human use of land and spatially defined resources. The focus is to provide a forum for reporting on recent results and question development, providing students with vital skills in designing and communicating the results of research. Under grads by permission of instructor.

ANTHRO 362A. Introduction to Human Evolution, Ecology, Genetics, and Culture. 5 Units.

Themes and topics of lasting heuristic value in the anthropological sciences. Combines the lecture content of 2A and 2B with a discussion section for graduate students. Must be taken in the Autumn Quarter of a student's first year in the graduate program.

ANTHRO 363. Demography and Life History Theory. 5 Units.

Problems in demography and theoretical population biology applied to human systems. Emphasis is on establishing relationships between models in theoretical population biology and empirical demographic methodology. Topics include philosophy of models and model building, population dynamics, stable population theory, species interactions in human ecology, models of infectious diseases and their control, cultural evolution. Prerequisites: HUMBIO 137 or consent of instructor.

ANTHRO 364. EcoGroup: Current Topics in Ecological, Evolutionary, and Environmental Anthropology. 2-5 Units.

Seminar; restricted to graduate students. Topics vary with instructor. How to ask appropriate questions, how to derive research hypotheses from theory, how to design methodologies for testing hypotheses, and how to present results by reading and critiquing key contemporary papers in the field. Ph.D. students enrolling in this course to fulfill the department review course requirement must enroll in 5 units. Graduate students enrolling in this course to participate in a topical forum may enroll in 2 units. Course may be repeated for 2 units. Prerequisites: by consent of instructor.

ANTHRO 364A. EcoGroup: Problems in Ecological and Evolutionary Anthropology. 2-5 Units.

Seminar; restricted to graduate students. Topics vary with instructor. How to ask appropriate questions, how to derive research hypotheses from theory, how to design methodologies for testing hypotheses, and how to present results by reading and critiquing key contemporary papers in the field. Ph.D. students enrolling in this course to fulfill the department review course requirement must enroll in 5 units. Graduate students enrolling in this course to participate in a topical forum may enroll in 2 units. Course may be repeated for 2 units. Prerequisites: by consent of instructor.

ANTHRO 365. The Theory of the Modern Subject. 5 Units.

This course traces the emergence of a coherent theory of the modern subject through readings of philosophical works and social theory from 18th century to the 20th century. Prerequisite: graduate standing or consent of instructor.

ANTHRO 366. Material Semiotics. 5 Units.

This seminar will focus on the emerging body of literature on the materiality of the production, circulation, and mediation of paperwork as constitutive of modern forms of governance. We will discuss specific genres of paperwork; notes, memos, files, documents, as well as archives and other mnemonic technologies; both as cultural practices and reflexive objects, and examine how they produce modern social epistemologies of accountability, evidence, the fact, and truth in the fields of law, business, and public administration, as well as in civil society generally. Readings will include works by Max Weber, Bruno Latour, Jacques Derrida, Michel Foucault, Cornelia Vismann, Ann Stoler, and others. Prerequisite: graduate standing or consent of instructor.

ANTHRO 367. The Anthropology of Science: Global Politics and Laboratory Life. 5 Units.

Science and technology are important cultural products that often dramatically reorganize various aspects of human life. In this course we will explore how recent innovations in the life sciences and biomedicine may reconfigure crucial elements of social institutions, lend new structures to identity politics, and often change the way we interact with and conceive of nature. We will examine these issues in various global settings to explore how everyday politics shape politics of life in different locales.

ANTHRO 368. Dynamics of Coupled Human-Natural Systems. 5 Units.

This is a graduate research seminar on the interdisciplinary approach to the study of the dynamics of what is known as coupled human-natural systems. We will take a critical perspective on such systems, asking to what extent the idea of coupling of discrete subsystems is intellectually profitable and what defines a human-natural system? We will explore concepts such as coupling, nonlinearity, threshold behavior, feedback, complexity, resilience, and catastrophes. Case studies will be drawn from the literature on human ecology, population dynamics, disease ecology, and social dynamics. Emphasis will be on developing a working knowledge of mathematical and computational models of coupled systems embedded within a rigorous empirical framework of biosocial data collection.

ANTHRO 369. Advanced Topics in Human Behavioral. 2-5 Units.

Course covers a variety of advanced topics which rotate annually, such as: ownership and egalitarianism, the integration of landscape and behavioral ecology, conservation and indigenous subsistence, or fertility and demography. Course may be repeated for credit when topics change.

ANTHRO 370. Advanced Theory and Method in Historical Archaeology. 5 Units.

Current debates about theory and method. Prerequisite: consent of instructor.

ANTHRO 371. Proposal Writing for Archaeologists. 3 Units.

The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor. Same as: ARCHLGY 371

ANTHRO 372. Urban Ecologies. 5 Units.

At the intersections of urbanism and environmental studies, political ecology, postcolonial theory and the new materialism, new fields are in formation. This seminar explores scholarship that connects cities with countryside through questions of resources and infrastructures. We will consider questions of inequality, access and community as well as unexpected urban ecologies.

ANTHRO 373. Things: An Archaeology of the Relationships Between Humans and Things. 5 Units.

This course examines a variety of approaches that claim to explore the relationships between humans and things. Some of the approaches include Marx and material culture studies; Heidegger; cognitive and phenomenological; Actor Network Theory. But there is a need also to examine behavioral and ecological and Darwinian approaches. Many of these approaches do not adequately deal with the physicality of things as objects and there is a need to seek a way to incorporate such aspects of things into social theory. Prerequisite: graduate standing or consent of instructor.

ANTHRO 374. Archaeology of Colonialism/Postcolonialisms. 5 Units.

Advanced graduate seminar focused on the archaeology of colonial and postcolonial contexts, both prehistoric and historic. Emphasis on intersections between archaeological research and and subaltern, postcolonial, and transnational feminist/queer theory. Prerequisite: consent of instructor.

ANTHRO 375. Archaeology and Globalism. 4-5 Units.

The emergence of archaeology as a discipline in the context of the rise of the nation state. Global economies and other issues have created a new context for archaeology. How are archaeology and heritage responding? The idea of world heritage. The impact of postcolonialism. The commodification of the past: the past as theme park, as travel tourism or nostalgia, as exotic and other. Conflict between uses of the past for identity and as theme park; between heritage and resource or play. The impact of the Goddess, New Age, and other movements. Archaeology and human rights issues including forensic archaeology. Prerequisite: consent of instructor.

ANTHRO 376. Archaeology: The Emergence of a Discipline. 5 Units.

This course explores the key thinkers and practitioners who have founded the discipline of archaeology. Reaching back into the nineteenth century, the course examines in depth the key figures, their preoccupations and projects that shaped the way that archaeology grew through the 20th and into the 21st century. Global in scope, the emphasis will be on field projects and practical problems that stimulated the intellectual development of archaeology as an independent discipline closely tied to geology, history, anthropology, and the natural sciences. Prerequisite: consent of instructor.

ANTHRO 377. The Mystery of Ministry: What is Authority?. 5 Units.

Why do people obey others in the absence of explicit coercion? Why do people accept some leaders but not others? What does it mean to say something or someone has authority? Is authority personal or institutional? Why do people believe in the Pope? Why do people believe some objects have power and others not? Is charisma only a perfume? Can institutions wield charismatic power? These are questions that from Max Weber onwards classical and contemporary anthropologists and sociologists continue to ask. In returning to (Weberian) questions of authority and legitimacy this course takes a question posed by Bourdieu: what is the mystery of ministry? We will apply the question of authority broadly, not just in the explicitly political realm but also to understand, for example, how (culturally specific) charismatic and sacral authority can be fashioned through persons and through objects (eg. relics). The course will thus move between interrelated religious, moral, and political notions to try to generate some critical questions for how a contemporary anthropology that explicitly (rather than implicitly) re-addresses authority might look.

ANTHRO 378. Dynamics of Coupled Human-Natural Systems. 5 Units.

This is a graduate research seminar on the interdisciplinary approach to the study of the dynamics of what is known as "coupled human-natural systems." We will take a critical perspective on such systems, asking to what extent the idea of coupling of discrete subsystems is intellectually profitable and what defines a "human" vs. a "natural" system? We will explore concepts such as coupling, nonlinearity, threshold behavior, feedback, complexity, resilience, and catastrophes. Case studies will be drawn from the literature on human ecology, population dynamics, disease ecology, and social dynamics. Emphasis will be on developing a working knowledge of mathematical and computational models of coupled systems embedded within a rigorous empirical framework of biosocial data collection.

ANTHRO 379. Empathy Lab. 5 Units.

This lab-based class examines the ways in which various disciplines and art forms conceive of, and tell stories about, the experiences and stories of others. With permission of instructor.
Same as: TAPS 284, TAPS 384

ANTHRO 380. Practice and Performance: Bourdieu, Butler, Giddens, de Certeau. 5 Units.

Poststructuralist theories of iteration and mimesis used by social scientists to negotiate the tension between social structure and social practice: Giddens' structuration theory; Bourdieu's practice theory; Butler's theories of gender performativity; and de Certeau's analysis of tactics and strategies. Ethnographic and archaeological case studies that employ methodologies inspired by these approaches. Intersections and contradictions between these theorists' work; their use in anthropological practice. Issues of gender, sexuality, and ethnicity. Prerequisite: consent of instructor.

ANTHRO 381. Archaeology of Violence. 5 Units.

This advanced graduate seminar reflects on archaeological research on violence in relation to readings in philosophy, political anthropology, cultural studies, and gender and ethnic studies. While some forensic approaches are discussed, the emphasis is more on structural and collective violence and the role of violence in the formation of the archaeological record.

ANTHRO 382. Advanced Topics in Medical Anthropology. 5 Units.

Graduate seminar. The history and theories of medical anthropology. Focus is on medical anthropology's transformations in the 20th century: how medical anthropology has emerged as a field of inquiry, grown in dialogue with other areas of scholarship, and come to offer a unique array of theoretical positions and modes of ethnographic engagement. Emphasis is on debates within interpretive and critical medical anthropology, and how an understanding of these debates may be used to assess contemporary works within the field. Prerequisite: consent of instructor.

ANTHRO 384. Sacrifice, Ethics and Modern Convictions. 5 Units.

This course is an investigation of how notions of sacrifice, of ethics and conviction are embedded in both ordinary and extraordinary practices in our contemporary world. The key question is how the modern global condition has transformed the way in which it is possible to hold convictions, and to frame forms of ethical conduct, be they religious or secular. We will ask if convictions based on choice or moral outrage differ from convictions based on inhabiting and reversing stigmatized racial and social identities. Rather than maintaining a categorical distinction between `the religious' and `the secular', we will focus on how groups and individuals have attached themselves passionately to ideas, abstractions, ritual communities or ethical frames. When do certain attachments appear necessary and compelling, almost beyond choice? How does one forge a sense of ethics and ethical conduct through social media rather than face-to-face contact? Students will acquire a grounded and guided understanding of philosophical and anthropological theories of ideas of ethics, sacrifice, and political conviction as well as explore these ideas through contemporary ethnographic contexts. Readings will be philosophical, historical and ethnographic; drawing on original texts and ethnographic accounts from Europe, Asia and Africa.

ANTHRO 386. Epidemics, Chronics, and Contagion. 5 Units.

The seminar will take as its focal point the question: how do institutional and personal responses to disease result from judgements about threat level? Through a series of contemporary monographs on obesity, HIV/AIDS, avian flu, vaccination, cancer, and other health issues, this class will examine ways of understanding broader ideologies of health in the United States.

ANTHRO 387. Strangers and Intimate: Exploring Civility. 5 Units.

How do we encounter and read each other in public and private spaces? How are these very spaces historically constituted around such distinctions and manners of reading? What do these questions look like in dense heterogeneous cities with differentiated class, caste and ethnic communities? How might we consider the differentiation between private and public in different ethnographic contexts? What kinds of sociality might emerge from these kinds of encounters? This course will explore these questions through social theory and ethnographies. There are two major sets of concepts that will be explored and interrogated. The first is that deriving from the essays of the Georg Simmel such as *quest*; *The Facequest*; and *quest*; *The Strangerquest*; which explore the new forms of sociality enabled by seemingly anonymous city life, which in turn have been interpreted very differently by Zygmunt Bauman and James Siegel to understand the place of continually excluded outsiders and the high stakes of reading each other. The other is the strand of work on the emergence of the public sphere such as the work of Jurgen Habermas, Richard Sennet, Michael Warner, Nancy Fraser etc. While much of the social theory on the public, the stranger and civility emerge from studies of Euro-American politics and city spaces, in this course we will move some of these discussion into considering these questions in the global south and the kinds of sociality (including their historicity) that make up the dense fabric of ordinary life. How does this work out in contexts where we take into account intense social differentiation by class, race, and communitarian divisions? This could be asked of the historical and social context addressed in these theories as well as from the postcolonial world. The course will attempt to understand whether such theorizations can indeed be re-rooted and re-imagined or whether ethnographic and historical difference re-route them instead. In doing so we will also bring theories of the private and the intimate to bear on questions of the public and the stranger.

ANTHRO 388. Anthropology of the Extraordinary: Ontologies and Phenomenologies. 5 Units.

In the last few years anthropology has taken what has come to be called an *quest*; *ontological turnquest*; in which the ways an object or experience is felt to be real is explored from different perspectives. Often this involves exploring phenomena (like ghosts, talking trees and humans who become jaguars) which could be called *quest*; *extraordinaryquest*; and which challenge secular, western expectations of what is real. There has also been a *quest*; *phenomenological turnquest*; in which anthropologists have become interested in classifying and categorizing human experience in particular detail. The class will explore the scholarship in this area. Readings will include an introduction to classic philosophical writing (William James, Karl Jaspers, Martin Heidegger) and more recent work such as David Hufford, *The Terror that Comes in the Night*; Eduardo Kohn *How Forests Think*; Morton Pederson *Not Quite Shamans*; Ann Taves *Religious Experience Reconsidered*; Annemarie Mol, *The Body Multiple*; Roger Lohmann *Dream Travelers*, and others.

ANTHRO 389. Ethnographic Writing and Beyond. 3-5 Units.

In this class we analyze anthropological writing that has examined and pushed the bounds of the discipline. We will focus on how writing itself is a practice in anthropology, and how styles of writing impact argument, affect, and ultimately, the discipline itself. Students will also work in different genres of writing to better understand writing as a craft, a discipline, and a means of communication.

ANTHRO 400. Dissertation Writers Seminar. 1-3 Unit.

Required of fifth-year Ph.D. students returning from dissertation field research and in the process of writing dissertations and preparing for professional employment. Prerequisite: consent of instructor.

ANTHRO 401A. Qualifying Examination: Topic. 2-5 Units.

Required of second- and third-year Ph.D. students writing the qualifying paper or the qualifying written examination. May be repeated for credit.

ANTHRO 401B. Qualifying Examination: Area. 2-5 Units.

Required of second- and third-year Ph.D. students writing the qualifying paper or the qualifying written examination. May be repeated for credit one time.

ANTHRO 440. Teaching Assistantship. 3-5 Units.

Supervised experience as assistant in one undergraduate course.

ANTHRO 441. Master's Research Thesis. 1-15 Unit.

Supervised work for terminal and coterminous master's students writing the master's project in the final quarter of the degree program.

ANTHRO 442. Reading Group. 2-3 Units.

Graduate student reading group on a thematic topic of interest. Intended for first or second-year cohort PhD students. Sections: Liisa Malkki, Sylvia Yanagisako, Thomas Hansen, Paulla Ebron, and Miyako Inoue.

ANTHRO 444. Anthropology Colloquium. 1 Unit.

Department Colloquia Lecture Series. Lectures presented on a variety of anthropological topics. Colloquium is intended for the Department of Anthropology's under graduate majors and graduate students. May be repeated for credit.

ANTHRO 445. Anthropology Brown Bag Series. 1 Unit.

Current topics and trends in cultural/social anthropology, archaeology, and environmental and ecological anthropology. Enrollment in this noon-time series is restricted to the Department of Anthropology Master's students and First and Second-year PhD students.

ANTHRO 446A. Method of Analysis Program in the Social Sciences. 1 Unit.

Colloquium series. Creation and application of new methodological techniques for social science research. Presentations on methodologies of use for social scientists across departments at Stanford by guest speakers from Stanford and elsewhere. See <http://mapss.stanford.edu>. Same as: COMM 310

ANTHRO 450. Research Apprenticeship. 1-15 Unit.

Supervised work on a research project with an individual faculty member. May be repeated for credit.

ANTHRO 451. Directed Individual Study. 1-15 Unit.

Supervised work for a qualifying paper, examination, or project with an individual faculty member.

ANTHRO 452. Graduate Internship. 3-5 Units.

Provides graduate students with the opportunity to pursue their area of specialization in an institutional setting such as a laboratory, clinic, research institute, or government agency.

ANTHRO 801. TGR Project. 0 Units.

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ANTHRO 802. TGR Dissertation. 0 Units.

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Applied Physics Courses

APPPHYS 10AX. The Expressive Vessel: An Immersive Introduction to Clay. 2 Units.

Students will learn to make and to analyze functional ceramic forms, with a focus on wheel-thrown pottery. Studio time will be dedicated to the acquisition and refinement of shaping, marking/glazing and finishing skills; supplementary lectures and discussions will be used to explore the aesthetic range of contemporary studio ceramics as well as major historical traditions in clay. No prior experience is necessary, but instructors will work individually with students at all levels of ability to make this Arts Intensive experience both challenging and rewarding. Each student will produce functional ware (e.g. dishes, cups, vases, et cetera) suitable for use and display and will give a final class presentation on a selection of their most personally expressive work.

APPPHYS 77N. Functional Materials and Devices. 3 Units.

Preference to freshmen. Exploration via case studies how functional materials have been developed and incorporated into modern devices. Particular emphasis is on magnetic and dielectric materials and devices. Recommended: high school physics course including electricity and magnetism.

APPPHYS 79N. Energy Options for the 21st Century. 3 Units.

Preference to freshmen. Choices for meeting the future energy needs of the U.S. and the world. Basic physics of energy sources, technologies that might be employed, and related public policy issues. Trade-offs and societal impacts of different energy sources. Policy options for making rational choices for a sustainable world energy economy.

APPPHYS 100. The Questions of Clay: Craft, Creativity and Scientific Process. 5 Units.

Description will be forthcoming.

APPPHYS 201. Electrons and Photons. 4 Units.

Applied Physics Core course appropriate for graduate students and advanced undergraduate students with prior knowledge of elementary quantum mechanics, electricity and magnetism, and special relativity. Interaction of electrons with intense electromagnetic fields from microwaves to x-ray, including electron accelerators, x-ray lasers and synchrotron light sources, attosecond laser-atom interactions, and x-ray matter interactions. Mechanisms of radiation, free-electron lasing, and advanced techniques for generating ultrashort brilliant pulses. Characterization of electronic properties of advanced materials, prospects for single-molecule structure determination using x-ray lasers, and imaging attosecond molecular dynamics.
Same as: PHOTON 201

APPPHYS 203. Atoms, Fields and Photons. 4 Units.

Applied Physics Core course appropriate for graduate students and advanced undergraduate students with prior knowledge of elementary quantum mechanics, electricity and magnetism, and ordinary differential equations. Structure of single- and multi-electron atoms and molecules, and cold collisions. Phenomenology and quantitative modeling of atoms in strong fields, with modern applications. Introduction to quantum optical theory of atom-photon interactions, including quantum trajectory theory, mechanical effects of light on atoms, and fundamentals of laser spectroscopy and coherent control.

APPPHYS 204. Quantum Materials. 4 Units.

Applied Physics Core course appropriate for graduate students and advanced undergraduate students with prior knowledge of elementary quantum mechanics. Introduction to materials and topics of current interest. Topics include superconductivity, magnetism, charge and spin density waves, frustration, classical and quantum phase transitions, multiferroics, and interfaces. Prerequisite: elementary course in quantum mechanics.

APPPHYS 205. Introduction to Biophysics. 3-4 Units.

Core course appropriate for advanced undergraduate students and graduate students with prior knowledge of calculus and a college physics course. Introduction to how physical principles offer insights into modern biology, with regard to the structural, dynamical, and functional organization of biological systems. Topics include the roles of free energy, diffusion, electromotive forces, non-equilibrium dynamics, and information in fundamental biological processes.

Same as: BIO 126, BIO 226

APPPHYS 206. Dynamical Systems: Linear, Non-Linear, and Stochastic. 4 Units.

Introduction to dynamical systems including linear, nonlinear, stochastic and spatiotemporal models. Emphasis on asymptotic and multi-scale analysis as well as fundamental concepts of stability, bifurcation and oscillation. Prerequisites: linear algebra and unfamiliarity with ordinary and partial differential equations; basic probability.

APPPHYS 207. Laboratory Electronics. 4 Units.

Lecture/lab emphasizing analog and digital electronics for lab research. RC and diode circuits. Transistors. Feedback and operational amplifiers. Active filters and circuits. Pulsed circuits, voltage regulators, and power circuits. Precision circuits, low-noise measurement, and noise reduction techniques. Circuit simulation tools. Analog signal processing techniques and modulation/demodulation. Principles of synchronous detection and applications of lock-in amplifiers. Common laboratory measurements and techniques illustrated via topical applications. Limited enrollment. Prerequisites: undergraduate device and circuit exposure.

APPPHYS 208. Laboratory Electronics. 4 Units.

Lecture/lab emphasizing analog and digital electronics for lab research. Continuation of APPPHYS 207 with emphasis on applications of digital techniques. Combinatorial and synchronous digital circuits. Design using programmable logic. Analog/digital conversion. Microprocessors and real time programming, concepts and methods of digital signal processing techniques. Current lab interface protocols. Techniques commonly used for lab measurements. Development of student lab projects during the last three weeks. Limited enrollment. Prerequisites: undergraduate device and circuit exposure. Recommended: previous enrollment in APPPHYS 207.

APPPHYS 215. Numerical Methods for Physicists and Engineers. 4 Units.

Fundamentals of numerical methods applied to physical systems. Derivatives and integrals; interpolation; quadrature; FFT; singular value decomposition; optimization; linear and nonlinear least squares fitting; error estimation; deterministic and stochastic differential equations; Monte Carlo methods. Lectures will be accompanied by guided project work enabling each student to make rapid progress on a project of relevance to their interests.

APPPHYS 216. X-Ray and VUV Physics. 3 Units.

Research and classical concepts in photon science. Photon-electron interactions; x-ray absorption and Compton scattering. X-ray spectroscopy; EXAFS, SEXAFS, edge structure, magnetic circular dichroism, and linear dichroism. Photoemission spectroscopy and many-electron effects: angle-resolved and integrated photoemission, resonance photoemission, spin-polarized photoemission. Photoelectron diffraction and holography. X-ray interactions with condensed matter: diffraction and scattering. Photon sources: synchrotron, wigglers, and undulators. Photon and electron detectors and analyzers. Prerequisite: familiarity with quantum mechanics.
Same as: PHOTON 216

APPPHYS 217. Estimation and Control Methods for Applied Physics. 4 Units.

Recursive filtering, parameter estimation, and feedback control methods based on linear and nonlinear state-space modeling. Topics in: dynamical systems theory; practical overview of stochastic differential equations; model reduction; and tradeoffs among performance, complexity, and robustness. Numerical implementations in MATLAB. Contemporary applications in systems biology and quantum precision measurement. Prerequisites: linear algebra and ordinary differential equations.

APPPHYS 219. Solid State Physics Problems in Energy Technology. 3 Units.

Technology issues for a secure energy future; role of solid state physics in energy technologies. Topics include the physics principles behind future technologies related to solar energy and solar cells, solid state lighting, superconductivity, solid state fuel cells and batteries, electrical energy storage, materials under extreme condition, nanomaterials.

APPPHYS 220. Applied Electrodynamics. 3 Units.

Techniques for general electrodynamics, illustrated by examples from geophysics, microwave engineering, optical devices, accelerators, antennas, and plasma physics. RF/microwave structure representations, scattering matrices, treatments for periodic systems. Perturbation and variational techniques applied to approximate solutions, fundamentals of numerical techniques. Analysis methods via expansions in terms of natural modes. Introduction to finite element methods via the application of variational techniques. Laboratory experiments including time domain and frequency domain methods. Solutions of inverse electrodynamic problems via perturbation techniques coupled with lab measurements (such as estimation of a physical structure via experimental measurements and formal models). Prerequisites: PHYSICS 121, MATH 106 and MATH 132, or equivalent experience.

APPPHYS 223. Stochastic and Nonlinear Dynamics. 3 Units.

Theoretical analysis of dynamical processes: dynamical systems, stochastic processes, and spatiotemporal dynamics. Motivations and applications from biology and physics. Emphasis is on methods including qualitative approaches, asymptotics, and multiple scale analysis. Prerequisites: ordinary and partial differential equations, complex analysis, and probability or statistical physics. Same as: BIO 223

APPPHYS 223B. Nonlinear Dynamics: This Side of Chaos. 3 Units.

Linear dynamics, periodic systems, Hamiltonian motion and phase space. The physics of nonlinear motion: thinking in phase space. Perturbation theory, periodic orbits, resonances, stability and instability. Integrability and symplectic integration. The KAM theorem and renormalization description of the transition to chaos. Dissipation and bifurcation. Application of methods to nanoscience, lasers and accelerators, condensed matter physics and biophysics. Prerequisites: differential equations and classical mechanics.

APPPHYS 225. Probability and Quantum Mechanics. 3 Units.

Structure of quantum theory emphasizing states, measurements, and probabilistic modeling. Generalized quantum measurement theory; parallels between classical and quantum probability; conditional expectation in the Schrödinger and Heisenberg pictures; covariance with respect to symmetry groups; reference frames and super-selection rules. Classical versus quantum correlations; nonlocal aspects of quantum probability; axiomatic approaches to interpretation. Prerequisites: undergraduate quantum mechanics, linear algebra, and basic probability and statistics.

APPPHYS 232. Advanced Imaging Lab in Biophysics. 4 Units.

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

Same as: BIO 132, BIO 232, BIOPHYS 232, GENE 232

APPPHYS 236. Biology by the Numbers. 3 Units.

For PhD students and advanced undergraduates. Students will develop skills in quantitative reasoning over a wide range of biological problems. Topics: biological size scales ranging from proteins to ecosystems; biological time scales ranging from enzymatic catalysis and DNA replication to evolution; biological energy, motion and force from molecular to organismic scales; mechanisms of environmental sensing ranging from bacterial chemotaxis to vision.

Same as: BIOC 236

APPPHYS 240. From Atom Smashers to X-ray Lasers. 3 Units.

Physics and impact of particle beams and accelerators from their origins up to the present state of the art. Accelerator fundamentals, special topic lectures by expert scientists, laboratory accelerator experiment using state of the art accelerators at SLAC. Prerequisites: Advanced undergraduate courses in Maxwell's equations, special relativity, mathematical physics, and introductory quantum mechanics.

Same as: PHOTON 240

APPPHYS 270. Magnetism and Long Range Order in Solids. 3 Units.

Cooperative effects in solids. Topics include the origin of magnetism in solids, crystal electric field effects and anisotropy, exchange, phase transitions and long-range order, ferromagnetism, antiferromagnetism, metamagnetism, density waves and superconductivity. Emphasis is on archetypal materials. Prerequisite: PHYSICS 172 or MATSCI 209, or equivalent introductory condensed matter physics course.

APPPHYS 272. Solid State Physics. 3 Units.

Introduction to the properties of solids. Crystal structures and bonding in materials. Momentum-space analysis and diffraction probes. Lattice dynamics, phonon theory and measurements, thermal properties. Electronic structure theory, classical and quantum; free, nearly-free, and tight-binding limits. Electron dynamics and basic transport properties; quantum oscillations. Properties and applications of semiconductors. Reduced-dimensional systems. (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Undergraduates should register for PHYSICS 172 and graduate students for APPPHYS 272. Prerequisites: PHYSICS 170 and PHYSICS 171, or equivalents. Same as APPPHYS 272.

Same as: PHYSICS 172

APPPHYS 273. Solid State Physics II. 3 Units.

Introduction to the many-body aspects of crystalline solids. Second quantization of phonons, anharmonic effects, polaritons, and scattering theory. Second quantization of Fermi fields. Electrons in the Hartree-Fock and random phase approximation; electron screening and plasmons. Magnetic exchange interactions. Electron-phonon interaction in ionic/covalent semiconductors and metals; effective attractive electron-electron interactions, Cooper pairing, and BCS description of the superconducting state. Prerequisite: APPPHYS 272 or PHYSICS 172.

APPPHYS 280. Phenomenology of Superconductors. 3 Units.

Phenomenology of superconductivity viewed as a macroscopic quantum phenomenon. Topics include the superconducting pair wave function, London and Ginzburg-Landau theories, the Josephson effect, type I type II superconductivity, and the response of superconductors to currents, magnetic fields, and RF electromagnetic radiation. Introduction to thermal fluctuation effects in superconductors and quantum superconductivity.

APPPHYS 285. Physics of Disordered Systems. 3 Units.

Topics include types of disorder, percolation, localization, glasses and spin glasses, fractals, self-organized criticality, aggregation, gelation, and other random processes leading to disordered media.

APPPHYS 290. Directed Studies in Applied Physics. 1-15 Unit.

Special studies under the direction of a faculty member for which academic credit may properly be allowed. May include lab work or directed reading.

APPPHYS 291. Practical Training. 3 Units.

Opportunity for practical training in industrial labs. Arranged by student with research adviser's approval. Summary of activities required.

APPPHYS 293. Theoretical Neuroscience. 3 Units.

Introduction to fundamental theoretical ideas that provide conceptual insights into how networks of neurons cooperatively mediate important brain functions. Topics include basic mathematical models of single neurons, neuronal computation through feedforward and recurrent network dynamics, principles of associative memory, applications of information theory to early sensory systems, correlations and neural population coding, network plasticity and the self-organization of stimulus selectivity, and supervised and unsupervised learning through multiple mechanisms of synaptic plasticity. Emphasis on developing mathematical and computational skills to analyze complex neural systems. Prerequisites: calculus, linear algebra, and basic probability theory, or consent of instructor.

APPPHYS 294. Cellular Biophysics. 3 Units.

Physical biology of dynamical and mechanical processes in cells. Emphasis is on qualitative understanding of biological functions through quantitative analysis and simple mathematical models. Sensory transduction, signaling, adaptation, switches, molecular motors, actin and microtubules, motility, and circadian clocks. Prerequisites: differential equations and introductory statistical mechanics.

Same as: BIO 294

APPPHYS 304. Lasers Laboratory. 4 Units.

Theory and practice. Theoretical and descriptive background for lab experiments, detectors and noise, and lasers (helium neon, beams and resonators, argon ion, cw dye, titanium sapphire, semiconductor diode, and the Nd:YAG). Measurements of laser threshold, gain, saturation, and output power levels. Laser transverse and axial modes, linewidth and tuning, Q-switching and modelocking. Limited enrollment. Prerequisites: EE 236C and EE 332, or consent of instructor.

APPPHYS 305. Advanced Nonlinear Optics Laboratory. 4 Units.

Core concepts and experiments in the nonlinear interaction of laser light with matter. Experiments on second harmonic generation and optical parametric oscillation culminate with assembly and use of an optical frequency comb for student-defined, open-ended experiments. Supercontinuum light generation, carrier-envelope phase stabilization, and metrology and spectroscopy. Prerequisites: APPPHYS 304, or consent of instructor.

APPPHYS 315. Methods in Computational Biology. 3 Units.

Methods of bioinformatics and biomolecular modeling from the standpoint of biophysical chemistry. Methods of genome analysis; cluster analysis, phylogenetic trees, microarrays; protein, RNA and DNA structure and dynamics, structural and functional homology; protein-protein interactions and cellular networks; molecular dynamics methods using massively parallel algorithms.

APPPHYS 324. Introduction to Accelerator Physics. 3 Units.

Physics of particle beams in linear and circular accelerators. Transverse and longitudinal beam dynamics, equilibrium emittances in electron storage rings, high-brightness electron sources, RF acceleration and emittance preservation, bunch compression and associated collective effects, accelerator physics design for x-ray FELs, advanced accelerator concepts.

APPPHYS 325. X-rays: Past, Present and Future. 3 Units.

Introduction to the physics of bright x-ray sources. Topics include: physics and basic properties of short wavelength radiation, X-ray generation via incoherent Compton scattering and High Harmonic Generation (HHG), applications and impact of insertion devices in synchrotron radiation facilities and the development of x-ray free electron lasers. Includes selected laboratory tours of the Linac Coherent Light Source and/or measurements at SLAC. Prerequisite: graduate-level electrodynamics, or consent of instructor.

Same as: PHOTON 325

APPPHYS 345. Advanced Numerical Methods for Data Analysis and Simulation. 3 Units.

Gaussian and unit sphere quadrature, singular value decomposition and principal component analysis, Krylov methods, non-linear fitting and super-resolution, independent component analysis, 3d reconstruction, "shrink-wrap", hidden Markov methods, support vector machines, simulated annealing, molecular dynamics and parallel tempering, Markov state methods, Monte Carlo methods for constrained systems.

APPPHYS 376. Literature of Cavity QED and Cavity Optomechanics. 3 Units.

Cavity quantum electrodynamics and optomechanics in modern quantum optics, photonics and quantum engineering. Review of basic concepts and survey of key literature in seminar format.

APPPHYS 383. Introduction to Atomic Processes. 3 Units.

Atomic spectroscopy, matrix elements using the Coulomb approximation, summary of Racah algebra, oscillator and line strengths, Einstein A coefficients. Radiative processes, Hamiltonian for two- and three-state systems, single- and multi-photon processes, linear and nonlinear susceptibilities, density matrix, brightness, detailed balance, and electromagnetically induced transparency. Inelastic collisions in the impact approximation, interaction potentials, Landau-Zener formulation. Continuum processes, Saha equilibrium, autoionization, and recombination.

APPPHYS 387. Quantum Optics and Measurements. 3 Units.

Basic concerns and fundamental postulates in quantum theory of measurements. Quantum non-demolition measurements, nonlinear measurements and continuous measurements. Non-local quantum correlation and Bell's inequality. Generation, detection, and application of single photons and entangled photon-pairs. Reservoir theory of an open dissipative system. Laser phase transition versus BCS transition in microcavities.

APPPHYS 390. Dissertation Research. 1-15 Unit.

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APPPHYS 392. Topics in Molecular Biophysics: Biophysics of Functional RNA. 3 Units.

Survey of methods used to relate RNA sequences to the structure and function of transcribed RNA molecules. Computation of contributions of the counter-ion cloud to the dependence of free energy on conformation of the folded RNA. The relation of structure to function of riboswitches and ribozymes.

APPPHYS 453A. Synchrotron Radiation and Free Electron Lasers: Principles and Applications. 3 Units.

Synchrotron radiation sources for scientific exploration. X-ray FELs for studies of ultrafast processes at the atomic scale. Fundamental concepts in electron and photon beams, bending magnet and undulator radiation, one-dimensional and three-dimensional FEL theory and simulations, self-amplified spontaneous emission, seeding and other improvement schemes, x-ray methodology, techniques and instrumentation for the study of ultrafast phenomena. Course may be repeated when a different course is offered as a Special Topics.

Same as: PHOTON 453A

APPPHYS 470. Condensed Matter Seminar. 1 Unit.

Current research and literature; offered by faculty, students, and outside specialists. May be repeated for credit.

APPPHYS 473B. Topics in Condensed Matter Physics: Quantum Matter Meets Quantum Optics. 3 Units.

Graduate seminar to survey the contemporary literature on emerging topics in light-matter interactions, including novel optical spectroscopy approaches to the study of material properties and exotic optical properties of novel materials.

APPPHYS 483. Optics and Electronics Seminar. 1 Unit.

Current research topics in lasers, quantum electronics, optics, and photonics by faculty, students, and invited outside speakers. May be repeated for credit.

APPPHYS 801. TGR Master's Project. 0 Units.

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APPPHYS 802. TGR PhD Dissertation. 0 Units.

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Arabic Language Courses

ARABLANG 1. First-Year Arabic, First Quarter. 5 Units.

(Formerly AMELANG 1A.) One-year sequence designed to develop beginning proficiency, with additional emphasis is on reading and writing standard Arabic.

ARABLANG 1A. Accelerated First-Year Arabic, Part I. 5 Units.

Completes first-year sequence in two rather than three quarters. For students with previous knowledge of Arabic. Prerequisite: Placement Test or consent of instructor.

ARABLANG 1H. First-Year Arabic for Heritage Learners, First Quarter. 5 Units.

(Formerly AMELANG 1H). For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: Placement Test or consent of instructor.

ARABLANG 2. First-Year Arabic, Second Quarter. 5 Units.

(Formerly AMELANG 1B.) One-year sequence designed to develop beginning proficiency, with additional emphasis on reading and writing standard Arabic. Prerequisite: Placement Test, ARABLANG 1.

ARABLANG 2A. Accelerated First-Year Arabic, Part II. 5 Units.

Completes first-year sequence in two rather than three quarters. For students with previous knowledge of Arabic. Prerequisite: Placement Test, completion of ARABLANG 1A. This course fulfills the University Foreign Language Requirement.

ARABLANG 2H. First-Year Arabic for Heritage Learners, Second Quarter. 5 Units.

(Formerly AMELANG 2H). Continuation of ARABLANG 1H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: Placement Test, ARABLANG 1H.

ARABLANG 3. First-Year Arabic, Third Quarter. 5 Units.

(Formerly AMELANG 1C.) Continuation of ARABLANG 2. One-year sequence designed to develop beginning proficiency, with additional emphasis on reading and writing standard Arabic (*fusha*). Fulfills the University Foreign Language Requirement. Prerequisite: Placement Test, ARABLANG 2.

ARABLANG 3H. Beginning Arabic for Heritage Learners, Third Quarter. 5 Units.

Continuation of ARABLANG 2H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: ARABLANG 2H.

ARABLANG 5. Intensive first year Arabic. 15 Units.

Same as ARABLANG 1, 2, 3 combined. One-year sequence designed to develop beginning proficiency, with additional emphasis on reading and writing standard Arabic.

ARABLANG 10. Arabic Calligraphy. 2 Units.

(Formerly AMELANG 30). Calligraphy requires no linguistic background, stipulates no artistic skill for one to appreciate it and is the supreme art form of the Islamic world. Other Islamic arts (architecture, metal work, ceramics, glass, and textiles) draw on calligraphy as their principal source of embellishment. Interactive lecture-workshop sketches its development and illustrates the forms of Arabic calligraphy in use today.

ARABLANG 14A. Short Stories and Poetry from the Arab World - Part I. 2-4 Units.

(Formerly AMELANG 34). Short Stories and Poetry from the Arab World - Selections of short stories and poetry written by contemporary Arab writers. Discussion and analysis of representative samples spanning a wide spectrum of the Arab world, e.g., Egypt, Iraq, Lebanon, Libya, Morocco, Palestine, Sudan, Syria, Tunisia, and Yemen. The creative impulses and cultural symbols involved in the interpretation of each work. The stories and poetry illustrate the rich diversity of the Arab world and accentuate the various cultural issues and forces influencing Arab writers. Prerequisite: completion of 2nd year Arabic or equivalent.

ARABLANG 21. Second-Year Arabic, First Quarter. 5 Units.

(Formerly AMELANG 11A.) One-year sequence designed to develop intermediate proficiency, with additional emphasis on functional applications and reading and writing standard Arabic. Prerequisite: Placement Test, ARABLANG 3.

ARABLANG 21A. Accelerated Second-Year Arabic, Part I. 5 Units.

Completes second-year sequence in two rather than three quarters. For students with previous knowledge of Arabic. Prerequisite: Placement Test, ARABLANG 2A.

ARABLANG 21H. Second-Year Arabic for Heritage Learners, First Quarter. 5 Units.

(Formerly AMELANG 11H). For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: Placement Test, ARABLANG 3H.

ARABLANG 22. Second-Year Arabic, Second Quarter. 5 Units.

(Formerly AMELANG 11B.) Continuation of ARABLANG 21. One-year sequence designed to develop intermediate proficiency, with additional emphasis on functional applications and reading and writing standard Arabic. Prerequisite: Placement Test, ARABLANG 21.

ARABLANG 22A. Accelerated second-Year Arabic, Part II. 5 Units.

Completes Second-year sequence in two rather than three quarters. For students with previous knowledge of Arabic. Prerequisite: Placement Test, ARABLANG 22A.

ARABLANG 22H. Second-Year Arabic for Heritage Learners, Second Quarter. 5 Units.

(Formerly AMELANG 12H). Continuation of ARABLANG 21H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: Placement Test, ARABLANG 21H.

ARABLANG 23. Second-Year Arabic, Third Quarter. 5 Units.

(Formerly AMELANG 11C.) Continuation of ARABLANG 22. One-year sequence designed to develop intermediate proficiency, with additional emphasis on functional applications and reading and writing standard Arabic. Prerequisite: Placement Test, ARABLANG 22.

ARABLANG 23H. Second-Year Arabic for Heritage Learners, Third Quarter. 5 Units.

(Formerly AMELANG 13H). Continuation of ARABLANG 22H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: Placement Test, ARABLANG 23H.

ARABLANG 25. Intensive 2nd year Arabic. 15 Units.

Same as ARABLANG 21, 22, 23 combined. Prerequisite: one year of college-level Arabic or equivalent or completion of ARABLANG 3. Stanford graduate students restricted to 9 units may take ARABLANG 225 for a total of 9 units.

ARABLANG 125A. Colloquial Arabic, First Quarter. 2-4 Units.

(Formerly AMELANG 25A.) Sources include authentic videotaped conversations with native speakers, conversations, and texts of these conversations to enhance comprehension and improve aural skills. Prerequisite: 2 years of Arabic.

ARABLANG 125B. Colloquial Arabic, Second Quarter. 2-4 Units.

(Formerly AMELANG 25B.) Continuation of ARABLANG 125A. Sources include authentic videotaped conversations with native speakers, conversations, and texts of these conversations to enhance comprehension and improve aural skills. Prerequisite: ARABLANG 125A.

ARABLANG 125C. Colloquial Arabic, Third Quarter. 2-4 Units.

(Formerly AMELANG 25C.) Continuation of ARABLANG 125B. Sources include authentic videotaped conversations with native speakers, conversations, and texts of these conversations to enhance comprehension and improve aural skills. Prerequisite: ARABLANG 125B.

ARABLANG 126A. Media Arabic, First Quarter. 2-4 Units.

(Formerly AMELANG 26A.) Arabic language used today in the printed and electronic media, including the Internet. Emphasizes current vocabulary and structures used in different modes of media coverage. Prerequisite: 2 years of Arabic.

ARABLANG 126B. Media Arabic, Second Quarter. 2-4 Units.

(Formerly AMELANG 26B.) Continuation of ARABLANG 126A. Arabic language used today in the printed and electronic media, including the Internet. Emphasizes current vocabulary and structures used in different modes of media coverage. Prerequisite: ARABLANG 126A.

ARABLANG 126C. Media Arabic, Third Quarter. 2-4 Units.

(Formerly AMELANG 26C.) Continuation of ARABLANG 126B. Arabic language used today in the printed and electronic media, including the Internet. Emphasizes current vocabulary and structures used in different modes of media coverage. Prerequisite: ARABLANG 126B.

ARABLANG 127. Intermediate to Advanced Conversation. 2-3 Units.

Students develop communication skills (listening and speaking) in Arabic while discussing real-life issues, current events, and cultural topics. Pronunciation, vocabulary development, and group discussion skills are stressed. May be taken concurrently with other Arabic courses. Prerequisite: Completion of First-Year Arabic.

ARABLANG 131. Third-Year Arabic, First Quarter. 5 Units.

(Formerly AMELANG 21A.) Continuation of ARABLANG 23. One-year sequence designed to develop advanced proficiency with emphasis on complex and compound sentences through use of literary works, media Arabic, the Internet, and cultural productions. Prerequisite: Placement Test, ARABLANG 23.

ARABLANG 131H. Third-Year Arabic for Heritage Learners, First Quarter. 5 Units.

Continuation of ARABLANG 23H. Prerequisite ARABLANG 23H.

ARABLANG 132. Third-Year Arabic, Second Quarter. 5 Units.

(Formerly AMELANG 21B.) Continuation of ARABLANG 131. One-year sequence designed to develop advanced proficiency with emphasis on complex and compound sentences through use of literary works, media Arabic, the Internet, and cultural productions. Prerequisite: Placement Test, ARABLANG 131.

ARABLANG 132H. Third-Year Arabic for Heritage Learners, Second Quarter. 5 Units.

Continuation of ARABLANG 131H. Prerequisite: ARABLANG 131H.

ARABLANG 133. Third-Year Arabic, Third Quarter. 5 Units.

(Formerly AMELANG 21C.) Continuation of ARABLANG 132. One-year sequence designed to develop advanced proficiency with emphasis on complex and compound sentences through use of literary works, media Arabic, the Internet, and cultural productions. Prerequisite: Placement Test, ARABLANG 132.

ARABLANG 133H. Third-Year Arabic for Heritage Learners, Third Quarter. 5 Units.

Continuation of ARABLANG 132H. Prerequisite: ARABLANG 132H.

ARABLANG 141. Fourth-Year Arabic, First Quarter. 3-4 Units.

(Formerly AMELANG 23A.) Prerequisite: three years of Arabic.

ARABLANG 142. Fourth-Year Arabic, Second Quarter. 3-4 Units.

(Formerly AMELANG 23B.) Continuation of ARABLANG 141. Prerequisite: ARABLANG 141.

ARABLANG 143. Fourth-Year Arabic, Third Quarter. 3-4 Units.

(Formerly AMELANG 23C.) Continuation of ARABLANG 142. Prerequisite ARABLANG 142.

ARABLANG 225. Intensive Second-Year Arabic for Graduate Students. 6-9 Units.

Equivalent to ARABLANG 21, 22, 23 combined or ARABLANG 25. Prerequisite one year of College Arabic or equivalent or completion of ARABLANG 3. Stanford graduate students restricted to 9 units may take ARABLANG 225 for a total of 9 units.

ARABLANG 297. Directed Reading. 1-5 Unit.**ARABLANG 394. Graduate Studies in Arabic Conversation. 1-3 Unit.**

Prerequisite: Consent of Instructor.

ARABLANG 395. Graduate Studies in Arabic. 1-5 Unit.

Prerequisite: Consent of instructor.

Archaeology Courses

ARCHLGY 1. Introduction to Prehistoric Archeology. 3-5 Units.

Aims, methods, and data in the study of human society's development from early hunters through late prehistoric civilizations. Archaeological sites and remains characteristic of the stages of cultural development for selected geographic areas, emphasizing methods of data collection and analysis appropriate to each.

Same as: ANTHRO 3

ARCHLGY 10. The Archaeology of Home. 3-5 Units.

Homes evoke powerful emotions about place and also highlight the dynamic and complex nature of people, their relationships, and the broader society they live in. Focus on the ways that material traces from the past shed light on the diversity of domestic life, which includes household organization, economic strategies, diet and status, rituals, and identity.

Archaeological case studies to see how archaeologists identify reoccurring patterns in material culture found in homes or domestic dwellings to reconstruct household patterns and social relations.

Same as: ANTHRO 10A

ARCHLGY 12. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years. 3-5 Units.

Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis.

ARCHLGY 13. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization. These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography.

Same as: ANTHRO 13A, HISTORY 7E, HISTORY 107E

ARCHLGY 34. Animals and Us. 5 Units.

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of 'animals as social actors' is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognized as a viable mechanism for understanding our cultural and economic past. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ANTHRO 34

ARCHLGY 42. Pompeii. 3-5 Units.

(Formerly CLASSART 42 and CLASSGEN 60.) The Roman town of Pompeii, buried by the eruption of Mt. Vesuvius in 79 C.E., provides information about the art and archaeology of ancient social life, urban technology and production, and ancient spatial patterns and experience. Its fame illustrates modern relationships to the ancient past, from Pompeii's importance on the Grand Tour, to plaster casts of vaporized bodies, to debates about reconstruction, preservation, and archaeological methods.

ARCHLGY 51. Introduction to the Archaeology of Greece. 3-5 Units.

An introduction to the archaeology of ancient Greece, from the first city states through the cultural achievements of classical Athens to the conquest by Rome.

Same as: CLASSICS 51

ARCHLGY 64. Cultural Heritage and Human Rights. 1 Unit.

This interdisciplinary research workshop will critically engage the issue of the growing currency of human rights discourse within cultural heritage. Epistemological and practical areas of tension between rights discourse and cultural discourse will be surveyed within the context of current global challenges facing heritage practice, conservation and archaeology. Topics will include the inequities of cultural recognition between North-South globalizations, questions of cultural property and rights, the role of tourism, and the impact of environmental conservation discourse on cultural rights.

Same as: ARCHLGY 164

ARCHLGY 81. Introduction to Roman Archaeology. 3-5 Units.

(Formerly CLASSART 81.) This course will introduce you to the material culture of the ancient Roman world, from spectacular imperial monuments in the city of Rome to cities and roads around the Mediterranean, from overarching environmental concerns to individual human burials, from elite houses and army forts to the lives of slaves, freedmen and gladiators. Key themes will be change and continuity over time; the material, spatial and visual workings of power; how Roman society was materially changed by its conquests and how conquered peoples responded materially to Roman rule.

Same as: CLASSICS 52

ARCHLGY 97. Archaeology Internship. 1-10 Unit.

Opportunity for students to pursue their specialization in an institutional setting such as a laboratory, clinic, research institute, museums or government agency. May be repeated for credit. Prior instructor consent needed.

ARCHLGY 98B. Digital Methods in Archaeology. 3-5 Units.

This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods.

Same as: ANTHRO 98B, ANTHRO 298B

ARCHLGY 99A. Historical Archaeology in the Archive, Lab, and Underground: Methods. 5 Units.

The practice of historical archaeology through methodologies including archival research, oral history, material culture analysis, and archaeological excavation. Students use these methods to analyze the history and archaeology of a local park, the Thornewood Open Space Preserve.

ARCHLGY 100. ARCHAEOLOGY OF TECHNOLOGY. 5 Units.

The course is an introduction to the social organization of material production and to the theoretical, ethnographic, and historical frameworks used by archaeologists to link the technologies of the past to salient sociocultural information about the people who employed them.

Comparison of metallurgical, ceramic, lithic, and textile industries in different cultural and historical settings will inform critical discussions of how and to what extent analyses of artifacts, workshops, and industrial installations can provide insight into past societies.

Same as: ANTHRO 101B, ANTHRO 201B, ARCHLGY 200

ARCHLGY 101. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3-5 Units.

This interdisciplinary seminar explores challenges and avenues for furthering protection of the cultural heritage rights enshrined in the UN Declaration on the Rights of Indigenous Peoples. Using an innovative combination of online lectures by Stanford faculty and students, and recorded interviews with Indigenous leaders, artists, performers, scholars and museum professionals, the seminar will explore and problematize: historic and contemporary understandings of "Indigenous cultural heritage" and the impact of colonialism, urbanization and other forces on Indigenous identity and cultural heritage; current and potential domestic and international legal and non-legal frameworks for Indigenous cultural heritage protection and repatriation; past and present museum approaches to Indigenous peoples and their cultural material; and optimal methods of resolving repatriation disputes. While the seminar will cover primarily the situation of Indigenous peoples in North America, comparisons will be drawn with other regions of the globe. The on-campus component of the seminar will involve directed discussions of the online content, the online forum, assigned readings and short writing assignments. Students can choose between a final exam, paper or video project. Lunch is provided.

Same as: ANTHRO 102C, ARCHLGY 202, CSRE 102, NATIVEAM 102

ARCHLGY 102. Archaeological Methods. 5 Units.

Methodological issues related to the investigation of archaeological sites and objects. Aims and techniques of archaeologists including: location and excavation of sites; dating of places and objects; analysis of artifacts and technology and the study of ancient people, plants, and animals. How these methods are employed to answer the discipline's larger research questions.

Same as: ANTHRO 91A

ARCHLGY 102B. Incas and their Ancestors: Peruvian Archaeology. 3-5 Units.

The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred.

Same as: ANTHRO 106, ANTHRO 206A

ARCHLGY 103. History of Archaeological Thought. 5 Units.

Introduction to the history of archaeology and the forms that the discipline takes today, emphasizing developments and debates over the past five decades. Historical overview of culture, historical, processual and post-processual archaeology, and topics that illustrate the differences and similarities in these theoretical approaches.

ARCHLGY 104C. The Archaeology of Ancient China. 5 Units.

Early China from the perspective of material remains unearthed from archaeological sites; the development of Chinese culture from early hominid occupation nearly 2 million years ago through the development of agriculture in the Neolithic period and complex society in the Bronze Age to the political unification of China under the Qin Dynasty. Continuity of Chinese culture from past to present, history of Chinese archaeology, relationships between archaeology and politics, and food in early China.

Same as: ARCHLGY 304C

ARCHLGY 105. Heritage & Neoliberalism: Theorizations of the Past. 3-5 Units.

This course explores the emergence of heritage from within the broader field of modern historical thought. Readings explore how transformations in economic theory and changes in traditional philosophies of history have shaped how the historical event and historical figures are cast and recast within heritage. The distinctive modes by which archaeological sites and heritage sites are spatialized, linked and narrated are explored as these relate to corresponding turns in the modern concepts of freedom, inequality, personhood, sovereignty, community and culture.

Same as: ANTHRO 105B, ANTHRO 205B

ARCHLGY 106A. Museums and Collections. 5 Units.

Practical, theoretical, and ethical issues which face museums and collections. Practical collections-based work, museum visits, and display research. The roles of the museum in contemporary society. Students develop their own exhibition and engage with the issues surrounding the preservation of material culture.

Same as: ARCHLGY 306A

ARCHLGY 107A. Archaeology as a Profession. 5 Units.

Academic, contract, government, field, laboratory, museum, and heritage aspects of the profession.

Same as: ANTHRO 101A

ARCHLGY 108E. Catalhoyuk and Neolithic Archaeology. 3 Units.

Catalhoyuk as a case study to understand prehistoric social life during the Neolithic in Anatolia and the Near East. Developments in agriculture, animal domestication, material technology, trade, art, religion, skull cults, architecture, and burial practices. Literature specific to Catalhoyuk and other excavations throughout the Anatolian and Levantine regions to gain a perspective on diversity and variability throughout the Neolithic. The reflexive methodology used to excavate Catalhoyuk, and responsibilities of excavators to engage with larger global audiences of interested persons and stakeholders.

Same as: ANTHRO 108E

ARCHLGY 111. Emergence of Chinese Civilization from Caves to Palaces. 3-4 Units.

Introduces processes of cultural evolution from the Paleolithic to the Three Dynasties in China. By examining archaeological remains, ancient inscriptions, and traditional texts, four major topics will be discussed: origins of modern humans, beginnings of agriculture, development of social stratification, and emergence of states and urbanism.

Same as: CHINGEN 141, CHINGEN 241

ARCHLGY 111B. Muwékma: Landscape Archaeology and the Narratives of California Natives. 3-5 Units.

This course explores the unique history of San Francisco Bay Area tribes with particular attention to Muwékma Ohlone- the descendent community associated with the landscape surrounding and including Stanford University. The story of Muwékma provides a window into the history of California Indians from prehistory to Spanish exploration and colonization, the role of Missionaries and the controversial legacy of Junipero Serra, Indigenous rebellions throughout California, citizenship and land title during the 19th century, the historical role of anthropology and archaeology in shaping policy and recognition of Muwékma, and the fight for acknowledgement of Muwékma as a federally recognized tribe. We will visit local sites associated with this history and participate in field surveys of the landscape of Muwékma.

Same as: ANTHRO 111B, NATIVEAM 111B

ARCHLGY 113B. Religious Practices in Archaeological Cultures. 5 Units.

According to Hawkes (1954), religion or ideology is the most difficult part of social life to access archaeologically. Luckily, not all scholars agree; according to Fogelin (2008) 'religion is not something people think about, but something people do'. Thus, archaeology, an inherently multidisciplinary subject that studies material culture, is well suited to delve into religion and its underpinnings. This course will explore religious practices, as they can be defined and interpreted from archaeological contexts spanning the Paleolithic to historic periods. Definitions of religion differ from author to author but they mostly agree that religion is a fully integrated and thus integral part of human social life. Politics, economics, identity and social class influence religion, and religion influences how these forces play out in society. Thus, the course will also examine the significance of ritual and religion in a variety of social contexts.

Same as: ANTHRO 113B, ANTHRO 213B

ARCHLGY 115. The Social life of Human Bones. 3-5 Units.

Skeletal remains serve a primary function of support and protection for the human body. However, beyond this, they have played a range of social roles once an individual is deceased. The processes associated with excarnation, interment, exhumation and reburial all speak to the place that the body, and its parts, play in our cultural as well as physical landscape. This course builds on introductory courses in human skeletal anatomy by adding the social dynamics that govern the way humans treat other humans once they have died. It draws on anthropological, biological and archaeological research, with case studies spanning a broad chronological and spatial framework to provide students with an overview of social practice as it relates to the human body.

Same as: ANTHRO 115, ANTHRO 215

ARCHLGY 118. Engineering the Roman Empire. 4-5 Units.

(Formerly CLASSART 117.) Roman monuments and monumental space were designed to impress. This class explores the interrelated aesthetics and mechanics of construction that led to one of the most extensive building programs undertaken by a pre-modern state. Through case studies ranging from arches, columns and domes to road networks, machines and landscape modification, we investigate not only the materials, methods, and knowledge behind Roman architectural innovation, but the communication of imperial messages through designed space.

Same as: CLASSICS 168

ARCHLGY 119. Zooarchaeology: An Introduction to Faunal Remains. 5 Units.

As regularly noted, whether historic or pre-historic, animal bones are often the most commonly occurring artefacts on archaeological sites. As bioarchaeological samples, they offer the archaeologist an insight into food culture, provisioning, trade and the social aspects of human-animal interactions. The course will be taught through both practical and lecture sessions: the 'hands-on' component is an essential complement to the lectures. The lectures will offer grounding in the main methodological approaches developed, as well as provide case-studies to illustrate where and how the methods have been applied. The practical session will walk students through the skeletal anatomy of a range of species. It will guide students on the identification of different parts of the animal, how to age / sex individuals, as well as recognize taphonomic indicators and what these mean to reconstructing post-depositional modifications.

Same as: ANTHRO 119, ANTHRO 219

ARCHLGY 124. Archaeology of Food: production, consumption and ritual. 3-5 Units.

This course explores many aspects of food in human history from an archaeological perspective. We will discuss how the origins of agriculture helped to transform human society; how food and feasting played a prominent role in the emergence of social hierarchies and the development of civilization; and how various foodways influenced particular cultures. We will also conduct experimental studies to understand how certain methods of food procurement, preparation, and consumption can be recovered archaeologically.

Same as: ARCHLGY 224

ARCHLGY 125. ARCHAEOLOGICAL FIELD SURVEY METHODS. 3 Units.

Practicum applying a variety of survey techniques to discover, map, and record archaeological sites. Basic cartographic skills for archaeologists and an introduction to GIS tools, GPS instruments, and geophysical techniques. Participants should be able to walk 3 - 4 miles over uneven terrain or make special arrangements with the instructor for transportation.

ARCHLGY 126. Archaeobotany. 5 Units.

Archaeobotany, also known as paleoethnobotany, is the study of the interrelationships of plants and humans through the archaeological record. Knowledge and understanding of Archaeobotany sufficient to interpret, evaluate, and understand archaeobotanical data. Dominant approaches in the study of archaeobotanical remains: plant macro-remains, pollen, phytoliths, and starch grains in the identification of diet and environmental reconstruction.

Same as: ARCHLGY 226

ARCHLGY 127. Introduction to bioarchaeological Method and Theory. 3-5 Units.

This course deals with the skeletal biology of past populations, covering both the theoretical approaches and methods used in the study of skeletal and dental remains. Issues surrounding the reconstruction of the individual and population, which include age, sex and other paleodemographic factors, will be explored. The health and disease of teeth and bones, and the biomechanical and chemical analyses of bone will also be explored to illustrate how the variety of methods available to bioarchaeologists can be used to reconstruct past lifeways. While this course will be of primary interest to students interested in skeletal biology and archaeology, it is not exclusive to those pursuing careers in biological anthropology. The emphasis is on critical analysis, research skills, and communication skills that can be useful to students pursuing careers in other sub-disciplines of anthropology, laboratory research, or other lateral health-related fields. Required readings will be selected from current literature, and in some classes there will be practical material/exercises so that students can learn some of these techniques. The class is intended to be an interactive learning process in discussion format, and students are required to take an active part in class along with lectures.

Same as: ARCHLGY 227

ARCHLGY 132. The Anthropology of Heritage: Concepts, Contexts and Critique. 3-5 Units.

This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice.

Same as: ANTHRO 332A, ARCHLGY 232, ARCHLGY 332

ARCHLGY 134. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the iquest;black boxquest; of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores iquest;museum culturesquest;: representations of iquest;selfquest; and iquest;otherquest; within museums and institutional cultures of the museum world itself.

Same as: AMSTUD 134, ARCHLGY 234, ARTHIST 284B, CSRE 134, EDUC 214, NATIVEAM 134

ARCHLGY 135. Constructing National History in East Asian Archaeology. 3-5 Units.

Archaeological studies in contemporary East Asia share a common concern, to contribute to building a national narrative and cultural identity. This course focuses on case studies from China, Korea, and Japan, examining the influence of particular social-political contexts, such as nationalism, on the practice of archaeology in modern times.

Same as: ARCHLGY 235, CHINGEN 118, CHINGEN 218

ARCHLGY 137. Ethnographic Archaeologies. 4-5 Units.

How have ethnographic and archaeological methods been combined in anthropological research? What methodological and theoretical implications do these kinds of projects generate? Seminar topics will include ethnoarchaeology, ethnographies of archaeological practice, public archaeology and heritage ethics. Lecture and discussion.

Same as: ANTHRO 140A, ANTHRO 240A

ARCHLGY 139. The Aegean in the Neolithic and Bronze Age. 3-5 Units.

This course provides a survey of Aegean prehistory (7th-2nd millennium BC), focusing on traditions that were picked up or renegotiated, instead of taking a standpoint that evaluates phenomena as steps leading up to a `state-likequest; `palatialquest; society. It will draw on the regionquest; wealth of data, and will be set within a theoretically informed, problem-oriented framework, aiming to introduce students to current interpretations and debates, mainly through discussion of specific case-studies.

Same as: ANTHRO 115A, ANTHRO 215A, ARCHLGY 239

ARCHLGY 139A. Forgotten Africa: An Introduction to the Archaeology of Africa. 5 Units.

This course provides an introductory survey of Africaquest;s past from prehistoric times through the 19th-century. The course will challenge Western depictions of Africa as a dark continent `without historyquest; by highlighting the continentquest;s vibrant cultures, sophisticated technologies, complex political systems and participation in far-reaching commercial networks, all predating European colonization. In tandem, the course explores how these histories are mobilized in the production of negative ideas about Africa in contemporary discourse.

Same as: AFRICAST 139A, ANTHRO 139A

ARCHLGY 140. Post-Socialist Heritages: memorialisation, past mastering and nostalgia in Eurasia. 3-5 Units.

The post-Soviet story is far from resolved! While national identities and geopolitical alliances are being (re)negotiated across Eurasia, unresolved atrocities continue to reopen old wounds. Within this process the past is skillfully embraced to support and sustain conflicting political discourses. Drawing on a variety of highly topical case studies this course will explore the main dynamics and historically entrenched structures that define how the past plays out in the present since the disintegration of the Soviet Empire.

Same as: ARCHLGY 240, REES 240

ARCHLGY 142. Lost and found: Roman Coinage. 4-5 Units.

New trends in Roman numismatics (from the late Republic to the early Empire, 3rd-c. BCE-1st-c. CE). Archaeology from coins. Barter, money, and coinage. The introduction of coinage in Rome and the provinces. Making money (coin production), using money (monetary, non-monetary and ritual uses), losing money (coin circulation, hoards, single finds): contextual interpretations. Monetary systems: coins from Rome and coins from the provinces. Coinage and identity. False coinage.

Same as: ARCHLGY 242, CLASSART 232

ARCHLGY 143. Classical Archaeology Today: Ethical Issues of Excavation, Ownership, and Display. 3-5 Units.

(Formerly CLASSART 143.) While Classical archaeology engages with material remains from the Greco-Roman past, it is embedded within and inseparable from contemporary practice. Through an examination of case studies, legal statutes, professional codes, and disciplinary practices, this seminar discusses ethical dilemmas raised by Classical archaeology in the 21st century. We will focus on broad issues ranging from ownership, looting, reconstruction, and collecting to nationalism, religion, tourism, and media, with an eye toward defining ethical iquest;best practicesquest; for Classical archaeology.

ARCHLGY 145. Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean. 3-4 Units.

(Formerly CLASSART 145.) Why do we care about shipwrecks? What can sunken sites and abandoned ports tell us about our past? Focusing primarily on the archaeological record of shipwrecks and harbors, along with literary evidence and contemporary theory, this course examines how and why ancient mariners ventured across the "wine-dark seas" of the Mediterranean for travel, warfare, pilgrimage, and especially commerce. We will explore interdisciplinary approaches to the development of maritime contacts and communication from the Bronze Age through the end of Roman era. At the same time, we will engage with practical techniques of maritime archaeology, which allows us to explore the material record first hand.

Same as: CLASSICS 154

ARCHLGY 148. Ceramic Analysis for Archaeologists. 3-5 Units.

The analysis and interpretation of ceramic remains allow archaeologists to accomplish varied ends: establish a time scale, document interconnections between different areas, and suggest what activities were carried out at particular sites. The techniques and theories used to bridge the gap between the recovery of ceramics and their interpretation within archaeological contexts is the focus of this seminar.

Same as: ARCHLGY 248

ARCHLGY 151. Ten Things: An Archaeology of Design. 3 Units.

(Formerly CLASSART 113/213.) Connections among science, technology, society and culture by examining the design of a prehistoric hand axe, Egyptian pyramid, ancient Greek perfume jar, medieval castle, Wedgwood teapot, Edison's electric light bulb, computer mouse, Sony Walkman, supersonic aircraft, and BMW Mini. Interdisciplinary perspectives include archaeology, cultural anthropology, science studies, history and sociology of technology, cognitive science, and evolutionary psychology.

Same as: CLASSICS 151

ARCHLGY 153. Ancient Urbanism. 5 Units.

(Formerly CLASSART 112/212.) Archaeology of Greek, Roman and early Islamic cities and urbanism in the Mediterranean and western Asia. Comparison and contrast of the shaping role of religion and politics; definitions of public and private space, monumental buildings, houses, streets, infrastructure. Special themes are city and country connections; the problems of giant cities; cities in the longue dureacute;e. Case studies include Athens, Olynthos, Rome, Pompeii, Constantinople, Damascus and Cairo.

Same as: CLASSICS 153, URBANST 119

ARCHLGY 164. Cultural Heritage and Human Rights. 1 Unit.

This interdisciplinary research workshop will critically engage the issue of the growing currency of human rights discourse within cultural heritage. Epistemological and practical areas of tension between rights discourse and cultural discourse will be surveyed within the context of current global challenges facing heritage practice, conservation and archaeology. Topics will include the inequities of cultural recognition between North-South globalizations, questions of cultural property and rights, the role of tourism, and the impact of environmental conservation discourse on cultural rights.

Same as: ARCHLGY 64

ARCHLGY 169. Archaeology of Britannia. 3-4 Units.

Life in the Roman Empire: this course is a broad introduction to the archaeology of one of the best known provinces of the empire.

Same as: CLASSICS 169

ARCHLGY 190. Archaeology Directed Reading/Independent Study. 1-5 Unit.**ARCHLGY 195. Independent Study/Research. 1-5 Unit.**

Students conducting independent study and or research with archaeology faculty members.

ARCHLGY 199. Honors Independent Study. 5-6 Units.

Independent study with honors faculty adviser.

ARCHLGY 200. ARCHAEOLOGY OF TECHNOLOGY. 5 Units.

The course is an introduction to the social organization of material production and to the theoretical, ethnographic, and historical frameworks used by archaeologists to link the technologies of the past to salient sociocultural information about the people who employed them. Comparison of metallurgical, ceramic, lithic, and textile industries in different cultural and historical settings will inform critical discussions of how and to what extent analyses of artifacts, workshops, and industrial installations can provide insight into past societies.

Same as: ANTHRO 101B, ANTHRO 201B, ARCHLGY 100

ARCHLGY 202. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3-5 Units.

This interdisciplinary seminar explores challenges and avenues for furthering protection of the cultural heritage rights enshrined in the UN Declaration on the Rights of Indigenous Peoples. Using an innovative combination of online lectures by Stanford faculty and students, and recorded interviews with Indigenous leaders, artists, performers, scholars and museum professionals, the seminar will explore and problematize: historic and contemporary understandings of "Indigenous cultural heritage" and the impact of colonialism, urbanization and other forces on Indigenous identity and cultural heritage; current and potential domestic and international legal and non-legal frameworks for Indigenous cultural heritage protection and repatriation; past and present museum approaches to Indigenous peoples and their cultural material; and optimal methods of resolving repatriation disputes. While the seminar will cover primarily the situation of Indigenous peoples in North America, comparisons will be drawn with other regions of the globe. The on-campus component of the seminar will involve directed discussions of the online content, the online forum, assigned readings and short writing assignments. Students can choose between a final exam, paper or video project. Lunch is provided. Same as: ANTHRO 102C, ARCHLGY 101, CSRE 102, NATIVEAM 102

ARCHLGY 222. Pottery Analysis for Archaeologists: The Social and Material Dimensions of Ceramic Containers. 5 Units.

Due to the dominance of pottery in the archaeological record for the past 10,000 years, its analysis has attracted a great deal of research attention, making it imperative that all archaeologists have at least a working knowledge of ceramics. This course provides classroom and laboratory perspectives for understanding the information about ancient society, economy, and culture that can be plausibly derived from pottery and the visual, structural, and compositional methods that best help obtain that information.

ARCHLGY 224. Archaeology of Food: production, consumption and ritual. 3-5 Units.

This course explores many aspects of food in human history from an archaeological perspective. We will discuss how the origins of agriculture helped to transform human society; how food and feasting played a prominent role in the emergence of social hierarchies and the development of civilization; and how various foodways influenced particular cultures. We will also conduct experimental studies to understand how certain methods of food procurement, preparation, and consumption can be recovered archaeologically.

Same as: ARCHLGY 124

ARCHLGY 226. Archaeobotany. 5 Units.

Archaeobotany, also known as paleoethnobotany, is the study of the interrelationships of plants and humans through the archaeological record. Knowledge and understanding of Archaeobotany sufficient to interpret, evaluate, and understand archaeobotanical data. Dominant approaches in the study of archaeobotanical remains: plant macro-remains, pollen, phytoliths, and starch grains in the identification of diet and environmental reconstruction.

Same as: ARCHLGY 126

ARCHLGY 227. Introduction to bioarchaeological Method and Theory. 3-5 Units.

This course deals with the skeletal biology of past populations, covering both the theoretical approaches and methods used in the study of skeletal and dental remains. Issues surrounding the reconstruction of the individual and population, which include age, sex and other paleodemographic factors, will be explored. The health and disease of teeth and bones, and the biomechanical and chemical analyses of bone will also be explored to illustrate how the variety of methods available to bioarchaeologists can be used to reconstruct past lifeways. While this course will be of primary interest to students interested in skeletal biology and archaeology, it is not exclusive to those pursuing careers in biological anthropology. The emphasis is on critical analysis, research skills, and communication skills that can be useful to students pursuing careers in other sub-disciplines of anthropology, laboratory research, or other lateral health-related fields. Required readings will be selected from current literature, and in some classes there will be practical material/exercises so that students can learn some of these techniques. The class is intended to be an interactive learning process in discussion format, and students are required to take an active part in class along with lectures.

Same as: ARCHLGY 127

ARCHLGY 232. The Anthropology of Heritage: Concepts, Contexts and Critique. 3-5 Units.

This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice.

Same as: ANTHRO 332A, ARCHLGY 132, ARCHLGY 332

ARCHLGY 234. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the black box of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores museum cultures: representations of self and other; within museums and institutional cultures of the museum world itself.

Same as: AMSTUD 134, ARCHLGY 134, ARTHIST 284B, CSRE 134, EDUC 214, NATIVEAM 134

ARCHLGY 235. Constructing National History in East Asian Archaeology. 3-5 Units.

Archaeological studies in contemporary East Asia share a common concern, to contribute to building a national narrative and cultural identity. This course focuses on case studies from China, Korea, and Japan, examining the influence of particular social-political contexts, such as nationalism, on the practice of archaeology in modern times.

Same as: ARCHLGY 135, CHINGEN 118, CHINGEN 218

ARCHLGY 239. The Aegean in the Neolithic and Bronze Age. 3-5 Units.

This course provides a survey of Aegean prehistory (7th-2nd millennium BC), focusing on traditions that were picked up or renegotiated, instead of taking a standpoint that evaluates phenomena as steps leading up to a "state-like" society. It will draw on the regional wealth of data, and will be set within a theoretically informed, problem-oriented framework, aiming to introduce students to current interpretations and debates, mainly through discussion of specific case-studies.

Same as: ANTHRO 115A, ANTHRO 215A, ARCHLGY 139

ARCHLGY 240. Post-Socialist Heritages: memorialisation, past mastering and nostalgia in Eurasia. 3-5 Units.

The post-Soviet story is far from resolved! While national identities and geopolitical alliances are being (re)negotiated across Eurasia, unresolved atrocities continue to reopen old wounds. Within this process the past is skillfully embraced to support and sustain conflicting political discourses. Drawing on a variety of highly topical case studies this course will explore the main dynamics and historically entrenched structures that define how the past plays out in the present since the disintegration of the Soviet Empire.

Same as: ARCHLGY 140, REES 240

ARCHLGY 242. Lost and found: Roman Coinage. 4-5 Units.

New trends in Roman numismatics (from the late Republic to the early Empire, 3rd-c. BCE-1st-c. CE). Archaeology from coins. Barter, money, and coinage. The introduction of coinage in Rome and the provinces. Making money (coin production), using money (monetary, non-monetary and ritual uses), losing money (coin circulation, hoards, single finds): contextual interpretations. Monetary systems: coins from Rome and coins from the provinces. Coinage and identity. False coinage.

Same as: ARCHLGY 142, CLASSART 232

ARCHLGY 248. Ceramic Analysis for Archaeologists. 3-5 Units.

The analysis and interpretation of ceramic remains allow archaeologists to accomplish varied ends: establish a time scale, document interconnections between different areas, and suggest what activities were carried out at particular sites. The techniques and theories used to bridge the gap between the recovery of ceramics and their interpretation within archaeological contexts is the focus of this seminar.

Same as: ARCHLGY 148

ARCHLGY 270. Heritage Ecologies: Heritage, Culture, and the Environment. 3-5 Units.

Conceptual and theoretical approaches to examine cultural and natural heritage from an interdisciplinary perspective. We ask: What are heritage ecologies? How are natural and cultural heritages interpreted, managed, and defined? Do heritage managers privilege nature and conservation over cultural heritage? This course uses archaeological data, ethnographic methods, archival analysis, and guest lectures to examine case studies representing key issues including conservation, indigenous rights, cultural landscapes, heritage in conflict, international heritage policy, and the use of expert knowledge in heritage contexts.

ARCHLGY 299. INDEPENDENT STUDY/RESEARCH. 1-5 Unit. nnINDEPENDENT STUDY/RESEARCH.**ARCHLGY 304C. The Archaeology of Ancient China. 5 Units.**

Early China from the perspective of material remains unearthed from archaeological sites; the development of Chinese culture from early hominid occupation nearly 2 million years ago through the development of agriculture in the Neolithic period and complex society in the Bronze Age to the political unification of China under the Qin Dynasty. Continuity of Chinese culture from past to present, history of Chinese archaeology, relationships between archaeology and politics, and food in early China.

Same as: ARCHLGY 104C

ARCHLGY 306A. Museums and Collections. 5 Units.

Practical, theoretical, and ethical issues which face museums and collections. Practical collections-based work, museum visits, and display research. The roles of the museum in contemporary society. Students develop their own exhibition and engage with the issues surrounding the preservation of material culture.

Same as: ARCHLGY 106A

ARCHLGY 319. Archaeological Theory: Graeco-Roman Antiquity. 3-5 Units.

The ways that archaeology is a medium of understanding Classical antiquity. We will selectively and deeply review themes in archaeological theory as they inform the academic study of Graeco-Roman antiquity. The aim is not to acquire comprehensive coverage of contemporary archaeological theory, but to focus on concepts, methodologies and practices that have a strong connection with agendas in contemporary Classics, and to explore interdisciplinary links through social and cultural theory and critique, performance studies, science studies (including the history and sociology of technology), design studies and approaches to material culture.

ARCHLGY 327. Doing Business in Classical Antiquity: Mediterranean Exchange. 3-5 Units.

Exchange was everywhere in the Mediterranean, from the individual household to the state. Yet the specific models by which goods changed hands were as varied as the ideas and values that moved alongside them. This seminar will explore theoretical approaches to commercial and non-commercial exchange, drawing primarily on the crucial but uneven bodies of archaeological evidence and historical sources in an effort to investigate the simple but hardly straightforward question of how business was undertaken in the Greco-Roman world.

Same as: CLASSICS 352

ARCHLGY 332. The Anthropology of Heritage: Concepts, Contexts and Critique. 3-5 Units.

This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice.

Same as: ANTHRO 332A, ARCHLGY 132, ARCHLGY 232

ARCHLGY 335. Models in Archaeology. 3-5 Units.

(Formerly CLASSART 335.) This seminar explores how we can use archaeological sources to build models of Graeco-Roman antiquity. A model is defined as a systematic and schematic representation of the way the ancient world worked, and particularly by using social and cultural theory. We will take in classic works of Marx and Weber, as well as contemporary approaches. A key objective is for class members to connect this most important aspect of social science to their own research project.

ARCHLGY 342. Archaeology of Roman Slavery. 4-5 Units.

(Formerly CLASSART 342.) The archaeological study of Roman slavery has been severely limited by a focus on identifying the traces of slaves in the material record. This seminar explores a range of newer and more broadly conceived approaches to understanding slavery and slaves' experiences, including spatial analysis, bioarchaeology, epigraphy, visual imagery, and comparative archaeologies of slavery. Students will learn about the current state of research, work with different kinds of evidence and a range of methodologies, and develop original research projects of their own.

ARCHLGY 353. Archaeology: Post-Humanist Agendas. 3-5 Units.

How do people and their artifacts connect? Just what is the subject of archaeological history? A seminar reviewing the latest materialist approaches in archaeology and heritage studies.

Same as: CLASSICS 353

ARCHLGY 367. Mediterranean Networks. 3-5 Units.

The the ancient Mediterranean was highly interconnected is common knowledge, and the idea of integration has become a defining factory in current approaches to Greco-Roman cultural identities. Yet how connectivity functioned, and how we should effectively analyze it, are less well understood. This seminar highlights emerging network approaches--both broad theoretical network paradigms and specific network science methodologies--as conceptual tools for archaeological and historical investigations of cultural interaction (economic, religious, artistic, colonial, etc.) across the Mediterranean world.

Same as: CLASSICS 367

ARCHLGY 371. Proposal Writing for Archaeologists. 3 Units.

The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor.

Same as: ANTHRO 371

Art History Courses

ARTHIST 1A. Introduction to the Visual Arts: Prehistoric through Medieval. 5 Units.

A survey of the art and architecture from the cave paintings of Lascaux to the Gothic Cathedrals of France; the material is organized both chronologically and thematically and covers a multiplicity of religions: pagan, Christian, and Islamic.

Same as: CLASSICS 56

ARTHIST 1B. Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present. 5 Units.

This course surveys the history of Western painting from the start of the 14th century to the late 20th century and our own moment. Lectures introduce important artists (Giotto, Rembrandt, Velazquez, Goya, Manet, Matisse, Pollock, and others), and major themes associated with the art of particular periods and cultures. The course emphasizes training students to look closely at - and to write about - works of art.

ARTHIST 2. Asian Arts and Cultures. 5 Units.

An introduction to major monuments, themes, styles, and media of East and South Asian visual arts, in their social, literary, religious, and political contexts. Through close study of primary monuments of architectural, pictorial, and sculptural arts and related texts, this course will explore ritual and mortuary arts; Buddhist arts across Asia; narrative and landscape images; and courtly, urban, monastic, and studio environments for art from Bronze Age to modern eras.

Same as: JAPANGEN 60

ARTHIST 3. Introduction to World Architecture. 5 Units.

This lecture course surveys the history of architecture and urbanism, from the first societies to the present, in Europe, West and East Asia, the Americas, and Africa. The course progresses by case studies of exemplary monuments and cities, and examines the built environment as both cultural artifact and architectural event. It considers the social and political circumstances of architectural invention as well as plumbing the depth of artistic context by which particular formal choices resonate with an established representational culture.

Same as: CLASSICS 54

ARTHIST 10SC. Photography: Truth or Fiction or.... 2 Units.

"All photographs are accurate. None is the truth." Richard Avedon (1923-2004)
The invention of photography inspired the belief that there could be a truthful and objective way to visually record the world. From portraits to travel photographs to documentary, photography has influenced how modern history is understood and remembered. Yet, a photograph is a manipulated image, shaped by the perspective of the photographer and further framed by its printing, presentation, and interpretation. The complex ethical and political issues associated with photography significantly impact how events and moments are recorded by history. Consider, for example, the US government's 18-year ban (ended in 2009) on photographing the flag-draped coffins of America's war dead as their bodies are returned to the United States. What matters most: protecting the privacy of military families or protecting American citizens from the death toll of war? Over the past decade, the number of photographers has increased exponentially, further blurring the boundary between what is truth and what is fiction. Even the concept of "gatekeepers" is obsolete: anyone with a smartphone is armed with a camera and can create their own stories, their own records, and their own truths. Further, the Internet grants nearly universal freedom to document and disseminate images that record, incriminate, illuminate, persuade, enrage, and glorify. In this course, we will examine the ethical parameters of photography and the many ways in which photography contributes to presenting powerful truths, creating compelling fictions, and recontextualizing history.
The course will feature opportunities to work with photographs in the Cantor's collection and to explore the many photographic communities of the Bay Area including extensive field trips to museums, galleries, artists studios, private collections, photo studios, and more. Our discussions will also be informed by course readings. In addition, special sessions covering photographic techniques will familiarize students with the diversity of the medium and hands on experience to create work, if interested. No prior experience required. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

ARTHIST 80N. The Portrait: Identities in Question. 3 Units.

Most of us hold libraries of hundreds or thousands of images: portraits, self-portraits, more or less instantly available posed images of ourselves and others. For most of human history, before the development of portable and digital cameras, portraiture was a much rarer and more deliberate social act and cultural practice, involving special materials and techniques, encounters with expert portraitists or photographers, and established settings for display. What almost all portraits, of whatever time or cultural place, have in common are presentations of social identities, roles, or persona, as well as a potential fascination and power that may be based in our neurological capacities for facial recognition and reading of facial expressions. This introductory seminar will explore many aspects of this basically simple category of images of particular persons. Our point of departure will be from the history of art, focusing on portrait sculptures, paintings, and photographs from many eras and cultures, some of which are among the most studied and discussed of all artistic monuments. We will consider techniques and approaches of portrait making, including the conventions that underlie seemingly realistic portraits, posing, the portrait situation, and portrait genres. Our primary focus will be on the multiple purposes of portraiture, from commemoration, political glorification, and self-fashioning to making claims of social status, cultural role, and personal identity. We will also discuss the changing status of portraiture under modern states of social dislocation, technological change, and psychoanalytic interrogation, and in postmodern conditions of multi-mediated realities and distributed subjectivities. Along the way, we will see that our understandings of portraiture benefits from the approaches and insights of many fields: political and social history, anthropology, neuroscience, and literary studies among others.

ARTHIST 99A. Student Guides at the Cantor Center for the Visual Arts. 2 Units.

Open to all Stanford students. Public speaking, inquiry methods, group dynamics, theme development, and art-related vocabulary. Introduction to museum administration; art registration, preparation and installation; rights and reproduction of images; exhibition planning; and art storage, conservation, and security. Students research, prepare, and present discussions on art works of their choice.

ARTHIST 100N. The Artist in Ancient Greek Society. 3 Units.

Given the importance of art to all aspects of their lives, the Greeks had reason to respect their artists. Yet potters, painters and even sculptors possessed little social standing. Why did the Greeks value the work of craftsmen but not the men themselves? Why did Herodotus dismiss those who worked with their hands as "mechanics?" What prompted Homer to claim that "there is no greater glory for a man than what he achieves with his own hands," provided that he was throwing a discus and not a vase on a wheel? Painted pottery was essential to the religious and secular lives of the Greeks. Libations to the gods and to the dead required vases from which to pour them. Economic prosperity depended on the export of wine and oil in durable clay containers. At home, depictions of gods and heroes on vases reinforced Greek values and helped parents to educate their children. Ceramic sets with scenes of Dionysian excess were reserved for elite symposia from which those who potted and painted them were excluded. Sculptors were less lowly but even those who carved the Parthenon were still regarded as "mechanics," with soft bodies and soft minds (Xenophon) "indifferent to higher things" (Plutarch). The seminar addresses these issues. Students will read and discuss texts, write response papers and present slide lectures and gallery talks on aspects of the artist's profession.

Same as: CLASSICS 18N

ARTHIST 101. Archaic Greek Art. 4 Units.

In the decades 480-460, just before work began on the Parthenon, the sculptor Myron, creator of the Discus-Thrower, was even more celebrated for his bronze cow. Ancient authors describe an image so palpably alive that shepherds threw stones at her, thinking that she had strayed from the herd, and bulls vied for her attention. A century later, the quest for mimesis prompted a contest between two artists. Zeuxis painted a bunch of grapes seductive enough to attract hungry birds; Parrhasios then added a linen curtain, which Zeuxis asked to be removed from his painting. Zeuxis conceded defeat since he had fooled only birds, whereas Parrhasios had deceived an artist. This course explores the art and culture of the ancestors of these men. The Greeks of the archaic period (1000-480) would have understood the painters' competitive zeal, but only toward the end of the period would they have recognized naturalism as an artistic aim. Earlier Greek art is more abstract than life-like, closer to Calder than Michelangelo. In the eighth century Homer's descriptions of the rippling muscles (and egos) of his heroes, and the grief of Achilles, horses, evoke living men and sentient animals, but his fellow sculptors and painters prefer abstraction. This changes in the seventh century as a result of commercial contacts with the Near East and Egypt. Imported bronzes, ivories and other Near Eastern exotica alerted Greek artists to a wider range of subjects, techniques and intentions, including naturalism. Later in the century, Greek expatriates learned the art of carving hard stone from Egyptian masters and soon marble sculpture and architecture spread throughout Greece. In the course of the sixth and early fifth centuries Greek artists assimilate what they had borrowed, compete with one another, obey and disobey their teachers, test the tolerance of the gods and eventually produce works of art that speak with a Greek accent. When the Persians invaded the Acropolis in 480 and 479, they encountered artifacts with little trace of alien influence or imprint and, at Salamis and Plataea, fought decisive battles in which the Greeks prevailed. In the aftermath of the war, as the Greeks rebuilt their cities and their lives, Myron's cow reminded them of their debts to other cultures and their resolve to remain true to their own.

Same as: CLASSICS 161

ARTHIST 102. Empire and Aftermath: Greek Art from the Parthenon to Scopas. 4 Units.

The class begins with the art, architecture and political ideals of Periclean Athens, from the emergence of the city as the political and cultural center of Greece in 450 to its defeat in the Peloponnesian War in 404. It then considers how Athens and the rest of Greece proceed in the fourth century to rebuild their lives and the monuments that define them. Earlier artistic traditions endure, with subtle changes, in the work of sculptors such as Kephisodotos. Less subtle are the outlook and output of his son Praxiteles. In collaboration with Phryne, his muse and mistress, Praxiteles challenged the canons and constraints of the past with the first female nude in the history of Greek sculpture. His gender-bending depictions of gods and men were equally audacious, their shiny surfaces reflecting Plato's discussion of Eros and androgyny. Scopas was also a man of his time but pursued different interests. Drawn to the inner lives of men and woman, his tormented Trojan War heroes and victims are still scarred by memories of the Peloponnesian War, and a world away from the serene faces of the Parthenon. His famous Maenad, a devotee of Dionysos who has left this world for another, belongs to the same years as Euripides' Bacchae and, at the same time, anticipates the torsion and turbulence of Bernini and the Italian Baroque. In the work of these and other fourth century personalities, the stage is set for Alexander the Great and his conquest of a kingdom extending from Greece to the Indus River. (Formerly CLASSART 102).

Same as: ARTHIST 302, CLASSICS 162

ARTHIST 105. Art & Architecture in the Medieval Mediterranean. 4 Units.

Chronological survey of Byzantine, Islamic, and Western Medieval art and architecture from the early Christian period to the Gothic age. Broad art-historical developments and more detailed examinations of individual monuments and works of art. Topics include devotional art, court and monastic culture, relics and the cult of saints, pilgrimage and crusades, and the rise of cities and cathedrals.

Same as: ARTHIST 305, CLASSICS 172

ARTHIST 105B. Medieval Journeys: Introduction through the Art and Architecture. 3-5 Units.

The course explores the experience and imagination of medieval journeys through an interdisciplinary, cross-cultural, and skills-based approaches. As a foundations class, this survey of medieval culture engages in particular the art and architecture of the period. The Middle Ages is presented as a network of global economies, fueled by a desire for natural resources, access to luxury goods and holy sites. We will study a large geographical area encompassing the British Isles, Europe, the Mediterranean, Central Asia, India, and East Africa and trace the connectivity of these lands in economic, political, religious, and artistic terms from the fourth to the fourteenth century C.E. The students will have two lectures and one discussion session per week. Depending on the size of the class, it is possible that a graduate student TA will run the discussion session. Our goal is to give a skills-oriented approach to the Middle Ages and to engage students in creative projects that will satisfy 1. Ways-Creative Expression requirement as well as one of the following two: Ways-Analytical Interpretive or Ways-Engaging Difference.

Same as: DLCL 123

ARTHIST 106. Byzantine Art and Architecture, 300-1453 C.E.. 4 Units.

(Formerly CLASSART 106/206.) This course and its study trip to the Getty (Los Angeles) to view the new Byzantine exhibition explores the art and architecture of the Eastern Mediterranean: Constantinople, Jerusalem, Alexandria, Antioch, Damascus, Thessaloniki, and Palermo, 4th-15th centuries. Applying an innovative approach, we will probe questions of phenomenology and aesthetics, focusing our discussion on the performance and appearance of spaces and objects in the changing diurnal light, in the glitter of mosaics and in the mirror reflection and translucency of marble.

Same as: ARTHIST 306, CLASSICS 171

ARTHIST 106B. What Do Medieval Images Want? Theories of the Image in Byzantium, Islam, and the Latin West. 4 Units.

What is an image? The medieval response was tied to religious identity. At the core of the debate was whether the image was just a mimetic representation or a living entity: matter imbued with divine spirit. Byzantium, Islam, and the Latin West each developed their own positions and used it as a platform for political legitimacy. We will study the development of the medieval image theories by focusing on specific monuments and objects and by reading both primary sources in translation and current scholarly interpretations.

Same as: ARTHIST 306B

ARTHIST 107A. St. Petersburg, a Cultural Biography: Architecture, Urban Planning, the Arts. 4 Units.

The most premeditated city in the whole world, according to Dostoevsky; created in 1703 by Peter the Great as a counterpoise to Moscow and old Russian culture; planned as a rational, west-European-appearing capital city of the Russian Empire. St. Petersburg's history through works of its artists, architects, urban planners, writers, and composers.

ARTHIST 108. Virginity and Power: Mary in the Middle Ages. 4 Units.

The most influential female figure in Christianity whose state cult was connected with the idea of empire. The production and control of images and relics of the Virgin and the development of urban processions and court ceremonies through which political power was legitimized in papal Rome, Byzantium, Carolingian and Ottonian Germany, Tuscany, Gothic France, and Russia.

Same as: ARTHIST 308

ARTHIST 109. The Book in the Medieval World. 4 Units.

Studying the design and function of books in medieval society from the 7th to the 15th century, and the ways in which manuscripts are designed to meet (and shape) the cultural and intellectual demands of their readers. Major themes are the relationships between text and image, and between manuscripts and other media; the audience and production context of manuscripts; and changing ideas about pictorial space, figural style, page design, and progression through the book. Final project may be either a research paper or an original artist's book.

Same as: ARTHIST 309

ARTHIST 109D. Means, Media and Mode: An Introduction to Western Medieval Art. 4 Units.

The course is an introduction to western medieval art approached primarily through distinctions of materials and media. We work with a combination of medieval and later sources, often engaging with the modern objects and spaces available for study on campus in order to create new perspectives on the historical material. Medieval case studies are chosen that raise particularly complex issues of materiality, mixed-media form, and cross-media citation.

Same as: ARTHIST 309D

ARTHIST 111. Introduction to Italian Renaissance, 1420-1580. 4 Units.

New techniques of pictorial illusionism and the influence of the humanist revival of antiquity in the reformulation of the pictorial arts in 15th-century Italy. How different Italian regions developed characteristic artistic cultures through mutual interaction and competition.

Same as: ARTHIST 311

ARTHIST 114. Mystical Naturalism: Van Eyck, Dürer, and the Northern Renaissance. 4 Units.

A survey of the major innovations in Northern European painting ca. 1400-1600, in light of the social status of the artist between city and court. In the early fifteenth century painters began to render an idealized world down to its smallest details in ways that engaged new devotional practices. Later Hieronymus Bosch would identify the painter's imagination with the bizarre and grotesque. In response to Renaissance humanism, some painters introduced classical mythology and allegorical subjects in their works, and many traveled south to absorb Italianate pictorial styles. We will be visiting art museums in San Francisco and Stanford. May be repeat for credit.

Same as: ARTHIST 314

ARTHIST 117. Picturing the Papacy, 1300-1850. 4 Units.

Popes deployed art and architecture to glorify their dual spiritual and temporal authority, being both Christ's vicars on earth and rulers of state. After the return of the papacy from Avignon, Rome underwent numerous campaigns of renovation that staged a continuity between the pontiffs and the ancient Roman emperors. Patronage of art and architecture became important tools in the fight against Protestantism. Artists include Botticelli, Michelangelo, Caravaggio, and Bernini.

Same as: ARTHIST 317

ARTHIST 118. Titian, Veronese, Tintoretto. 4 Units.

The course addresses the ways in which Venetian painters of the sixteenth century redefined paradigms of color, design, and invention. Themes to be examined include civic piety, new kinds of mythological painting, the intersection between naturalism and eroticism, and the relationship between art and rituals of church and statecraft.

Same as: ARTHIST 318

ARTHIST 118N. Pagan Mythology and the Making of Modern Europe. 3 Units.

Once a religion loses its claim to truth it enters the sphere of the mythic. From the fifteenth through the seventeenth century, European artists turned to the legends and poetry of Greco-Roman paganism for pictorial subjects. What roles could Venus and Mars, Mercury and Minerva play in a Christian culture? Artists and humanists had different answers to this question. As relics from the past the stories of the ancient gods could serve as the prehistory of worldly and religious institutions and hence legitimize them. Or pagan myth, because of its alien nature, could convey fantasies of the body, which could not be articulated otherwise. Among the artists who explored creatively the ancient legends were Donatello, Botticelli, Michelangelo, Raphael, Velazquez, Rubens, Rembrandt, Bernini, and Poussin. Next to ancient authors such as Homer and Ovid we shall be reading excerpts from the humanists Dante, Boccaccio, Petrarch, and Vasari as we explore word/image relationships. The seminar includes excursions to the Cantor Arts Center at Stanford University to look at Old Master prints from the museum's storage, not normally on display, and we shall study paintings and sculptures with mythological subjects in the Legion of Honor, the Fine Arts Museum of San Francisco.

ARTHIST 120. Living in a Material World: Seventeenth-century Dutch and Flemish Painting. 4 Units.

Painting and graphic arts by artists in Flanders and Holland from 1600 to 1680, a period of political and religious strife. Historical context; their relationship to developments in the rest of Europe and contributions to the problem of representation. Preferences for particular genres such as portraits, landscapes, and scenes of everyday life; the general problem of realism as manifested in the works studied.

Same as: ARTHIST 320

ARTHIST 121. 18th-Century Art in Europe, ca 1660-1780. 4 Units.

Major developments in painting across Europe including the High Baroque illusionism of Bernini, the founding of the French Academy, and the revival of antiquity during the 1760s, with parallel developments in Venice, Naples, Madrid, Bavaria, and London. Shifts in themes and styles amidst the emergence of new viewing publics. Artists: the Tiepolos, Giordano, Batoni, and Mengs; Ricci, Pellegrini, and Thornhill; Watteau and Boucher; Chardin and Longhi; Reynolds and West; Hogarth and Greuze; Vien, Fragonard, and the first works by David. Additional discussion for graduate students.

Same as: ARTHIST 321

ARTHIST 122. The Age of Revolution: Painting in Europe 1780-1830. 4 Units.

Survey of European painting bracketed by the French Revolution and the end of the Napoleonic conquest. Against this background of social upheaval, the visual arts were profoundly affected by shifts in patronage, public, and ideas about the social utility of image making. Lectures and readings align ruptures in the tradition of representation with the unfolding historical situation, and trace the first manifestations of a "romantic" alternative to the classicism that was the cultural legacy of pre-Revolutionary Europe.

Same as: ARTHIST 322

ARTHIST 123N. Thinking about Visual Attention : from Balzac to Facebook. 3 Units.

Writing in 1829, the French author Honoré de Balzac celebrated the acute visual attention of the flâneur, a character he closely associates with modern life: "To flâneur is to take pleasure, to collect flashes of wit, to admire sublime scenes of unhappiness, of love, of joy as well as graceful or grotesque portraits, to thrust one's attention into the depths of a thousand lives." In July 2012 the Huffington Report pointed to a fact of modern life: "On city streets, in suburban parking lots and in shopping centers, there is usually someone strolling while talking on a phone, texting with his head down, listening to music, or playing a video game. The problem isn't as widely discussed as distracted driving, but the danger is real." These two very different ways of circulating in urban space suggest that a major shift in how we humans relate to our environment has occurred over the course of nearly two centuries--especially in the densely populated spaces of modern cities. Where the great spectacle of urban life was a marvel of the nineteenth century, today's inhabitants want mainly to block it out by insulating themselves in a cocoon of favorite music or personal conversation, whether by voice or text, that they risk stepping into traffic, colliding with lightposts, or bumping into others similarly self-absorbed. This seminar proposes to think about the hows and whys of that important shift from the unique perspective of art history, a field of study especially attuned to the limits and exigencies of visual acuity. We will explore the topic across a range of media, from daguerreotypes to stereoscopes, from paintings to films, from television screen to the hand-held displays of our smartphones.

ARTHIST 124. The Age of Naturalism, Painting in Europe 1830-1874. 4 Units.

Survey of European painting from the heyday of Romanticism to the first Impressionist exhibition. Lectures and readings focus on the tensions between traditional forms and ambitions of history painting and the challenge of "modern" subjects drawn from contemporary life. Attention to the impact of painting in the open-air, and the effect of new imaging technologies- notably lithography and photography - to provide "popular" alternatives to the hand-wrought character and elitist appeal of "high art" cultural forms.

Same as: ARTHIST 324

ARTHIST 126. Post-Naturalist Painting. 4 Units.

How conceptual models from language, literature, new technologies, and scientific theory affected picture making following the collapse of the radical naturalism of the 1860s and 1870s. Bracketed in France by the first Impressionist exhibition (1874) and the first public acclamation of major canvases by Matisse and Picasso (1905), the related developments in England, Germany, Belgium, and Austria. Additional weekly discussion for graduate students. Recommended: some prior experience with 19th-century art.

Same as: ARTHIST 326

ARTHIST 127A. African Art and Politics, c. 1900 - Present. 4 Units.

This course explores the relationship between art and politics in twentieth century Africa. Artistic production and consumption is considered in the context of various major political shifts, from the experience of colonialism to the struggle against Apartheid. Each week we will look closely at different works of art and examine how artists and designers responded to such challenges as independence, modernization and globalization. We will look at painting, sculpture, religious art, public and performance art, photography and film. How western perceptions and understanding of African art have shifted, and how museums have framed African art throughout the twentieth century will remain important points of discussion throughout the course.

Same as: AFRICAST 127

ARTHIST 132. American Art and Culture, 1528-1910. 4 Units.

The visual arts and literature of the U.S. from the beginnings of European exploration to the Civil War. Focus is on questions of power and its relation to culture from early Spanish exploration to the rise of the middle classes. Cabeza de Vaca, Benjamin Franklin, John Singleton Copley, Phillis Wheatley, Charles Willson Peale, Emerson, Hudson River School, American Genre painters, Melville, Hawthorne and others.
Same as: AMSTUD 132, ARTHIST 332

ARTHIST 140N. Couture Culture: Fashion, Art & Modernism from Manet to Mondrian. 3-4 Units.

This course examines the ways in which fashion has figured in the construction of modern experience and how it has been represented in the visual arts, primarily in Europe and the United States between about 1850 and 1965. Alongside the emergence of haute couture, the rise of the ready-to-wear industry during this period coincided with the consolidation of the department store; these institutions contributed to the development of a culture of consumption and display that continues to shape our lives today. Manet, Degas and other Impressionist painters were sensitive to the nuances of fashion, which they, like Baudelaire, saw as an aspect of modernity indispensable to their art. Clothing was no less significant in the context of the Russian revolution, when Alexander Rodchenko, for example, outfitted himself in a home-made version of workers' overalls in order to reinforce his identification with factory laborers and thereby to suggest the breaking down of class distinctions. The course also explores the significance of fashion for an abstract painter like Piet Mondrian, but, more to the point, we look at how Mondrian's work was appropriated to the world of fashion by Yves Saint-Laurent, who assured that Mondrian's signature geometric style would become instantly recognizable and eventually function as a hugely popular brand. The circuits through which we can trace the historical trajectory of fashion will illuminate its importance for understanding many facets of modern culture.

ARTHIST 142. Architecture Since 1900. 4 Units.

Art 142 is an introduction to the history of architecture since 1900 and how it has shaped and been shaped by its cultural contexts. The class also investigates the essential relationship between built form and theory during this period.

Same as: CEE 32G

ARTHIST 142A. Home Alone: Houses that Artists and Thinkers Design for Themselves. 4 Units.

This course investigates houses, hideaways, and studios that artists and thinkers have designed for themselves with varying degrees of self-consciousness, from subconscious images of the self to knowing stages for the contemplative life. Case studies range from antiquity to the present, from the studio-house of Peter Paul Rubens to that of Kurt Schwitters; from the house-museum of Sir John Soane to the Vittoriale of Gabriele D'Annunzio; from the philosophical dwelling of the Emperor Hadrian to that of Ludwig Wittgenstein.

Same as: ARTHIST 342A

ARTHIST 143A. American Architecture. 4 Units.

A historically based understanding of what defines American architecture. What makes American architecture American, beginning with indigenous structures of pre-Columbian America. Materials, structure, and form in the changing American context. How these ideas are being transformed in today's globalized world.

Same as: ARTHIST 343A

ARTHIST 144. On Looking: Art, Obscenity, and the Ethics of Spectatorship. 4 Units.

This course considers the ethics of looking at art, photography, and other forms of visual representation that have been declared obscene or indecent, whether by religious authorities, government officials, community representatives, or legal opinions. What are the ethical stakes of looking at such materials? And what are the ethical implications of looking away and insisting that others do so as well? The creation of vanguard art since the late 19th-century has often been linked to the concept of transgression. Is it, we will ask, the modern artist's responsibility to challenge accepted standards of representation and the protocols of looking? If so, how are we, as viewers and students of art, to distinguish between legitimate art and unfit obscenity?.

ARTHIST 145. Culture Wars: Art and Social Conflict in the USA, 1890-1950. 4 Units.

This course examines social conflicts and political controversies in American culture through the lens of visual art and photography. We consider how visual images both reflect and participate in the social and political life of the nation and how the terms of citizenship have been represented; and, at times, contested; by artists throughout the first half of the 20th century. The class explores the relation between American art and the body politic by focusing on issues of poverty, war, censorship, consumerism, class identity, and racial division.
Same as: AMSTUD 145M, ARTHIST 345, FEMGEN 145

ARTHIST 146X. What is Contemporary Art, and Where Did it Come From?. 3 Units.

"Contemporary art challenges us to question our assumptions," wrote philanthropist and collector Eli Broad. "It asks us to think beyond the limits of conventional wisdom." This course aims to introduce both the difficulties and the great rewards presented by Contemporary Art (1970 to the present). Examining the historical foundations of Contemporary Art in the 18th, 19th, and 20th centuries, we will learn about the century's most game-changing art practices and movements such as cubism, abstract expressionism, conceptual art, and performance art. Working from the assumption that art in its moment of production was always contemporary, the course will organize content through various thematic lenses such as "portraiture and vision", "the photographic", and "the hand and the mind." Lectures occur both as traditional classroom sessions as well as on-site sessions at Stanford University's public sculpture collection, the Cantor Art Center, and the Anderson Collection, emphasizing close and direct engagement with artworks. Drawing on these experiences and on close readings of key texts, assignments will range from short essays to online curation to gallery talks. Students will develop and enhance their critical visual literacy and ability to grapple with the unknown through skills of creative synthesis, identifying patterns across time and space, and exercising conceptual and visual analysis. Broadly, the goals of the class are to understand the present through the past, to demystify the often confusing nature of contemporary art, and to question why art matters and how.

ARTHIST 147. MODERNISM AND MODERNITY. 4 Units.

The development of modern art and visual culture in Europe and the US, beginning with Paris in the 1860s, the period of Haussmann, Baudelaire and Manet, and ending with the Bauhaus and Surrealism in the 1920s and 30s. Modernism in art, architecture and design (e.g., Gauguin, Picasso, Duchamp, Mondrian, Le Corbusier, Breuer, Dali) will be explored as a compelling dream of utopian possibilities involving multifaceted and often ambivalent, even contradictory responses to the changes brought about by industrialization, urbanization, and the rise of mass culture.
Same as: ARTHIST 347

ARTHIST 148. Art and the First Amendment: Testing the Limits of Expression. 5 Units.

This course will take place in Washington D.C.

Same as: SIW 148

ARTHIST 149S. Art After the A-bomb: American and European Art, 1945-1989. 4 Units.

This course surveys the major movements, figures, and themes in American and European art during the Cold War, from the drop of the A-bomb in 1945 to the fall of the Berlin Wall in 1989. It examines the formative relationship between art and politics in this explosive period. We will consider the changed role of the avant-garde after the catastrophes of World War II; the use and abuse of modern art as propaganda; spectacular postwar affluence and the rise of the culture industry; multimedia, intermedia, and the invention of new communications technologies; the burgeoning military-industrial complex and the Vietnam War; the revolutionary efforts of second-wave feminism, sexual liberation, and the counterculture; and the charged debates of the iquest;culture wars; and the crisis of representation in the 1980s. What was art; its social, cultural, and political function in the recent past; and how is this role instructive in the present? Topics include Abstract Expressionism, Color Field Painting, Neo-Dada, Pop, Op, Fluxus, Happenings, Minimalism, Conceptualism, Performance, Institutional Critique, Process Art, Systems Art, Earth Art, Video Art, and theories of modernism and postmodernism. We will visit the Cantor Arts Center to view original works.

ARTHIST 152. The American West. 5 Units.

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ENGLISH 124, HISTORY 151, POLISCI 124A

ARTHIST 154. The American Civil War: A Visual History. 4 Units.

A painting of men charging across a field, a photograph of dead bodies in a ditch, a fragment of metal, a sliver of bone, and a brass button: how do we make sense of the visual record of the American Civil War (1861-65)? From the Capitol Dome to a skeleton dug up in a highway project a hundred years after the last battle, the course will consider the strange and scattered remnants of a famous era. Drawing on the poetry of Walt Whitman, Emily Dickinson, and Herman Melville, the paintings of Winslow Homer, the photographs of Alexander Gardner, and the oratory of Abraham Lincoln, the course will examine what cannot be portrayed: the trauma of war.

Same as: AMSTUD 154X, ARTHIST 354

ARTHIST 155C. Abstract Expressionism: Painting/Modern/America. 4 Units.

The course will focus on American abstract painting from the 1930s to the 1960s, emphasizing the works of art at the Anderson Collection at Stanford. We will focus on looking closely at pictures by Jackson Pollock, Mark Rothko, Willem de Kooning, and other renowned abstract painters, developing skills of speaking and writing about these works of art. We will also place these pictures in their mid-20th century context: World War II and the Cold War; Hollywood and popular culture generally; Beat literature; and locations such as New York and San Francisco.

Same as: AMSTUD 155C

ARTHIST 156. American and European Art, 1945-1968. 4 Units.

Examines the pivotal figures, movements, themes and practices of art in the United States and Europe, from the conclusion of World War 2 to the end of the 1960s. Emphasis is on the changed nature of the avant-garde after the catastrophic events of midcentury. Topics include: modern art, ideology and the Cold War; the rise of consumer society and the "Society of the Spectacle"; concepts of medium specificity; the impact of new media and technologies on postwar art making; the role of the artist as worker and activist. Movements include: Abstract Expressionism, Art Informel, Pop, minimalism, process, performance conceptual art. An introductory art history course is recommended.

Same as: ARTHIST 356

ARTHIST 156N. Art and the Power of Place: Site, Location, Environment. 3 Units.

Many iconic works in the history of art draw their power and significance from the place in which they are sited or installed. The cave paintings of Altamira, Spain; Michelangelo's Sistine Chapel and the monumental "earthworks" made in the deserts of the American Southwest during the 1960s are just a few examples showcasing the important relationship between art and place. In this seminar we will explore how works of art throughout history create a sense of place; and how place, in turn, changes the interpretation of works of art. We will learn how to analyze works of art in terms of their immediate contexts and surroundings, whether temples, museums, spaces of the city or unexpected environments, charting the historical meanings of place in the process. We will look at a range of examples throughout time, from prehistory to the present day. A critical feature of the seminar will be to consider works of art outside the classroom, on both the Stanford campus and beyond. Possible field trips include visits to Alcatraz Prison (where the famous Chinese artist, Ai Weiwei, will install a new work in the fall of 2014).

ARTHIST 157A. Histories of Photography. 4 Units.

This course investigates multiple histories of photography. It begins in early nineteenth-century Europe with the origins of the medium and ends in the United States on September 11, 2001, a day that demonstrated the limits of photographic seeing. Rather than stabilizing any single trajectory of technological iterations, the course is more interested in considering the iquest;work; performed by photography. Through historical case studies, it considers how `to photograph; is to order and to construct the world; to incite action and to persuade; to describe and to document; to record and to censor; to wound; to heal.

Same as: ARTHIST 357A

ARTHIST 159. American Photographs, 1839-1971: A Cultural History. 4 Units.

This course concentrates on many important American photographers, from the era of daguerreotypes to near the end of the pre-digital era. We study photographs of the Civil War, western exploration, artistic subjects, urban and rural poverty, skyscrapers, crime, fashion, national parks, and social protest, among other topics. Among the photographers we study: Carleton Watkins, Eadweard Muybridge, Walker Evans, Dorothea Lange, Garry Winogrand, and Diane Arbus. Emphasis on developing students' abilities to discuss and write about photography; to see it.

Same as: AMSTUD 159X, ARTHIST 359

ARTHIST 160. Intro to Contemporary Art. 4 Units.

Introduction to major themes, figures, movements and ideas in contemporary art, beginning with the question of art and politics in the 1960s. Topics: Postmodernism and the rise of consumer and spectacle culture; the "death" of painting, the impact of technology, cybernetics and the rise of new media; art at the end of the Cold War; globalization and the new global art world. An intro art history course is recommended.

ARTHIST 162. Race, Gender, and Sexuality in Contemporary Art. 4 Units.

This course focuses on issues of race, gender, and sexuality in American art and criticism from 1972 to the present. How have the terms of racial identity and sexual difference shaped the production and reception of contemporary art across the last four decades? What status has the body--and more specifically, the body of the artist--been accorded within recent work on identity and difference? Throughout the course of the semester, we will be particularly attentive to issues of racial and sexual stereotype. What critical or subversive uses have contemporary artists found for pictorial stereotype? How have stereotypes of race, gender, and sexuality been recycled in order to be mocked or deconstructed?.

Same as: ARTHIST 362

ARTHIST 164A. Technology and the Visual Imagination. 4 Units.

An exploration of the dynamic relationship between technology and the ways we see and represent the world. The course examines technologies from the Renaissance through the present day, from telescopes and microscopes to digital detectors, that have changed and enhanced our visual capabilities as well as shaped how we imagine the world. We also consider how these technologies influenced and inspired the work of artists. Special attention is paid to how different technologies such as linear perspective, photography, cinema, and computer screens translate the visual experience into a representation; the automation of vision; and the intersection of technology with conceptions of time and space.

Same as: ARTHIST 364A, FILMSTUD 164A, FILMSTUD 364A

ARTHIST 165A. Fashion Shows: From Lady Godiva to Lady Gaga. 4 Units.

The complex and interdependent relationship between fashion and art. Topics include: the ways in which artists have used fashion in different art forms as a means to convey social status, identity, and other attributes of the wearer; the interplay between fashion designers and various art movements, especially in the 20th century; the place of prints, photography, and the Internet in fashion, in particular how different media shape how clothes are seen and perceived. Texts by Thorstein Veblen, Roland Barthes, Dick Hebdige, and other theorists of fashion.

Same as: ARTHIST 365A, FILMSTUD 165A, FILMSTUD 365A

ARTHIST 166. Representing Fashion. 4 Units.

Course on the representation of fashion in the 20th and 21st century, with focus on fashion photography. Topics include: history of fashion illustration, fashion photography, and fashion films; intersection of art and commerce; role of designers, photographers, editors, and models; studio v. street photography; the place of mass media, alternative magazines, and online publications; and use of media, photography, and design theory for interpretation of fashion representations. Illustrators and artists include Lepape, Erte, Avedon, Penn, Klein, Newton, Sherman, and Leibovitz.

ARTHIST 167. Beyond the Fuzzy-Techie Divide: Art, Science, Technology. 4 Units.

Although art and science are often characterized as "two cultures" with limited common interests or language, they share an endeavor: gaining insight into our world. They even rely on common tools to make discoveries and visually represent their conclusions. To clarify and interrogate points of similarity and difference, each week's theme (time, earth, cosmos, body) explores the efforts of artists and scientists to understand and represent it and the role of technology in these efforts. Focus on contemporary examples.

Same as: ARTHIST 367, FILMSTUD 167B, FILMSTUD 367B

ARTHIST 173. Issues in Contemporary Art. 4 Units.

Major figures, themes, and movements of contemporary art from the 80s to the present. Readings on the neo-avant garde; postmodernism; art and identity politics; new media and technology; globalization and participatory aesthetics. Prerequisite: ARTHIST 155, or equivalent with consent of instructor.

Same as: ARTHIST 373

ARTHIST 176. Feminism and Contemporary Art. 4 Units.

(Same as ARTHIST 176) The impact of second wave feminism on art making and art historical practice in the 70s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the 70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, bad girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of performativity.

Same as: ARTHIST 376

ARTHIST 178. Ethnicity and Dissent in United States Art and Literature. 4 Units.

The role of the visual arts of the U.S. in the construction and contesting of racial, class, and gender hierarchies. Focus is on artists and writers from the 18th century to 1990s. How power, domination, and resistance work historically. Topics include: minstrelsy and the invention of race; mass culture and postmodernity; hegemony and language; memory and desire; and the borderlands.

Same as: AMSTUD 178, ARTHIST 378

ARTHIST 184. Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting. 4 Units.

Changes marking the transition from medieval to early modern Japanese society that generated a revolution in visual culture, as exemplified in subjects deemed fit for representation; how commoners joined elites in pictorializing their world, catalyzed by interactions with the Dutch.

Same as: ARTHIST 384, JAPANGEN 184, JAPANGEN 384

ARTHIST 186. Theme and Style in Japanese Art. 4 Units.

A mixture of lecture and discussion, this course presents a chronological introduction to some of the defining monuments in the history of Japanese visual culture from prehistory to the mid-19th century. This introductory class presumes no prior knowledge of art history or of Japan. We will emphasize certain overarching themes like religious life; notions of decorum appropriate to various classes (court, warrior, and commoner); the relationship between and among the arts, such as the visual and the verbal, or the symphonic assemblage arts as seen in the tea ceremony; pervasive cultural tropes like nostalgia, seasonality, or the sense of place; and broader issues such as censorship, patronage, gender issues, and the encounters between Japanese and foreign cultures.

Same as: ARTHIST 386, JAPANGEN 186, JAPANGEN 286

ARTHIST 187. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868. 4 Units.

Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty through visual culture during the change of episteme from late medieval to early modern, 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tensions between the old and the new leading to the modernization of Japan.

Same as: ARTHIST 387, JAPANGEN 185

ARTHIST 188A. The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism. 4 Units.

The recent rapid urbanization and architectural transformation of Asia; focus is on the architecture of Japan and China since the mid-19th century. History of forms, theories, and styles that serve as the foundation for today's buildings and cityscapes. How Eastern and Western ideas of modernism have merged or diverged and how these forces continue to shape the future of Japanese and Chinese architecture and urban form.

Same as: ARTHIST 388A

ARTHIST 188B. From Shanghai Modern to Global Contemporary: Frontiers of Modern Chinese Art. 4 Units.

Chinese artistic engagements with international arenas and with the cultural politics of modernity, from the late 19th century to the present. Topics will include Shanghai modernity and public media; artistic reform and political activism at the end of empire; competition between national style painting and international modernisms; politicized arts of resistance and revolution; post-Mao era experimental and avant-garde movements; transnational careers and exhibition circuits.

ARTHIST 189C. Global Currents: Early Modern Art Enterprises, Economies, and Imaginaries. 4 Units.

Episodes of global artistic exchange from the 16th to 19th centuries involving commodities (porcelains and textiles), technologies (printmaking, perspective, and cartography), and imaginaries (Chinoiserie, East Asian Occidentalism, Japonisme). The role of enterprises, institutions, and power relations in artistic economies, from the Portuguese Empire, Jesuit mission networks and East India Companies to imperialist systems. Same as: ARTHIST 389C

ARTHIST 192B. Art of the African Diaspora. 4 Units.

This introduction to the art of the African Diaspora uses art and visual culture as means to explore the history and impact of the global spread of African peoples from slavery until the present day. Lectures and discussions will examine a range of artistic practices from street festivals and Afro-Caribbean religious traditions to the work of studio-trained artists of international repute.

ARTHIST 200M. The Artist in Ancient Greek Society. 4-5 Units.

An exploration of the low status of artists in a culture that valued their work but not the men themselves. Potters were especially scorned but even sculptors of gold and ivory statues were seen as "mechanics" (Herodotus), with soft bodies and soft minds (Xenophon), "indifferent to higher things" (Plutarch). Topics include case studies of individual artists, their importance to the polis, their workshops, wages and occupational hazards and the impact of social isolation on the quality of their work. Same as: ARTHIST 400M

ARTHIST 203. Greek Art In and Out of Context. 4-5 Units.

The seminar considers Greek artifacts in the context of Greek life (including the life of the workshop), and the endless ways in which craftsmen served the needs of Greek society. Their foundries, factories and ceramic studios produced the material goods that defined Greek life: temples, statues and other offerings for the gods; arms and armor for warriors; sporting equipment and prizes for athletes; houses, clothing and crockery for the family; ships and sailcloth, wagons and ploughs, wine and oil-presses for a thriving domestic and overseas economy; gravestones and funeral vases for the dead. (Formerly CLASSART 109.) Most of the antiquities exhibited in museums, or purchased by private collectors from galleries and auction houses, survive because they were buried with people who used and cherished them. The Greek belief that the artifacts they valued in life would serve them in the afterlife informs the second part of the seminar, which is devoted to the recent history of tomb looting and the illicit trafficking in antiquities. Same as: CLASSICS 163

ARTHIST 205. Cairo and Istanbul: Urban Space, Memory, Protest. 5 Units.

In the aftermath of the Arab Spring, the city of Cairo has become a theater of social and political upheaval. In Istanbul, the Gezi protests in spring and summer 2013 drew attention to the contested public space. These events are the result of longstanding developments in the urban and social fabric. This seminar introduces students to the architectural and urban history of Istanbul and Cairo, with the current transformations as a central point of reference. Readings will focus on the tension between historical center and recent urban development, the social problems arising from the segregation, and reactions of scholars, architects, and artists to these issues.

ARTHIST 205A. Islamic Painting: Landscape, Body, Power. 5 Units.

This seminar focuses on the production of paintings, mostly but not exclusively miniatures in books, in the Islamic world. A particular focus lies on the Muslim Empires of the sixteenth to eighteenth centuries, namely the Ottoman, Safavid, and Mughal realms, together stretching from the Balkans to India. During this period, illustrated books were popular objects of high-level patronage, and numerous examples have survived that allow a detailed study of the implications of these images. Themes discussed include: figural representation in Islam, patronage and court culture; gender and the body; illustrations of literature and history; images of Sufis ceremonies; portraiture; images of animals and nature; the impact of European prints and paintings; space and landscape. A field-trip to the Museum of Asian Art in San Francisco to view Mughal paintings from India is planned.

ARTHIST 206H. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation. Same as: FEMGEN 216, HISTORY 216, HISTORY 316

ARTHIST 207C. Phenomenology and Aesthetics in Medieval Art. 5 Units.

This course explores the phenomenal aspects of the medieval image and space such as glitter, shadow, smoke, reverberation and how these presence effects were conceptualized in medieval culture as animation. Focus is on a select group of monuments as well as engagement with medieval objects at the Cantor Art Museum and the facsimiles of medieval manuscripts kept at the Art Library and Special Collections. Among the monuments we will study are the Alhambra in Spain, the Apocalypse MSS, the Cantigas of Alfonso X, the Byzantine Joshua Roll, the Homilies of the Monk Kokkinobaphos, the Ashburnhamensis Pentateuch, and the Rossano Gospels. Same as: ARTHIST 407C

ARTHIST 208. Hagia Sophia. 5 Units.

By employing a methodology based in psychoacoustics, semiotics, and phenomenology, this course explores the relationship among sound, water, marble, meaning, and religious experience in the sixth-century church of Hagia Sophia built by emperor Justinian in Constantinople. We will read medieval sources describing the interior and ritual, make short movies exploring the shimmer of marble in buildings on campus, and study the acoustics of domed buildings through computer auralization done at Stanford's CCRMA (Center for Computer Research in Music and Acoustics). Same as: CLASSICS 173

ARTHIST 208B. The Art of Medieval Spain: Muslims, Christians, Jews. 5 Units.

The seminar and its study trip explore the hybrid character of the art of Medieval Spain between the sixth and the fifteenth centuries. Rather than strictly chronological, our exploration of the artistic production of Muslims, Jews, and Christians is structured around major topics such as imperial power, pilgrimage, word and image. The readings juxtapose historical studies of specifically Spanish sites and objects with theoretical approaches tied to the broader themes.

ARTHIST 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

ARTHIST 209. Art and Religious Experience in Byzantium and Islam. 5 Units.

This course presents a comparative study of Christian and Islamic paradigms (sixth to the thirteenth centuries) in the construction of religious experience through the material fabric of the building, the interior decor, objects, and rituals. We will read medieval ekphrastic texts and poetry, which stirred the viewer/participant to experience the building/object as animate. Among the sites we will study are: Hagia Sophia, the Ka'ba, the Dome of the Rock, the Mosque at Damascus and at Cordoba. We will read Byzantine and Arabic writers such as Paul the Silentiary, Patriarch Germanos, Maximus Confessor, Shahrawardi, and Ibn Arabi.

Same as: ARTHIST 309, CLASSICS 174

ARTHIST 209C. Iconoclasm. 5 Units.

Iconoclasm, iconophobia, and aniconism as markers of cultural transformation of the Mediterranean in the 7th-9th centuries. The identity crisis in the region as the Arabs established the Umayyad caliphate, conquering the Holy Land, Egypt, and Spain. The West consolidated around the Carolingians versus the East split between the Byzantines and the Arabs. How each of these three empires emerged from the ashes of late antique culture and carved an identity out of a common cultural foundation. The course will take place in the seminar room of the Art and Architectural Library located in the Cummings Art Building.

Same as: ARTHIST 409, CLASSICS 158, CLASSICS 258, REES 409

ARTHIST 212. Renaissance Florence, 1440-1540. 5 Units.

Notions of cultural superiority in light of changes in Florentine society as it went from being a republic to a duchy ruled by the Medici. Artists and architects such as Donatello, Brunelleschi, Botticelli, Michelangelo, and Pontormo praised as having revived the arts and returned them to a level of ancient splendor. The role of the sacred in daily life and uses of the pagan past for poetic and scholarly expressions and as vehicles for contemporary experience.

ARTHIST 213. Renaissance Print Culture: Art in the Cantor Arts Center. 5 Units.

The seminar takes place in the Cantor Arts Center and provides a unique opportunity to study original works of art from the museum's storage. Beginning in the fifteenth century new techniques of reproduction changed the pictorial culture of Europe. Some engravings called attention to the engraver's virtuosity, and the private nature of the medium was explored for erotic imagery. By the sixteenth century printed images were used for political and religious propaganda during the societal upheavals.

ARTHIST 214. From the Pantheon to the Capitol: Architecture, Cosmology, Mathematics and Illusion. 5 Units.

This course traces the history of the dome over two millennia, from temples to the gods to Temples of the State, and from cosmic archetype to architectural fetish. The narrative interweaves the themes of the dome as image of the Cosmos, religious icon, national landmark, and political monument. It examines the dome not only as a venue for structural innovation, but also metaphysical geometry and transcendent illusionism. Individual case studies will familiarise you with major architects from Hadrian to Richard Rogers and historical milestones from the Dome of the Rock to the Capitol in Washington DC.

Same as: SIW 214

ARTHIST 217B. Architectural Theory from Antiquity to Le Corbusier. 5 Units.

This seminar focuses on themes and theories in architectural design from antiquity until the early twentieth century. Modern and contemporary architecture has often claimed its modernity through the incorporation of theory, but this seminar examines selections from key texts that have also moulded architectural and urbanistic thought in the ancient, medieval, and early modern eras in combination with analytical comparisons of built architecture.

Same as: ARTHIST 417B

ARTHIST 225. Cezanne. 5 Units.

This seminar will study the complexity and richness of pictures made by Paul Cezanne that affected the course of modernist painting during the early twentieth century. Usually called an Impressionist, Cezanne shares only partially Monet's concern for fleeting effects, and he evokes little of Renoir's charm. He did not paint the bustle of city life like Manet or Degas. Cezanne spent most of his career near his hometown of Aix-en-Provence painting landscapes, a few local residents, and many still-lives. Yet Matisse was serious when he said, "Cezanne, you see is a sort of god of painting. Dangerous his influence? So what? Too bad for those without the strength to survive it." The seminar will explore the foundations of that influence.

ARTHIST 229D. Topophilia: Place in Japanese Visual Culture through 19th Century. 5 Units.

Attachments to "place" and "home" are hard-wired into the biology of humans and animals alike, although such attachments vary according to specific times, cultures, and states of mind. Can we speak of a "Japanese sense of place" and if so, what is distinctive about it? Seminar explores religious visions and ritual fields; narratives of itinerancy; cityscapes; topographic taxonomies. Knowledge of Japanese culture is beneficial but not mandatory.

Same as: JAPANGEN 229

ARTHIST 243C. The Art of Travel. 5 Units.

This undergraduate seminar explores a variety of objects upon which we see the marks of makers smitten and/or stymied by new technologies of transportation: objects about the steamship, the railroad, the automobile, the airplane, the space shuttle, the internet. Among many types of material culture, the course considers scrimshaw, album quilts, maps, paintings, photographs, city plans, hood ornaments, and advertisements from the early Republic to the present. How do objects mark geographic movement, and the social relationships forged in the process? What do these marks tell us about how we, as contemporary viewers, experience the world?.

ARTHIST 244. The Visual Culture of the American Home Front, 1941-1945. 5 Units.

How does home front of WWII look now? What sort of meanings appear with the vantage of more than sixty years' distance? Examining Hollywood films from those years - films made during the war but mostly not directly about the war - the seminar focuses on developing students' abilities to write emotion-based criticism and history. Weekly short papers, each one in response to a film screening, are required. Among the films screened: *Shadow of a Doubt*, *Gaslight*, *I Walked with a Zombie*, *The Best Years of Our Lives*.

Same as: AMSTUD 244

ARTHIST 245. Art, Business & the Law. 5 Units.

This course examines the intersection of art, business, and the law from a number of different angles, focusing on issues that impact our understanding of works of art and their circulation in the modern and contemporary periods. Topics range from individual case studies (e.g., Leonardo da Vinci; Richard Serra) to the consolidation of the art market, and include cultural heritage issues, problems of censorship, and conceptions of authorship and intellectual property.

ARTHIST 246A. California Dreaming: West Coast Art and Visual Culture, 1848 - present. 5 Units.

This seminar examines art, photography, and other forms of cultural production (e.g. film, advertisements, postcards) in and about California from the middle of the 19th century to the present. It approaches California as a contested political, historical and geographical site and as a series of images and alternative "lifestyles." How have artists pictured the state's diverse landscapes, both natural and commercial, as well as its complex history of labor, immigration, ethnicity, tourism, and social division?.

ARTHIST 246B. Pop Art. 5 Units.

A new course on the history and meaning of Pop art in the United States and abroad. The course will feature close study of paintings, photographs, and prints at the Cantor Art Center. The course will be given in the Denning Family Resource Room, located in The Anderson Collection building. If you have any questions regarding the location, please contact Linda Esquivel at lindae@stanford.edu.

Same as: AMSTUD 246B

ARTHIST 248B. Architecture, Urbanism, and Visual Culture in Early Modern Rome. 5 Units.

This seminar investigates architecture in Rome, from Michelangelo to Piranesi. It examines the origins of modern urbanism; the piazza as ceremonial theater; the water network and fountain displays; palace design inside and out; religious institutions, from convents to confraternities; church design inside and out; the devotional and illusionistic space of the family chapel; festival architecture; light symbolism and geometry; the use of new materials and technologies; the relationship of early modern architecture to painting and sculpture; and the question of a unity of the arts.

ARTHIST 255. Hidden Histories: Art and Misrepresentation. 5 Units.

What happens when art functions as a decoy, taking us away from stories that it refuses to tell? We will explore three modern artists who grapple, in unpredictable ways, with the historical events that have shaped them: Philip Guston and the Holocaust; Martin Puryear and the Civil Rights movement; and South African artist William Kentridge and apartheid. When appropriate, we will look at objects at the Cantor Art Center (Stanford) as well as museums in the Bay Area. The course will provide the foundation for an exhibition at the Cantor Arts Center and the Yale University Art Gallery in 2016.

ARTHIST 262. Office of Metropolitan Architecture: Workshop of the New. 4-5 Units.

This seminar investigates all aspects of the work of the Office of Metropolitan Architecture (OMA) and its leader Rem Koolhaas. Topics for class research and inquiry include but are not be limited to: Koolhaas's early work at the Architectural Association and the founding of OMA, the publications of OMA and their style of presentation and theoretical foundations, the importance of AMO, and the architects who have left OMA and founded their own practices and how these differ from OMA. Each student completes an in-depth research paper and an in-class presentation.

Same as: CEE 132Q

ARTHIST 263B. The View through the Windshield: Cars and the American Landscape. 4 Units.

Both cars and the landscape are fundamental to American identity. This seminar will consider the relationship between them: how they have shaped each other, how one mediates the experience of the other, and how American artists such as Ansel Adams, Edward Hopper, and Ed Ruscha have represented both. We will discuss the relationship between nature and technology; the aesthetics of highways and parkways; the phenomenology of driving and road trips; maps and way finding; and the future of cars, mapping, and the landscape.

ARTHIST 264A. Picturing the Cosmos. 5 Units.

This seminar explores the place of images in how we understand and imagine the universe. The course draws on art, science, and popular culture, and pays particular attention to the ways they inform each other. Examples include: star maps, science fiction films, appropriated astronomical images, and telescopic views of stars, planets, and nebulae. Using these representations as well as accompanying readings we will discuss the importance of aesthetics for conceptions of the cosmos; the influence of technology on representations; strategies for representing concepts that exceed the limits of human vision; and the ways that views of the universe reflect and shape their cultural context. Open to undergraduates and graduates.

ARTHIST 269A. Art and Technology. 5 Units.

The dynamic relationship between art and technology and its formative impact on culture, politics and society. Beginning with Aristotle on the notion of *techne* and its implications for art and craft, the seminar will focus primarily on the modern period as well as contemporary developments. Topics: The invention of linear perspective during the Renaissance as influenced by Arab mathematics; the culture of optical devices and painting; the birth of photography and cinema and new forms of pictorial representation; the *avant-garde* and the *iquest*; *Machine Age* *iquest*; art and technology collaborations during the 1960s; interactivity and the rise of media arts; sound art; biotechnology and the arts. Guest speakers and possible field trips. Enrollment limited to STS Senior majors and art and art history majors.

Same as: STS 200I

ARTHIST 278. Anatomy of Exhibition. 5 Units.

This course provides students with the opportunity to research, write the exhibition texts, design, and install an exhibition at the Cantor Arts Center of paintings, prints, and drawings by African American artist Jacob Lawrence (1917-2000). An influential force in 20th-century art, Lawrence captured the trials and triumphs of the black experience. The works are a recent gift to the Cantor that have only rarely been exhibited up to now.

ARTHIST 284B. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the *iquest*; *black box* *iquest*; of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores *iquest*; *museum cultures* *iquest*; representations of *iquest*; *self* *iquest*; and *iquest*; *other* *iquest*; within museums and institutional cultures of the museum world itself.

Same as: AMSTUD 134, ARCHLGY 134, ARCHLGY 234, CSRE 134, EDUC 214, NATIVEAM 134

ARTHIST 287. Pictures of the Floating World: Images from Japanese Popular Culture. 5 Units.

Printed objects produced during the Edo period (1600-1868), including the *Ukiyo-e* (pictures of the floating world) and lesser-studied genres such as printed books (*ehon*) and popular broadsheets (*kawaraban*). How a society constructs itself through images. The borders of the acceptable and censorship; theatricality, spectacle, and slippage; the construction of play, set in conflict against the dominant neo-Confucian ideology of fixed social roles.

Same as: ARTHIST 487X, JAPANLIT 287

ARTHIST 287A. The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime. 5 Units.

The Japanese tea ceremony, the ultimate premodern multimedia phenomenon, integrates architecture, garden design, ceramics, painting, calligraphy, and other treasured objects into a choreographed ritual wherein host, objects, and guests perform designated roles on a tiny stage sometimes only six feet square. In addition to its much-touted aesthetic and philosophical aspects, the practice of tea includes inevitable political and rhetorical dimensions. This course traces the evolution of tea practice from its inception within the milieu of courtier diversions, Zen monasteries, and warrior villas, through its various permutations into the 20th century, where it was manipulated by the emerging industrialist class for different-but ultimately similar-ends.

Same as: JAPANGEN 287A

ARTHIST 288B. The Enduring Passion for Ink: Contemporary Chinese Ink Painting. 5 Units.

Contemporary Chinese ink painters are exploring new ground. They push the limits of the medium, creating installations and performances, mixing ink with other media, and advancing age-tested brushstrokes and compositions. The recent flurry of exhibitions attests to contemporary ink painting's increasing importance. This seminar introduces major figures (Xu Bing, Liu Dan, Zheng Chongbin, Li Huasheng, etc.) and movements in contemporary Chinese ink art. Emphasis is placed on improving writing abilities and on in-class reports and discussion. Topics for discussion include readings, individual works of art, and broad issues in contemporary art. Prerequisite: courses in Art History and/or Studio Art OR permission of instructor. open to undergraduates and graduates.

ARTHIST 289A. Making the Masterpiece in Song Dynasty China. 5 Units.

Studies of canon formation involving Song Dynasty (10-13th c.) Chinese works of painting, calligraphy, ceramics, and architecture. The roles of early art writing and criticism; collecting histories; art historical theory; / copying, imitation, and reproductive practices; period and regional taste; and modern museological and art historical discourses in identifying and constructing a canon of Song masterworks.

Same as: ARTHIST 489A

ARTHIST 294. Writing and the Visual. 5 Units.

The course examines how various forms of writing and description--from wall labels to scholarly texts--shape the history and perception of visual objects. Through concrete examples, we will analyze the limits of language in describing visual images and consider how those limits might be expanded or redrawn. Required course for Art History majors. WIM Course.

ARTHIST 295. Visual Arts Internship. 1-5 Unit.

Professional experience in a field related to the Visual Arts for six to ten weeks. Internships may include work for galleries, museums, art centers, and art publications. Students arrange the internship, provide a confirmation letter from the hosting institution, and must receive consent from the faculty coordinator to enroll in units. To supplement the internship students maintain a journal and write a research paper related to the experience and their area of academic interest. Evaluations from the student and the supervisor are submitted at the end of the internship. Restricted to declared majors and minors. May be repeated for credit.

ARTHIST 296. Junior Seminar: Methods & Historiography of Art History. 5 Units.

Historiography and methodology. Through a series of case studies, this course introduces a range of influential critical perspectives in art history as a discipline and a practice. The goal is to stimulate thinking about what it means to explore the history of art today, to expose and examine our assumptions, expectations and predilections as we undertake to learn and write about works of art, their meanings and their status in the world.

ARTHIST 297. Honors Thesis Writing. 1-5 Unit.

May be repeated for credit.

ARTHIST 298. Individual Work: Art History. 1-15 Unit.

For approved independent research with individual faculty members. Letter grades only. May be repeated for credit.

ARTHIST 302. Empire and Aftermath: Greek Art from the Parthenon to Scopas. 4 Units.

The class begins with the art, architecture and political ideals of Periclean Athens, from the emergence of the city as the political and cultural center of Greece in 450 to its defeat in the Peloponnesian War in 404. It then considers how Athens and the rest of Greece proceed in the fourth century to rebuild their lives and the monuments that define them. Earlier artistic traditions endure, with subtle changes, in the work of sculptors such as Kephisodotos. Less subtle are the outlook and output of his son Praxiteles. In collaboration with Phryne, his muse and mistress, Praxiteles challenged the canons and constraints of the past with the first female nude in the history of Greek sculpture. His gender-bending depictions of gods and men were equally audacious, their shiny surfaces reflecting Plato's quest; discussion of Eros and androgyny. Scopas was also a man of his time but pursued different interests. Drawn to the inner lives of men and woman, his tormented Trojan War heroes and victims are still scarred by memories of the Peloponnesian War, and a world away from the serene faces of the Parthenon. His famous Maenad, a devotee of Dionysos who has left this world for another, belongs to the same years as Euripides' Bacchae and, at the same time, anticipates the torsion and turbulence of Bernini and the Italian Baroque. In the work of these and other fourth century personalities, the stage is set for Alexander the Great and his conquest of a kingdom extending from Greece to the Indus River. (Formerly CLASSART 102).

Same as: ARTHIST 102, CLASSICS 162

ARTHIST 305. Art & Architecture in the Medieval Mediterranean. 4 Units.

Chronological survey of Byzantine, Islamic, and Western Medieval art and architecture from the early Christian period to the Gothic age. Broad art-historical developments and more detailed examinations of individual monuments and works of art. Topics include devotional art, court and monastic culture, relics and the cult of saints, pilgrimage and crusades, and the rise of cities and cathedrals.

Same as: ARTHIST 105, CLASSICS 172

ARTHIST 306. Byzantine Art and Architecture, 300-1453 C.E.. 4 Units.

(Formerly CLASSART 106/206.) This course and its study trip to the Getty (Los Angeles) to view the new Byzantine exhibition explores the art and architecture of the Eastern Mediterranean: Constantinople, Jerusalem, Alexandria, Antioch, Damascus, Thessaloniki, and Palermo, 4th-15th centuries. Applying an innovative approach, we will probe questions of phenomenology and aesthetics, focusing our discussion on the performance and appearance of spaces and objects in the changing diurnal light, in the glitter of mosaics and in the mirror reflection and translucency of marble.

Same as: ARTHIST 106, CLASSICS 171

ARTHIST 306B. What Do Medieval Images Want? Theories of the Image in Byzantium, Islam, and the Latin West. 4 Units.

What is an image? The medieval response was tied to religious identity. At the core of the debate was whether the image was just a mimetic representation or a living entity: matter imbued with divine spirit. Byzantium, Islam, and the Latin West each developed their own positions and used it as a platform for political legitimacy. We will study the development of the medieval image theories by focusing on specific monuments and objects and by reading both primary sources in translation and current scholarly interpretations.

Same as: ARTHIST 106B

ARTHIST 308. Virginity and Power: Mary in the Middle Ages. 4 Units.

The most influential female figure in Christianity whose state cult was connected with the idea of empire. The production and control of images and relics of the Virgin and the development of urban processions and court ceremonies though which political power was legitimized in papal Rome, Byzantium, Carolingian and Ottonian Germany, Tuscany, Gothic France, and Russia.

Same as: ARTHIST 108

ARTHIST 309. The Book in the Medieval World. 4 Units.

Studying the design and function of books in medieval society from the 7th to the 15th century, and the ways in which manuscripts are designed to meet (and shape) the cultural and intellectual demands of their readers. Major themes are the relationships between text and image, and between manuscripts and other media; the audience and production context of manuscripts; and changing ideas about pictorial space, figural style, page design, and progression through the book. Final project may be either a research paper or an original artist's book.

Same as: ARTHIST 109

ARTHIST 309D. Means, Media and Mode: An Introduction to Western Medieval Art. 4 Units.

The course is an introduction to western medieval art approached primarily through distinctions of materials and media. We work with a combination of medieval and later sources, often engaging with the modern objects and spaces available for study on campus in order to create new perspectives on the historical material. Medieval case studies are chosen that raise particularly complex issues of materiality, mixed-media form, and cross-media citation.

Same as: ARTHIST 109D

ARTHIST 311. Introduction to Italian Renaissance, 1420-1580. 4 Units.

New techniques of pictorial illusionism and the influence of the humanist revival of antiquity in the reformulation of the pictorial arts in 15th-century Italy. How different Italian regions developed characteristic artistic cultures through mutual interaction and competition.

Same as: ARTHIST 111

ARTHIST 314. Mystical Naturalism: Van Eyck, Dürer, and the Northern Renaissance. 4 Units.

A survey of the major innovations in Northern European painting ca. 1400-1600, in light of the social status of the artist between city and court. In the early fifteenth century painters began to render an idealized world down to its smallest details in ways that engaged new devotional practices. Later Hieronymus Bosch would identify the painter's imagination with the bizarre and grotesque. In response to Renaissance humanism, some painters introduced classical mythology and allegorical subjects in their works, and many traveled south to absorb Italianate pictorial styles. We will be visiting art museums in San Francisco and Stanford. May be repeat for credit.

Same as: ARTHIST 114

ARTHIST 317. Picturing the Papacy, 1300-1850. 4 Units.

Popes deployed art and architecture to glorify their dual spiritual and temporal authority, being both Christ's vicars on earth and rulers of state. After the return of the papacy from Avignon, Rome underwent numerous campaigns of renovation that staged a continuity between the pontiffs and the ancient Roman emperors. Patronage of art and architecture became important tools in the fight against Protestantism. Artists include Botticelli, Michelangelo, Caravaggio, and Bernini.

Same as: ARTHIST 117

ARTHIST 318. Titian, Veronese, Tintoretto. 4 Units.

The course addresses the ways in which Venetian painters of the sixteenth century redefined paradigms of color, design, and invention. Themes to be examined include civic piety, new kinds of mythological painting, the intersection between naturalism and eroticism, and the relationship between art and rituals of church and statecraft.

Same as: ARTHIST 118

ARTHIST 320. Living in a Material World: Seventeenth-century Dutch and Flemish Painting. 4 Units.

Painting and graphic arts by artists in Flanders and Holland from 1600 to 1680, a period of political and religious strife. Historical context; their relationship to developments in the rest of Europe and contributions to the problem of representation. Preferences for particular genres such as portraits, landscapes, and scenes of everyday life; the general problem of realism as manifested in the works studied.

Same as: ARTHIST 120

ARTHIST 321. 18th-Century Art in Europe, ca 1660-1780. 4 Units.

Major developments in painting across Europe including the High Baroque illusionism of Bernini, the founding of the French Academy, and the revival of antiquity during the 1760s, with parallel developments in Venice, Naples, Madrid, Bavaria, and London. Shifts in themes and styles amidst the emergence of new viewing publics. Artists: the Tiepolos, Giordano, Batoni, and Mengs; Ricci, Pellegrini, and Thornhill; Watteau and Boucher; Chardin and Longhi; Reynolds and West; Hogarth and Greuze; Vien, Fragonard, and the first works by David. Additional discussion for graduate students.

Same as: ARTHIST 121

ARTHIST 322. The Age of Revolution: Painting in Europe 1780-1830. 4 Units.

Survey of European painting bracketed by the French Revolution and the end of the Napoleonic conquest. Against this background of social upheaval, the visual arts were profoundly affected by shifts in patronage, public, and ideas about the social utility of image making. Lectures and readings align ruptures in the tradition of representation with the unfolding historical situation, and trace the first manifestations of a "romantic" alternative to the classicism that was the cultural legacy of pre-Revolutionary Europe.

Same as: ARTHIST 122

ARTHIST 324. The Age of Naturalism, Painting in Europe 1830-1874. 4 Units.

Survey of European painting from the heyday of Romanticism to the first Impressionist exhibition. Lectures and readings focus on the tensions between traditional forms and ambitions of history painting and the challenge of "modern" subjects drawn from contemporary life. Attention to the impact of painting in the open-air, and the effect of new imaging technologies- notably lithography and photography - to provide "popular" alternatives to the hand-wrought character and elitist appeal of "high art" cultural forms.

Same as: ARTHIST 124

ARTHIST 326. Post-Naturalist Painting. 4 Units.

How conceptual models from language, literature, new technologies, and scientific theory affected picture making following the collapse of the radical naturalism of the 1860s and 1870s. Bracketed in France by the first Impressionist exhibition (1874) and the first public acclamation of major canvases by Matisse and Picasso (1905), the related developments in England, Germany, Belgium, and Austria. Additional weekly discussion for graduate students. Recommended: some prior experience with 19th-century art.

Same as: ARTHIST 126

ARTHIST 332. American Art and Culture, 1528-1910. 4 Units.

The visual arts and literature of the U.S. from the beginnings of European exploration to the Civil War. Focus is on questions of power and its relation to culture from early Spanish exploration to the rise of the middle classes. Cabeza de Vaca, Benjamin Franklin, John Singleton Copley, Phillis Wheatley, Charles Willson Peale, Emerson, Hudson River School, American Genre painters, Melville, Hawthorne and others.

Same as: AMSTUD 132, ARTHIST 132

ARTHIST 342A. Home Alone: Houses that Artists and Thinkers Design for Themselves. 4 Units.

This course investigates houses, hideaways, and studios that artists and thinkers have designed for themselves with varying degrees of self-consciousness, from subconscious images of the self to knowing stages for the contemplative life. Case studies range from antiquity to the present, from the studio-house of Peter Paul Rubens to that of Kurt Schwitters; from the house-museum of Sir John Soane to the Vittoriale of Gabriele D'Annunzio; from the philosophical dwelling of the Emperor Hadrian to that of Ludwig Wittgenstein.

Same as: ARTHIST 142A

ARTHIST 343A. American Architecture. 4 Units.

A historically based understanding of what defines American architecture. What makes American architecture American, beginning with indigenous structures of pre-Columbian America. Materials, structure, and form in the changing American context. How these ideas are being transformed in today's globalized world.

Same as: ARTHIST 143A

ARTHIST 345. Culture Wars: Art and Social Conflict in the USA, 1890-1950. 4 Units.

This course examines social conflicts and political controversies in American culture through the lens of visual art and photography. We consider how visual images both reflect and participate in the social and political life of the nation and how the terms of citizenship have been represented; and, at times, contested; by artists throughout the first half of the 20th century. The class explores the relation between American art and the body politic by focusing on issues of poverty, war, censorship, consumerism, class identity, and racial division.

Same as: AMSTUD 145M, ARTHIST 145, FEMGEN 145

ARTHIST 347. MODERNISM AND MODERNITY. 4 Units.

The development of modern art and visual culture in Europe and the US, beginning with Paris in the 1860s, the period of Haussmann, Baudelaire and Manet, and ending with the Bauhaus and Surrealism in the 1920s and 30s. Modernism in art, architecture and design (e.g., Gauguin, Picasso, Duchamp, Mondrian, Le Corbusier, Breuer, Dali) will be explored as a compelling dream of utopian possibilities involving multifaceted and often ambivalent, even contradictory responses to the changes brought about by industrialization, urbanization, and the rise of mass culture.

Same as: ARTHIST 147

ARTHIST 354. The American Civil War: A Visual History. 4 Units.

A painting of men charging across a field, a photograph of dead bodies in a ditch, a fragment of metal, a sliver of bone, and a brass button: how do we make sense of the visual record of the American Civil War (1861-65)? From the Capitol Dome to a skeleton dug up in a highway project a hundred years after the last battle, the course will consider the strange and scattered remnants of a famous era. Drawing on the poetry of Walt Whitman, Emily Dickinson, and Herman Melville, the paintings of Winslow Homer, the photographs of Alexander Gardner, and the oratory of Abraham Lincoln, the course will examine what cannot be portrayed: the trauma of war.

Same as: AMSTUD 154X, ARTHIST 154

ARTHIST 356. American and European Art, 1945-1968. 4 Units.

Examines the pivotal figures, movements, themes and practices of art in the United States and Europe, from the conclusion of World War 2 to the end of the 1960s. Emphasis is on the changed nature of the avant-garde after the catastrophic events of midcentury. Topics include: modern art, ideology and the Cold War; the rise of consumer society and the "Society of the Spectacle"; concepts of medium specificity; the impact of new media and technologies on postwar art making; the role of the artist as worker and activist. Movements include: Abstract Expressionism, Art Informel, Pop, minimalism, process, performance conceptual art. An introductory art history course is recommended.

Same as: ARTHIST 156

ARTHIST 357A. Histories of Photography. 4 Units.

This course investigates multiple histories of photography. It begins in early nineteenth-century Europe with the origins of the medium and ends in the United States on September 11, 2001, a day that demonstrated the limits of photographic seeing. Rather than stabilizing any single trajectory of technological iterations, the course is more interested in considering the iquest;workiquest; performed by photography. Through historical case studies, it considers how `to photographiquest; is to order and to construct the world; to incite action and to persuade; to describe and to document; to record and to censor; to wound; to heal.

Same as: ARTHIST 157A

ARTHIST 359. American Photographs, 1839-1971: A Cultural History. 4 Units.

This course concentrates on many important American photographers, from the era of daguerreotypes to near the end of the pre-digital era. We study photographs of the Civil War, western exploration, artistic subjects, urban and rural poverty, skyscrapers, crime, fashion, national parks, and social protest, among other topics. Among the photographers we study: Carleton Watkins, Eadweard Muybridge, Walker Evans, Dorothea Lange, Garry Winogrand, and Diane Arbus. Emphasis on developing students' abilities to discuss and write about photography; to see it.

Same as: AMSTUD 159X, ARTHIST 159

ARTHIST 362. Race, Gender, and Sexuality in Contemporary Art. 4 Units.

This course focuses on issues of race, gender, and sexuality in American art and criticism from 1972 to the present. How have the terms of racial identity and sexual difference shaped the production and reception of contemporary art across the last four decades? What status has the body--and more specifically, the body of the artist--been accorded within recent work on identity and difference? Throughout the course of the semester, we will be particularly attentive to issues of racial and sexual stereotype. What critical or subversive uses have contemporary artists found for pictorial stereotype? How have stereotypes of race, gender, and sexuality been recycled in order to be mocked or deconstructed?.

Same as: ARTHIST 162

ARTHIST 364A. Technology and the Visual Imagination. 4 Units.

An exploration of the dynamic relationship between technology and the ways we see and represent the world. The course examines technologies from the Renaissance through the present day, from telescopes and microscopes to digital detectors, that have changed and enhanced our visual capabilities as well as shaped how we imagine the world. We also consider how these technologies influenced and inspired the work of artists. Special attention is paid to how different technologies such as linear perspective, photography, cinema, and computer screens translate the visual experience into a representation; the automation of vision; and the intersection of technology with conceptions of time and space.

Same as: ARTHIST 164A, FILMSTUD 164A, FILMSTUD 364A

ARTHIST 365A. Fashion Shows: From Lady Godiva to Lady Gaga. 4 Units.

The complex and interdependent relationship between fashion and art. Topics include: the ways in which artists have used fashion in different art forms as a means to convey social status, identity, and other attributes of the wearer; the interplay between fashion designers and various art movements, especially in the 20th century; the place of prints, photography, and the Internet in fashion, in particular how different media shape how clothes are seen and perceived. Texts by Thorstein Veblen, Roland Barthes, Dick Hebdige, and other theorists of fashion.

Same as: ARTHIST 165A, FILMSTUD 165A, FILMSTUD 365A

ARTHIST 367. Beyond the Fuzzy-Techie Divide: Art, Science, Technology. 4 Units.

Although art and science are often characterized as "two cultures" with limited common interests or language, they share an endeavor: gaining insight into our world. They even rely on common tools to make discoveries and visually represent their conclusions. To clarify and interrogate points of similarity and difference, each week's theme (time, earth, cosmos, body) explores the efforts of artists and scientists to understand and represent it and the role of technology in these efforts. Focus on contemporary examples.

Same as: ARTHIST 167, FILMSTUD 167B, FILMSTUD 367B

ARTHIST 373. Issues in Contemporary Art. 4 Units.

Major figures, themes, and movements of contemporary art from the 80s to the present. Readings on the neo-avant garde; postmodernism; art and identity politics; new media and technology; globalization and participatory aesthetics. Prerequisite: ARTHIST 155, or equivalent with consent of instructor.

Same as: ARTHIST 173

ARTHIST 376. Feminism and Contemporary Art. 4 Units.

(Same as ARTHIST 176) The impact of second wave feminism on art making and art historical practice in the 70s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the 70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, bad girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of performativity.

Same as: ARTHIST 176

ARTHIST 378. Ethnicity and Dissent in United States Art and Literature. 4 Units.

The role of the visual arts of the U.S. in the construction and contesting of racial, class, and gender hierarchies. Focus is on artists and writers from the 18th century to 1990s. How power, domination, and resistance work historically. Topics include: minstrelsy and the invention of race; mass culture and postmodernity; hegemony and language; memory and desire; and the borderlands.

Same as: AMSTUD 178, ARTHIST 178

ARTHIST 384. Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting. 4 Units.

Changes marking the transition from medieval to early modern Japanese society that generated a revolution in visual culture, as exemplified in subjects deemed fit for representation; how commoners joined elites in pictorializing their world, catalyzed by interactions with the Dutch.

Same as: ARTHIST 184, JAPANGEN 184, JAPANGEN 384

ARTHIST 386. Theme and Style in Japanese Art. 4 Units.

A mixture of lecture and discussion, this course presents a chronological introduction to some of the defining monuments in the history of Japanese visual culture from prehistory to the mid-19th century. This introductory class presumes no prior knowledge of art history or of Japan. We will emphasize certain overarching themes like religious life; notions of decorum appropriate to various classes (court, warrior, and commoner); the relationship between and among the arts, such as the visual and the verbal, or the symphonic assemblage arts as seen in the tea ceremony; pervasive cultural tropes like nostalgia, seasonality, or the sense of place; and broader issues such as censorship, patronage, gender issues, and the encounters between Japanese and foreign cultures.

Same as: ARTHIST 186, JAPANGEN 186, JAPANGEN 286

ARTHIST 387. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868. 4 Units.

Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty through visual culture during the change of episteme from late medieval to early modern, 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tensions between the old and the new leading to the modernization of Japan. Same as: ARTHIST 187, JAPANGEN 185

ARTHIST 388A. The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism. 4 Units.

The recent rapid urbanization and architectural transformation of Asia; focus is on the architecture of Japan and China since the mid-19th century. History of forms, theories, and styles that serve as the foundation for today's buildings and cityscapes. How Eastern and Western ideas of modernism have merged or diverged and how these forces continue to shape the future of Japanese and Chinese architecture and urban form.

Same as: ARTHIST 188A

ARTHIST 389C. Global Currents: Early Modern Art Enterprises, Economies, and Imaginaries. 4 Units.

Episodes of global artistic exchange from the 16th to 19th centuries involving commodities (porcelains and textiles), technologies (printmaking, perspective, and cartography), and imaginaries (Chinoiserie, East Asian Occidenteries, Orientalism, Japonisme). The role of enterprises, institutions, and power relations in artistic economies, from the Portuguese Empire, Jesuit mission networks and East India Companies to imperialist systems.

Same as: ARTHIST 189C

ARTHIST 400M. The Artist in Ancient Greek Society. 4-5 Units.

An exploration of the low status of artists in a culture that valued their work but not the men themselves. Potters were especially scorned but even sculptors of gold and ivory statues were seen as "mechanics" (Herodotus), with soft bodies and soft minds (Xenophon), "indifferent to higher things" (Plutarch). Topics include case studies of individual artists, their importance to the polis, their workshops, wages and occupational hazards and the impact of social isolation on the quality of their work.

Same as: ARTHIST 200M

ARTHIST 405. Art, Ekphrasis, and Music in Byzantium and Islam. 5 Units.

Focus is on the interrelation of art, architecture, verbal description, poetry, and music, including the singing of psalms and recitation of the Qur'an.

How ekphrasis, the style of writing vividly intended to transform the listeners into spectators, structures the perception of and response to artistic production be it an art object, building, or a musical performance. The role of ekphrasis in animating the inanimate and the importance of breath and spirit, which become manifest in visual, acoustic, olfactory, and gustatory terms. Religious and courtly settings: Hagia Sophia, the Great Palace of Constantinople, the Dome of the Rock, the palaces of Baghdad and Samarra, the mosque at Cordoba, Medinat al-Zahra and the Alhambra. Greek and Arabic writers on ekphrasis in translation, juxtaposing the medieval material to the ancient theories of ekphrasis and modern scholarship.

Same as: CLASSICS 376

ARTHIST 405A. Graduate Pedagogy Course. 2 Units.

This course is designed for graduate students in Art History and Film Studies preparing to work as teaching assistants in the Department of Art and Art History. The seminar will focus on a range of theoretical and practical concerns pertaining to the successful conceptualization, organization, and execution of class lectures and discussion sections. Students will be exposed to a variety of perspectives and strategies related to quality teaching at the college level.

ARTHIST 407C. Phenomenology and Aesthetics in Medieval Art. 5 Units.

This course explores the phenomenal aspects of the medieval image and space such as glitter, shadow, smoke, reverberation and how these presence effects were conceptualized in medieval culture as animation. Focus is on a select group of monuments as well as engagement with medieval objects at the Cantor Art Museum and the facsimiles of medieval manuscripts kept at the Art Library and Special Collections. Among the monuments we will study are the Alhambra in Spain, the Apocalypse MSS, the Cantigas of Alfonso X, the Byzantine Joshua Roll, the Homiles of the Monk Kokkinobaphos, the Ashburnhamensis Pentateuch, and the Rossano Gospels.

Same as: ARTHIST 207C

ARTHIST 408C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

ARTHIST 409. Iconoclasm. 5 Units.

Iconoclasm, iconophobia, and aniconism as markers of cultural transformation of the Mediterranean in the 7th-9th centuries. The identity crisis in the region as the Arabs established the Umayyad caliphate, conquering the Holy Land, Egypt, and Spain. The West consolidated around the Carolingians versus the East split between the Byzantines and the Arabs. How each of these three empires emerged from the ashes of late antique culture and carved an identity out of a common cultural foundation. The course will take place in the seminar room of the Art and Architectural Library located in the Cummings Art Building.

Same as: ARTHIST 209C, CLASSICS 158, CLASSICS 258, REES 409

ARTHIST 411. Animation, Performance, Presence in Medieval Art. 5 Units.

(Formerly CLASSART 311.) This course will explore concepts of animacy, performance, and presence in the art of Byzantium, focusing on the concept of image understood as the living bodies of the saints, the space of Hagia Sophia and its Eucharist ritual, the polymorphism of the mixed-media icon, and the interaction with these objects in prayer and recitation of epigrams.

Same as: CLASSICS 377

ARTHIST 413. Michelangelo. 5 Units.

Michelangelo's long career in light of recent scholarship. Topics include the status of the cult image, the paragon between poetry and the pictorial arts, painting and questions of literary genre, and Counter Reformation reactions to his art.

ARTHIST 415. Baroque: 1900-2000. 5 Units.

The seminar, which is largely methodological and historiographic, problematizes issues of periodization. The course examines different approaches to the question of "what is baroque," from Alois Riegl and Erwin Panofsky to Michel Foucault, Svetlana Alpers and Giovanni Careri.

ARTHIST 416. Bernini. 5 Units.

This seminar examines the career of Gianlorenzo Bernini (1598-1680), sculptor, architect, painter, stage designer and playwright, the premier artist of the popes. It will examine his cultural, political and religious milieu and lay particular emphasis on the theoretical relations between the arts that his oeuvre is seen to embody. In the process it will also review the genre of artistic biography, the historiography of the baroque and the myths of dynamism, theatricality, eroticism (and others) always associated with the period, and Bernini's work in particular.

ARTHIST 417B. Architectural Theory from Antiquity to Le Corbusier. 5 Units.

This seminar focuses on themes and theories in architectural design from antiquity until the early twentieth century. Modern and contemporary architecture has often claimed its modernity through the incorporation of theory, but this seminar examines selections from key texts that have also moulded architectural and urbanistic thought in the ancient, medieval, and early modern eras in combination with analytical comparisons of built architecture.

Same as: ARTHIST 217B

ARTHIST 422. Reception and Literacy in Roman Art. 5 Units.

(Formerly CLASSART 322.) Beyond a focus on artists and patrons: how Roman art was seen and understood by its contemporary viewers. Themes include memory, performance, gender, replication, and constructions of space. Goal is to draft a differentiated model of viewing and literacy, with attention to collective experience, hierarchy, access, and subversion.

Same as: CLASSICS 373

ARTHIST 423. The Material Imagination. 5 Units.

This seminar deals with the materials that artists have chosen in art and construction from antiquity to the early modern era. The particular focus is upon pre-modern perceptions of the inherent properties of materials, from amber and ivory to marble and granite, as well as the diverse ways in which societies have associated particular substances with social and cultural values. Particular emphasis is laid upon the architectural use of materials.

ARTHIST 426. NARRATIVE THEORY & VISUAL FORM. 5 Units.

The theoretical terrain of narrative studies in literary criticism and historiography. The critical implications of narrative analysis for the writing of history in general. Readings integrated with students' current research projects.

ARTHIST 432. Rethinking American Art. 5 Units.

A re-examination of American art of the 18th and 19th centuries, focusing on works in the collection of the de Young Museum, San Francisco. The class will meet weekly at the de Young, where we will be joined by Professor Margaretta Lovell and students from the University of California, Berkeley. Each student will pursue an in-depth study of a single work in the Museum's superb American collections, using documents of social and cultural history. We will pay particular attention to recent scholarship, questions of genre (landscape, portrait, still life and images of everyday life), and the "biography of objects" (the way works of art shift in context and interpretation over time). Graduate seminar open to advanced undergraduates with the instructor's approval.

ARTHIST 440A. The Art Market. 5 Units.

This seminar is designed to examine aspects of the art market in the current moment and since the mid 19th century. Participants will have an opportunity to engage with problems and perspectives that, until recently, have generally been overlooked or marginalized in narratives of the history of art. Each week, students will write a response to the readings to be shared in advance of the class meeting, and each week, discussion will be initiated by a different student. In individual research projects culminating in a seminar paper, students will be encouraged to focus on how the art market may have impacted the production, reception, and/or circulation of a work or works by a particular artist.

ARTHIST 442. Looking at Violence. 5 Units.

Violence in the media and its effects upon viewers, especially thennyoung, is an issue of national concern that has produced legislationnnfor the ratings of movies, television shows, and computer/video games. Parental control software makes it possible to program cable boxes andnncomputers to censor what broadcasts or websites are accessible tonnchildren. These are political and technical fixes to a perceivednnsocial problem. They do not ask why one is drawn to watch violence innnthe first place, nor why certain kinds of violent imagery is compelling. Debates about how such measures should be implemented usually proceed from the given that images of violence are subjectspecific, with little or no consideration of their formal qualities or visual protocols. This seminar assumes that the tools and categories of visual analysis specific to the History of Art might enrich our thinking about the attraction and impact of violence across media andnncross time. The seminar proposes to situate its topic at the intersection of social, philosophic, and visual traditions so as to allow productive points of view to emerge. Readings will include texts from the history of aesthetics, psychology, and moral philosophy. Research projects will encourage analysis of all forms of visual media: painting, sculpture, prints, photographs, film, video, and computer graphics.

ARTHIST 445. What's not American about American Art?. 5 Units.

This seminar focuses on American art as a history of migration (of people but also of visual objects) across national and continental boundaries. We examine trans-Atlantic and trans-Pacific dialogues and consider how anxieties about foreigners, immigrants, and political dissidents shaped American art and culture at particular moments in the 20th century. In the second half of the course, we consider a series of museum exhibitions that repositioned American art as a history of social conflict and exclusion.

ARTHIST 447. Piet Mondrian: Art, History and Historiography. 5 Units.

Taking Mondrian as a case study, this seminar will examine some of the salient factors that shape how a modern artist emerges into history. Participants will explore Mondrian's work and ideas, attending not only to his own self-fashioning but also to the myriad forces that have shaped his reception since his death in New York in 1944, including scholarship, museum exhibitions, the art market, the responses of innumerable subsequent artists, and the wide circulation of his work in popular culture.

ARTHIST 453. Reading Walter Benjamin. 5 Units.

Few cultural critics are so often cited by scholars in the humanities as Walter Benjamin. The impact of his writings has been decisive to some of the most influential art historians of recent memory, although usually based on a small number of texts (the *Kunstwerk* essay, the writings on photography, the flacirc;neur, and cinema). Literary historians have turned to somewhat different studies with great profit, notably his writings on Baudelaire, translation, and German tragic drama. The publication of Benjaminiquest;s entire oeuvre in English has made his work more accessible to a broad range of scholars with diverse interests; one direction emerging from this familiarity is a deeper awareness of his commitment to materialist history. With the palpable collapse of iquest;social art historyiquest; amongst younger art historians, dispersed ambitions of where iquest;visual studiesiquest; might lead, and the return to aesthetic meditations derived from protracted analyses of single works, it may be the time to re-read Benjamin with an eye towards understanding his ambitions for a iquest;materialist history.iquest; That is the objective of this seminar : we will read deeply in Benjaminiquest;s writings, configure some ideas of what history meant to him, and attempt to export some of those practices to our current art-historical projects.

ARTHIST 454. The Image in Question : French theory after Foucault. 5 Units.

TBD.

ARTHIST 457. Abstract Expressionism. 5 Units.

Coinciding with the opening of the Anderson Collection in the fall of 2014, this seminar considers the expanded field of Abstract Expressionism relative to both domestic and international cultural politics. Topics: Modernism and existentialism; transnational avant-gardes; interdisciplinary approaches to the visual image at mid-century; the ideologies of formalism and autonomous art; cold war aesthetics. Pollock. de Kooning, Guston, Newman, Rothko, Still, Gorky others. Close readings of Greenberg, Rosenberg and critics associated with *Partisan Review* and *little magazines*. Enrollment limited by application only; Phd students only with preference to Art History.

ARTHIST 458. Warhol and After. 5 Units.

This seminar focuses on the wide-ranging career of Andy Warhol as a meansnbsp;to consider the broader history of American art and culture since 1950. It examines little-studied aspects of Warholiquest;s visual production (e.g. his career as a commercial artist in the 1950s, his everyday photographs of the 1970s and 1980s)nbsp;as well as now-canonical Pop paintings of the early-to-mid 1960s. Warholiquest;s critical and scholarly reception will be scrutinized in detail, as will published interviews of and writings by the artist. Finally, we will consider Warholiquest;s legacy and influence on American art in the decades since his death in 1987.

ARTHIST 461. The American Civil War: An Experiential History. 5 Units.

Can one write a history of lived experience, of ephemeral states that never were represented? Can one look at representations of paintings, photographs, and literature to see where these ephemeral states might be trapped, or might otherwise be pictured? Feeling that the real war did not get in the books (for the most part), the course examines those books and other representations and so many things that never attained so exalted a form to look at the war anew. Methodological readings as well as readings about the Civil War.

ARTHIST 462. The Sense of Place in American Art. 5 Units.

The course will focus on places in American art, literature, and material culture--how places are imagined; how they are conceived in opposition to the pure flow of forgettable experience; how what happens in a place somehow remains.

ARTHIST 463. Grad Seminar: American - Ekphrasis. 5 Units.

Description is a prime skill for an art historian. nbsp;How to make a reader (or listener) see a work, whether it is illustrated or not, is arguably the most fundamental and important task and pleasure in this discipline. nbsp;How to make a world--both for oneself and for one's audience--is the larger purpose of such imagistic writing. nbsp;Considering historical and more recent examples of ekphrasis, the course will concentrate on works of art in the Cantor Arts Center, requiring each student to select a work that will become the basis for a quarter-long writing project.

ARTHIST 465. Media Technology Theory. 3-5 Units.

This course surveys major theoretical approaches to the study of media technologies, including Frankfurt School critical theory, media archaeology, actor network theory, science and technology studies, platform studies and theories of critical making. By the end of the course, students should have a rich familiarity with the literature in this area, as well as with exemplary empirical studies conducted within each tradition. Preference to Ph.D. students in Communication and Art and Art History. Consent of instructor required for non-PhD students.

Same as: COMM 384

ARTHIST 470. Globalization and the Visual Arts. 5 Units.

Enrollment restricted to graduate students. Globalization as the most important paradigm for the production, circulation, and reception of contemporary art since the 1990s. The expanding terrain of the art world; biennial culture; new economies of scale and the art market along with its critique in the discourses of empire and multitudes. Debates on the thematics of hybridity; post-Fordism; the flat world and capital flows; exteriority and site specificity; and new models of collectivism in recent art.

ARTHIST 472. Mellon Curating Course. 5 Units.

This course focuses on the production, criticism, and curating of art. It encompasses both the study of curatorial work and the organization of an exhibition at the Cantor. Through a series of required readings, intensive class discussions, class trips, guest lectures, and first-hand encounters with art objects and exhibitions, we will investigate the history and contemporary practice of curating. Our work together will culminate in an exhibition at the Cantor organized by class members in close consultation with Cantor staff. The show will open in late fall 2015-16 and will be on view for approximately 12-15 weeks. Students are expected to enroll in both the Spring 2014-15 and Fall 2015-16 quarters. For graduate students only and with the approval of the faculty. Course will be co-taught by Richard Meyer and Connie Wolf.

ARTHIST 478. Problems in the History of Collecting, Circulation and Display. 5 Units.

This graduate seminar involves intensive study of art collecting, circulation and display through the lens of one of the principal institutions of art history: the museum. It will include a site visit to the Solomon R. Guggenheim Museum to gain a comprehensive view of this complex institution as a basis for seminar-related research and writing. Limited to PhD students in Art History and Film Studies, or by permission of the instructor.

ARTHIST 485. The Situation of the Artist in Traditional Japan. 5 Units.

Topics may include: workshop production such as that of the Kano and Tosa families; the meaning of the signature on objects including ceramics and tea wares; the folk arts movement; craft guilds; ghost painters in China; individualism versus product standardization; and the role of lineage. How works of art were commissioned; institutions supporting artists; how makers purveyed their goods; how artists were recognized by society; the relationship between patrons/quest; desires and artists/quest; modes of production.

Same as: JAPANGEN 220

ARTHIST 485A. Exhibiting East Asian Art. 1-5 Unit.

This seminar will explore the history, conceptual approaches, design, and practicalities of museum-based exhibitions of East Asian art. Through readings, field trips, and site-based exercises the seminar will look to inform the planned reinstallation of the Cantor Center's East Asian galleries. Open to graduate and undergraduate students with interests in art history, museology, design, and cultural representation. Permission of the instructor required.

ARTHIST 487X. Pictures of the Floating World: Images from Japanese Popular Culture. 5 Units.

Printed objects produced during the Edo period (1600-1868), including the Ukiyo-e (pictures of the floating world) and lesser-studied genres such as printed books (ehon) and popular broadsheets (kawaraban). How a society constructs itself through images. The borders of the acceptable and censorship; theatricality, spectacle, and slippage; the construction of play, set in conflict against the dominant neo-Confucian ideology of fixed social roles.

Same as: ARTHIST 287, JAPANLIT 287

ARTHIST 489. Connoisseurship Studies of Chinese Painting, Calligraphy, and Seals. 5 Units.

This course focuses on taking connoisseurship out of the classroom and into the collecting world. With many classes being held at the Asian Art Museum and private collections in the Bay Area, students will learn not only what the role connoisseurship plays in the current art landscape, but how a museum works. Combines case studies in the field, reading material, eyes-on experience, and discussion, this class will address the topics of utilizing resources, conducting research, cultivating collectors, building collections, and curating exhibitions through the lens of connoisseurship.

ARTHIST 489A. Making the Masterpiece in Song Dynasty China. 5 Units.

Studies of canon formation involving Song Dynasty (10-13th c.) Chinese works of painting, calligraphy, ceramics, and architecture. The roles of early art writing and criticism; collecting histories; art historical theory; / copying, imitation, and reproductive practices; period and regional taste; and modern museological and art historical discourses in identifying and constructing a canon of Song masterworks.

Same as: ARTHIST 289A

ARTHIST 490. Curatorial Activism in the Arts of Africa. 5 Units.

Enrollment restricted to graduate students and advanced undergraduates. What is contemporary in African art and how does one curate the contemporary in and through African art? The course examines curatorial practices and activist projects. Topics include redefining museum exhibitions and collections of African art at the Cantor Arts Center and museums around the world; breaking away from stereotypical representations of the arts and cultures of Africa; controversial issues and dilemmas; curatorial activities directed toward cultural, social, and political activism; strategic modes of display and design; subjectivity vs. objectivity; and fostering critical dialogues about the arts and cultures of Africa.

ARTHIST 502. Methods and Issues in Visual Studies. 5 Units.

This course introduces grad students to a range of interpretive methods in the study of art, visual culture, and media. Required for incoming PhD students in Art History.

ARTHIST 600. Art History Bibliography and Library Methods. 1 Unit.

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ARTHIST 610. Teaching Praxis. 1-5 Unit.

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ARTHIST 620. Area Core Examination Preparation. 5 Units.

For Art History Ph.D. candidates. Prerequisite: consent of instructor.

ARTHIST 640. Dissertation Proposal Preparation. 5 Units.

(Staff).

ARTHIST 650. Dissertation Research. 5 Units.

(Staff).

ARTHIST 660. Independent Study. 1-15 Unit.

For graduate students only. Approved independent research projects with individual faculty members.

ARTHIST 660E. Extended Seminar. 4 Units.

May be repeated for credit. (Staff).

ARTHIST 670. Dissertation Seminar. 3-5 Units.

For graduate students writing and researching dissertations and dissertation proposals. How to define research projects, write grant proposals, and organize book-length projects.

ARTHIST 680. Curricular Practical Training. 1-3 Unit.

CPT course required for international students completing degree. Prerequisite: Art History Ph.D. candidate.

ARTHIST 802. TGR Dissertation. 0 Units.

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Art Studio Courses

ARTSTUDI 10AX. Filmmaking. 2 Units.

Production skills and project development in documentary filmmaking. The fundamentals of filmmaking using digital video production techniques focused on documentary storytelling. Shooting in mini-DV format and editing with Final Cut Pro software, students actualize their ideas in an audiovisual medium from conceptualization through post-production and exhibition.

ARTSTUDI 11A. Drawing: Means & Alternate Means. 2 Units.

The first half of the quarter students explore more traditional ways of drawing (still life, models, etc.) to develop a hand/eye relationship. The class will focus on seeing and documenting what is in front of them. The second half of the quarter expands into using alternative means of mark making to deconstruct and re-construct ideas learned in the first half of the quarter. String, tape, body parts and shadows are all fair game. This will be a lively class. The students are graded on their attendance, participation, weekly assignments and one final assignment consisting of two finished works, one being traditional, the other experimental.

ARTSTUDI 11AX. Digital Art and Design in Practice. 2 Units.

Hands-on exploration of art and design using digital tools. Overview of contemporary digital art and design including fine art, graphic design, film, and animation. Analysis of new work in these areas and visits to Bay Area production and artist studios. Demos will focus on 2D and time-based techniques, but students interested in procedural or 3D computer graphic are welcome. Students will complete a multi-part visual project to be included in a final exhibit.

ARTSTUDI 12AX. Drawing Intensive: Revisiting Nature. 2 Units.

As increasing technological advances can further separate us from direct impressions of nature, this class is designed to reconnect and enhance our relationship to the natural world and our surrounding environment. To do this we will develop visual skills and critical thinking through careful observation and classical drawing techniques. Inspired by Stanford's natural and manicured landscapes, students will enjoy the great outdoors while learning elements of perspective, composition, light, and form. Students will learn about master landscape artists, investigate the built and natural environment of the campus, and experiment with various drawing techniques, mediums, and styles.

ARTSTUDI 13A. Fundamentals of Oil Painting. 2 Units.

This course is an introduction to oil painting. Students concentrate primarily on the technical aspects of the medium (i.e. how to paint as opposed to what to paint.) We examine color: how to mix it, how it establishes spatial relationships, light, and shadow. The class progresses through a series of problems designed to develop a sensitivity to paint application and surface quality; as well as to value, composition, volume, light, and space as the necessary elements of recreating perceptual experience. By the end of the course, students are able to apply some sophisticated techniques to visual problem solving. The aim of the course is to demonstrate the mechanical structure of oil painting.

ARTSTUDI 13AX. Photography. 2 Units.

This hands-on course in photography will emphasize the techniques, aesthetics, and conceptual considerations of traditional black and white photography. Students will also explore photography's history and applications as an expressive tool, with the power to communicate ideas and move the viewer. Throughout the course, students will master the use of their own manual 35mm camera and process the film themselves in our lab. They will also learn the techniques needed to make quality black and white prints in the darkroom. Students will coordinate an exhibition and present their finest work in a professional manner.

ARTSTUDI 13BX. Narrative Painting For Non-Majors. 2 Units.

This course will introduce students to the fundamentals of painting using acrylic paints, while simultaneously examining the narrative in visual art. Content for this course will be centered on how human experience is remembered and transformed through self-reflexive, experiential learning that connects our artwork to our personal lives. Formal issues will include the use of color, paint handling, value, and composition. Students will become familiar with the materials through hands-on demonstrations, discussions of historical context for the medium, and in-class critiques. We will also discuss surface preparation, clean-up, and safety. Slide lectures, readings, and a visit to the Cantor museum will enhance studio work time. Drawing background preferred but not required.

ARTSTUDI 14. Drawing for Non-Majors. 2 Units.

Functional anatomy and perspective as they apply to problems of drawing the form in space. Individual and group instruction as students work from still life set-ups, nature, and the model. Emphasis is on the development of critical skills and perceptual drawing techniques for those with little or no previous experience with graphite, charcoal, conte, and inks. Lectures alternate with studio work.

ARTSTUDI 14AX. Sculpture and the Expanded Field. 2 Units.

Sculpture involves space, materials, techniques, and ideas. It is an art of the extraordinary as well as the everyday. No longer tied to architecture, mimesis, or commemorative representation, sculpture now appears in a variety of forms including as installations, collaborations, projections, appropriations, interventions, performances, and experimental projects that address formal concerns as well as issues of identity, historical memory, narrative, economics, the environment, popular culture, technology, globalism, politics, and time. Examples of such work; expanded work; sculpture include public art made to attach to buildings or to be given away, inflatable homeless shelters, and wearable art for street demonstrations. The principle area of knowledge addressed in this course involves exploratory learning about the formal, historical, and global dimensions of contemporary sculptural art. Students will work alone or in groups using a range of materials from cardboard to wood, to found objects, social affects, and conceptual ideas.

ARTSTUDI 15AX. Introduction to Sculpture. 2 Units.

This course offers a unique and interdisciplinary perspective on contemporary sculpture and art practice with the purpose of enabling artistic creation and discovery. The class will become familiar with traditional and non-traditional techniques through hands on workshops and instruction as well as lectures, visiting artists, and studio visits with working sculptors. There will be three major projects resulting in three complete works of art including a self-guided final project building on techniques and concepts covered in this course.

ARTSTUDI 16AX. Drawing Marathon. 2 Units.

Hosted by the New York Studio School of Drawing, Painting, and Sculpture and based entirely in New York, Drawing Marathon helps students learn the importance of drawing as the basis of understanding one's experience of the world. Drawing is seen here as the most direct route to the examination of our perceptions. Unorthodox tools and exercises will be introduced to broaden the students' drawing vocabulary. This course will investigate many implications of drawing as a physical and cerebral activity as well as drawing as a philosophy. It will discuss key issues, including those of scale, tiny to huge; the use of different formats; the use of the rectangle; the vertical axis and its significance; the nature of distortions; the compression of space and depth; the search for "form" and its consequences; space and its meaning; functions and the different kinds of space; and the nature of relational drawing. Students can expect to be in the studio 9 a.m. to 9 p.m. most days. The average day is spent mostly drawing from perspective and includes several group critiques; most nights accumulate in a lengthy final critique at the end of the physical drawing session. This practice intensifies for the last critique at the end of the course. Students learn to engage in clear and succinct dialogue and discussions within the group. Instruction encourages students to participate in and understand the visual language of drawing. The Marathons are intensive all-day programs that run for two weeks at the beginning of each semester at the acclaimed NY Studio School. Students reside in New York City during the program period. Daily drawing sessions at the Studio School, field trips, and creative exploration of the city are all included in the program. Drawing marathon is led both by full-time NYSS faculty and distinguished visiting artists. The Drawing Marathon is open to beginning and advanced artists, regardless of their major.

ARTSTUDI 17A. Black and White Darkroom. 2 Units.

A beginning black & white darkroom photography class with an emphasis on project conceptualization and the utilization of local environments. Students in addition to learning photography basics, will complete a cohesive, short body(s) of work. Students work collectively to realize a group exhibition. Theme and title of the exhibition are chosen at the beginning of the quarter and projects will be developed within its framework.

ARTSTUDI 17AX. Art in the Streets: Identity in Murals, Site-Specific Works, and Interventions in Public Spaces. 2 Units.

This class will introduce students to both historical and contemporary public art practices and the expression of race and identity through murals, graffiti, site-specific works and performative interventions in public spaces. Involving lectures, guest speakers, field trips, and hands-on art practice, students will be expected to produce both an individual and group piece as a final project.

ARTSTUDI 17X. Photography for Non-Majors: Discovering Photography. 2 Units.

This course is designed to introduce the beginning photographer to the basics of making, looking at and discussing fine-art photographs. Students will learn the fundamentals of camera operation; including focus, exposure, depth of field, and motion control. Emphasis will also be placed on learning the basic visual and linguistic vocabulary of photography through in-class discussions focused on the concerns addressed by fine-art photographers since the inception of the media. Students will be encouraged to approach their own image making with the intent of developing a series or set of images, rather than thinking in singular pictures.

ARTSTUDI 31X. New Art-Cinema for Non Majors. 2 Units.

This is a studio course in contemporary cinema art, focusing on actionable, ultra-low budget methods for creating sprawling, proprietary cinematic expressions. Students will build familiarity with the myriad tools of and approaches to digital cinema creation and their practical use in works of art. Students will also be encouraged to conceive of cinema art expansively-- as an opportunity to enclose, express and explore other forms of art: the written word, sound, sculpture, image-making and performance. We will think, talk, and work through the question of the role of art in cinema, and vice versa. We will create as a class no less than two short films. For each film, students will have the opportunity to reinvent their role (thinker-actor, writer-dancer, sound recordist, location scout, human sculpture, etc.). Together, we will smash the myth of the auteur as we hone ourselves into a finely ground machine for breakneck film-making.

ARTSTUDI 130. Interactive Art: Making it with Arduino. 4 Units.

Students use electronics and software to create kinetic and interactive elements in artwork. No prior knowledge of electronics or software is required. Students learn to program the Arduino, a small easy-to-use microprocessor control unit (see <http://www.arduino.cc/>). Learn to connect various sensors such as light, motion, sound and touch and use them to control software. Learn to interface actuators like motors, lights and solenoids to create movement. Learn to connect the Arduino to the MAX/MSP/Jitter programming environment to create media-intensive video and audio environments. Explore the social dimensions of electronic art. (lower level).

ARTSTUDI 130N. Introduction to Art Practice. 3 Units.

This hands-on introduction course will introduce students to formal and conceptual visual strategies in expression through a diversity of artistic mediums which may include drawing, digital media, printmaking, photography, performance and sculpture. This course is meant to give students an overview of many of the mediums and facilities that are available in the Art Practice program. Field trips, guest artists.

ARTSTUDI 131. Sound Art I. 4 Units.

Acoustic, digital and analog approaches to sound art. Familiarization with techniques of listening, recording, digital processing and production. Required listening and readings in the history and contemporary practice of sound art. (lower level).
Same as: MUSIC 154A

ARTSTUDI 138. Sound and Image. 4 Units.

Practices that combine audio and visual media. Topics include synesthesias, visual music, film soundtracks, and immersive multimedia practices that combine sound, music, still and moving images, projections, and performance. (lower level).

ARTSTUDI 140. Drawing I. 4 Units.

Functional anatomy and perspective as they apply to problems of drawing the form in space. Individual and group instruction as students work from still life set-ups, nature, and the model. Emphasis is on the development of critical skills and perceptual drawing techniques for those with little or no previous experience with pastels, inks, charcoal, conte, and pencil. Lectures alternate with studio work. (lower level).

ARTSTUDI 141. Plein Air Painting Now. 4 Units.

Surrounded by so many technologies for image production, why choose to take a course based on a style of painting developed over a hundred years ago? The standard answer to this question has changed remarkably little. Rather than answering that the camera cannot capture what the eye sees, we might instead respond that neither the computer, nor the camera, nor video, can reproduce in paint the subjective gaze of the contemporary viewer. Contained within this answer lies the trajectory for the class "PLEIN AIR PAINTING NOW!" In this course students will be introduced to various water based media appropriate for plein air painting and learn various techniques and strategies for making paintings outdoors. The course will include the traditional discussions of brushes, paints, the different types of supports as well as easels, umbrellas and chairs. A broad variety of painting techniques will be demonstrated. We will set up in various locations around campus, paying particular attention to the specifics of the sites as this will serve as the jumping off point for discussion of the readings that form the second component of the class. Please note that this class takes place outdoors. Plan accordingly, as we will be meeting in various locations around campus, and will be subject to inclement weather. Freshmen and Sophomores receive priority for enrollment. This is a designated CREATIVE EXPRESSIONS course.

ARTSTUDI 141S. Drawing Outdoors. 3 Units.

In this introductory class, we take drawing out into the world, exploring different environments, techniques, and approaches as we go. The fundamental nuts-and-bolts of basic drawing techniques: light logic, depicting depth and drawing the figure, are integrated into each environment. From the Stanford campus; cafe's, architecture and landscaping, to redwoods and water, to more urban settings, drawings will range from high-speed gestures to longer, more contemplative work. Through pen, graphite, charcoal, ink, watercolor/ gouache and mixed media, we explore dichotomous relationships, as well as those in seemingly perfect harmony. We move from the inanimate to animate, figure and architecture, motion and stillness, to the micro and macro, considering how even the smallest patch of earth may be as monumental as Hoover Tower. Both beginning and advanced students are welcome. Summer.

ARTSTUDI 145. Painting I. 4 Units.

Introduction to techniques, materials, and vocabulary in oil painting. Still life, landscape, and figure used as subject matter. Emphasis is on painting and drawing from life. (lower level).

ARTSTUDI 145A. PAINTING WITH ACRYLICS. 4 Units.

This introduction to painting takes full advantage of the quick-drying properties of acrylic paint. A flexible medium which can be altered to resemble everything from watercolor to oil paint to cement, we explore the options. Beginning with basic technique and considerations of color and composition, we move through selected schools of painting from Impressionism and Expressionism to Pop and personal projects. No experience necessary.

ARTSTUDI 147. Artist's Book. 4 Units.

Explores contemporary aesthetic interpretations of the book as an art object while invigorating traditional artistic practices of the art of the book. Through the medium of drawing, collage, and mixed media students produce their own artist's book. The course familiarizes students with bookbinding and the various techniques used, as well as exploring the narrative, text and image, and the book as a sculptural object.

ARTSTUDI 147S. DRAWING AND PAINTING INTENSIVE. 3 Units.

This introductory course teaches the basic tools of drawing and painting with acrylics, along with an introduction to a range of artists for inspiration. From the beginning, we take advantage of Stanford's beautiful campus, drawing and painting outside, along with studio work and slide lectures. We begin with our unique gestures and mark-making, moving through linear perspective, light logic, photo-realism, and the figure, using a range of media from graphite and charcoal to bamboo brush and ink. The introduction to acrylic painting explores the many ways we may use acrylic paint, looking at different art historical approaches along the way. A flexible medium, acrylic can be used to mimic watercolor, oil paint, or even cement, and works on a variety of surfaces. We begin by learning color theory and different paint applications through abstract painting, taking as our inspiration Piet Mondrian, Hans Hofmann, and J.W. Turner. Using thick, impasto paint, we move outdoors for plein air painting, stealing strategies from the Impressionists, and adapting them in our personal projects with today's technologies. Moving back indoors, we switch it up again, exploring the expressive gesture, and figurative distortion, using acrylic now more thinly, a la watercolor or gouache, along with charcoal, creating dramatic effects, and working on different surfaces. Each student will finish the quarter with a wide range of techniques and materials at the ready. No previous painting or drawing experience is necessary.

ARTSTUDI 148. Monotype. 4 Units.

Introduction to printmaking using monotype, a graphic art medium used by such artists as Blake, Degas, Gauguin, and Pendergast. May be repeated for credit. Prerequisite: 140. (lower level). May be repeated 2 times for total of 8 units.

ARTSTUDI 148A. Lithography. 4 Units.

The classic technique of printing from limestones. Techniques to draw an image on the stone, etch and fix the image on the stone, and print it in numbered editions. Students work on a variety of stone sizes. Field trips to local publishers of lithography or lithography exhibitions. (lower level).

ARTSTUDI 148B. Introduction to Printmaking Techniques. 4 Units.

Techniques such as monotype, monoprint, photocopy transfers, linocut and woodcut, intaglio etching. Demonstrations of these techniques. Field trips to local print collections or print exhibitions. (lower level).

ARTSTUDI 148P. DIGITAL PRINTMAKING. 4 Units.

The Digital Printmaking course explores a combination of experimental printmaking methods and investigates print media within contemporary art and culture. Techniques like large-format inkjet printing and laser plate etching will be demonstrated in class. Students will have in-class access to a flatbed printer that is capable of printing digital images on a wider variety of materials like glass, fabric, and wood. Through a series of hands-on labs, students will develop projects using a combination of methods and discussions will address issues relating to print media today; audience, distribution, repetition, originality, and reproduction.

ARTSTUDI 149C. Etching. 4 Units.

In this class students will explore various techniques of etching (or intaglio) on zinc plates such as, hard ground, soft ground, aquatint, marbling aquatint and sugar lift, through an electrolytic process that uses no acid but sulfates and very low electrical power (1.5 V or the same as a AA battery). This process is much less toxic than the traditional etching with nitric (which produces toxic fumes) or ferric acid (difficult to clean). These techniques will be complemented by other ones that can be mixed with etching such as photocopy transfers, Chine collecut; (attaching a different color paper between plate and main paper), and mono-printing. Etching/Intaglio (making a mark under the surface of the plate) is one of the most tactile and elegant forms of printmaking. The plate leaves a 3-D line mark and embossed marks in the deep etched areas as well as at the edges of the plate. Many major artists have left memorable images by working in this medium (Rembrandt, Goya, Kathe Kollwitz, Eduard Munch, and many others) influencing many contemporary artists.

ARTSTUDI 151. Sculpture I. 4 Units.

Traditional and non-traditional approaches to sculpture production through working with materials including wood, metal, and plaster. Conceptual and technical skills, and safe and appropriate use of tools and materials. Impact of material and technique upon form and content; the physical and expressive possibilities of diverse materials. Historical and contemporary forming methods provide a theoretical basis for studio work. Field trips; guest lecturers.

ARTSTUDI 153N. Ecology of Materials. 3 Units.

This hands on studio based sculpture course takes a critical look at the materials used in sculpture and addresses the environmental concerns surrounding them. We will look at artists concerned with environmental impact and the interconnection of art to other fields. This class also addresses the impact of material and technique upon form and content; therefore understanding the physical and expressive possibilities of diverse materials. Conceptual and technical considerations will be addressed. Students will learn traditional building techniques as needed (wood shop, metal shop, mold making, found object) as well as anti-object techniques. Existing at the intersection of art, science, technology and ecology, environmental art often functions to inform and/or interpret natural conditions and the processes associated with both "non-human" and "human-made" constructions. It will also educate us about environmental issues and concerns. This course introduces and provides a context for this area of interdisciplinary exchange and artist production by examining areas commonly known as cradle to cradle design, land art, eco art, environmental art, and art and technology. What role does sculpture play in a fragile world with depleting natural resources, global economies and media dominance? What is the life cycle of object making and creating? What is our relationship to objects in a growing technological age? Students will make 3-4 projects based on these questions. Group discussions, critiques, readings, video presentations, a field trip to a local artist-in-residence program Recology at the San Francisco Dump, visiting artists and visiting faculty from Stanford doing environmental research will augment this class.

ARTSTUDI 155. Social Sculpture. 4 Units.

This course investigates the immediacy of the body as material and sculpture in order to investigate private and social spaces. Actions are often used to understand or question the function and psychological aspects of a space and are documented for the perpetuation of these ideas. Throughout the quarter we will investigate the body as material and develop site specific performances enacted for: Private/Domestic and Public Space; Constructed Space & Physical Space; ecological systems; and generate both Individual & Collaborative based Actions, Interventions, & Events."

ARTSTUDI 160. Design I : Fundamental Visual Language. 3-4 Units.

Formal elements of visual expression (color, composition, space, and process) through hands-on projects. Two- and three-dimensional media. Emphasis is on originality and inventiveness. Content is realized abstractly. Centered in design; relevant to visual art study and any student seeking to develop visual perception. (lower level).

ARTSTUDI 161. Catalysts for Design. 3-4 Units.

Nature and science as sources of design inspiration. Projects in natural pattern formation, biological growth and form, Fibonacci numbers and the golden section, planar and spatial symmetry, mechanics, chaos, and fractals. Emphasis is on importance of creative synthesis to the design process. Projects take the form of physical constructions as opposed to renderings or computer models. Field trips. (lower level).

ARTSTUDI 166. Design in Motion. 3-4 Units.

Design areas for which movement and transformation are essential. Experimentation with mechanical means such as linking, hinging, inflating, and rotating. Projects in lighting, automata, tools and utensils, chain reactions, toys and games, festival props, and quasi-architecture emphasize the creation of works in which motion is a significant agent for aesthetic gratification. No experience in mechanical engineering required. (lower level).

ARTSTUDI 167. Introduction to Animation. 3-4 Units.

Projects in animation techniques including flipbook, cutout/collage, stop-motion such as claymation, pixilation, and puppet animation, rotoscoping, and time-lapse. Films. Computers used as post-production tools, but course does not cover computer-generated animation. (lower level).

ARTSTUDI 170. Introduction to Photography. 4 Units.

Critical, theoretical, and practical aspects of creative photography through camera and lab techniques. Field work. Cantor Art Center and Art Gallery exhibitions. Course requires the use of a 35mm camera. The Department will supply if necessary. (lower level).

ARTSTUDI 170S. Introduction to Photo- Summer. 3 Units.

Critical, theoretical, and practical aspects of creative photography through camera and lab techniques. Field work. Cantor Art Center and Art Gallery exhibitions. Course requires the use of a 35mm camera. The Department will supply if necessary. Summer. (lower level).

ARTSTUDI 171. Intro to Digital Photo. 3 Units.

This course offers an introduction to creative digital imaging. Students will master camera controls and explore meaningful image production. Course topics include: image capture, composition, artificial & natural light, image correction, data storage, night photography, and photography as a communicative tool.

ARTSTUDI 173E. Cell Phone Photography. 4 Units.

The ubiquity of cell phone photography has had a widespread impact on the tradition, practice, and purposes of photography, as well as concepts of art and what art should be for. In this class, we discuss the documentarian bent of much cell phone photography, its potential as a component of citizen journalism, the ways in which the environments of these photographs (Instagram, Tumblr) are changing ideas of the image and of authorship, and effects that cell phone photography may be having on us as subjects. Alongside these discussions, students will create works of art utilizing the experimental, documentary, and social potentials of cell phone photography.

ARTSTUDI 174B. Creativity in the Age of Facebook: Making Art for and from Networks. 4 Units.

This class explores the history, practice and technique of creating art on and for the internet. Discussions, projects and readings focus on the ways in which internet art embodies changing ideas about artistic creation, technology, and interactivity as a way of blurring the line between artist and audience. Setting recent work against the backdrop of earlier moments in contemporary art (found object art, photomontage), this course also situates internet art in the pre-internet tradition of finding new perspectives on, and meanings in, overfamiliar or banal media surroundings. In collaborative and individual projects, students will create visual compositions on online platforms such as NewHive and explore social media interventions, Twitter experiments, crowdsourced work, collections of online found imagery, supercuts, GIFs, and "choose your own adventure"- style online storytelling.

ARTSTUDI 176. Time Shifts. 4 Units.

In this course, we examine how both individual perceptions and artistic representations of time have historically shifted with changes in technology. What are the current possibilities to extend/re-imagine how we represent time using digital tools? How do these possibilities, in turn, re-inform traditional media? This is a conceptual and experimental class with a studio focus. Examples are mainly from an art context, but include interaction design, information visualization, and scientific illustration of time-based events and processes. Students should have previous experience with a set of digital tools - Photoshop, FinalCutPro, AfterEffects, or a programming language that will allow you to digitally manipulate images. Assignments include exercises using traditional media, and digitally based projects. Occasional writing assignments also required.

ARTSTUDI 177. Video Art I. 4 Units.

Students create experimental video works. Conceptual, formal, and performance-based approaches to the medium. The history of video art since the 70s and its influences including experimental film, television, minimalism, conceptual art, and performance and electronic art. Topics: camera technique, lighting, sound design, found footage, cinematic conventions, and nonlinear digital editing. (lower level).

ARTSTUDI 178. Art and Electronics. 4 Units.

Analog electronics and their use in art. Basic circuits for creating mobile, illuminated, and responsive works of art. Topics: soldering; construction of basic circuits; elementary electronics theory; and contemporary electronic art. (lower level).

ARTSTUDI 179. Digital Art I. 4 Units.

Contemporary electronic art focusing on digital media. Students create works exploring two- and three-dimensional, and time-based uses of the computer in fine art. History and theoretical underpinnings. Common discourse and informative resources for material and inspiration. Topics: imaging and sound software, web art, and rethinking the computer as interface and object. (lower level).

ARTSTUDI 180. Color. 3-4 Units.

Hands-on study of color to develop color sensitivity and the ability to manipulate color to exploit its expressive potential. Guided experimentation and observation. Topics include color relativity, color and light, color mixing, color harmony, and color and content. (lower level). Same as: TAPS 180P

ARTSTUDI 230. Interdisciplinary Art Survey. 4 Units.

This course is designed to develop diversity of concepts and strategies within the student's artistic practice. The course includes a survey of artists using different media taught in the department's studio program such as painting, drawing, video and digital art, printmaking, photography, and sculpture. This seminar-style class seeks to expand the artistic practice outside of traditional media boundaries and focuses on the translation of concepts across various media. Priority to Art Practice majors and minors. (upper level).

ARTSTUDI 236. Future Media, Media Archaeologies. 3-4 Units.

Hand-on. Media technologies from origins to the recent past. Students create artworks based on Victorian era discoveries and inventions, early developments in electronic media, and orphaned technologies. Research, rediscover, invent, and create devices of wonder and impossible objects. Readings in history and theory. How and what media technologies mediate. Same as: MUSIC 236

ARTSTUDI 239. Intermedia Workshop. 3-4 Units.

Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent. May be repeated for credit. Same as: MUSIC 155, MUSIC 255

ARTSTUDI 240. Drawing II. 4 Units.

Intermediate/advanced. Observation, invention, and construction. Development of conceptual and material strategies, with attention to process and purpose. May be repeated for credit. Prerequisite: 140 or consent of instructor. (upper level).

ARTSTUDI 245. Painting II. 4 Units.

Symbolic, narrative, and representational self-portraits. Introduction to the pictorial strategies, painting methods, and psychological imperatives of Duumlrer, Rembrandt, Ceacute;zanne, Kahlo, Beckmann, Schiele, and Munch. Students paint from life, memory, reproductions, and objects of personal significance to create a world in which they describe themselves. May be repeated for credit. Prerequisites: 140, 145, or consent of instructor. (upper level).

ARTSTUDI 246. Individual Work: Drawing and Painting. 1-15 Unit.

Prerequisites: two quarters of painting or drawing and consent of instructor.

ARTSTUDI 249. Advanced Undergraduate Seminar. 3-4 Units.

Capstone experience for majors in Art Practice. Interdisciplinary. Methods of research, cross-media critiques, and strategies for staging and presenting work, including a group exhibition for Commencement. Guest artists from the Bay Area. Minors may interview for possible inclusion. (upper level).

ARTSTUDI 250. Individual Work: Sculpture. 1-15 Unit.

May be repeated for credit.

ARTSTUDI 252. Sculpture II. 4 Units.

Builds upon 151. Installation and non-studio pieces. Impact of material and technique upon form and content; the physical and expressive possibilities of diverse materials. Historical and contemporary forming methods provide a theoretical basis for the studio work. Field trips; guest lecturers. (upper level).

ARTSTUDI 254. Kinetic Sculpture. 3-4 Units.

This course is focused on developing a practical, hands on understanding of kinetic mechanisms applied to objects and materials in sculpture and installation. Class time will take the form of lectures and technical demos, and hands-on labs where you will be exposed to different strategies for making movement in the physical world. Topics investigated include Rube Goldberg machines, devices of wonder, interactivity, audience experience and participation. This course will not be co-taught this year.

ARTSTUDI 260. Design II. 3-4 Units.

The historical spectrum of design including practical and ritual. The values and conceptual orientation of visual fundamentals. Two- and three-dimensional projects grouped to relate design theory to application, balancing imaginative and responsible thinking. Prerequisite: ARTSTUDI 160 and ME 203 (upper level). May be repeated for credit.

ARTSTUDI 261. Individual Work: Design. 1-15 Unit.

May be repeated for credit.

ARTSTUDI 262. The Chair. 3-4 Units.

Students design and fabricate a highly refined chair. The process is informed and supported by historical reference, anthropometrics, form studies, user testing, material investigations, and workshops in fiberglass molding, wood steam-bending, plywood forming, metal tube bending, TIG & MIG welding, upholstery & sewing. Prerequisites: ME 203, or consent of instructor. (upper level).

ARTSTUDI 263. Paper. 3-4 Units.

Beyond conventional use of paper as a foundation for mark-making to its potential as a medium in its own right. Students experiment with papers to develop facility with techniques of folding, scoring, curling, cutting, tearing, piercing, embossing, layering, and binding to create three-dimensional forms, patterned/textured surfaces, reliefs, interactive dynamic structures such as pop-ups, containers, and book forms. (upper level). May be repeated for credit.

ARTSTUDI 265. Design for Exploration. 3-4 Units.

A collaboration with the Exploratorium in San Francisco. Students investigate and experiment with all aspects of the creation of interactive museum exhibits. On-site exhibit floor sessions and prototyping workshops. Lectures from museum staff on exhibit design. Students design and construct exhibits for temporary placement on the floor of the Exploratorium. To be considered for admission to the course, student must fill out an application form at <http://stanford.edu/~edmark/application.htm> no later than Nov 30th, 2013.

Same as: ME 213

ARTSTUDI 270. Advanced Photography Seminar. 1-5 Unit.

Student continues with own work, showing it in weekly seminar critiques. May be repeated for credit. (upper level).

ARTSTUDI 271. The View Camera: Its Uses and Techniques. 4 Units.

For students of photography who wish to gain greater control and refine skills in image making. 4x5 view cameras provided. Enrollment limited to 8. (upper level).

ARTSTUDI 272. Individual Work: Photography. 1-5 Unit.

Student continues with own work, showing it in weekly seminar critiques. May be repeated for credit.

ARTSTUDI 273. Individual Work: Experimental Media Art. 1-15 Unit.

May be repeated for credit.

ARTSTUDI 274. Alternative Processes. 4 Units.

Priority to advanced students. Technical procedures and the uses of primitive and hand-made photographic emulsions. Enrollment limited to 10. Prerequisites: 170, 270, or consent of instructor. (upper level).

ARTSTUDI 275. Introduction to Digital Photography and Visual Images. 4 Units.

Students use Adobe Lightroom to organize and edit images, manipulate and correct digital files, print photographs, create slide shows, and post to the Internet. How to use digital technology to concentrate on visual thinking rather than darkroom techniques. (upper level). May be repeated 2 times for a total of 8 units.

ARTSTUDI 276. The Photographic Book. 4 Units.

Grouping and sequencing photographic images to produce a coherent body of work with a thematic structure. (lower level).

ARTSTUDI 277. Project class: Digital and Analog Projects in Photography. 4 Units.

Students pursue a topic of their own definition. Further exploration of darkroom and other printing techniques; contemporary theory and criticism. (lower level). May be repeated for credit 2 times for a maximum of 8 units.

ARTSTUDI 278. Intermediate Black and White Photography. 4 Units.

This course explores several intermediate-level topics and techniques in film based photography. These include medium format photography utilizing the school's cameras; fine printing techniques using fiber paper; the full range of black and white films currently available; and alternative black and white techniques such as pinhole photography, photograms, and Holga cameras. We briefly discuss basic lighting techniques. The course emphasizes improving the student's image content and sequencing of images.

ARTSTUDI 279A. Digital Art II. 4 Units.

Advanced. Interactive art works using multimedia scripting software. Experimental interfaces, computer installation work, and mobile technologies. Contemporary media art theory and practice. (upper level).

ARTSTUDI 284. Art and Biology. 4 Units.

The relationship between biology and art. Rather than how art has assisted the biological sciences as in medical illustration, focus is on how biology has influenced art making practice. New technologies and experimental directions, historical shifts in artists' relationship to the living world, the effects of research methods on the development of theory, and changing conceptions of biology and life. Projects address these themes and others that emerge from class discussions and presentations. (upper level).

ARTSTUDI 285. Topics in Media Studies: Street Media. 4 Units.

Literal and figurative meanings of street and how they provide potential to media technologies and invite innovative forms of artistic practice. Contemporary art as the juncture where street movements and new media collide. Small projects. May be repeated for credit.

ARTSTUDI 310A. Directed Reading: Studio. 1-15 Unit.

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ARTSTUDI 310B. Directed Reading: Studio. 1-15 Unit.

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ARTSTUDI 310C. Directed Reading: Studio. 1-15 Unit.

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ARTSTUDI 342. MFA Project: Tutorial. 1-15 Unit.

Students construct an individual tutorial with an instructor selected from the studio art faculty, including visiting artists. The student must take tutorials with at least three different faculty members during the six-quarter program. Prior approval of advisor is required.

ARTSTUDI 342A. MFA: Object Seminar. 1-15 Unit.

Weekly seminars, studio practice, and individual tutorials. Student work is critiqued on issues of identity, presentation, and the development of coherent critical language. May be repeated for credit. Restricted to M.F.A. studio students only.

ARTSTUDI 342B. MFA: Concept Seminar. 1-15 Unit.

Weekly seminars, studio practice, and individual tutorials. Modes of conceptualization to broaden the base of cognitive and generative processes. May be repeated for credit. Restricted to M.F.A. studio students only.

ARTSTUDI 342C. M.F.A Seminar. 1-15 Unit.

Professional practices; preparation of documentation; exhibition and presentation. Restricted to M.F.A. studio students only. May be repeat for credit total units allowed 45 and total completion 6.

ARTSTUDI 350A. Art & Design I: History and Theory. 3 Units.

This two part graduate level course is required for all first year JPD students (both MFA and ME students), and open to all MFA Art Practice students. The first quarter of the course is a seminar, which focuses on the history of design practices and theories in a broad range of fields including design, art, and architecture. We will examine how well known concepts such as "The Bauhaus", "the designer", "Design Thinking", and metaphors such as "workshop", "school", "laboratory", "studio", or "post-studio" arise, and how they shape the artist or designer's work in a particular cultural context. Through reading, writing, and discussion, students will attempt to define their current position within a historical context and chart their future vision. The course may involve guest lectures and visits to various collections and archives.

ARTSTUDI 350B. Art & Design II: Personal Practice. 3 Units.

This two part graduate level course is required for all first year JPD students (both MFA and ME students), and open to all MFA Art Practice students. The second quarter of the course is a studio class, which examines our personal relationships to various creative processes (technical, procedural, and conceptual). Our goal is to gain new insights into our creative processes and find new possibilities within our available working methods. We will investigate issues such as constraint, iteration, collaboration, delegation, daily practice, and tools. Assignments such as "handmade-readymade-fablab" will challenge students to work with various processes and conceptual frameworks within single projects. The course will include four major projects, many minor studio exercises, readings, and discussion.

ARTSTUDI 360A. Design Masters Project I. 4 Units.

This two part graduate level seminar and studio course is required for second year JPD MFA students, and open to second year JPD ME students and all MFA art practice students. The first quarter of this course examines artists as contextually engaged problem solvers and provocateurs. What strategies have artists used to draw attention to, and drive change regarding issues they care about? How is art used to change habits, shift the directions of cultural discussions, and make the invisible visible? We will study artists and designers who use innovative techniques to these ends such as Merle Ukeles, Krzysztof Wodiczko, Eduardo Kac, Jon Rubin, Amy Franceschini, Alfredo Jaar, Stamen Design (cab spotting), and Rebar. In addition to readings and discussions, students will create and critique a series of four studio projects that engage participants to rethink a specific site or situation.

ARTSTUDI 360B. Design Masters Project II. 4 Units.

This two part graduate level seminar and studio course is required for second year JPD MFA students, and open to second year JPD ME students and all MFA art practice students. In this second quarter of the course, students will refine and expand one of their assignments from Sites/Situations I to create a completed site-specific installation, intervention, or product/object, which provokes discussion or change in our community. Works will be realized at various sites around campus, or in the community at large. Issues such as budget, public safety and code will be addressed. Time will be allotted for documentation, critique, and assessment of these projects.

ARTSTUDI 360C. Master's Project: Design. 2-4 Units.

Students enroll concurrently in ME 316. Over the course of the year, students create and present two master's theses involving the synthesis of aesthetics and technological concerns in the service of human need and possibility.

ARTSTUDI 361. MFA First Year Seminar: Context. 1-15 Unit.

tbd.

ARTSTUDI 801. TGR Project. 0 Units.

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Arts Institute Courses

ARTSINST 10AX. Tiny Eco House for Artists - Social Practice, Design / Build. 2 Units.

Guest artist, David Szlasa will work with students to build a mobile art studio for use on Stanford campus. Students would then curate a program to implement in the studio, which will be placed in White Plaza during Fall Quarter of 2015. Longer term, the studio will be a presence at Jasper Ridge Biological Preserve as a venue for artists engaging with the natural environment and Stanford community. The studio structure is built from salvaged materials largely from scrap material available at the Jasper Ridge maintenance site. We intend that Jasper Ridge will be the home for the mobile studio after this initial build and campus intervention, so the use of scrap from the preserve would be a wonderful link between the land and the art. Students will explore four major themes: 1. Art and design as social practice and community engagement, including curatorial practice and public programming as civic engagement 2. Sustainable construction and design from theory to practice 3. Scalability in design and implementation, theorizing a mobile national arts residency program. 4. Developing a dialogue around arts and environmental research.

ARTSINST 11Q. Art in the Metropolis. 3 Units.

This seminar is offered in conjunction with the annual "Arts Immersion" trip to New York that takes place over the spring break and is organized by the Stanford Arts Institute (SAI). Participation in the trip is a requirement for taking part in the seminar (and vice versa). The trip is designed to provide a group of students with the opportunity to immerse themselves in the cultural life of New York City guided by faculty and the SAI programming director. Students will experience a broad range and variety of art forms (visual arts, theater, opera, dance, etc.) and will meet with prominent arts administrators and practitioners, some of whom are Stanford alumni. For further details and updates about the trip, see <http://artsinstitute.stanford.edu>.
Same as: MUSIC 11Q

ARTSINST 15. The Stillness of the Dunes. 3 Units.

An advanced writing course in nonfiction craft, drawing, and contemplative practice. A significant portion of each class meeting will focus on the development and sharpening of writing craft, especially of the essay, in a hybrid form both scholarly and personal. We will also explore writing as meditative practice, through examples and through short exercises. We will deepen our cultural understanding of the desert and its impact, through art, literature, philosophy, film, and contemplative practice, and the course will build toward a four-day camping trip to the dunes of Death Valley, six weeks into the quarter.

ARTSINST 150. The Changing World of Popular Music. 2 Units.

This course will cover changes in the business, economics, and practices of the popular music industry. It will provide a brief historical overview of the industry and its business models. The majority of the course will focus on the industry as it works today and on forces that are causing it to change rapidly. The course will feature guest artists and executives with current experience in the field, as well as project-based assignments designed to give students hands-on experience. Topics will include: Economics and business models of commercial music business, Technology and music production, Technology and music distribution, Technology and marketing, Leadership in the music industry: case studies, Managing creative projects, Copyright and legal issues.

ARTSINST 199. Independent Study. 1-5 Unit.

May be repeated for credit.

ARTSINST 200A. Honors in the Arts Workshop. 2 Units.

First in a three-quarter series required of all Honors in the Arts participants. Students initiate and develop interdisciplinary creative projects with the support of peers and mentors in a small, workshop format. Required enrollment in 200 A,B,C.

ARTSINST 200B. Honors in the Arts Workshop. 2 Units.

Second in a three-quarter series required of all Honors in the Arts participants. Students initiate and develop interdisciplinary creative projects with the support of peers and mentors in a small, workshop format. Required enrollment in 200 A,B,C.

ARTSINST 200C. Honors in the Arts Workshop. 2 Units.

Third in a three-quarter series required of all Honors in the Arts participants. Students initiate and develop interdisciplinary creative projects with the support of peers and mentors in a small, workshop format. Required enrollment in 200 A,B,C.

Asian American Studies Courses

ASNAMST 52D. Asian American Human Development: Cultural Perspectives on Psychology, Education and Critical Issues. 3 Units.

In this course, we will examine the critical issues in Asian American growth and development with particular attention given to current theoretical and research perspectives within a diverse society. We will consider topics related to their cultural identity, cognitive, and socio-emotional development, engaging in the ethnic discourse on Confucian history and culture, Eastern and Western thought and learning, tiger parenting, gender roles, the model minority stereotype, acculturation and bicultural identity, and mental health. This course uniquely integrates the fields of history, education, psychology, human biology, and ethnic studies as we seek to understand the underlying processes of the Asian American person as an individual and as an effective member of the larger society.
Same as: CSRE 52D

ASNAMST 107. Asian American Leadership: Controversies, Dilemmas, and Decision-Making Strategies. 3-5 Units.

This course examines the experiences of Asian Americans in a variety of contemporary leadership contexts to identify the complexities of race, gender, class, and ethnicity for both understanding and responding to social relations of power. Through seminar discussion, readings, guest speakers, case studies, and experiential activities, students evaluate situated practices of Asian American leadership in consideration of longstanding themes that have animated the field of Asian American Studies: self- and collective identification, representation and equality, community organizing and advocacy, interracial coalition-building, and minority empowerment. Students explore how Asian American leadership is conceptualized, practiced, and assessed in relation to the following contexts: campus and community activism of the Asian American movement of the 1960s to the present, institutional settings of employment, electoral politics, the field of Asian American Studies, and public intellectual life. A multidisciplinary approach will draw upon anthropology, psychology, political science, sociology, and Asian American Studies.

ASNAMST 112. Public Archaeology: Market Street Chinatown Archaeology Project. 4-5 Units.

This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

Same as: ANTHRO 112, ANTHRO 212

ASNAMST 118A. Digital Heritage: Bringing the Past Online with the Chinese American Historical Museum. 5 Units.

Interpreting the past is no longer just for people like historians and archaeologists, and it's no longer confined to the pages of books. More and more, community-based organizations are gathering stories and perspectives from everyday people, and they're putting them out for the world to see online. With these big changes, what will be the future of thinking about the past? In this course, students will work through the dynamics of digital heritage through readings, discussion, and original research. The course centers around artifacts unearthed at the Market Street Chinatown in San Jose. Each student will analyze and gather stories relating to a single artifact in order to contribute to a multimedia exhibit for the Chinese American Historical Museum in San Jose. Class time will be devoted both to discussion and to work on artifact-based projects, and will also include a fieldtrip to the museum and collaboration time with members of the Chinese Historical and Cultural Project.

Same as: ANTHRO 118A, CSRE 118A

ASNAMST 131. Trauma, healing, and empowerment in Asian America. 3-5 Units.

This course will look at the ways in which Asian Americans are affected by the legacy of war, occupation and colonialism through themes of home, displacement, community, roots, identity, and inter-generational trauma. The approach is integrative, including scholarly investigation, embodied practice, and creative approach. This self-reflective process uses narrative, oral and written, as a means of becoming whole and healing personal, historical, and collective wounds.

Same as: CSRE 131C

ASNAMST 144. Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class. 5 Units.

Exploration of crossing borders within ourselves, and between us and them, based on a belief that understanding the self leads to understanding others. How personal identity struggles have meaning beyond the individual, how self healing can lead to community healing, how the personal is political, and how artistic self expression based in self understanding can address social issues. The tensions of victimization and agency, contemplation and action, humanities and science, embracing knowledge that comes from the heart as well as the mind. Studies are founded in synergistic consciousness as movement toward meaning, balance, connectedness, and wholeness. Engaging these questions through group process, journaling, reading, drama, creative writing, and storytelling. Study is academic and self-reflective, with an emphasis on developing and presenting creative works in various media that express identity development across borders.

Same as: CSRE 144, FEMGEN 144X

ASNAMST 146S. Asian American Culture and Community. 3-5 Units.

This course introduces students to the histories of Asians in America, specifically as these histories are part of a broader Asia-US-Pacific history that characterized the 20th century and now the 21st. We will combine readings in history, literature, sociology, with community-based learning. The course takes place over two quarters. The first quarter focuses on gaining knowledge of Asian America and discussion key topics that students wish to focus on collaboratively. During this first quarter we also learn about community-based learning, set up teams and projects, and develop relationships with community organizations. The second quarter students work with student liaisons (senior students who have experience in service learning) and complete their work with the community; there are no formal class meetings this second quarter. Service Learning Course (certified by Haas Center). Course can be repeated once.

Same as: AMSTUD 146, COMPLIT 146, CSRE 146S

ASNAMST 185A. Race and Biomedicine. 3-5 Units.

Race, identity, culture, biology, and political power in biomedicine. Biological theories of racial ordering, sexuality and the medicalization of group difference. Sources include ethnography, film, and biomedical literature. Topics include colonial history and medicine, the politics of racial categorization in biomedical research, the protection of human subjects and research ethics, immigration health and citizenship, race-based models in health disparities research and policy, and recent developments in human genetic variation research.

Same as: ANTHRO 185A

ASNAMST 187. Geography, Time, and Trauma in Asian American Literature. 5 Units.

The notion that homes can be stable locations for cultural, racial, ethnic, and similarly situated identity categories. The possibility that there really is no place like home for Asian American subjects. How geography, landscape, and time situate traumas within fictional Asian American narratives.

Same as: AMSTUD 261A

ASNAMST 189. The Vietnamese Experience in America. 3 Units.

The purpose of this course to study the experience of the Vietnamese refugees from their exodus after the Vietnam War to their resettlement in America, and to examine larger historical, social, political, and economic processes at work. We will focus on the processes that lead to the formation of this community the variables leading to various locations.

ASNAMST 193F. Psychological Well-Being on Campus: Asian American Perspectives. 1 Unit.

Topics: the Asian family structure, and concepts of identity, ethnicity, culture, and racism in terms of their impact on individual development and the counseling process. Emphasis is on empathic understanding of Asians in America. Group exercises.

Same as: EDUC 193F

ASNAMST 200R. Directed Research. 1-5 Unit.

May be repeated for credit.

ASNAMST 200W. Directed Reading. 1-5 Unit.

(Staff).

ASNAMST 265. Writing Asian American History. 5 Units.

Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

Same as: AMSTUD 265, HISTORY 265, HISTORY 365

ASNAMST 281. Asian Religions in America; Asian American Religions. 4 Units.

This course will analyze both the reception in America of Asian religions (i.e. of Buddhism in the 19th century), and the development in America of Asian American religious traditions.

Same as: AMSTUD 281, RELIGST 281, RELIGST 381

ASNAMST 295F. Race and Ethnicity in East Asia. 4-5 Units.

Intensive exploration of major issues in the history of race and ethnicity in China, Japan, and Korea from the early modern period to the present day.

Same as: HISTORY 295F, HISTORY 395F

Asian Languages Courses

ASNLANG 1. 1ST YR JPNESE. 0-60 Units.

Astronomy Courses

Athletics, Physical Education, Recreation Courses

ATHLETIC 3M. Aikido. 1 Unit.

Aikido originated in the centuries-old tradition of the Japanese martial arts and is a form of budo; a way of life that seeks to polish the self through a blend of rigorous physical training and spiritual discipline. There is no attack in Aikido. Its uniqueness as a martial art lies in its awareness of a deep sense of harmony with all of creation with training to defend not only the self but to bring the attacker under control without the necessity of inflicting injury. Because of Aikido's noncompetitive, harmonious philosophy, men and women of all ages can train together in a mutually supportive atmosphere, at an energy level appropriate for each individual. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://aikido.stanford.edu>.

ATHLETIC 4C. Archery Club Team. 1 Unit.

Restricted to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. Not a PE class or for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. Students new to a team should register for the course in future quarters once committed as a team member. (AU).

ATHLETIC 5C. Climbing Club Team. 1 Unit.

This class is for members of the Climbing Club Sports team. All students must complete 21 hours of participation with the team and meet any other team requirements during the quarter. While many teams are open to beginners, this class is for returning athletes committed to the team for the year and are at an intermediate or advanced level. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. May be repeat for credit.

ATHLETIC 10. Band, Sports Activity. 1 Unit.

(AU).

ATHLETIC 12V. Baseball, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 14V. Basketball, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 15V. Basketball, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 20M. Capoeira Club. 1 Unit.

Capoeira is a breathtaking Afro-Brazilian art which combines practical martial arts, dance, acrobatics, music, history and philosophy. The origin of Capoeira is obscure since the evolution of Capoeira during the Brazilian slave trade was not well documented. Most theories point toward adapted movements from traditional Angola dance which evolved into techniques of self-defense. When Capoeira was outlawed by slave owners the fighting art became disguised as a dance through the addition of music and acrobatic movements. In the 1930s Capoeira was legalized in Brazil and is now spreading throughout the world. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements.

ATHLETIC 22C. Competitive Cheer Club. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member.

ATHLETIC 25V. Crew, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 26V. Crew, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 28V. Cross Country, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 29V. Cross Country, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 31C. Cycling Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 34V. Diving, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 35V. Diving, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 37C. Equestrian Club Team. 1 Unit.

(AU).

ATHLETIC 38M. Eskrima. 1 Unit.

Eskrima is the study of the Filipino martial art. It focuses on practical self-defense from a unique weapons-oriented perspective. Unlike most martial arts, Eskrima teaches students empty hand and weapon techniques concurrently. Here at Stanford, we study the Inayan System of Eskrima under the instruction of Suro Jason Inay. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://eskrima.stanford.edu>.

ATHLETIC 41V. Fencing, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 42V. Fencing, Varsity Women. 1-2 Unit.

(AU) (Milgram).

ATHLETIC 47V. Field Hockey, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 48V. Football, Varsity. 1-2 Unit.

(AU).

ATHLETIC 55V. Golf, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 56V. Golf, Varsity Women. 1-2 Unit.

AU.

ATHLETIC 60V. Gymnastics, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 61V. Gymnastics, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 70C. Horse Polo Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 72C. Ice Hockey Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. Men (AU).

ATHLETIC 73M. JKA Shotokan Karate. 1 Unit.

Shotokan Karate is a weaponless martial art developed in Okinawa and Japan, emphasizing power and efficiency in combat. Skilled karateka defeat their opponents with minimal number of techniques and effort, which is particularly useful when facing multiple opponents. Shotokan is distinguished from other martial arts by the linearity and strength of its punches, blocks, and kicks. Precise techniques, accompanied by mastery and focus of energy flows and a deep knowledge of the body's vital points, make this karate style a comprehensive system for self-defense and combat. However, Shotokan Karate is much more than just a way to defend and fight; it is an holistic system in which the training itself has far reaching effects on the trainee. It is an ideal way to become and stay fit, as it combines intense aerobic and anaerobic exercises. It is a way to gain self-discipline and the confidence to surmount everyday obstacles, whether tangible or not. Shotokan Karate encourages and helps in the exploration and understanding of both the physical and mental self. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://karate.stanford.edu>.

ATHLETIC 74C. Judo Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 75M. Jujitsu Self Defense. 1 Unit.

The Stanford Self-Defense Class teaches practical methods of self-defense drawn from all the martial arts. This coed course is available to beginners every quarter. Advanced training also is available year-round through senior black belt level, and is offered to improve and widen each student's skills. All Stanford students, faculty and staff members are invited to join our relaxed atmosphere, as we work on conditioning and coordination. Students who have completed the beginner's course can further refine their basic skills, as well as learn more complicated techniques. Advanced students may continue as long as they wish, with the possibility of receiving formal belt ranks in Aiki Jujitsu. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://jujitsu.stanford.edu>.

ATHLETIC 76M. Kendo. 1 Unit.

Kendo is a Japanese form of fencing with two-handed bamboo swords, originally developed as a safe form of sword training for samurai. This is part of the Stanford Martial Arts program.

ATHLETIC 77C. Lacrosse Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).
Same as: Men

ATHLETIC 78M. Kenpo Karate. 1 Unit.

The Stanford Kenpo Karate Association teaches vital self-defense techniques, designed to maximize effectiveness regardless of size or strength. Beginning students will learn tools for responding to a modern street-fight situation, including single- or multiple-attackers, with or without weapons, under a variety of circumstances. Kenpo students learn multiple-strike defenses, hand strikes, kicks, joint locks, evasions, pressure points, sweeps, throws and even falls and rolls. In addition to self-defense, SKKA also teaches sparring and kata, encouraging balance, flexibility, strength and personal growth in the martial arts. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://www.stanfordkenpo.com>.

ATHLETIC 78V. Lacrosse, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 81M. Muay Thai. 1 Unit.

Muay Thai or Thai Kickboxing is a martial art developed in Thailand about 500 years ago to defend the country against invaders. Muay Thai combines Western-style boxing with kicking, and includes the use of elbows and knees. Though traditionally Muay Thai is designed to be fatal to the opponent, in our class we focus on self-defense and counter attack. Usually light sparring is practiced with minimal use of elbows. During class, students will wear boxing gloves, shin guards, and mouth protectors. Head protection is required for sparring. In order to excel in Muay Thai, one will need to develop flexibility, strength, endurance, concentration, and reflexes. One will learn to adapt the techniques according to their strengths and weaknesses on their own pace. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://kickboxing.stanford.edu>.

ATHLETIC 82. Manager: Athletic Team. 1 Unit.

For student managers of intercollegiate teams. Prerequisite: consent of respective varsity team head coach. (AU).

ATHLETIC 91C. Rugby Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).
Same as: Men

ATHLETIC 92C. Rugby Club Team. 1 Unit.

(AU).

Same as: Women

ATHLETIC 104V. Sailing, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 105V. Sailing, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 107C. Ski Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 118V. Soccer, Varsity Men. 1-2 Unit.

(AU).

ATHLETIC 119V. Soccer, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 121V. Softball, Varsity Women. 1-2 Unit.

(AU).

ATHLETIC 125C. Squash Club Team. 1 Unit.
(AU).

Same as: Men

ATHLETIC 126V. Squash, Varsity Women. 1-2 Unit.
(AU).

ATHLETIC 135V. Swimming, Synchronized: Varsity. 1-2 Unit.
(AU).

ATHLETIC 136V. Swimming, Varsity Men. 1-2 Unit.
(AU).

ATHLETIC 137V. Swimming, Varsity Women. 1-2 Unit.
(AU).

ATHLETIC 141C. Tae Kwon Do Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 143C. Tennis Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 148V. Tennis, Varsity Men. 1-2 Unit.
(AU).

ATHLETIC 149V. Tennis, Varsity Women. 1-2 Unit.
(AU).

ATHLETIC 153V. Track and Field, Varsity Men. 1-2 Unit.
(AU).

ATHLETIC 154V. Track and Field, Varsity Women. 1-2 Unit.
(AU).

ATHLETIC 156C. Triathlon Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 158C. Ultimate Frisbee Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

Same as: Men

ATHLETIC 159C. Ultimate Frisbee Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU) (Staff).

Same as: Women

ATHLETIC 166V. Volleyball, Varsity Men. 1-2 Unit.
(AU).

ATHLETIC 167V. Volleyball, Varsity Women. 1-2 Unit.
(AU).

ATHLETIC 168C. Volleyball Club Team. 1 Unit.

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU).

ATHLETIC 171V. Water Polo, Varsity Men. 1-2 Unit.
(AU).

ATHLETIC 172V. Water Polo, Varsity Women. 1-2 Unit.
(AU).

ATHLETIC 178M. Wing Chun Kung Fu. 1 Unit.

Wing Chun Kung Fu; its roots can be traced from the Southern Shaolin Temple in China to the late Grand Master Yip Man. It is one of the few martial arts that attributes its origins to a woman. Although popularized as Bruce Lee's; mother's, the practice of Wing Chun remains substantially different from his Jeet Kune Do. Taught as a predominantly internally-oriented style stressing technique, sensitivity, and subtle awareness instead of brute force, Wing Chun provides practical self-defense for men and women and a means for developing the mind and spirit. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://wingchun.stanford.edu>.

ATHLETIC 180V. Wrestling, Varsity. 1-2 Unit.
(AU).

ATHLETIC 181M. Wushu. 1 Unit.

Modern Wushu is a martial art which combines a foundation in the traditional Chinese fighting arts with a modern disposition towards aesthetics, grace, and performance. It emphasizes a combination of strength, speed, and flexibility rarely seen in other martial arts or sports. Both a martial art and a performance art, Wushu is the national sport of China, and is practiced throughout the world. Along with open hand training, Wushu athletes do extensive training with weapons such as broadsword, staff, spear, and straight sword. This class is part of the Stanford Martial Arts program, in order to receive credit you must meet program requirements. For more information visit: <http://wushu.stanford.edu>.

Biochemistry Courses

BIOC 109A. The Human Genome and Disease. 3 Units.

The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both. Same as: BIO 109A, BIOC 209A, HUMBIO 158

BIOC 109B. The Human Genome and Disease: Genetic Diversity and Personalized Medicine. 3 Units.

Continuation of 109A/209A. Genetic drift: the path of human predecessors out of Africa to Europe and then either through Asia to Australia or through northern Russia to Alaska down to the W. Coast of the Americas. Support for this idea through the histocompatibility genes and genetic sequences that predispose people to diseases. Guest lectures from academia and pharmaceutical companies. Prerequisite: Biology or Human Biology core. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both. Same as: BIO 109B, BIOC 209B

BIOC 118Q. Genomics and Medicine. 3 Units.

Preference to sophomores. Knowledge gained from sequencing human genomes and implications for medicine and biomedical research. Novel diagnoses and treatment of diseases, including stem cells, gene therapy and rational drug design. Personal genomics and how it is used to improve health and well being. Social and ethical implications of genetic information such as privacy, discrimination and insurability. Course Webpage: <http://biochem118.stanford.edu/>.

BIOC 158. Genomics, Bioinformatics and Medicine. 3 Units.

Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIO 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>. Same as: BIO 258, BIOMEDIN 258, HUMBIO 158G

BIOC 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

BIOC 200. Applied Biochemistry. 2 Units.

Enrollment limited to MD candidates. Fundamental concepts of biochemistry as applied to clinical medicine. Topics include vitamins and cofactors, metabolism of carbohydrates, lipids, amino acids and nucleotides, and the integration of metabolic pathways. Clinical case studies discussed in small-group, problem-based learning sessions.

BIOC 202. Biochemistry Bootcamp. 1 Unit.

Open to first year Biochemistry students and to other PhD students with consent of instructor. Hands-on, week-long immersion in biochemical methods and practice, high-throughput sequencing and data analysis, theory and application of light microscopy, and computational approaches to modern biological problems.

BIOC 205. Molecular Foundations of Medicine. 3 Units.

For medical students. Topics include DNA structure, replication, repair, and recombination; gene expression, including mechanisms for regulating transcription and translation; chromosome structure and function; gene cloning, protein engineering, and genomics. Patient presentations and journal clubs illustrate how molecular biology affects the practice of medicine.

BIOC 209A. The Human Genome and Disease. 3 Units.

The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both. Same as: BIO 109A, BIOC 109A, HUMBIO 158

BIOC 209B. The Human Genome and Disease: Genetic Diversity and Personalized Medicine. 3 Units.

Continuation of 109A/209A. Genetic drift: the path of human predecessors out of Africa to Europe and then either through Asia to Australia or through northern Russia to Alaska down to the W. Coast of the Americas. Support for this idea through the histocompatibility genes and genetic sequences that predispose people to diseases. Guest lectures from academia and pharmaceutical companies. Prerequisite: Biology or Human Biology core. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both. Same as: BIO 109B, BIOC 109B

BIOC 215. Frontiers in Biological Research. 1 Unit.

Literature discussion in conjunction with the Frontiers in Biological Research seminar series in which investigators present current work. Students and faculty meet beforehand to discuss papers from the speaker's primary research literature. Students meet with the speaker after the seminar to discuss their research and future directions, commonly used techniques to study problems in biology, and comparison between the genetic and biochemical approaches in biological research. Same as: DBIO 215, GENE 215

BIOC 220. Chemistry of Biological Processes. 3 Units.

The principles of organic and physical chemistry as applied to biomolecules. The goal is a working knowledge of chemical principles that underlie biological processes, and chemical tools used to study and manipulate biological systems. Current topics may include chemical genetics, activity-based probes, DNA/RNA chemistry and molecular evolution, protein labeling, carbohydrate engineering, fluorescent proteins and sensors, optochemical/optogenetic methods, mass spectrometry, and genome-editing technologies. Prerequisites: organic chemistry and biochemistry, or consent of instructor. Same as: CSB 220

BIOC 221. The Teaching of Biochemistry. 3 Units.

Required for teaching assistants in Biochemistry. Practical experience in teaching on a one-to-one basis, and problem set design and analysis. Familiarization with current lecture and text materials; evaluations of class papers and examinations. Prerequisite: enrollment in the Biochemistry Ph.D. program or consent of instructor.

BIOC 223. Open Problems in Biology. 1 Unit.

Introduces open problems in biology to those outside the field with quantitative backgrounds (e.g. science, computer science, engineering, and mathematics). Ten different experts cover ten different topics.

BIOC 224. Advanced Cell Biology. 4 Units.

For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, and differentiation. Weekly reading of current papers from the primary literature. Preparation of an original research proposal. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor. Same as: BIO 214, MCP 221

BIOC 226. Interdisciplinary Approaches to Biochemistry: Single Molecule Biophysics to Clinical Outcomes. 3 Units.

Interdisciplinary analyses from basic biochemistry and biophysics to clinical outcomes of disease states and potential therapeutic interventions (translational research). Focus on cardiac system. Cardiomyopathies arise from missense mutations in cardiac muscle proteins, including the cardiac myosin motor. Single molecule biophysics and classical enzyme kinetics and use of induced pluripotent stem cells (iPS cells) and single cell studies lay the foundation for discussions of the effects of cardiomyopathy mutations on heart function. Potential therapeutic approaches discussed, including genetic analysis, DNA cloning, reconstitution of functional assemblies, xray diffraction and 3D reconstruction of electron microscope images, spectroscopic methods, computational approaches, single molecule biophysics, use of induced pluripotent stem cells in research, and other interdisciplinary approaches. Current papers examined. Prerequisites: basic biochemistry.

BIOC 236. Biology by the Numbers. 3 Units.

For PhD students and advanced undergraduates. Students will develop skills in quantitative reasoning over a wide range of biological problems. Topics: biological size scales ranging from proteins to ecosystems; biological times time scales ranging from enzymatic catalysis and DNA replication to evolution; biological energy, motion and force from molecular to organismic scales; mechanisms of environmental sensing ranging from bacterial chemotaxis to vision. Same as: APPPHYS 236

BIOC 241. Biological Macromolecules. 3-5 Units.

The physical and chemical basis of macromolecular function. Topics include: forces that stabilize macromolecular structure and their complexes; thermodynamics and statistical mechanics of macromolecular folding, binding, and allostery; diffusional processes; kinetics of enzymatic processes; the relationship of these principles to practical application in experimental design and interpretation. The class emphasizes interactive learning, and is divided equally among lectures, in-class group problem solving, and discussion of current and classical literature. Enrollment limited to 50. Prerequisites: Background in biochemistry and physical chemistry recommended but material available for those with deficiency in these areas; undergraduates with consent of instructor only. Same as: BIOPHYS 241, GENE 241, SBIO 241

BIOC 257. Currents in Biochemistry. 1 Unit.

Seminars by Biochemistry faculty on their ongoing research. Background, current advances and retreats, general significance, and tactical and strategic research directions.

BIOC 258. Genomics, Bioinformatics and Medicine. 3 Units.

Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIOC 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>. Same as: BIOC 158, BIOMEDIN 258, HUMBIO 158G

BIOC 299. Directed Reading in Biochemistry. 1-18 Unit.

Prerequisite: consent of instructor.

BIOC 350. Development of Thesis Research. 2 Units.

Biochemistry 2nd year PhD students with permission of instructor only. Students place their thesis research into a broader scientific perspective, identify important questions to ask, and learn to communicate these clearly. The course includes a series of roundtable discussions with students and faculty about the students' proposed research topics. The initial focus is on developing the equivalent of a specific aims page for a research grant.

BIOC 360. Developing an Original Research Proposal. 1 Unit.

Biochemistry 3rd year PhD students with permission of instructor only. Students foster broad familiarity with the biomedical literature and learn to develop new research directions. Topics well outside of each student's research topic are chosen for regular informal journal club presentations. Students work with faculty to hone skills for identifying important open scientific questions, formulating hypotheses, and refining experimental logic. Students work collectively to create a "model" research proposal on a topic of general interest to the group, and then individually to develop an original proposal on a topic of each student's choice.

BIOC 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

BIOC 399. Graduate Research and Special Advanced Work. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members.

BIOC 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics. Same as: BIO 459, BIOE 459, CHEM 459, CHEMENG 459, PSYCH 459

BIOC 801. TGR Project. 0 Units.

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BIOC 802. TGR Dissertation. 0 Units.

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Bioengineering Courses

BIOE 10N. Form and Function of Animal Skeletons. 3 Units.

Preference to freshmen. The biomechanics and mechanobiology of the musculoskeletal system in human beings and other vertebrates on the level of the whole organism, organ systems, tissues, and cell biology. Field trips to labs. Same as: ME 10N

BIOE 32Q. Bon Appétit, Marie Curie! The Science Behind Haute Cuisine. 3 Units.

This seminar is for anyone who loves food, cooking or science! We will focus on the science and biology behind the techniques and the taste buds. Not a single lecture will pass by without a delicious opportunity - each weekly meeting will include not only lecture, but also a lab demonstration and a chance to prepare classic dishes that illustrate that day's scientific concepts.

BIOE 36Q. The Biophysics of Innate Immunity. 3 Units.

The innate immune system provides our first line of defense against disease--both infections, and cancer. Innate immune effectors such as host defense peptides are deployed by numerous cell types (for instance neutrophils, macrophages, NK cells, epithelial cells and keratinocytes) and work by biophysical mechanisms of action. The course draws from the primary literature and covers the evolution, structures, mechanisms, and physiological functions of important "innate immune effectors" (components of the innate immune system that can attack pathogens, and infected or host cells, and kill or incapacitate them directly). The course is aimed at students who have an interest in biochemistry, molecular/cellular biology, biophysics, and/or bioengineering.

BIOE 41. Physical Biology of Macromolecules. 4 Units.

Principles of statistical physics, thermodynamics, and kinetics with applications to molecular biology. Topics include entropy, temperature, chemical forces, enzyme kinetics, free energy and its uses, self assembly, cooperative transitions in macromolecules, molecular machines, feedback, and accurate replication. Prerequisites: MATH 41, 42; CHEM 31A, B (or 31X); strongly recommended: PHYSICS 41, CME 100 or MATH 51, and CME 106; or instructor approval.

BIOE 42. Physical Biology of Cells. 4 Units.

Principles of transport, continuum mechanics, and fluids, with applications to cell biology. Topics include random walks, diffusion, Langevin dynamics, transport theory, low Reynolds number flow, and beam theory, with applications including quantitative models of protein trafficking in the cell, mechanics of the cell cytoskeleton, the effects of molecular noise in development, the electromagnetics of nerve impulses, and an introduction to cardiovascular fluid flow. Prerequisites: MATH 41, 42; CHEM 31A, B (or 31X); strongly recommended: CS 106A, PHYSICS 41, CME 100 or MATH 51, and CME 106; or instructor approval. 4 units, Spr (Huang, K).

BIOE 44. Fundamentals for Engineering Biology Lab. 4 Units.

Introduction to next-generation techniques in genetic, molecular, biochemical, and cellular engineering. Lab modules build upon current research including: gene and genome engineering via decoupled design and construction of genetic material; component engineering focusing on molecular design and quantitative analysis of experiments; device and system engineering using abstracted genetically encoded objects; and product development based on useful applications of biological technologies. Concurrent or previous enrollment in BIO 41.

BIOE 51. Anatomy for Bioengineers. 4 Units.

Fundamental human anatomy, spanning major body systems and tissues including nerve, muscle, bone, cardiovascular, respiratory, gastrointestinal, and renal systems. Explore intricacies of structure and function, and how various body parts come together to form a coherent and adaptable living being. Correlate clinical conditions and therapeutic interventions. Participate in lab sessions with predissected cadaveric material and hands-on learning to gain understanding of the bioengineering human application domain. Encourage anatomical thinking, defining challenges and opportunities for bioengineers.

BIOE 70Q. Medical Device Innovation. 3 Units.

BIOE 70Q introduces students to the design of medical technologies and the non-technical factors that impact their clinical adoption and market success. Guest speakers include engineers, doctors, and other professionals who have helped bring ideas from concept to clinical use. Hands-on design projects will challenge students to invent their own solutions to clinical needs. No previous engineering training is required.

BIOE 80. Introduction to Bioengineering. 4 Units.

Broad but rigorous overview of the field of bioengineering, centered around the common theme of engineering analysis and design of biological systems. Topics include biomechanics, systems and synthetic biology, physical biology, biomolecular engineering, tissue engineering, and devices. Emphasis on critical thinking and problem solving approaches, and quantitative methods applied to biology. 4 units, Spr (Cochran). Same as: ENGR 80

BIOE 101. Systems Biology. 4 Units.

Complex biological behaviors through the integration of computational modeling and molecular biology. Topics: reconstructing biological networks from high-throughput data and knowledge bases. Network properties. Computational modeling of network behaviors at the small and large scale. Using model predictions to guide an experimental program. Robustness, noise, and cellular variation. Prerequisites: CME 102; BIO 41, BIO 42; or consent of instructor. Same as: BIOE 210

BIOE 103. Systems Physiology and Design. 4 Units.

Physiology of intact human tissues, organs, and organ systems in health and disease, and bioengineering tools used (or needed) to probe and model these physiological systems. Topics: Clinical physiology, network physiology and system design/plasticity, diseases and interventions (major syndromes, simulation, and treatment, instrumentation for intervention, stimulation, diagnosis, and prevention), and new technologies including tissue engineering and optogenetics. Discussions of pathology of these systems in a clinical-case based format, with a view towards identifying unmet clinical needs. Learning computational skills that not only enable simulation of these systems but also apply more broadly to biomedical data analysis. Prerequisites: MATH 41, 42; CME 102; PHY 41; BIO 41, 42; strongly recommended PHY 43; or instructor approval.

BIOE 103B. Systems Physiology and Design. 4 Units.

ONLINE Offering of BIOE103. This pilot class, BIOE103B, is an entirely online offering with the same content, learning goals, and prerequisites as BIOE103. Students attend class by watching videos and completing assignments remotely. Students may attend recitation and office hours in person, but cannot attend the BIOE103 in-person lecture due to room capacity restraints. Physiology of intact human tissues, organs, and organ systems in health and disease, and bioengineering tools used (or needed) to probe and model these physiological systems. Topics: Clinical physiology, network physiology and system design/plasticity, diseases and interventions (major syndromes, simulation, and treatment, instrumentation for intervention, stimulation, diagnosis, and prevention), and new technologies including tissue engineering and optogenetics. Discussions of pathology of these systems in a clinical-case based format, with a view towards identifying unmet clinical needs. Learning computational skills that not only enable simulation of these systems but also apply more broadly to biomedical data analysis. Prerequisites: MATH 41, 42; CME 102; PHY 41; BIO 41, 42; strongly recommended PHY 43; or instructor approval.

BIOE 115. Computational Modeling of Microbial Communities. 4 Units.

Provides biologists with basic computational tools and knowledge to confront large datasets in a quantitative manner. Students learn basic programming skills focused on Matlab, but also are introduced to Perl and Python. Topics include: image analysis, bioinformatics algorithms, reaction diffusion modeling, Monte Carlo algorithms, and population dynamics. Students apply computational skills to a miniature research project studying the human gut microbiota. Same as: MI 245

BIOE 122. Biosecurity and Bioterrorism Response. 4-5 Units.

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. This course satisfies the TiS requirement for Engineering students; please check with your major advisor to verify this. 4 units for twice weekly attendance (Mon. and Wed.); additional 1 unit for writing a research paper for 5 units total maximum. PLEASE NOTE: This class will meet for the first time on Wednesday, April 1. Same as: PUBLPOL 122, SURG 122

BIOE 123. Optics and Devices Lab. 4 Units.

This course provides a hands-on introduction to designing, and building devices for controlling experiments in the field of bioengineering. This course focuses on the tools and concepts related to optics and electronics, but also touches on other valuable techniques such as rapid prototyping and micro-fluidics. The first part of the course consists of guided modules, while the second half of the course is project based where students design and develop their own biotic game. Prerequisites: BIOE 41 and Matlab recommended.

BIOE 131. Ethics in Bioengineering. 3 Units.

Bioengineering focuses on the development and application of new technologies in the biology and medicine. These technologies often have powerful effects on living systems at the microscopic and macroscopic level. They can provide great benefit to society, but they also can be used in dangerous or damaging ways. These effects may be positive or negative, and so it is critical that bioengineers understand the basic principles of ethics when thinking about how the technologies they develop can and should be applied. On a personal level, every bioengineer should understand the basic principles of ethical behavior in the professional setting. This course will involve substantial writing, and will use case-study methodology to introduce both societal and personal ethical principles, with a focus on practical applications.

BIOE 141A. Senior Capstone Design I. 4 Units.

Lecture/Lab. First course of two-quarter capstone sequence. Team based project introduces students to the process of designing new biological technologies to address societal needs. Topics include methods for validating societal needs, brainstorming, concept selection, and the engineering design process. First quarter deliverable is a design for the top concept. Second quarter involves implementation and testing. Guest lectures and practical demonstrations are incorporated. Prerequisites: BIOE 123 and BIOE 44. This course is open only to seniors in the undergraduate Bioengineering program.

BIOE 141B. Senior Capstone Design II. 4 Units.

Lecture/Lab. Second course of two-quarter capstone sequence. Team based project introduces students to the process of designing new biological technologies to address societal needs. Emphasis is on implementing and testing the design from the first quarter with the at least one round of prototype iteration. Guest lectures and practical demonstrations are incorporated. Prerequisites: BIOE123 and BIOE44. This course is open only to seniors in the undergraduate Bioengineering program. **IMPORTANT NOTE:** class meets in Shriram 112.

BIOE 191. Bioengineering Problems and Experimental Investigation. 1-5 Unit.

Directed study and research for undergraduates on a subject of mutual interest to student and instructor. Prerequisites: consent of instructor and adviser. (Staff).

BIOE 191X. Out-of-Department Advanced Research Laboratory in Bioengineering. 1-15 Unit.

Individual research by arrangement with out-of-department instructors. Credit for 191X is restricted to declared Bioengineering majors pursuing honors and requires department approval. See <http://bioengineering.stanford.edu/education/undergraduate.html> for additional information. May be repeated for credit.

BIOE 196. INTERACTIVE MEDIA AND GAMES. 1 Unit.

Interactive media and games increasingly pervade and shape our society. In addition to their dominant roles in entertainment, video games play growing roles in education, arts, and science. This seminar series brings together a diverse set of experts to provide interdisciplinary perspectives on these media regarding their history, technologies, scholarly research, industry, artistic value, and potential future.

BIOE 201C. Diagnostic Devices Lab. 2 Units.

This course exposes students to the engineering principles and clinical application of medical devices through lectures and hands-on labs, performed in teams of two. Teams take measurements with these devices and fit their data to theory presented in the lecture. Devices covered include X-ray, CT, MRI, EEG, ECG, Ultrasound and BMI (Brain-machine interface). Prerequisites: BioE 103 or BioE 300B or EE 122B. Same as: BIOE 301C

BIOE 210. Systems Biology. 4 Units.

Complex biological behaviors through the integration of computational modeling and molecular biology. Topics: reconstructing biological networks from high-throughput data and knowledge bases. Network properties. Computational modeling of network behaviors at the small and large scale. Using model predictions to guide an experimental program. Robustness, noise, and cellular variation. Prerequisites: CME 102; BIO 41, BIO 42; or consent of instructor. Same as: BIOE 101

BIOE 211. Biophysics of Multi-cellular Systems and Amorphous Computing. 2-3 Units.

Provides an interdisciplinary perspective on the design, emergent behavior, and functionality of multi-cellular biological systems such as embryos, biofilms, and artificial tissues and their conceptual relationship to amorphous computers. Students discuss relevant literature and introduced to and apply pertinent mathematical and biophysical modeling approaches to various aspect multi-cellular systems, furthermore carry out real biology experiments over the web. Specific topics include: (Morphogen) gradients; reaction-diffusion systems (Turing patterns); visco-elastic aspects and forces in tissues; morphogenesis; coordinated gene expression, genetic oscillators and synchrony; genetic networks; self-organization, noise, robustness, and evolvability; game theory; emergent behavior; criticality; symmetries; scaling; fractals; agent based modeling. The course is geared towards a broadly interested graduate and advanced undergraduates audience such as from bio / applied physics, computer science, developmental and systems biology, and bio / tissue / mechanical / electrical engineering. Prerequisites: Previous knowledge in one programming language - ideally Matlab - is recommended; undergraduate students benefit from BIOE 41, BIOE 42, or equivalent. Same as: BIOE 311, BIOPHYS 311, DBIO 211

BIOE 212. Introduction to Biomedical Informatics Research Methodology. 3 Units.

Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Because the team projects start in the first week of class, attendance that week is strongly recommended. Prerequisites: BIOMEDIN 210 or 211 or 214 or 217 or consent of instructor. Same as: BIOMEDIN 212, CS 272, GENE 212

BIOE 214. Representations and Algorithms for Computational Molecular Biology. 3-4 Units.

Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units. Same as: BIOMEDIN 214, CS 274, GENE 214

BIOE 215. Physics-Based Simulation of Biological Structure. 3 Units.

Modeling, simulation, analysis, and measurement of biological systems. Computational tools for determining the behavior of biological structures- from molecules to organisms. Numerical solutions of algebraic and differential equations governing biological processes. Simulation laboratory examples in biology, engineering, and computer science. Limited enrollment. Prerequisites: basic biology, mechanics ($F=ma$), ODEs, and proficiency in C or C++ programming.

BIOE 220. Introduction to Imaging and Image-based Human Anatomy. 3 Units.

Focus on learning the fundamentals of each imaging modality including X-ray Imaging, Ultrasound, CT, and MRI, to learn normal human anatomy and how it appears on medical images, to learn the relative strengths of the modalities, and to answer, "What am I looking at?" Course website: <http://rad220.stanford.edu>.

Same as: RAD 220

BIOE 221. Physics and Engineering of Radionuclide Imaging. 3 Units.

Physics, instrumentation, and algorithms for positron emission tomography (PET) and single photon emission computed tomography (SPECT). Topics include basic physics of photon emission and detection, electronics, system design, strategies for tomographic image reconstruction, data correction algorithms, methods of image quantification, and image quality assessment, and current developments in the field. Prerequisites: Completion of university level mathematics and physics.

Same as: RAD 221

BIOE 222. Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects. 4 Units.

Focuses on instruments, algorithms and other technologies for imaging of cellular and molecular processes in living subjects. Introduces preclinical and clinical molecular imaging modalities, including strategies for molecular imaging using PET, SPECT, MRI, Ultrasound, Optics, and Photoacoustics. Covers basics of instrumentation physics, the origin and properties of the signal generation, and image data quantification.

Same as: RAD 222

BIOE 223. Physics and Engineering of X-Ray Computed Tomography. 3 Units.

CT scanning geometries, production of x-rays, interactions of x-rays with matter, 2D and 3D CT reconstruction, image presentation, image quality performance parameters, system components, image artifacts, radiation dose. Prerequisites: differential and integral calculus. Knowledge of Fourier transforms (EE261) recommended.

Same as: RAD 223

BIOE 224. Probes and Applications for Multi-modality Molecular Imaging of Living Subjects. 4 Units.

Focuses on molecular contrast agents (a.k.a. "probes") that interrogate and target specific cellular and molecular disease mechanisms. Covers the ideal characteristics of molecular probes and how to optimize their design for use as effective imaging reagents that enables readout of specific steps in biological pathways and reveal the nature of disease through noninvasive imaging assays. Prerequisites: none.

Same as: RAD 224

BIOE 225. Ultrasound Imaging and Therapeutic Applications. 3 Units.

Covers the basic concepts of ultrasound imaging including acoustic properties of biological tissues, transducer hardware, beam formation, and clinical imaging. Also includes the therapeutic applications of ultrasound including thermal and mechanical effects, visualization of the temperature and radiation force with MRI, tissue assessment with MRI and ultrasound, and ultrasound-enhanced drug delivery. Course website: <http://bioe325.stanford.edu>.

Same as: RAD 225

BIOE 226. In Vivo Magnetic Resonance Spectroscopy and Imaging. 3 Units.

Collections of identical independent nuclear spins are described by the classical vector model of magnetic resonance imaging (MRI); however, interactions among spins, as occur in many in vivo processes, require a more complete description. Physics and engineering principles of these in vivo magnetic resonance phenomena with emphasis on current research questions and clinical applications. Topics: quantum mechanical description of magnetic resonance, density matrix theory, product operator formalism, relaxation theory and contrast mechanisms, spectroscopic imaging, spectral editing, and multinuclear studies. Prerequisites: EE 369B or familiarity with magnetic resonance, working knowledge of linear algebra.

Same as: RAD 226

BIOE 227. Functional MRI Methods. 3 Units.

(Same as RAD 227, BIOPHYS 227) Basics of functional magnetic resonance neuroimaging, including data acquisition, analysis, and experimental design. Journal club sections. Cognitive neuroscience and clinical applications. Prerequisites: basic physics, mathematics; neuroscience recommended.

BIOE 229. Advanced Research Topics in Multi-modality Molecular Imaging of Living Subjects. 4 Units.

Covers advanced topics and controversies in molecular imaging in the understanding of biology and disease. Lectures will include discussion on instrumentation, probes and bioassays. Topics will address unmet needs for visualization and quantification of molecular pathways in biology as well as for diagnosis and disease management. Areas of unmet clinical needs include those in oncology, neurology, cardiovascular medicine and musculoskeletal diseases. The aim is to identify important problems and controversies in a field and address them by providing background and relevance through review of the relevant primary literature, and then proposing and evaluating innovative imaging strategies that are designed to address the problem. The organization of lectures is similar to the thought process that is necessary for writing an NIH grant proposal in which aims are proposed and supported by background and relevance. The innovation of proposed approaches will be highlighted. An aim of the course is to inform students on how to creatively think about a problem and propose a solution focusing on the key elements of writing a successful grant proposal. Prerequisites: none.

Same as: RAD 222C

BIOE 231. Protein Engineering. 3 Units.

The design and engineering of biomolecules emphasizing proteins, antibodies, and enzymes. Combinatorial and rational methodologies, protein structure and function, and biophysical analyses of modified biomolecules. Clinically relevant examples from the literature and biotech industry. Prerequisite: basic biochemistry. Winter, Cochran.

Same as: BIOE 331

BIOE 236. Biophysical Mechanisms of Innate Immunity. 3 Units.

The innate immune system provides our first line of defense against infections of all kinds as well as cancer. Innate immune effectors, e.g. host defense peptides are deployed by numerous cell types (neutrophils, macrophages, NK cells, as well as epithelial cells, keratinocytes, and others) and attack by biophysical mechanisms of action. Disorders of innate immunity are increasingly being implicated in human autoimmune disease. Using primary literature, we will cover the evolution, structures, mechanisms, and functions of innate immune effectors.

BIOE 244. Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems. 4 Units.

Concepts and techniques for the design and implementation of engineered genetic systems. Topics covered include the quantitative exploration of tools that support (a) molecular component engineering, (b) abstraction and composition of functional genetic devices, (c) use of control and dynamical systems theory in device and systems design, (d) treatment of molecular "noise", (e) integration of DNA-encoded programs within cellular chassis, (f) designing for evolution, and (g) the use of standards in measurement, genetic layout architecture, and data exchange. Prerequisites: CME104, CME106, CHEM 33, BIO41, BIO42, BIOE41, BIOE42, and BIOE44 (or equivalents), or permission of the instructors.

BIOE 253. Science and Technology Policy. 3-4 Units.

How U.S. and international political institutions and processes govern science and technology; the roles of scientists, engineers, and physicians in creating and implementing policies; introduction to analytical techniques that are common to research and policy analysis in technology and public policy; and examples from specific mission areas (e.g., economic growth, health, climate, energy and the environment, information technology, international security). Assignments: analyzing the politics of particular legislative outcomes, assessing options for trying to reach a policy objective, and preparing a mock policy memo and congressional testimony. Same as: PUBLPOL 353

BIOE 260. Tissue Engineering. 3 Units.

Principles of tissue engineering and design strategies for practical applications for tissue repair. Topics include tissue components and dynamics, morphogenesis, stem cells, cellular fate processes, cell and tissue characterization, controlled drug and gene delivery, bioreactors, cell-materials interactions, and host integration. Present research proposal to solve a real life tissue engineering problem. Same as: ORTHO 260

BIOE 261. Principles and Practice of Stem Cell Engineering. 3 Units.

Quantitative models used to characterize incorporation of new cells into existing tissues emphasizing pluripotent cells such as embryonic and neural stem cells. Molecular methods to control stem cell decisions to self-renew, differentiate, die, or become quiescent. Practical, industrial, and ethical aspects of stem cell technology application. Final projects: team-reviewed grants and business proposals. Same as: NSUR 261

BIOE 273. BIODESIGN FOR MOBILE HEALTH. 1-2 Unit.

This seminar examines the emerging Mobile Health industry. Mobile Health is the provision of health services and information via mobile technologies such as mobile phones and wearable sensors. Faculty from Stanford University and other Academic Institutions and guest lecturers from the Mobile Health industry discuss the driving needs, opportunities and challenges that characterize the emerging Mobile Health innovation landscape, and present an overview of the technologies, initiatives and companies that are transforming the way we access health care today. Same as: MED 273

BIOE 280. Skeletal Development and Evolution. 3 Units.

The mechanobiology of skeletal growth, adaptation, regeneration, and aging is considered from developmental and evolutionary perspectives. Emphasis is on the interactions between mechanical and chemical factors in the regulation of connective tissue biology. Prerequisites: BIO 42, and ME 80 or BIOE 42. Same as: ME 280

BIOE 281. Biomechanics of Movement. 3 Units.

Experimental techniques to study human and animal movement including motion capture systems, EMG, force plates, medical imaging, and animation. The mechanical properties of muscle and tendon, and quantitative analysis of musculoskeletal geometry. Projects and demonstrations emphasize applications of mechanics in sports, orthopedics, and rehabilitation. Same as: ME 281

BIOE 283. Mechanotransduction in Cells and Tissues. 3 Units.

Mechanical cues play a critical role in development, normal functioning of cells and tissues, and various diseases. This course will cover what is known about cellular mechanotransduction, or the processes by which living cells sense and respond to physical cues such as physiological forces or mechanical properties of the tissue microenvironment. Experimental techniques and current areas of active investigation will be highlighted. Same as: ME 244

BIOE 284B. Cardiovascular Bioengineering. 3 Units.

Continuation of ME/BIOE 284A. Integrative cardiovascular physiology, blood fluid mechanics, and transport in the microcirculation. Sensing, feedback, and control of the circulation. Overview of congenital and adult cardiovascular disease, diagnostic methods, and treatment strategies. Engineering principles to evaluate the performance of cardiovascular devices and the efficacy of treatment strategies. Same as: ME 284B

BIOE 287. Introduction to Physiology and Biomechanics of Hearing. 3 Units.

Hearing is fundamental to our ability to communicate, yet in the US alone over 30 million people suffer some form of hearing impairment. As engineers and scientists, it is important for us to understand the underlying principles of the auditory system if we are to devise better ways of helping those with hearing loss. The goal of this course is to introduce undergraduate and graduate students to the anatomy, physiology, and biomechanics of hearing. Principles from acoustics, mechanics, and hydrodynamics will be used to build a foundational understanding of one of the most complex, interdisciplinary, and fascinating areas of biology. Topics include the evolution of hearing, computational modeling approaches, fluid-structure interactions, ion-channel transduction, psychoacoustics, diagnostic tools, and micrometer to millimeter scale imaging methods. We will also study current technologies for mitigating hearing loss via passive and active prostheses, as well as future regenerative therapies.

Same as: ME 166, ME 266

BIOE 291. Principles and Practice of Optogenetics for Optical Control of Biological Tissues. 3 Units.

Principles and practice of optical control of biological processes (optogenetics), emphasizing bioengineering approaches. Theoretical, historical, and current practice of the field. Requisite molecular-genetic, optoelectronic, behavioral, clinical, and ethical concepts, and mentored analysis and presentation of relevant papers. Final projects of research proposals and a laboratory component in BioX to provide hands-on training. Contact instructor before registering.

BIOE 299B. Practical Training. 1 Unit.

For Ph.D. students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the student services office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

BIOE 300A. Molecular and Cellular Bioengineering. 3 Units.

The molecular and cellular bases of life from an engineering perspective. Analysis and engineering of biomolecular structure and dynamics, enzyme function, molecular interactions, metabolic pathways, signal transduction, and cellular mechanics. Quantitative primary literature. Prerequisites: CHEM 171 and BIO 41 or equivalents; MATLAB or an equivalent programming language.

BIOE 300B. Physiology and Tissue Engineering. 3 Units.

This course focuses on engineering approaches to quantifying, modeling and controlling the physiology and pathophysiology of complex systems, from the level of individual cells to tissue, organ and multi-organ systems.

BIOE 300C. Medical Devices, Diagnostics, and Pharmaceuticals: Technologies, Regulation, and Applications. 3 Units.

Preference to Bioengineering graduate students. Major classes of technologies including imaging techniques, chemical diagnostics, drug design and delivery. Topics include pacemakers, fMRI, PCR, stents, and biomaterials. Principles, practical limitations, and feature trade-offs in clinical settings.

BIOE 301A. Molecular and Cellular Engineering Lab. 2 Units.

Preference to Bioengineering graduate students. Practical applications of biotechnology and molecular bioengineering including recombinant DNA techniques, molecular cloning, microbial cell growth and manipulation, and library screening. Emphasis is on experimental design and data analysis. Limited enrollment. Fall (Cochran).

BIOE 301B. Clinical Needs and Technology. 2 Units.

The goal of this course is to introduce bioengineering students to medical technology as it is used in current clinical practice, in the modern tertiary care, subspecialty hospital. Half of the course will be devoted to labs, in which small groups of students participate in hands-on experiences using advanced clinical technology in areas such as medical imaging, robotic surgery, and minimally invasive diagnosis and treatment. The second half of the course brings pairs of students and clinical faculty mentors together for a more in-depth, focused exposure to clinical care in one specific area. Final grades will be based on attendance, and presentations made by each pair of student to the class about their mentoring experience.

BIOE 301C. Diagnostic Devices Lab. 2 Units.

This course exposes students to the engineering principles and clinical application of medical devices through lectures and hands-on labs, performed in teams of two. Teams take measurements with these devices and fit their data to theory presented in the lecture. Devices covered include X-ray, CT, MRI, EEG, ECG, Ultrasound and BMI (Brain-machine interface). Prerequisites: BioE 103 or BioE 300B or EE 122B. Same as: BIOE 201C

BIOE 311. Biophysics of Multi-cellular Systems and Amorphous Computing. 2-3 Units.

Provides an interdisciplinary perspective on the design, emergent behavior, and functionality of multi-cellular biological systems such as embryos, biofilms, and artificial tissues and their conceptual relationship to amorphous computers. Students discuss relevant literature and introduced to and apply pertinent mathematical and biophysical modeling approaches to various aspect multi-cellular systems, furthermore carry out real biology experiments over the web. Specific topics include: (Morphogen) gradients; reaction-diffusion systems (Turing patterns); visco-elastic aspects and forces in tissues; morphogenesis; coordinated gene expression, genetic oscillators and synchrony; genetic networks; self-organization, noise, robustness, and evolvability; game theory; emergent behavior; criticality; symmetries; scaling; fractals; agent based modeling. The course is geared towards a broadly interested graduate and advanced undergraduates audience such as from bio / applied physics, computer science, developmental and systems biology, and bio / tissue / mechanical / electrical engineering. Prerequisites: Previous knowledge in one programming language - ideally Matlab - is recommended; undergraduate students benefit from BIOE 41, BIOE 42, or equivalent. Same as: BIOE 211, BIOPHYS 311, DBIO 211

BIOE 313. Neuromorphics: Brains in Silicon. 3 Units.

This course introduces neuromorphic system design, starting at the device level, going through the circuit level, and ending up at the system level. At the device level, it covers MOS transistor operation in the subthreshold region. At the circuit level, it covers silicon neuron and synapse design. And at the system level, it covers to reroutable interconnection. At the end of the course, you will understand how various neuromorphic architectures request; area and energy use scale with network size. Prerequisites: EE114 & EE108A.

Same as: EE 304

BIOE 326B. In Vivo MR: Relaxation Theory and Contrast Mechanisms. 3 Units.

Principles of nuclear magnetic resonance relaxation theory as applicable to in vivo processes with an emphasis on medical imaging. Topics: physics and mathematics of relaxation, relaxation times in normal and diseased tissues, magnetization transfer contrast, chemical exchange saturation transfer, MRI contrast agents, and hyperpolarized ¹³C. Prerequisites: RAD 226.

Same as: RAD 226B

BIOE 331. Protein Engineering. 3 Units.

The design and engineering of biomolecules emphasizing proteins, antibodies, and enzymes. Combinatorial and rational methodologies, protein structure and function, and biophysical analyses of modified biomolecules. Clinically relevant examples from the literature and biotech industry. Prerequisite: basic biochemistry. Winter, Cochran.

Same as: BIOE 231

BIOE 332. Large-Scale Neural Modeling. 3 Units.

This course examines the dynamics of large networks of spiking neurons (several thousand), with particular focus on how these networks achieve cognitive behaviors such as working memory, selective attention, and decision making. The course will feature lectures and labs using two Python-based simulators: Brian, a software platform, and Neurogrid, a hardware platform that simulates up to a million spiking neurons in real time. Most of the course will be project-based, allowing students to explore their individual interests.

BIOE 333. Interfacial Phenomena and Bionanotechnology. 3 Units.

Control over and understanding of interfacial phenomena and colloidal science are the essential foundation of bionanotechnology. Key mathematical relationships derived by Laplace, Gibbs, Kelvin and Young are derived and explained, along with the thermodynamics of systems of large interfacial area. Forces controlling surface and interfacial phenomena and surfactant and biomacromolecule self-assembly are discussed. Protein folding/unfolding and aggregation, and nano- and microfluidics are elucidated in these terms. Students will gain insight into the interplay between physical and chemical properties of biomolecules. Spring, (Barron, A.).

BIOE 334. Engineering Principles in Molecular Biology. 3 Units.

The achievements and difficulties that exemplify the interface of theory and quantitative experiment. Topics include: bistability, cooperativity, robust adaptation, kinetic proofreading, analysis of fluctuations, sequence analysis, clustering, phylogenetics, maximum likelihood methods, and information theory. Sources include classic papers.

BIOE 335. Molecular Motors I. 3 Units.

Physical mechanisms of mechanochemical coupling in biological molecular motors, using F1 ATPase as the major model system. Applications of biochemistry, structure determination, single molecule tracking and manipulation, protein engineering, and computational techniques to the study of molecular motors.

BIOE 337. Organismic Biophysics and Living Soft-matter. 3 Units.

Integrated physical biology; from molecules to organisms. Tree of life, diversity of life forms. Multi-scale/hierarchical systems in biophysics, Hierarchical self-organization. Basic theory of squishy materials, colloidal physics. Phase transitions in living soft-matter. Experimental techniques in soft-matter physics. Active fluid models for living matter. Design of self-assembling and self-organizing, biomimetic supramolecular systems.

BIOE 355. Advanced Biochemical Engineering. 3 Units.

Combines biological knowledge and methods with quantitative engineering principles. Quantitative review of biochemistry and metabolism; recombinant DNA technology and synthetic biology (metabolic engineering). The production of protein pharmaceuticals as a paradigm for the application of chemical engineering principles to advanced process development within the framework of current business and regulatory requirements. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41, or equivalent.

Same as: CHEMENG 355

BIOE 361. Biomaterials in Regenerative Medicine. 3 Units.

Materials design and engineering for regenerative medicine. How materials interact with cells through their micro- and nanostructure, mechanical properties, degradation characteristics, surface chemistry, and biochemistry. Examples include novel materials for drug and gene delivery, materials for stem cell proliferation and differentiation, and tissue engineering scaffolds. Prerequisites: undergraduate chemistry, and cell/molecular biology or biochemistry.

Same as: MATSCI 381

BIOE 370. Microfluidic Device Laboratory. 2 Units.

Fabrication of microfluidic devices for biological applications. Photolithography, soft lithography, and micromechanical valves and pumps. Emphasis is on device design, fabrication, and testing.

BIOE 371. Global Biodesign: Medical Technology in an International Context. 1-3 Unit.

(Same as OIT 587) This course examines the development and commercialization of innovative medical technologies in different global settings. Faculty and guest speakers from the medtech field will discuss the status of the industry, as well as opportunities in and challenges to medical technology innovation unique to seven primary geographic regions: Africa, China, Europe, India, Japan, United States and Latin America. Students will be exposed to the biodesign innovation process, which provides a proven approach for identifying important unmet medical needs and inventing meaningful solutions to address them. They will also explore key differences between the covered geographies, which range from emerging markets with vast bottom-of-the-pyramid and growing middle class populations, to well-established markets with sophisticated demands and shifting demographics. The class will utilize real-world case studies and class projects (for 3-unit students) to promote engagement and provide a hands-on learning experience. There is no 2 unit option for this course.

Same as: MED 271

BIOE 372. Design for Service Innovation. 4 Units.

(Same as OIT 343/01) Open to graduate students from all schools and departments. An experiential project course in which students work in multidisciplinary teams to design new services to address the needs of medically patients. Project teams partner with "safety net" hospitals and clinics to find better ways to deliver care to the low income and uninsured patients these institutions serve. Students learn proven innovation processes from experienced GSB, d. school, and SoM faculty, interface with students from across the university, and have the opportunity to see their ideas translated into improvements in the quality and efficiency of healthcare in the real world. Prerequisite: admission to the course is by application only. Applications available at <http://DesignForService.stanford.edu>. Applications must be submitted by November 16, 2011.

Same as: HRP 274, MED 274

BIOE 374A. Biodesign Innovation: Needs Finding and Concept Creation. 4 Units.

This is the first quarter of a two-quarter course series (OIT 384/OIT 385). In this course, students learn how to develop comprehensive solutions (most commonly medical devices) to some of the most significant medical problems. The first quarter includes an introduction to needs finding methods, brainstorming and concept creation. Students learn strategies for understanding and interpreting clinical needs, researching literature and searching patents. Working in small entrepreneurial multidisciplinary teams, students gain exposure to clinical and scientific literature review, techniques of intellectual property analysis and feasibility, basic prototyping and market assessment. Students create, analyze and screen medical technology ideas, and select projects for future development. Final presentations at the end of the winter quarter to a panel of prominent inventors and investors in medical technology provide the impetus for further work in the spring quarter. Course format includes expert guest lecturers (Thu: 4:15 to 6:05 pm), faculty-led practical demonstrations and coaching sessions, and interactive team meetings (Tues: 4:15 to 6:05 pm). Projects from previous years included: prevention of hip fractures in the elderly; methods to accelerate healing after surgery; less invasive techniques for bariatric surgery; point of care diagnostics to improve emergency room efficiency; novel devices to bring specialty-type of care to primary care community doctors. More than 300,000 patients have been treated to date with technologies developed as part of this program and more than thirty venture-backed companies were started by alums of the program. Students must apply and be accepted into the course. The application is available online at <http://biodesign.stanford.edu/bdn/courses/bioe374.jsp>.

Same as: ME 368A, MED 272A

BIOE 374B. Biodesign Innovation: Concept Development and Implementation. 4 Units.

Two-quarter sequence (see OIT384 for complete description of the sequence). The second quarter focuses on how to take a conceptual solution to a medical need forward into development and potential commercialization. Continuing work in teams with engineering and medical colleagues, students will learn the fundamentals of medical device prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing a commercialization route (licensing vs. start-up); marketing, sales and distribution strategies; ethical issues including conflict of interest; fundraising approaches and cash requirements; financial modeling; essentials of developing a business or research plan/canvas; and strategies for assembling a development team. Final project presentations are made to a panel of prominent venture and corporate investors. New students (i.e. students who did not take OIT384 in the winter quarter) may be admitted, depending on team needs. Candidates need to submit an application at <http://biodesign.stanford.edu/bdn/courses/bioe374app.jsp> by March 1.

Same as: ME 368B, MED 272B

BIOE 375A. Biodesign Innovation: Needs Finding and Concept Creation. 2 Units.

Enrollment limited to SCPD students. Two quarter sequence. Inventing new medical devices and instrumentation, including: methods of validating medical needs; techniques for analyzing intellectual property; basics of regulatory (FDA) and reimbursement planning; brainstorming and early prototyping. Guest lecturers and practical demonstrations.

BIOE 375B. Biodesign Innovation: Concept Development and Implementation. 2 Units.

Enrollment limited to SCPD students. Two quarter sequence. How to take a medical device invention forward from early concept to technology translation and development. Topics include prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing translation route (licensing versus start-up); ethical issues including conflict of interest; fundraising approaches and cash requirements; essentials of writing a business or research plan; strategies for assembling a development team. Prerequisite: BIOE 375A.

BIOE 376. Startup Garage: Design. 4 Units.

A hands-on, project-based course, in which teams identify and work with users, domain experts, and industry participants to identify an unmet customer need, design new products or services that meet that need, and develop business models to support the creation and launch of startup products or services. This course integrates methods from human-centered design, lean startup, and business model planning. Each team will conceive, design, build, and field-test critical aspects of both the product or service and the business model.

BIOE 377. Startup Garage: Testing and Launch. 4 Units.

STRAMGT 356/BIOE 376 teams that concluded at the end of fall quarter that their preliminary product or service and business model suggest a path to viability, may continue with STRAMGT 366/BIOE 377 in winter quarter. Teams develop more elaborate versions of their product/service and business model, perform a series of experiments to test key hypotheses about their product and business model, and prepare and present an investor pitch for a seed round of financing to a panel of seasoned investors and entrepreneurs.

BIOE 381. Orthopaedic Bioengineering. 3 Units.

Engineering approaches applied to the musculoskeletal system in the context of surgical and medical care. Fundamental anatomy and physiology. Material and structural characteristics of hard and soft connective tissues and organ systems, and the role of mechanics in normal development and pathogenesis. Engineering methods used in the evaluation and planning of orthopaedic procedures, surgery, and devices.

Same as: ME 381

BIOE 386. Neuromuscular Biomechanics. 3 Units.

The interplay between mechanics and neural control of movement. State of the art assessment through a review of classic and recent journal articles. Emphasis is on the application of dynamics and control to the design of assistive technology for persons with movement disorders.

Same as: ME 386

BIOE 390. Introduction to Bioengineering Research. 1-2 Unit.

Preference to medical and bioengineering graduate students with first preference given to Bioengineering Scholarly Concentration medical students. Bioengineering is an interdisciplinary field that leverages the disciplines of biology, medicine, and engineering to understand living systems, and engineer biological systems and improve engineering designs and human and environmental health. Students and faculty make presentations during the course. Students expected to make presentations, complete a short paper, read selected articles, and take quizzes on the material.

Same as: MED 289

BIOE 391. Directed Study. 1-6 Unit.

May be used to prepare for research during a later quarter in 392. Faculty sponsor required. May be repeated for credit.

BIOE 392. Directed Investigation. 1-10 Unit.

For Bioengineering graduate students. Previous work in 391 may be required for background; faculty sponsor required. May be repeated for credit.

BIOE 393. Bioengineering Departmental Research Colloquium. 1 Unit.

Bioengineering department labs at Stanford present recent research projects and results. Guest lecturers. Topics include applications of engineering to biology, medicine, biotechnology, and medical technology, including biodesign and devices, molecular and cellular engineering, regenerative medicine and tissue engineering, biomedical imaging, and biomedical computation. Aut, Win, Spr (Lin, Riedel-Kruse, Barron).

BIOE 450. Advances in Biotechnology. 3 Units.

Guest academic and industrial speakers. Latest developments in fields such as bioenergy, green process technology, production of industrial chemicals from renewable resources, protein pharmaceutical production, industrial enzyme production, stem cell applications, medical diagnostics, and medical imaging. Biotechnology ethics, business and patenting issues, and entrepreneurship in biotechnology.

Same as: CHEMENG 450

BIOE 454. Synthetic Biology and Metabolic Engineering. 3 Units.

Principles for the design and optimization of new biological systems. Development of new enzymes, metabolic pathways, other metabolic systems, and communication systems among organisms. Example applications include the production of central metabolites, amino acids, pharmaceutical proteins, and isoprenoids. Economic challenges and quantitative assessment of metabolic performance. Pre- or corequisite: CHEMENG 355 or equivalent.

Same as: CHEMENG 454

BIOE 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOC 459, CHEM 459, CHEMENG 459, PSYCH 459

BIOE 484. Computational Methods in Cardiovascular Bioengineering. 3 Units.

Lumped parameter, one-dimensional nonlinear and linear wave propagation, and three-dimensional modeling techniques applied to simulate blood flow in the cardiovascular system and evaluate the performance of cardiovascular devices. Construction of anatomic models and extraction of physiologic quantities from medical imaging data. Problems in blood flow within the context of disease research, device design, and surgical planning.

Same as: ME 484

BIOE 485. Modeling and Simulation of Human Movement. 3 Units.

Direct experience with the computational tools used to create simulations of human movement. Lecture/labs on animation of movement; kinematic models of joints; forward dynamic simulation; computational models of muscles, tendons, and ligaments; creation of models from medical images; control of dynamic simulations; collision detection and contact models. Prerequisite: 281, 331A,B, or equivalent.

Same as: ME 485

BIOE 500. Thesis. 1-15 Unit.

(Staff).

Same as: Ph.D.

BIOE 802. TGR Dissertation. 0 Units.

(Staff).

Biology Courses

BIO 1. Human Evolution and Environment. 3 Units.

Human genetic and cultural evolution and how people interact with their environments, from the ancestors of Australopithecus to current events. Issues include race, gender, and intelligence; pesticide and antibiotic resistance; abortion and contraception; ecosystem services; environmental economics and ethics; the evolution of religion; climate change; population growth and overconsumption; origins and spread of ideas and technologies; and the distribution of political and economic power.

BIO 3. Frontiers in Marine Biology. 1 Unit.

An introduction to contemporary research in marine biology, including ecology, conservation biology, environmental toxicology, behavior, biomechanics, evolution, neurobiology, and molecular biology. Emphasis is on new discoveries and the technologies used to make them. Weekly lectures by faculty from the Hopkins Marine Station.

BIO 3N. Views of a Changing Sea: Literature & Science. 3 Units.

The state of a changing world ocean, particularly in the eastern Pacific, will be examined through historical and contemporary fiction, non-fiction and scientific publications. Issues will include harvest and mariculture fisheries, land-sea interactions and oceanic climate change in both surface and deep waters.

BIO 7N. Introduction to Conservation Photography. 3 Units.

Introduction to the field of conservation photography and the strategic use of visual communication in addressing issues concerning the environment and conservation. Students will be introduced to basic digital photography, digital image processing, and the theory and application of photographic techniques. Case studies of conservation issues will be examined through photographs and multimedia platforms including images, video, and audio. Lectures, tutorials, demonstrations, and optional field trips will culminate in the production of individual and group projects.

BIO 7S. Introduction to Biology. 3 Units.

The major fields of biology: biochemistry, the cell, evolution, and diversity. Foundation for higher-level biology courses.

BIO 7SL. Introduction to Biology Lab. 2 Units.

Optional lab to be taken concurrently with BIO 7S.

BIO 9S. Introduction to Biological Research Methods. 3 Units.

Theory and practice of experimental biology. Introduction to how to plan an experiment, conduct, and analyze data. Introduction to scientific writing and reading scientific journal articles. Prerequisite: high school biology.

BIO 10AX. Conservation Photography. 2 Units.

Account of the genre of conservation photography and strategic use of visual communication in the environmental arena. Introduction to use of digital SLR cameras and digital image processing. Case studies of conservation issues accompanied by multimedia platforms including images, video, and audio. Theory and application of photographic techniques. Lectures, tutorials, demonstrations, and field trips. Individual and group projects.

BIO 10SC. Natural History, Marine Biology, and Research. 2 Units.

Monterey Bay is home to the nation's largest marine sanctuary and also home to Stanford's Hopkins Marine Station. This course, based at Hopkins, explores the spectacular biology of Monterey Bay and the artistic and political history of the region. The course focuses on issues of conservation, sanctuary, and stewardship of the oceans and coastal lands. We will meet with conservationists, filmmakers, artists, authors, environmentalists, politicians, land-use planners, and lawyers, as well as scientists and educators, to learn what is being done to appreciate, protect, and study the coastline and near-shore waters at local and national levels. We will take a look at the discipline of marine biology to discover the range of topics and methods of research it embraces and to help define some of the larger issues in biology that loom in our future. The course emphasizes interactions and discussions between individuals, groups, and our guests; it is a total immersion experience. We will be together all of the time, either at our base at the Belden House in Pacific Grove or hiking and camping in Big Sur. Students are expected to have read the several books provided as introductory material before the course begins, and each is also expected to become our local expert in an area such as plant identification, bird identification, poetry, weather prediction, photography, history, ethnography, etc. The course requires an individual research project of your choice on a topic related to the general theme. Final reports will be presented at the last meeting of the group and may involve any medium, including written, oral, and performance media. Note: This course will be held at the Hopkins Marine Station in the Monterey region, and housing will be provided nearby. Transportation from campus to the housing site will be provided once students arrive on campus on August 30. Transportation to campus from the Belden House in Pacific Grove will be provided on September 19. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

BIO 11N. Biotechnology in Everyday Life. 3 Units.

Preference to freshmen. The science that makes transgenic plants and animals possible. Current and future applications of biotechnology and the ethical issues raised.

BIO 12N. Sensory Ecology of Marine Animals. 3 Units.

Animals living in the oceans experience a highly varied range of environmental stimuli. An aquatic lifestyle requires an equally rich range of sensory adaptations, including some that are totally foreign to us. In this course we will examine sensory system in marine animals from both an environmental and behavioral perspective and from the point of view of neuroscience and information systems engineering.

BIO 13N. Environmental Problems and Solutions. 3 Units.

Preference to freshmen. Students do independent investigations of current environmental problems, analyzing differing views of them and discussing possible solutions. Each student gives seminar presentations and leads seminar discussions. Short, documented position papers are written for policy makers.

BIO 15N. Environmental Literacy. 3 Units.

Preference to freshmen. Lack of public understanding of the details of most environmental problems is cited as a cause of environmental deterioration. Good citizenship requires literacy about the elements of the scientific and decision making processes that accompany most environmental issues: what can happen, what are the odds, how can the credibility of sources of expertise be assessed, which components of environmental debates deal with factual and theoretical issues, and which are political value judgments?.

BIO 17N. Getting Renewable Energy up to Scale: The Problem of Location. 3 Units.

As the climate continues to warm, plants and animals around the globe have a higher risk of going extinct. The Intergovernmental Panel for Climate Change (IPCC) Assessment Report 4 said in 2007 that when the global average temperature gets to 2 degrees C (3.6 degrees F) above the global average temperature in the mid 1700s, 20 to 40% of the species on the planet could be at high risk of extinction. Given that we know about two million species on the planet that means that 400,000 to 800,000 species could be at high risk. The IPCC went on to say that if the global average temperature gets to as much as 4 degrees C (7.2 degrees F) above natural, then as many as half of the species on the planet could be at high risk of extinction. Currently we are on a trajectory of surpassing 2 degrees C well before the end of the 21st Century. The only way to drop to a lower temperature trajectory is to decrease the amount of CO₂ in the atmosphere, which can be done by either scrubbing the CO₂ out of the atmosphere or decreasing our emission of CO₂. Techniques to do the former at the scale needed are not known as of yet, while decreasing our emissions substantially we do understand: it will require increasing substantially the amount of renewable energy used, which in turn will require deployment of renewables to a much greater amount than is planned currently. One of the main reasons holding up deployment of renewables is the debate about where the renewables will be located. This seminar will examine the arguments about the need for renewables, investigate the pros and cons of locating renewable at different sites and try to determine if and where the best locations might be.

BIO 18Q. Plant Evolutionary Ecology. 3 Units.

Plant EcoEvo analyzes the conceptual basis of ecology and evolution from the plants' perspective. After a broad overview of the biomes of the world, it explores population ecology, community ecology and biotic interactions. This is followed by an analysis of biodiversity from the botanical perspective and closes with a discussion of anthropogenic impact on plants. The course is based on lectures and practical activities (discussion of selected papers; analysis of data; laboratory activities, 2 field trips). Emphasis: Latin American ecosystems.

BIO 19N. Organ Development and Disease. 3 Units.

The development of tissues and organs is a fascinating process that we can directly observe in model organisms such as the zebrafish or chick. Particularly amazing is watching organs that move in front of our very eyes such as the beating heart or circulating blood. Unfortunately, the development of these complex systems often goes awry resulting in diseases that plague our society. This class will introduce some concepts of organogenesis, how disruptions can cause disease, and how we find underlying genetic mutations. It will include lectures and discussions, direct observations of developing organs in experimental animals, and an inspiring field trip. Students will be expected to participate in discussions and complete a short presentation.

BIO 20. Introduction to Brain and Behavior. 3 Units.

Evolutionary principles to understand how the brain regulates behavior physiologically, and is also influenced by behavioral interactions. Topics include neuron structure and function, transmission of neural information, anatomy and physiology of sensory and motor systems, regulation of body states, the biological basis of learning and memory, and behavioral abnormalities.

Same as: HUMBIO 21

BIO 21. The Science of the Extreme Life of the Sea. 3 Units.

Based on the book *Extreme Life of the Sea*, this course will explore the new science about how marine species thrive in some of the world's most difficult environments. Species that live in the hottest, coldest, deepest and shallowest habitats will be described along with the genetic, biochemical, physiological and behavioral adaptations that allow them to persist. We will also examine the fastest, the oldest, the most archaic, the smallest, biggest and the most numerous species. Emphasis will be on the scientific discoveries about these species that give insight into their lives.

BIO 22Q. Infection, Immunity, and Global Health. 3 Units.

Why do infectious diseases continue to challenge us despite advances in medicine? This course will explore the causes and prevention of infectious diseases, focusing on the interplay between pathogens, the immune system, the environment, and societal factors that affect disease occurrence and outcomes. Topics will include: basic elements of microbiology, immunology, and epidemiology; case studies of old diseases (e.g., smallpox, tuberculosis, malaria) and recently-emergent diseases (e.g., Ebola, AIDS, antibiotic-resistant bacteria, Lyme disease, and pandemic influenza) that illustrate the biological, environmental, cultural, political, and economic factors that affect disease emergence, spread, and control; the limitations of modern medical approaches such as antibiotics and vaccines; and strategies for reducing global infectious disease threats. The seminar will feature class discussion, student projects, and faculty and student presentations. Prerequisite: biology background, preferably introductory college courses (e.g., 41, 42, or HUMBIO 2A, 3A).

BIO 23N. FACEBUG: The Social Life of Microbes. 3 Units.

Exploration of three crucial aspects of microbial life. First, examine how the unseen microbial majority is responsible for critical but under-appreciated aspects of the biology of the planet. Second, investigate the array of current genomic and imaging tools available to probe microscopic organisms in the environment. Last, we will research the importance of microbial communities and social dynamics in ecological and human health settings.

BIO 25Q. The Molecular Basis of Genetic Disease. 3 Units.

Preference to sophomores. Focus is on two genetic diseases resulting from the production of protein molecules that are unable to fold into their native conformations, called conformational diseases: cystic fibrosis and amyotrophic lateral sclerosis or Lou Gehrig's disease. Hypotheses and controversies surrounding the molecular basis of these disorders, and implications for novel therapeutics. Readings from research literature.

BIO 26N. Maintenance of the Genome. 3 Units.

Preference to freshmen. The precious blueprint for life is entrusted to the genomic DNA molecules in all living cells. Multiple strategies have evolved to prevent the deleterious consequences from endogenous DNA alterations and damage from radiation or genotoxic chemicals in the environment. In this seminar you will learn about the remarkable systems that scan cellular DNA for alterations and make repairs to ensure genomic stability. Deficiencies in DNA repair have been implicated in many hereditary diseases involving developmental defects, premature aging, and/or predisposition to cancer. An understanding of DNA repair mechanisms is important for advances in the fields of cancer biology, neurobiology, and gerontology. Background readings, introductory lectures, student presentations, short term paper.

BIO 29N. PARTY WITH TREES. 3 Units.

Ever marveled at the imposing trees around campus? This course will explore trees on campus using Bracewell's marvelous "Trees of Stanford" as a rough guide. We will develop tools and explore ideas that will allow the wider community to cherish and appreciate the oft-neglected trees on campus. The course will include guest lectures that focus on the theme of trees: from literature to the physics and biology of trees, to the environmental impact of global forest loss.

BIO 30. Ecology for Everyone. 4 Units.

Everything is connected, but how? Ecology is the science of interactions and the changes they generate. This project-based course links individual behavior, population growth, species interactions, and ecosystem function. Introduction to measurement, observation, experimental design and hypothesis testing in field projects, mostly done in groups. The goal is to learn to think analytically about everyday ecological processes involving bacteria, fungi, plants, animals and humans. The course uses basic statistics to analyze data; there are no math prerequisites except arithmetic. Open to everyone, including those who may be headed for more advanced courses in ecology and environmental science.

Same as: EARTHYSYS 30

BIO 30N. Extinctions in Near Time: Biodiversity loss since the Pleistocene. 3 Units.

The transition 11,700 years ago from the Pleistocene glacial period into the Holocene interglacial witnessed the expansion of humans around the world, climatic warming and the demise of many large vertebrate species. Since that time extinctions have continued on land and in the sea, culminating with the biodiversity crisis we are experiencing today. We will explore these prehistoric extinctions: "Who? When? Where? and Why?" in order to learn more about our planet's future.

BIO 31Q. Ants: Behavior, Ecology, and Evolution. 3 Units.

Preference to sophomores. Behavior: the organization of colonies, how they operate without central control, how they resemble other complex systems like brains. Ecology: how populations of colonies change, comparing the ecology of a species in SW American desert and invasive Argentine ants. Evolution: why are there so many species of ants; how are they alike, how do they differ, and why? Ants as the theme for exploring how to do research in animal behavior, ecology, and evolution. Research project will be on the invasive Argentine ant: its distribution on campus, foraging trails, and nest structure.

BIO 33N. Conservation Science and Practice. 3 Units.

Preference to freshmen. Interdisciplinary. The science and art of conservation today. The forces that are driving change in Earth's atmosphere, lands, waters, and variety of life forms. Which broad dimensions of the biosphere, and which elements of ecosystems, most merit protection? The prospects for, and challenges in, making conservation economically attractive and commonplace. Field trip; project.

BIO 34N. Hunger. 3 Units.

The biology of hunger and satiety, disease states that disrupt normal responses to hunger and satiety, starvation responses and adaptations to starvation in a variety of organisms, food production and distribution mechanisms, historic famines and their causes, the challenges of providing adequate food and energy for the Earth's growing population, local and global efforts to alleviate hunger, and hunger in fiction.

BIO 35N. Water: From Cadillac Deserts to Plant Physiology. 3 Units.

Water is an essential ingredient for life. While the Mediterranean climate of California draws immigrants and tourists to our mild dry climate, infrequent rain and prized water rights have led to a tumultuous history behind how water is currently distributed. In this freshman seminar we will discuss water in California from multiple perspectives that span weather, history, art and plant physiology. The implications of climate change on agriculture and the Californian economy and lifestyle will also be discussed.

BIO 37N. Green Revolution and Plant Biotechnology. 2-3 Units.

Feeding ever-growing populations is a constant challenge to mankind. In the second half of the 20th century, the breeding of improved varieties combined with the use of chemical fertilizers and pesticides led to crop yield increases labeled the Green Revolution. Modern technologies in genetic engineering are expected to bring the second green revolution. Meeting the current and future global food needs without further damaging the fragile environment requires innovative effort from scientists and the society.

BIO 41. Genetics, Biochemistry, and Molecular Biology. 5 Units.

Emphasis is on macromolecules (proteins, lipids, carbohydrates, and nucleic acids) and how their structure relates to function and higher order assembly; molecular biology, genome structure and dynamics, gene expression from transcription to translation. Prerequisites: CHEM 31X (or 31A,B), 33. Recommended: CHEM 35; MATH 19, 20, 21 or 41, 42.

BIO 41A. Bio Solve-It. 1 Unit.

Students enrolled in Bio41 lecture and regular discussion sections attend an additional 75 min section. The objective of the course is to help students to solidify basic concepts, identify areas to work on, and apply core concepts learned that week in Bio41 lecture and section. Space is limited, by application only. Application is due September 22, 2014. Co-Requisite: Bio 41.

BIO 41S. Biochemistry, Genetics, and Molecular Biology. 5 Units.

Emphasis is on macromolecules (proteins, lipids, carbohydrates, and nucleic acids) and how their structure relates to function and higher order assembly; molecular biology, genome structure and dynamics, gene expression from transcription to translation. Prerequisites: CHEM 31X (or 31A,B), 33; MATH 19, 20, 21 or 41, 42. Recommended: CHEM 35.

BIO 42. Cell Biology and Animal Physiology. 5 Units.

Cell structure and function; principles of animal physiology (immunology, renal, cardiovascular, sensory, motor physiology, and endocrinology); neurobiology from cellular basis to neural regulation of physiology. Prerequisites: CHEM 31X (or 31A,B), 33. Recommended: BIO 41; CHEM 35; MATH 19, 20, 21 or 41, 42.

BIO 42A. Bio Solve-It. 1 Unit.

Students enrolled in Bio42 lecture and regular discussion sections attend an additional 75 min section. The objective of the course is to help students to solidify basic concepts, identify areas to work on, and apply core concepts learned that week in Bio42 lecture and section. Space is limited, by application only. Application deadline is December 12, 2014. Co-Requisite: Bio 42.

BIO 43. Plant Biology, Evolution, and Ecology. 5 Units.

Principles of evolution: macro- and microevolution and population genetics. Ecology: the principles underlying the exchanges of mass and energy between organisms and their environments; population, community, and ecosystem ecology; populations, evolution, and global change. Equivalent to BIOHOPK 43. Prerequisites: CHEM 31X (or 31A,B), 33. Recommended: BIO 41, 42; CHEM 35; MATH 19, 20, 21 or 41, 42.

BIO 43A. Bio Solve-It. 1 Unit.

Students enrolled in Bio43 lecture and regular discussion sections attend an additional 75 min section. The objective of the course is to help students to solidify basic concepts, identify areas to work on, and apply core concepts learned that week in Bio43 lecture and section. Space is limited, by application only. Click to apply. Application deadline = March 20, 2015. Co-Requisite: Bio 43.

BIO 44X. Core Molecular Biology Laboratory. 5 Units.

Investigate yeast strains that are engineered to express the human protein, p53, and use modern molecular methods to identify the functional consequences of p53 mutations isolated from tumor cells. Learn about the protein's role as a tumor suppressor through lectures and by reading and discussing journal articles. Use molecular visualization programs to examine the structure of wild type and mutant p53 proteins. Formulate a testable hypothesis and assay the ability of mutant p53 to direct expression of several reporter genes. During guided reflection, formulate further analyses to determine whether mutant p53 is present in the cell, can bind to DNA, and/or can enter the nucleus. Conduct lab experiments, present findings through a team oral presentation, as well as a scientific poster. Prerequisites: CHEM 31X, or 31A,B, and 33; concurrent or past enrollment in Biology or Human Biology core. 44X,Y should be taken sequentially in the same year, preferably as sophomores, to prepare for internships. Preference given to juniors and seniors in fall quarter, preference given to sophomores in winter quarter. Lab fee. Information about this class is available at <http://bio44.stanford.edu>.

BIO 44Y. Core Plant Biology & Eco Evo Laboratory. 5 Units.

The goal of this course is to develop an understanding of how to conduct biological research, using a topic in Ecology, Evolutionary Biology, and Plant Biology as a practical example. This includes the complete scientific process: assessing background literature, generating testable hypotheses, learning techniques for field- and lab-based data collection, analyzing data using appropriate statistical methods, and finally writing and sharing results. To build these skills, this course will focus on communities of microorganisms living in floral nectar at Stanford's nearby Jasper Ridge Biological Preserve. Students, working in teams, will develop novel research hypotheses and execute the necessary experiments and measurements to test these hypotheses. The capstone of the course will be an oral defense of students' findings, as well as a research paper in the style of a peer-reviewed journal article. Labs will be completed both on campus and at Jasper Ridge. Lab fee. Information about this class is available at <http://bio44.stanford.edu>. Satisfies WIM in Biology.

BIO 54SI. Aberrant Immune Responses: Allergy, Asthma, and Autoimmunity. 1 Unit.

This is a discussion-based course for advanced undergraduate and graduate students. Its purpose is to introduce students to a basic understanding of diseases involving overactive immune responses and immune responses directed against the host. Lectures may include a history of the disease, etiology, epidemiology, current and future treatments, and relevant research. This class will emphasize key scientific discoveries in molecular and cellular biology that have benefited our understanding and treatment of these diseases.

BIO 101. Ecology. 4 Units.

The principles of ecology. Topics: interactions of organisms with their environment, dynamics of populations, species interactions, structure and dynamics of ecological communities, biodiversity. Half-day field trip required. Satisfies Central Menu Area 4. Prerequisite: 43, or consent of instructor. Recommended: statistics.

BIO 102. Demography: Health, Development, Environment. 3 Units.

Demographic methods and their application to understanding and projecting changes in human infant, child, and adult mortality and health, fertility, population, sex ratios, and demographic transitions. Progress in human development, capabilities, and freedoms. Relationships between population and environment. Prerequisites: numeracy and basic statistics; Biology or Human Biology core; or consent of instructor.

Same as: HUMBIO 119

BIO 104. Advanced Molecular Biology. 5 Units.

Molecular mechanisms that govern the replication, recombination, and expression of eukaryotic genomes. Topics: DNA replication, DNA recombination, gene transcription, RNA splicing, regulation of gene expression, protein synthesis, and protein folding. Satisfies Central Menu Area 1. Prerequisite: Biology core.

Same as: BIO 200

BIO 105A. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.

Formerly 96A - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

Same as: EARTHSYS 105A

BIO 105B. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.

Formerly 96B - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

Same as: EARTHSYS 105B

BIO 107. Human Physiology Laboratory. 4 Units.

This laboratory course is inquiry based, so the subject matter of the course will change in successive years. In 2015, the two questions to be researched concurrently in Spring will be (1) Can heat-related performance decrements incurred by individuals clad in impermeable attire (e.g., biohazard personal protective suits) be mitigated?; and (2) Can the sensation of thermal comfort be affected by regional skin temperature manipulations. Students will participate both as experimenters and as subjects. The laboratory work will focus on exercise and temperature. Thus, participants must be in good physical condition and be willing to participate in strenuous exercise routines under adverse environmental conditions. Varsity athletes currently participating in a spring sport should first talk with Prof. Heller before applying. Combined Lab/Discussion sessions will be Tue and Thurs 1:15 - 5:05. You must attend both days each week, with no conflicts with other courses. Prerequisite is Bio 42 or HumBio 4A. Satisfies WIM for majors in biology. Enrollment for Spring 2015 course is limited to 16 students by permission. See: sites.stanford.edu/bio107 for the link to online application form.

Same as: HUMBIO 136

BIO 108. Essential Statistics for Human Biology. 4 Units.

Introduction to statistical concepts and methods that are essential to the study of questions in biology, environment, health, epidemiology and related areas. The course will teach and use the computer language R. Topics include distributions, probabilities, likelihood, linear models; illustrations will be based on recent research.

Same as: HUMBIO 85A

BIO 109A. The Human Genome and Disease. 3 Units.

The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both.

Same as: BIOC 109A, BIOC 209A, HUMBIO 158

BIO 109B. The Human Genome and Disease: Genetic Diversity and Personalized Medicine. 3 Units.

Continuation of 109A/209A. Genetic drift: the path of human predecessors out of Africa to Europe and then either through Asia to Australia or through northern Russia to Alaska down to the W. Coast of the Americas. Support for this idea through the histocompatibility genes and genetic sequences that predispose people to diseases. Guest lectures from academia and pharmaceutical companies. Prerequisite: Biology or Human Biology core. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both.

Same as: BIOC 109B, BIOC 209B

BIO 110. DNA Replication and Genomic Maintenance. 3 Units.

Maintenance of the genome and its accurate replication are prerequisites for life. DNA replication is also intricately connected to pathways for responding to genotoxic stress, which include inevitable collisions with transcription. In eukaryotes, DNA repair and replication are tightly connected to chromatin modification. Emphasis for lecture topics include: DNA-templated chromatin transactions; Chromatin manipulation during replication and DNA damage responses; Structural biology and molecular mechanisms of replication and DNA repair enzymes; Inducible responses to genotoxic stress; Relationships of DNA damage processing to mutagenesis, carcinogenesis, aging and human genetic disease.

Same as: BIO 210

BIO 112. Human Physiology. 4 Units.

Human physiology will be examined by organ systems: respiratory, cardiovascular, renal, and gastrointestinal. Concepts of cell and molecular biology that underlie organ development, pathophysiology and opportunities for regenerative medicine will be introduced. Signaling and integrative control by the endocrine, autonomic and central nervous systems will be introduced. Prerequisite: Biology or Human Biology core.

Same as: HUMBIO 133

BIO 113. Fundamentals of Molecular Evolution. 4 Units.

The inference of key molecular evolutionary processes from DNA and protein sequences. Topics include random genetic drift, coalescent models, effects and tests of natural selection, combined effects of linkage and natural selection, codon bias and genome evolution. Satisfies Central Menu Areas 1 or 4. Prerequisites: Biology core or graduate standing in any department, and consent of instructor.

Same as: BIO 244

BIO 115. The hidden kingdom - evolution, ecology and diversity of fungi. 4 Units.

Fungi are critical, yet often hidden, components of the biosphere. They regulate decomposition, are primary partners in plant symbiosis and strongly impact agriculture and economics. Students will explore the fascinating world of fungal biology, ecology and evolution via lecture, lab, field exercises and Saturday field trips that will provide traditional and molecular experiences in the collection, analysis and industrial use of diverse fungi. Students will choose an environmental niche, collect and identify resident fungi, and hypothesize about their community relationship. Prerequisite: Bio 43 recommended.

BIO 116. Ecology of the Hawaiian Islands. 4 Units.

Terrestrial and marine ecology and conservation biology of the Hawaiian Archipelago. Taught in the field in Hawaii as part of quarter-long sequence of courses including Earth Sciences and Anthropology. Topics include ecological succession, plant-soil interactions, conservation biology, biological invasions and ecosystem consequences, and coral reef ecology. Restricted to students accepted into the Earth Systems of Hawaii Program.

Same as: EARTHSYS 116

BIO 117. Biology and Global Change. 4 Units.

The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing.

Same as: EARTHSYS 111, EESS 111

BIO 118. Genetic Analysis of Biological Processes. 4 Units.

Focus is on using mutations and genetic analysis to study biological and medical questions. The first portion of the course covers how the identification and analysis of mutations can be used in model systems to investigate biological processes such as development and metabolism. In the second portion of the course, we focus on the use of existing genetic variation in humans and other species to identify disease-associated genes as well as to investigate variation in morphological traits such as body size and shape.

BIO 120. Bacteria in Health and Disease. 3 Units.

Enrollment limited to junior and senior undergraduates, graduate students and medical students. Introduces students to the bacteria that live in and on humans and, in some cases, can cause disease and sometimes death. Topics include the biology of the interaction of the simple microbe with complex human biology and the factors that determine whether or not we coexist relatively peacefully, suffer from overt disease, or succumb to the bacterial onslaught.

Same as: MI 120

BIO 121. Biogeography. 3 Units.

Global distributions of organisms through the Phanerozoic, with emphasis on historical causes. Topics: plate tectonics, island biogeography, climatic change, dispersal, vicariance, ecology of invasions, extinction, gradients, diversity. Satisfies Central Menu Area 4.

BIO 126. Introduction to Biophysics. 3-4 Units.

Core course appropriate for advanced undergraduate students and graduate students with prior knowledge of calculus and a college physics course.

Introduction to how physical principles offer insights into modern biology, with regard to the structural, dynamical, and functional organization of biological systems. Topics include the roles of free energy, diffusion, electromotive forces, non-equilibrium dynamics, and information in fundamental biological processes.

Same as: APPPHYS 205, BIO 226

BIO 127. From Generation to Generation: Scientific and Cultural Approaches to Jewish Genetics. 1 Unit.

This series of guest lectures aims to explore the connections between genetics and Jewish Studies. How do different Jewish populations relate to each other? To what extent are Jewish populations of the present descended from those of the past? What are the causes of diseases that occur disproportionately in Jewish populations? These and other questions will be addressed in a program that crosses the boundaries between science and Jewish Studies, culture and biology.

BIO 128. Geographic Impacts of Global Change: Mapping the Stories. 4 Units.

Forces of global change (eg., climate disruption, biodiversity loss, disease) impart wide-ranging political, socioeconomic, and ecological impacts, creating an urgent need for science communication. Students will collect data for a region of the US using sources ranging from academic journals to popular media and create an interactive Story Map (<http://stanford.maps.arcgis.com/apps/StorytellingTextLegend/index.html?appid=dafe2393fd2e4acc8b0a4e6e71d0b6d5>) that merges the scientific and human dimensions of global change. Students will interview stakeholders as part of a community-engaged learning experience and present the Map to national policy-makers. Our 2014 Map is being used by the CA Office of Planning & Research.

Same as: EARTHSYS 129

BIO 129A. Cellular Dynamics I: Cell Motility and Adhesion. 4 Units.

Cell motility emphasizing role of actin assembly and dynamics coupling actin organization to cell movement. Interaction of cells with extracellular matrix, and remodelling of extracellular matrix in development and disease. Directed cell migration by chemotaxis (neuronal path-finding, immune cells). Cell-cell adhesion, formation of intercellular junctions and mechanisms regulating cell-cell interactions in development and diseases. Emphasis is on experimental logic, methods, problem solving, and interpretation of results. Students present research papers. Satisfies Central Menu Area 2. Prerequisite: Biology core.

BIO 129B. Cellular Dynamics II: Building a Cell. 4 Units.

Principles of cell organization; how common biochemical pathways are modified to generate diversity in cell structure and function. Roles of actin and microtubule cytoskeletons in cellular architecture. Mechanisms of protein sorting and trafficking, and protein modules and switches in regulating cell polarity. Yeast to polarized epithelial cells and neurons. Emphasis is on experimental logic, methods, problem solving, and interpretation of results. Students present research papers. Satisfies Central Menu Area 2. Prerequisite: Biology core. Recommended: 129A.

BIO 131. Complex Systems Lab. 1 Unit.

Applications of complex systems will be explored in this seminar through lectures, discussions, and a class project. Lecture topics include a discussion of chaos in weather modeling and aircraft turbulence, application of network science to understand Ebola and the ALS ice bucket challenge, and self-organized processes such as crowd dynamics and Wikipedia. The first half of the course will emphasize complex systems applications. Students will apply complex systems analysis techniques to their personal research, a current event, or repeat a classic complex systems experiment. Projects can include topics such as calculating the fractal dimension of a forest, simulating crowd dynamics, studying the degree distribution of social networks, or making a Van der Pol oscillator. Graduate student led seminar. Can be repeated for credit.

BIO 132. Advanced Imaging Lab in Biophysics. 4 Units.

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

Same as: APPPHYS 232, BIO 232, BIOPHYS 232, GENE 232

BIO 136. Evolutionary Paleobiology. 4 Units.

A paleontological approach to evolutionary theory. Topics: history of life, speciation, heterochrony, evolutionary constraint, coevolution, macroevolution, the Cambrian Explosion, mass extinctions, taphonomy, life on land, life in the sea, life in the air. Satisfies Central Menu Area 4. Prerequisite: Biology Core.

BIO 137. Plant Genetics. 3-4 Units.

Gene analysis, mutagenesis, transposable elements; developmental genetics of flowering and embryo development; biochemical genetics of plant metabolism; scientific and societal lessons from transgenic plants. Satisfies Central Menu Area 2. Prerequisite: Biology core or consent of instructor. Satisfies WIM in Biology.

BIO 138. Ecosystem Services: The Science of Valuing Nature. 3 Units.

This advanced course explores the science of valuing nature, beginning with its historical origins, and then its recent development in natural (especially ecological), economic, psychological, and other social sciences. We will use the ecosystem services framework (characterizing benefits from ecosystems to people) to define the state of knowledge, core methods of analysis, and research frontiers, such as at the interface with biodiversity, resilience, human health, and human development. Intended for diverse students, with a focus on research and real-world cases. Class size is limited to 12. To apply, please email the instructor (gdaily@stanford.edu) with a brief description of your background and research interests. Same as: BIO 238

BIO 139. Biology of Birds. 3 Units.

How birds interact with their environments and each other, emphasizing studies that had impact in the fields of population biology, community ecology, and evolution. Local bird communities. Emphasis is on field research. Enrollment limited to 20. Prerequisites: 43 or equivalent, and consent of instructor. Recommended: birding experience.

BIO 141. Biostatistics. 3-5 Units.

Introductory statistical methods for biological data: describing data (numerical and graphical summaries); introduction to probability; and statistical inference (hypothesis tests and confidence intervals). Intermediate statistical methods: comparing groups (analysis of variance); analyzing associations (linear and logistic regression); and methods for categorical data (contingency tables and odds ratio). Course content integrated with statistical computing in R.

Same as: STATS 141

BIO 143. Evolution. 3 Units.

Principles of evolution. Adaptation and natural selection. Darwin and the history of evolutionary thought. Population genetics, including genetic variation and mutation, and effects of migration, drift, linkage, and recombination. Evolutionary phenomena: developmental evolution, life history evolution, molecular evolution, sexual selection, social evolution, and speciation. Pattern and process in biological diversity. Case studies, including human evolution. Satisfies central menu area 4, ecology & evolution.

BIO 144. Conservation Biology: A Latin American Perspective. 3 Units.

Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class.

Same as: BIO 234, HUMBIO 112

BIO 145. Ecology and evolution of animal behavior. 3 Units.

Ecological and evolutionary perspectives on animal behavior, with an emphasis on social and collective behavior. This is a project-based course in a lecture/seminar format. Seminars will be based on discussion of journal articles. Independent research projects on the behavior of animals on campus. Prerequisites: Biology or Human Biology core, Biology/ES 30. Recommended: statistics.

Same as: BIO 245

BIO 146. Population Studies. 1 Unit.

Series of talks by distinguished speakers introducing approaches to population and resource studies.

BIO 149. The Neurobiology of Sleep. 4 Units.

Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.

Same as: BIO 249, HUMBIO 161

BIO 150. Human Behavioral Biology. 5 Units.

Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness.

Same as: BIO 250, HUMBIO 160

BIO 151. Mechanisms of Neuron Death. 3 Units.

For Biology majors with background in neuroscience. Cell and molecular biology of neuron death during neurological disease. Topics: the amyloid diseases (Alzheimer's), prion diseases (kuru and Creutzfeldt-Jakob), oxygen radical diseases (Parkinson's and ALS), triplet repeat diseases (Huntington's), and AIDS-related dementia. Student presentations. Enrollment limited to 15; application required.

BIO 152. Imaging: Biological Light Microscopy. 3 Units.

Survey of instruments which use light and other radiation for analysis of cells in biological and medical research. Topics: basic light microscopy through confocal fluorescence and video/digital image processing. Lectures on physical principles; involves partial assembly and extensive use of lab instruments. Lab. Prerequisites: some college physics, Biology core. Same as: MCP 222

BIO 153. Cellular Neuroscience: Cell Signaling and Behavior. 4 Units.

Neural interactions underlying behavior. Prerequisites: PSYCH 1 or basic biology. Same as: PSYCH 120

BIO 154. Molecular and Cellular Neurobiology. 4 Units.

For advanced undergraduate students. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases. Satisfies Central Menu Areas 2 or 3 for Bio majors. Prerequisite for undergraduates: Biology core or equivalent, or consent of instructors.

BIO 156. Epigenetics. 2 Units.

Epigenetics is the process by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. Course will cover the molecular mechanisms governing epigenetics, ranging from the discovery of epigenetic phenomena to present-day studies on the role of chromatin, DNA methylation, and RNA in regulating epigenetics processes. Topics include: position effect gene expression, genome regulation, gene silencing & heterochromatin, histone code, DNA methylation & imprinting, epigenetics & disease, and epigenetic-based therapeutics. Prerequisite: BIO41 and BIO42 or consent of instructor, advanced biology course such as Bio104.

Same as: BIO 256

BIO 157. Biochemistry and Molecular Biology of Plants. 3-4 Units.

Biochemical and molecular basis of plant growth and adaptation. Topics include: hormone signal transduction; photoreceptor chemistry and signaling; metabolite sensing and transport; dynamics of photosynthesis; plant innate immunity and symbiosis. Lectures and readings will emphasize research methods. Prerequisite: Biology core or equivalent, or consent of instructor.

Same as: BIO 257

BIO 158. Developmental Neurobiology. 4 Units.

For advanced undergraduates and coterminal students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Satisfies Central Menu Areas 2 or 3. Prerequisite: BIO 42 or equivalent.

Same as: BIO 258

BIO 160A. Developmental Biology I. 4 Units.

Focus is on the molecular mechanisms underlying the generation of diverse cell types and tissues during embryonic and post-embryonic animal development. The role of cell-cell communication in controlling key developmental decisions. Topics covered in this quarter include embryonic axis formation, morphogen signaling, cell type specification and stem cells. Experimental logic and methods of research in developmental biology. Discussions of research papers. Satisfies Central Menu Areas 1 or 2. Prerequisite: Biology core or consent of instructor.

BIO 160B. Developmental Biology II. 4 Units.

Continuation of BIO 160A. Focus is on the molecular mechanisms underlying the generation of diverse cell types and tissues during embryonic and post-embryonic animal development. The role of cell-cell communication in controlling key developmental decisions. The topics include sexual control of development, tissue polarity and growth, cell migration, regeneration, and the evolution of developmental mechanisms. Experimental logic and methods of research in developmental biology. Discussions of research papers. Satisfies Central Menu Areas 1 or 2. Prerequisites: Biology Core and 160A, or consent of instructor.

BIO 163. Neural Systems and Behavior. 4 Units.

The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A. Same as: BIO 263, HUMBIO 163

BIO 164. Biosphere-Atmosphere Interactions. 4 Units.

Physiological, ecological, and physical aspects of ecosystem function, emphasizing how ecosystems influence and are influenced by the atmosphere. Prerequisites: 42, 43; or consent of instructor. Same as: BIO 264

BIO 165. Molecular and Cellular Mechanisms of Neurological Disease. 1 Unit.

Current topics in research and investigative therapies of neurological disorders, including epilepsy, OCD, Alzheimer's disease, stroke and multiple sclerosis. Analysis and discussion of primary research papers as well as sources directed at general public. Emphasis on critical thinking, experimental design, therapeutic approaches. Guest lecturers include Dr. Lawrence Steinman and Dr. Gary Steinberg."

BIO 166. Faunal Analysis: Animal Remains for the Archaeologist. 5 Units.

The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

Same as: ANTHRO 113, ANTHRO 213, BIO 266

BIO 168. Explorations in Stem Cell Biology. 3 Units.

A discussion-based course for advanced undergraduates. The purpose of this course is to introduce students to key topics in stem cell biology and foster the development of strong scientific writing skills. We will review and discuss some landmark and current primary literature in the stem cell field. Topics will include embryonic and adult stem cells, cellular reprogramming and stem cells in disease and regenerative medicine. Students will present a current research paper in their preferred stem cell topic area and compose a novel research proposal. Prerequisites: Biology or Human Biology core. Satisfies WIM in Biology.

BIO 171. Principles of Cell Cycle Control. 3 Units.

Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2.

Same as: BIO 271, CSB 271

BIO 174. Human Skeletal Anatomy. 5 Units.

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, ANTHRO 275, BIO 274, HUMBIO 180

BIO 177. Plant Microbe Interaction. 3 Units.

Molecular basis of plant symbiosis and pathogenesis. Topics include mechanisms of recognition and signaling between microbes and plant hosts, with examples such as the role of small molecules, secreted peptides, and signal transduction pathways in symbiotic or pathogenic interactions. Readings include landmark papers together with readings in the contemporary literature. Prerequisites: Biology core and two or more upper division courses in genetics, molecular biology, or biochemistry. Recommended: plant genetics or plant biochemistry.

Same as: BIO 277

BIO 178. Microbiology Literature. 3 Units.

For advanced undergraduates and first-year graduate students. Critical reading of the research literature in prokaryotic genetics and molecular biology, with particular applications to the study of major human pathogens. Classic and foundational papers in pathogenesis, genetics, and molecular biology; recent literature on bacterial pathogens such as *Salmonella*, *Vibrio*, and/or *Yersinia*. Diverse experimental approaches: biochemistry, genomics, pathogenesis, and cell biology. Prerequisites: Biology Core and two upper-division courses in genetics, molecular biology, or biochemistry.

Same as: BIO 278

BIO 181. Human Genetic Variation. 3 Units.

The geographic distribution of human genetic variation; the genetic perspective on ancient and recent human migrations; quantitative methods for inference of human evolutionary history from patterns of genetic variation. Connections of human genetic variation to current topics such as ancestry testing, DNA forensics, and identification of disease genes. Prerequisites: Bio or HumBio core, calculus.

BIO 182. Modeling Cultural Evolution. 3 Units.

Seminar. Quantitative models for the evolution of socially transmitted traits. Rates of change of learned traits in populations and patterns of cultural diversity as a function of innovation and cultural transmission. Learning in constant and changing environments. Possible avenues for gene-culture coevolution.

Same as: BIO 282

BIO 183. Theoretical Population Genetics. 3 Units.

Models in population genetics and evolution. Selection, random drift, gene linkage, migration, and inbreeding, and their influence on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisites: calculus and linear algebra, or consent of instructor.

Same as: BIO 283

BIO 186. Natural History of the Vertebrates. 4 Units.

Broad survey of the diversity of vertebrate life. Discussion of the major branches of the vertebrate evolutionary tree, with emphasis on evolutionary relationships and key adaptations as revealed by the fossil record and modern phylogenetics. Modern orders introduced through an emphasis on natural history, physiology, behavioral ecology, community ecology, and conservation. Lab sessions focused on comparative skeletal morphology through hands-on work with skeletal specimens. Discussion of field methods and experience with our local vertebrate communities through field trips to several of California's distinct biomes. Prerequisite: Biology core.

Same as: BIO 286

BIO 188. Biochemistry I. 3 Units.

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. (CHEMENG offerings formerly listed as 188/288.) Prerequisites: CHEM 33, 35, 131, and 135 or 171.

Same as: BIO 288, CHEM 181, CHEMENG 181, CHEMENG 281

BIO 189. Biochemistry II. 3 Units.

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288).

Same as: BIO 289, CHEM 183, CHEMENG 183, CHEMENG 283

BIO 196A. Biology Senior Reflection. 3 Units.

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C. Satisfies WIM in Biology.

BIO 196B. Biology Senior Reflection. 3 Units.

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C.

BIO 196C. Biology Senior Reflection. 3 Units.

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C.

BIO 197WA. Senior Writing Project: The Personal Essay in Biology. 3 Units.

Seminar focused on writing. Compose, workshop and revise scientifically relevant and personal essays in biology directed at a mainstream audience, interweaving research, interview, memoir, and other elements of nonfiction craft. Satisfies WIM in Biology.

BIO 198. Directed Reading in Biology. 1-15 Unit.

Individually arranged under the supervision of members of the faculty.

BIO 198X. Out-of-Department Directed Reading. 1-15 Unit.

Individually arranged under the supervision of members of the faculty. Credit for work arranged with out-of-department faculty is restricted to Biology majors and requires department approval. See <http://biohonors.stanford.edu> for information and petitions. May be repeated for credit.

BIO 199. Advanced Research Laboratory in Experimental Biology. 1-15 Unit.

Individual research taken by arrangement with in-department instructors. See <http://biohonors.stanford.edu> for information on research sponsors, units, and credit for summer research. May be repeated for credit.

BIO 199W. Senior Honors Thesis: How to Effectively Write About Scientific Research. 3 Units.

Workshop. For seniors pursuing an honors thesis in a biology-focused major or program. Focus on improving scientific writing and synthesizing in the context of students' individual research projects. Complete literature review which will form the basis for the thesis introduction. Develop methods section of the thesis. Small seminar-style discussion sections with research-based discussions, student led PowerPoint presentations, and writing workshops. Co-requisite: Concurrent enrollment in 199 or 199X or equivalent. Satisfies WIM in Biology.

BIO 199X. Out-of-Department Advanced Research Laboratory in Experimental Biology. 1-15 Unit.

Individual research by arrangement with out-of-department instructors. Credit for 199X is restricted to declared Biology majors and requires department approval. See <http://biohonors.stanford.edu> for information on research sponsors, units, petitions, deadlines, credit for summer research, and out-of-Stanford research. May be repeated for credit.

BIO 200. Advanced Molecular Biology. 5 Units.

Molecular mechanisms that govern the replication, recombination, and expression of eukaryotic genomes. Topics: DNA replication, DNA recombination, gene transcription, RNA splicing, regulation of gene expression, protein synthesis, and protein folding. Satisfies Central Menu Area 1. Prerequisite: Biology core.

Same as: BIO 104

BIO 202. Ecological Statistics. 3 Units.

Intended for graduate students (and advanced undergraduates in special circumstances with consent of instructors) in biology and related environmental sciences, this course is an introduction to statistical methods for ecological data analysis, using the programming language R. The course will have lectures, discussions, and independent research projects using the students' own data or simulated or publicly available data.

BIO 204. Neuroplasticity: From Synapses to Behavior. 3 Units.

This course will focus on neuroplasticity from a broad perspective, from molecular cellular mechanism to its involvement in behavior and diseases. Emphasis will be on: a) molecular and cellular mechanisms underlying various forms of neuroplasticity; b) the neuroplasticity during brain development; c) the neuroplasticity in adult brain with respect to learning and memory; and d) maladaptive neuroplasticity in neurodegenerative disease and drug addiction. This course is designed for Ph.D. students from both the Biology and Neuroscience programs. Open to advanced undergraduates by consent of instructor.

BIO 207. Life and Death of Proteins. 3 Units.

How proteins are made and degraded in the cell. Discussion of primary literature. Case studies follow the evolution of scientific ideas, and evaluate how different experimental approaches contribute to our understanding of a biological problem. Emphasis on multidisciplinary approaches. Topics: protein folding and assembly, mechanisms of chaperone action, sorting into organelles, misfolding and disease, and the ubiquitin-proteasome pathway. Enrollment limited to 30.

BIO 208. Spanish in Science/Science in Spanish. 2 Units.

For graduate and undergraduate students interested in the natural sciences and the Spanish language. Students will acquire the ability to communicate in Spanish using scientific language and will enhance their ability to read scientific literature written in Spanish. Emphasis on the development of science in Spanish-speaking countries or regions. Course is conducted in Spanish and intended for students pursuing degrees in the sciences, particularly disciplines such as ecology, environmental science, sustainability, resource management, anthropology, and archeology.

Same as: EARTHSYS 207, LATINAM 207

BIO 210. DNA Replication and Genomic Maintenance. 3 Units.

Maintenance of the genome and its accurate replication are prerequisites for life. DNA replication is also intricately connected to pathways for responding to genotoxic stress, which include inevitable collisions with transcription. In eukaryotes, DNA repair and replication are tightly connected to chromatin modification. Emphasis for lecture topics include: DNA-templated chromatin transactions; Chromatin manipulation during replication and DNA damage responses; Structural biology and molecular mechanisms of replication and DNA repair enzymes; Inducible responses to genotoxic stress; Relationships of DNA damage processing to mutagenesis, carcinogenesis, aging and human genetic disease.

Same as: BIO 110

BIO 214. Advanced Cell Biology. 4 Units.

For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, and differentiation. Weekly reading of current papers from the primary literature. Preparation of an original research proposal. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor.

Same as: BIOC 224, MCP 221

BIO 216. Terrestrial Biogeochemistry. 3 Units.

Nutrient cycling and the regulation of primary and secondary production in terrestrial, freshwater, and marine ecosystems; land-water and biosphere-atmosphere interactions; global element cycles and their regulation; human effects on biogeochemical cycles. Prerequisite: graduate standing in science or engineering; consent of instructor for undergraduates or coterminal students.

Same as: EESS 216

BIO 217. Neuronal Biophysics. 4 Units.

Biophysical descriptions and mechanisms of passive and excitable membranes, ion channels and pumps, action potential propagation, and synaptic transmission. Introduction to dynamics of single neurons and neuronal networks. Emphasis is on the experimental basis for modern research applications. Interdisciplinary aspects of biology and physics. Literature, problem sets, and student presentations. Prerequisites: undergraduate physics, calculus, and biology.

BIO 220. Essential Mathematics for Research in Life and Social Sciences. 2 Units.

Targeted review of mathematics for research in life (and social) sciences. Material includes: real and complex functions, sequences and series, essential calculus, linear algebra, probability, stochastic processes, model-building and introduction to Matlab. Links techniques to applications in research and modeling, particularly in population biology. Students will use online materials including lecture videos, problem sets, course notes, and self-paced tests.

BIO 222. Exploring Neural Circuits. 3 Units.

Seminar. The logic of how neural circuits control behavior; how neural circuits are assembled during development and modified by experience. Emphasis is on primary literature. Topics include: neurons as information processing units; simple and complex circuits underlying sensory information processing and motor control; and development and plasticity of neural circuits. Advanced undergraduates and graduate students with background in physical science, engineering, and biology may apply to enroll. Recommended: background in neuroscience.

BIO 223. Stochastic and Nonlinear Dynamics. 3 Units.

Theoretical analysis of dynamical processes: dynamical systems, stochastic processes, and spatiotemporal dynamics. Motivations and applications from biology and physics. Emphasis is on methods including qualitative approaches, asymptotics, and multiple scale analysis. Prerequisites: ordinary and partial differential equations, complex analysis, and probability or statistical physics.

Same as: APPPHYS 223

BIO 226. Introduction to Biophysics. 3-4 Units.

Core course appropriate for advanced undergraduate students and graduate students with prior knowledge of calculus and a college physics course. Introduction to how physical principles offer insights into modern biology, with regard to the structural, dynamical, and functional organization of biological systems. Topics include the roles of free energy, diffusion, electromotive forces, non-equilibrium dynamics, and information in fundamental biological processes.

Same as: APPPHYS 205, BIO 126

BIO 227. Foundations of Community Ecology. 2 Units.

Discussion of classic papers in community ecology (Forbes, Clements, Gleason, Grinnell, Lindeman, Preston, Elton, Hutchinson, May, MacArthur, Odum, Connell, Paine, Tilman, etc.) and contemporary papers on related topics, to develop historical perspectives to understand current issues and identify future directions. Prerequisite for undergraduates: consent of instructor.

BIO 230. Molecular and Cellular Immunology. 4 Units.

Components of the immune system and their functions in immune responses in health and disease: development of the immune system; innate and adaptive immunity; structure and function of antibodies; molecular biology and biochemistry of antigen receptors and signaling pathways; cellular basis of immune responses and their regulation; genetic control of immune responses and disease susceptibility. Lectures and discussion in class and in sections. Satisfies Central Menu Areas 1 or 2. For upper class undergraduates and graduate students who have not previously taken an introductory immunology course. Prerequisite for undergraduates: Biology or Human Biology core, or consent of instructor.

BIO 230A. Molecular and Cellular Immunology Literature Review. 1 Unit.

Special discussion section for graduate students. Supplement to 230. Corequisite: 230.

BIO 232. Advanced Imaging Lab in Biophysics. 4 Units.

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

Same as: APPPHYS 232, BIO 132, BIOPHYS 232, GENE 232

BIO 234. Conservation Biology: A Latin American Perspective. 3 Units.

Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class.

Same as: BIO 144, HUMBIO 112

BIO 238. Ecosystem Services: The Science of Valuing Nature. 3 Units.

This advanced course explores the science of valuing nature, beginning with its historical origins, and then its recent development in natural (especially ecological), economic, psychological, and other social sciences. We will use the ecosystem services framework (characterizing benefits from ecosystems to people) to define the state of knowledge, core methods of analysis, and research frontiers, such as at the interface with biodiversity, resilience, human health, and human development. Intended for diverse students, with a focus on research and real-world cases. Class size is limited to 12. To apply, please email the instructor (gdaily@stanford.edu) with a brief description of your background and research interests.

Same as: BIO 138

BIO 244. Fundamentals of Molecular Evolution. 4 Units.

The inference of key molecular evolutionary processes from DNA and protein sequences. Topics include random genetic drift, coalescent models, effects and tests of natural selection, combined effects of linkage and natural selection, codon bias and genome evolution. Satisfies Central Menu Areas 1 or 4. Prerequisites: Biology core or graduate standing in any department, and consent of instructor.

Same as: BIO 113

BIO 245. Ecology and evolution of animal behavior. 3 Units.

Ecological and evolutionary perspectives on animal behavior, with an emphasis on social and collective behavior. This is a project-based course in a lecture/seminar format. Seminars will be based on discussion of journal articles. Independent research projects on the behavior of animals on campus. Prerequisites: Biology or Human Biology core, Biology/ES 30. Recommended: statistics.

Same as: BIO 145

BIO 249. The Neurobiology of Sleep. 4 Units.

Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.

Same as: BIO 149, HUMBIO 161

BIO 250. Human Behavioral Biology. 5 Units.

Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness.

Same as: BIO 150, HUMBIO 160

BIO 254. Molecular and Cellular Neurobiology. 3-5 Units.

For graduate students. Includes lectures for BIO 154. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases.

Same as: NBIO 254

BIO 256. Epigenetics. 2 Units.

Epigenetics is the process by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. Course will cover the molecular mechanisms governing epigenetics, ranging from the discovery of epigenetic phenomena to present-day studies on the role of chromatin, DNA methylation, and RNA in regulating epigenetics processes. Topics include: position effect gene expression, genome regulation, gene silencing & heterochromatin, histone code, DNA methylation & imprinting, epigenetics & disease, and epigenetic-based therapeutics. Prerequisite: BIO41 and BIO42 or consent of instructor, advanced biology course such as Bio104.

Same as: BIO 156

BIO 257. Biochemistry and Molecular Biology of Plants. 3-4 Units.

Biochemical and molecular basis of plant growth and adaptation. Topics include: hormone signal transduction; photoreceptor chemistry and signaling; metabolite sensing and transport; dynamics of photosynthesis; plant innate immunity and symbiosis. Lectures and readings will emphasize research methods. Prerequisite: Biology core or equivalent, or consent of instructor.

Same as: BIO 157

BIO 258. Developmental Neurobiology. 4 Units.

For advanced undergraduates and coterminal students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Satisfies Central Menu Areas 2 or 3. Prerequisite: BIO 42 or equivalent.

Same as: BIO 158

BIO 263. Neural Systems and Behavior. 4 Units.

The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A.

Same as: BIO 163, HUMBIO 163

BIO 264. Biosphere-Atmosphere Interactions. 4 Units.

Physiological, ecological, and physical aspects of ecosystem function, emphasizing how ecosystems influence and are influenced by the atmosphere. Prerequisites: 42, 43; or consent of instructor.

Same as: BIO 164

BIO 266. Faunal Analysis: Animal Remains for the Archaeologist. 5 Units.

The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

Same as: ANTHRO 113, ANTHRO 213, BIO 166

BIO 267. Molecular Mechanisms of Neurodegenerative Disease. 4 Units.

The epidemic of neurodegenerative disorders such as Alzheimer's and Parkinson's disease occasioned by an aging human population. Genetic, molecular, and cellular mechanisms. Clinical aspects through case presentations.

Same as: NENS 267

BIO 268. Statistical and Machine Learning Methods for Genomics. 3 Units.

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets.

Same as: BIOMEDIN 245, CS 373, GENE 245, STATS 345

BIO 271. Principles of Cell Cycle Control. 3 Units.

Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2.

Same as: BIO 171, CSB 271

BIO 274. Human Skeletal Anatomy. 5 Units.

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, ANTHRO 275, BIO 174, HUMBIO 180

BIO 274S. Hopkins Microbiology Course. 3-12 Units.

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

Same as: BIOHOPK 274, CEE 274S, EESS 253S

BIO 277. Plant Microbe Interaction. 3 Units.

Molecular basis of plant symbiosis and pathogenesis. Topics include mechanisms of recognition and signaling between microbes and plant hosts, with examples such as the role of small molecules, secreted peptides, and signal transduction pathways in symbiotic or pathogenic interactions. Readings include landmark papers together with readings in the contemporary literature. Prerequisites: Biology core and two or more upper division courses in genetics, molecular biology, or biochemistry. Recommended: plant genetics or plant biochemistry.

Same as: BIO 177

BIO 278. Microbiology Literature. 3 Units.

For advanced undergraduates and first-year graduate students. Critical reading of the research literature in prokaryotic genetics and molecular biology, with particular applications to the study of major human pathogens. Classic and foundational papers in pathogenesis, genetics, and molecular biology; recent literature on bacterial pathogens such as *Salmonella*, *Vibrio*, and/or *Yersinia*. Diverse experimental approaches: biochemistry, genomics, pathogenesis, and cell biology. Prerequisites: Biology Core and two upper-division courses in genetics, molecular biology, or biochemistry.

Same as: BIO 178

BIO 282. Modeling Cultural Evolution. 3 Units.

Seminar. Quantitative models for the evolution of socially transmitted traits. Rates of change of learned traits in populations and patterns of cultural diversity as a function of innovation and cultural transmission. Learning in constant and changing environments. Possible avenues for gene-culture coevolution.

Same as: BIO 182

BIO 283. Theoretical Population Genetics. 3 Units.

Models in population genetics and evolution. Selection, random drift, gene linkage, migration, and inbreeding, and their influence on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisites: calculus and linear algebra, or consent of instructor.

Same as: BIO 183

BIO 286. Natural History of the Vertebrates. 4 Units.

Broad survey of the diversity of vertebrate life. Discussion of the major branches of the vertebrate evolutionary tree, with emphasis on evolutionary relationships and key adaptations as revealed by the fossil record and modern phylogenetics. Modern orders introduced through an emphasis on natural history, physiology, behavioral ecology, community ecology, and conservation. Lab sessions focused on comparative skeletal morphology through hands-on work with skeletal specimens. Discussion of field methods and experience with our local vertebrate communities through field trips to several of California's distinct biomes. Prerequisite: Biology core.

Same as: BIO 186

BIO 287. Advanced topics in human population genetics. 3 Units.

Focused examination of specific topics in human population genetics, with emphasis on primary literature. Course themes may include: mathematical properties of statistics used in human population genetics, population genetics and biological race, and statistical inference of human migrations.

BIO 288. Biochemistry I. 3 Units.

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. (CHEMENG offerings formerly listed as 188/288.) Prerequisites: CHEM 33, 35, 131, and 135 or 171.

Same as: BIO 188, CHEM 181, CHEMENG 181, CHEMENG 281

BIO 289. Biochemistry II. 3 Units.

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288).

Same as: BIO 189, CHEM 183, CHEMENG 183, CHEMENG 283

BIO 290. Teaching of Biology. 1-5 Unit.

Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. May be repeated for credit. Prerequisite: consent of instructor.

BIO 291. Development and Teaching of Core Experimental Laboratories. 1-2 Unit.

Preparation for teaching the core experimental courses (44X and 44Y). Emphasis is on lab, speaking, and writing skills. Focus is on updating the lab to meet the changing technical needs of the students. Taken prior to teaching either of the above courses. May be repeated for credit. Prerequisite: selection by instructor.

BIO 292. Curricular Practical Training. 1-3 Unit.

CPT course required for international students completing degree requirements.

BIO 294. Cellular Biophysics. 3 Units.

Physical biology of dynamical and mechanical processes in cells. Emphasis is on qualitative understanding of biological functions through quantitative analysis and simple mathematical models. Sensory transduction, signaling, adaptation, switches, molecular motors, actin and microtubules, motility, and circadian clocks. Prerequisites: differential equations and introductory statistical mechanics.

Same as: APPPHYS 294

BIO 299. Biology PhD Lab Rotation. 1-10 Unit.

Limited to first year Biology PhD students. Lab rotations with Biosciences faculty.

BIO 300. Graduate Research. 1-10 Unit.

For graduate students only. Individual research by arrangement with in-department instructors.

BIO 300X. Out-of-Department Graduate Research. 1-10 Unit.

Individual research by arrangement with out-of-department instructors. Master's students: credit for work arranged with out-of-department instructors is restricted to Biology students and requires approved department petition. See <http://biohonors.stanford.edu> for more information. May be repeated for credit.

BIO 301. Frontiers in Biology. 1-3 Unit.

Limited to and required of first-year Ph.D. students in molecular, cellular, and developmental biology. Current research in molecular, cellular, and developmental biology emphasizing primary research literature. Held in conjunction with the department's Monday seminar series. Students and faculty meet weekly before the seminar for a student presentation and discussion of upcoming papers.

BIO 302. Current Topics and Concepts in Population Biology, Ecology, and Evolution. 1 Unit.

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics. This course is open only to Biology PhD students and is not open to auditors."

BIO 303. Current Topics and Concepts in Population Biology, Ecology, and Evolution. 1 Unit.

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics. This course is open only to Biology PhD students and is not open to auditors."

BIO 304. Current Topics and Concepts in Population Biology, Ecology, and Evolution. 1 Unit.

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics. This course is open only to Biology PhD students and is not open to auditors.

BIO 306. Current Topics in Integrative Organismal Biology. 1 Unit.

Limited to and required of graduate students doing research in this field. At Hopkins Marine Station.

BIO 312. Ethical Issues in Ecology and Evolutionary Biology. 1 Unit.

Focus is on ethical issues addressed in Donald Kennedy's *Academic Duty* and others of importance to academics and scientists in the fields of ecology, behavior, and evolutionary biology. Discussions led by faculty and outside guests. Satisfies ethics course requirement for ecology and evolutionary biology. Prerequisite: PhD student in the ecology and evolutionary biology or marine program, or consent of instructor.

BIO 321. Ecological Genetics. 1-3 Unit.

Systematic exploration of (1) the types of questions that can be addressed by ecological genetics techniques (i.e., community genomics, genetic variation between species in the same ecosystem, resource use, landscape genetics, etc.); (2) laboratory techniques available; and (3) analyses and modeling best suited for ecological genetics questions. Analysis of specific research problems and efforts (now underway or planned for the near future) among seminar participants, and discussion of these efforts with group review of the relative merits of alternative approaches.

BIO 325. The Evolution of Body Size. 2 Units.

Preference to graduate students and upper-division undergraduates in GES and Biology. The influence of organism size on evolutionary and ecological patterns and processes. Focus is on integration of theoretical principles, observations of living organisms, and data from the fossil record. What are the physiological and ecological correlates of body size? Is there an optimum size? Do organisms tend to evolve to larger size? Does productivity control the size distribution of consumers? Does size affect the likelihood of extinction or speciation? How does size scale from the genome to the phenotype? How is metabolic rate involved in evolution of body size? What is the influence of geographic area on maximum body size?.

Same as: GES 325

BIO 326. Foundations in Biogeography. 2 Units.

Seminar. Focus on classic papers covering the global distribution and abundance of organisms through time. Topics include: phylogenetics, phylogeography, plate tectonics, island biogeography, climatic change, dispersal, vicariance, ecology of invasions, extinction, gradients, diversity, conservation and a history of the field.

BIO 342. Plant Biology Seminar. 1-3 Unit.

Topics announced at the beginning of each quarter. Current literature. May be repeated for credit. See <http://carnegiedpb.stanford.edu/seminars/seminars.php>.

BIO 346. Advanced Seminar on Prokaryotic Molecular Biology. 1 Unit.

Enrollment limited to PhD students associated with departmental research groups in genetics or molecular biology.

BIO 375. Field Ecology & Conservation. 4 Units.

This course is based on question-driven research in the field, addressing both conceptual frameworks and methodological aspects of evolutionary ecology and conservation biology. It consists of faculty-led research projects and student independent projects. The field part takes place in a tropical rain forest research station in Mexico September 5-15, 2014. The field component is followed by sessions on campus, where the research data are analyzed, discussed and prepared as scientific papers. The training includes presentations of the papers in a mini-symposium organized as a professional meeting.

BIO 383. Seminar in Population Genetics. 1-3 Unit.

Literature review, research, and current problems in the theory and practice of population genetics and molecular evolution. May be repeated for credit. Prerequisite: consent of instructor.

BIO 384. Theoretical Ecology. 1-3 Unit.

Recent and classical research papers in ecology, and presentation of work in progress by participants. Prerequisite: consent of instructor.

BIO 387. Hacking Consciousness: Consciousness, Cognition, and the Brain. 1 Unit.

Listen to renowned physicists, nutritionists, neuroscientists, etc. as they investigate the nature of consciousness as a field of all possibilities. We'll explore consciousness as the source not only of the human mind and its ability to experience, know, innovate... but also as the source of all structures and functions in creation, from fine particles to DNA to galaxies, in parallel with the scientific notion of a unified field, or superstring at the basis of the infinite diversity of time and space.

BIO 390. Topics in Biology. 1 Unit.

Seminar. Topics in biology ranging from neurobiology to ecology.

BIO 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIOC 459, BIOE 459, CHEM 459, CHEMENG 459, PSYCH 459

BIO 802. TGR Dissertation. 0 Units.

Biology/Hopkins Marine Courses

BIOHOPK 43. Plant Biology, Evolution, and Ecology. 5 Units.

Introduction to biology in a marine context. Principles of plant biology: physiology, structure, diversity. Principles of evolution: macro and microevolution, population genetics. Ecology: the principles governing the distribution and abundance of organisms; population, community, and ecosystem ecology. Equivalent to BIO 43. Corequisite: BIOHOPK 44Y.

BIOHOPK 44Y. Core Laboratory in Plant Biology, Ecology and Evolution. 5 Units.

Laboratory and field projects provide working familiarity with the concepts, organisms, and techniques of plant and evolutionary biology, and ecology. Emphasis is on hands-on experimentation in the marine environment, analysis of data, and written and oral presentation of the experiments. Equivalent to BIO 44Y. Corequisite: BIOHOPK 43. Satisfies WIM in Biology.

BIOHOPK 150H. Ecological Mechanics. 3 Units.

(Graduate students register for 250H.) The principles of life's physical interactions. We will explore basic physics: fluid mechanics, thermal dynamics, and materials science to see how the principles of these fields can be used to investigate ecology at levels from the individual to the community. Topics include: diffusion, boundary layers, fluid-dynamic forces, locomotion, heat-budget models, fracture mechanics, adhesion, beam theory, the statistics of extremes, and the theory of self-organization. Open to students from all backgrounds. Some familiarity with basic physics and calculus advantageous but not necessary.

Same as: BIOHOPK 250H

BIOHOPK 151H. Ecological Mechanics. 2 Units.

(Graduate students register for 151H.) A continuation of BIOHOPK 150. The principles of life's physical interactions. We will explore basic physics and fluid dynamics to see how these physical principles can be used to investigate ecology at levels from the individual to the community. Thermal mechanics, biological materials, fracture mechanics, adhesion, beam theory, variation and scale, the statistics of extremes, and self-organization. Open to students from all backgrounds. Some familiarity with basic physics and calculus advantageous, but not necessary.

Same as: BIOHOPK 251H

BIOHOPK 152H. Physiology of Global Change. 2 Units.

(Graduate students register for 252H.) Global change is leading to significant alterations in several environmental factors, including temperature, ocean acidity and oxygen availability. This course focuses on: (i) how these environmental changes lead to physiological stress and (ii) how, and to what extent, are organisms able to adapt through short-term acclimatization and evolutionary adaptation to cope with these stresses. A major focus of the class is to link changes in species' distribution patterns with underlying physiological mechanisms that establish environmental optima and tolerance limits.

Same as: BIOHOPK 252H

BIOHOPK 153H. Current Topics and Concepts in Quantitative Fish Dynamics and Fisheries Management. 1 Unit.

(Graduate students register for 253H) The course will focus on extensive reading of seminal and reference papers published in the literature in the last decade on modeling population biology, community dynamics and fishery management in the marine environment. Basic knowledge of population dynamics is welcome. The goal is to develop an appreciation on both traditional and cutting-edge modeling approaches to study the dynamics and management of marine populations subjected to natural or anthropogenic shocks and pressures.

Same as: BIOHOPK 253H

BIOHOPK 154H. Animal Diversity: An Introduction to Evolution of Animal Form and Function from Larvae to Adults. 7 Units.

Survey of invertebrate diversity, emphasizing form and function of both adult and larval life history stages. Focuses on how morphology, life histories, and development contribute to current views of the evolutionary diversification of multicellular animals. Labs are a hands-on exploration of animal diversity using local marine species as examples, as well as techniques of obtaining, handling, and maintaining larvae from early development through settlement. Lectures, labs, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructors.

Same as: BIOHOPK 254H

BIOHOPK 160H. Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates. 5-8 Units.

(Graduate students register for 261H.) Lab course is designed to introduce students to the diversity in the early developmental strategies of marine invertebrates and how an understanding of these microscopic life histories is key to understanding the evolutionary diversification of phyla and the distribution of their more familiar adults. Emphasis is on hands-on collection, spawning, observation and manipulation of embryos and their larvae.

Same as: BIOHOPK 260H

BIOHOPK 161H. Invertebrate Zoology. 5 Units.

(Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine forms as examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

Same as: BIOHOPK 261H

BIOHOPK 162H. Comparative Animal Physiology. 5 Units.

(Graduate students register for 262H.) How animals work. Topics: physiology of respiration, circulation, energy metabolism, thermal regulation, osmotic regulation, muscle physiology, and locomotion. Evolutionary and ecological physiology. Lectures, lab, and field research. An option to combine the course work with a more intensive research focus, with more units, is available. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

Same as: BIOHOPK 262H

BIOHOPK 163H. Oceanic Biology. 4 Units.

(Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Satisfies Central Menu Area 4 for Bio majors. Recommended: PHYSICS 21 or 51, CHEM 31, Biology core, or consent of instructor.

Same as: BIOHOPK 263H

BIOHOPK 165H. The Extreme Life of the Sea. 3 Units.

(Graduate students register for 265H.) Lecture course that explores the way marine species live in extreme ocean habitats. We will cover the deepest, hottest, coldest, and shallowest habitats and the biggest, fastest, most fecund, oldest and smallest species. We will focus on the molecular, physiological and ecological adaptations that allow species to thrive in these unusual environments.

Same as: BIOHOPK 265H

BIOHOPK 166H. Molecular Ecology. 5 Units.

(Graduate students register for 266H.) How modern technologies in gene sequencing, detection of nuclear nucleotide polymorphisms, and other approaches are used to gather data on genetic variation that allow measurement of population structure, infer demographic histories, inform conservation efforts, and advance understanding of the ecology of diverse types of organisms.

Same as: BIOHOPK 266H

BIOHOPK 167H. Nerve, Muscle, and Synapse. 5 Units.

(Graduate students register for 267H.) Fundamental aspects of membrane excitability, nerve conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: PHYSICS 23, 28, 43, or equivalent; CHEM 31, 135; calculus; or consent of instructor.

Same as: BIOHOPK 267H

BIOHOPK 172H. Marine Ecology: From Organisms to Ecosystems. 5 Units.

(Graduate students register for 272H.) This course incorporates the approaches of experimental ecology, biomechanics (ecomechanics), and physiology to develop an integrated perspective on the factors that govern the structures of marine ecosystems and how environment change, including anthropogenic influences, affects ecosystems' species composition and health. Focus is on rocky intertidal, kelp forest, estuarine, and midwater ecosystems of Monterey Bay. Experimental projects done in the field offer experience in a variety of ecological techniques and in analysis of ecological data. Students will engage in presentation and debates of current topics in marine ecology and conservation. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: Biology core or consent of instructor. Fulfills WIM in Biology.

Same as: BIOHOPK 272H

BIOHOPK 173H. Marine Conservation Biology. 4 Units.

(Graduate students register for 273H.) Introduction to the key concepts of ecology and policy relevant to marine conservation issues at the population to ecosystems level. Focus on the origin and maintenance of biodiversity and conservation applications from both the biology and policy perspectives (for example, endangered species, captive breeding, reserve design, habitat fragmentation, ecosystem restoration/rehabilitation). Also includes emerging approaches such as ecosystem based management, ocean planning, and coupled social-ecological systems. The course will include lectures, readings and discussions of primary literature, and attendance at seminars with visiting scholars. Prerequisite: introductory biology; suggested: a policy and/or introductory ecology course.

Same as: BIOHOPK 273H

BIOHOPK 174H. Experimental Design and Probability. 3 Units.

(Graduate students register for 274H.) Variability is an integral part of biology. Introduction to probability and its use in designing experiments to address biological problems. Focus is on analysis of variance, when and how to use it, why it works, and how to interpret the results. Design of complex, but practical, asymmetrical experiments and environmental impact studies, and regression and analysis of covariance. Computer-based data analysis. Prerequisite: Biology core or consent of instructor.

Same as: BIOHOPK 274H

BIOHOPK 177H. Dynamics and Management of Marine Populations. 4 Units.

(Graduate students register for 277H.) Course examines the ecological factors and processes that control natural and harvested marine populations. Course emphasizes mathematical models as tools to assess the dynamics of populations and to derive projections of their demographic fate under different management scenarios. Course objectives will be met by a combination of theoretical lectures, assigned readings and class discussions, case study analysis and interactive computer sessions.

Same as: BIOHOPK 277H

BIOHOPK 179H. Physiological Ecology of Marine Megafauna. 3 Units.

(Graduate students register for 279H.) The ocean is home to the largest animals of all-time. How, when, and why did gigantism evolve in different taxa? What are the consequences of large body size? This course will focus on how biological processes scale with body size, with an emphasis on oceanic megafauna including marine mammals, birds, fishes, and reptiles. In particular, the course will explore the functional mechanisms that generate the scaling relationships for physiological and ecological traits, such as metabolism, ecosystem function and body size evolution. Students will also be introduced to state-of-the-art technologies used to study marine megafauna in some of the most logistically challenging habitats on earth.

Same as: BIOHOPK 279H

BIOHOPK 180H. Air and Water. 3 Units.

(Graduate students register for 280H.) Introduction to environmental physics. The physical properties of life's fluids compared and contrasted. How and why life has evolved differently on land than in water. Topics: density, viscosity, diffusion, thermal properties, sound, light, evaporation, and surface tension. Recommended: PHYSICS 21, 23, or 51, 53; calculus; Biology core; or consent of instructor.

Same as: BIOHOPK 280H

BIOHOPK 182H. Stanford at Sea. 16 Units.

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

Same as: BIOHOPK 323H, EARTHSYS 323, EESS 323

BIOHOPK 184H. Holistic Biology. 16 Units.

(Graduate students register for 284H.) For majors and non-majors. Complexity in natural systems is examined from complementary points of view, including scientific, historical, philosophical and literary. Lectures and discussions will focus on the writings of Ed Ricketts and John Steinbeck, poetry of Robinson Jeffers and on historical and contemporary works concerning marine and fresh-water systems, resource management and climate change. A group project with individual contributions will be carried out and presented at a symposium. This course will involve a significant amount of creative writing, and it satisfies the Writing in Major requirement for Biology. It is open to all majors and classes. Only 6 units may count towards the Biology major.

Same as: BIOHOPK 284H

BIOHOPK 185H. Ecology and Conservation of Kelp Forest Communities. 5 Units.

(Graduate students register for 285H.) Five week course. Daily lectures, labs, and scuba dives focused on kelp forest biology. Topics include identification and natural history of resident organisms, ecological processes that maintain biodiversity and community organization, field methods, data analysis, and research diving techniques. Class projects contribute to ongoing studies associated with Hopkins Marine Life Observatory. It is recommended that students complete Stanford's Scientific Diver Training workshop, offered during spring break and the week before the course starts, although this is not a requirement. Prerequisites: consent of instructor; advanced scuba certification and scuba equipment.

Same as: BIOHOPK 285H

BIOHOPK 187H. Sensory Ecology. 4 Units.

(Graduate students register for 287H.) Topics: the ways animals receive, filter, and process information gleaned from the environment, sensory receptor mechanisms, neural processing, specialization to life underwater, communication within and between species, importance of behavior to ecosystem structure and dynamics, impact of acoustic and light pollution on marine animals. Emphasis is on the current scientific literature. The laboratory portion of the class explores sensory mechanisms using neurobiological methods and methods of experimental animal behavior.

Same as: BIOHOPK 287H

BIOHOPK 189H. Sustainability and Marine Ecosystems. 3 Units.

(Graduate students register for 289H.) The health of marine ecosystems is in decline due to overfishing, pollution, habitat damage, invasive species, and climate change. Because human communities are tightly coupled to coastal marine resources, understanding pathways to sustainability require understanding as much about humans as about the ocean. In this course, we explore factors that contribute to the sustainability and resilience of marine ecosystems and the human communities that depend upon them. This course is based on readings in the primary literature, discussions, and student projects.

Same as: BIOHOPK 289H

BIOHOPK 198H. Directed Instruction or Reading. 1-15 Unit.

May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research. Credit for work arranged with out-of-department instructors restricted to Biology majors and requires department approval. May be repeated for credit. (Staff).

BIOHOPK 199H. Undergraduate Research. 1-15 Unit.

Qualified undergraduates undertake individual work in the fields listed under 300H. Arrangements must be made by consultation or correspondence.

BIOHOPK 250H. Ecological Mechanics. 3 Units.

(Graduate students register for 250H.) The principles of life's physical interactions. We will explore basic physics: fluid mechanics, thermal dynamics, and materials science to see how the principles of these fields can be used to investigate ecology at levels from the individual to the community. Topics include: diffusion, boundary layers, fluid-dynamic forces, locomotion, heat-budget models, fracture mechanics, adhesion, beam theory, the statistics of extremes, and the theory of self-organization. Open to students from all backgrounds. Some familiarity with basic physics and calculus advantageous but not necessary.

Same as: BIOHOPK 150H

BIOHOPK 251H. Ecological Mechanics. 2 Units.

(Graduate students register for 151H.) A continuation of BIOHOPK 150. The principles of life's physical interactions. We will explore basic physics and fluid dynamics to see how these physical principles can be used to investigate ecology at levels from the individual to the community. Thermal mechanics, biological materials, fracture mechanics, adhesion, beam theory, variation and scale, the statistics of extremes, and self-organization. Open to students from all backgrounds. Some familiarity with basic physics and calculus advantageous, but not necessary.

Same as: BIOHOPK 151H

BIOHOPK 252H. Physiology of Global Change. 2 Units.

(Graduate students register for 252H.) Global change is leading to significant alterations in several environmental factors, including temperature, ocean acidity and oxygen availability. This course focuses on: (i) how these environmental changes lead to physiological stress and (ii) how, and to what extent, are organisms able to adapt through short-term acclimatization and evolutionary adaptation to cope with these stresses. A major focus of the class is to link changes in species' distribution patterns with underlying physiological mechanics that establish environmental optima and tolerance limits.

Same as: BIOHOPK 152H

BIOHOPK 253H. Current Topics and Concepts in Quantitative Fish Dynamics and Fisheries Management. 1 Unit.

(Graduate students register for 253H) The course will focus on extensive reading of seminal and reference papers published in the literature in the last decade on modeling population biology, community dynamics and fishery management in the marine environment. Basic knowledge of population dynamics is welcome. The goal is to develop an appreciation on both traditional and cutting-edge modeling approaches to study the dynamics and management of marine populations subjected to natural or anthropogenic shocks and pressures.

Same as: BIOHOPK 153H

BIOHOPK 254H. Animal Diversity: An Introduction to Evolution of Animal Form and Function from Larvae to Adults. 7 Units.

Survey of invertebrate diversity, emphasizing form and function of both adult and larval life history stages. Focuses on how morphology, life histories, and development contribute to current views of the evolutionary diversification of multicellular animals. Labs are a hands-on exploration of animal diversity using local marine species as examples, as well as techniques of obtaining, handling, and maintaining larvae from early development through settlement. Lectures, labs, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructors.

Same as: BIOHOPK 154H

BIOHOPK 260H. Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates. 5-8 Units.

(Graduate students register for 261H.) Lab course is designed to introduce students to the diversity in the early developmental strategies of marine invertebrates and how an understanding of these microscopic life histories is key to understanding the evolutionary diversification of phyla and the distribution of their more familiar adults. Emphasis is on hands-on collection, spawning, observation and manipulation of embryos and their larvae.

Same as: BIOHOPK 160H

BIOHOPK 261H. Invertebrate Zoology. 5 Units.

(Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine forms as examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

Same as: BIOHOPK 161H

BIOHOPK 262H. Comparative Animal Physiology. 5 Units.

(Graduate students register for 262H.) How animals work. Topics: physiology of respiration, circulation, energy metabolism, thermal regulation, osmotic regulation, muscle physiology, and locomotion. Evolutionary and ecological physiology. Lectures, lab, and field research. An option to combine the course work with a more intensive research focus, with more units, is available. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

Same as: BIOHOPK 162H

BIOHOPK 263H. Oceanic Biology. 4 Units.

(Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Satisfies Central Menu Area 4 for Bio majors. Recommended: PHYSICS 21 or 51, CHEM 31, Biology core, or consent of instructor.

Same as: BIOHOPK 163H

BIOHOPK 264H. POPULATION GENOMICS. 1-2 Unit.

Introduces students to the analysis of single nucleotide polymorphism data from next generation sequencing projects. Computer analysis, hypothesis testing, and projects based on existing data sets will be pursued.

BIOHOPK 265H. The Extreme Life of the Sea. 3 Units.

(Graduate students register for 265H.) Lecture course that explores the way marine species live in extreme ocean habitats. We will cover the deepest, hottest, coldest, and shallowest habitats and the biggest, fastest, most fecund, oldest and smallest species. We will focus on the molecular, physiological and ecological adaptations that allow species to thrive in these unusual environments.

Same as: BIOHOPK 165H

BIOHOPK 266H. Molecular Ecology. 5 Units.

(Graduate students register for 266H.) How modern technologies in gene sequencing, detection of nuclear nucleotide polymorphisms, and other approaches are used to gather data on genetic variation that allow measurement of population structure, infer demographic histories, inform conservation efforts, and advance understanding of the ecology of diverse types of organisms.

Same as: BIOHOPK 166H

BIOHOPK 267H. Nerve, Muscle, and Synapse. 5 Units.

(Graduate students register for 267H.) Fundamental aspects of membrane excitability, nerve conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: PHYSICS 23, 28, 43, or equivalent; CHEM 31, 135; calculus; or consent of instructor.

Same as: BIOHOPK 167H

BIOHOPK 272H. Marine Ecology: From Organisms to Ecosystems. 5 Units.

(Graduate students register for 272H.) This course incorporates the approaches of experimental ecology, biomechanics (ecomechanics), and physiology to develop an integrated perspective on the factors that govern the structures of marine ecosystems and how environment change, including anthropogenic influences, affects ecosystems' species composition and health. Focus is on rocky intertidal, kelp forest, estuarine, and midwater ecosystems of Monterey Bay. Experimental projects done in the field offer experience in a variety of ecological techniques and in analysis of ecological data. Students will engage in presentation and debates of current topics in marine ecology and conservation. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: Biology core or consent of instructor. Fulfills WIM in Biology.

Same as: BIOHOPK 172H

BIOHOPK 273H. Marine Conservation Biology. 4 Units.

(Graduate students register for 273H.) Introduction to the key concepts of ecology and policy relevant to marine conservation issues at the population to ecosystems level. Focus on the origin and maintenance of biodiversity and conservation applications from both the biology and policy perspectives (for example, endangered species, captive breeding, reserve design, habitat fragmentation, ecosystem restoration/rehabilitation). Also includes emerging approaches such as ecosystem based management, ocean planning, and coupled social-ecological systems. The course will include lectures, readings and discussions of primary literature, and attendance at seminars with visiting scholars. Prerequisite: introductory biology; suggested: a policy and/or introductory ecology course. Same as: BIOHOPK 173H

BIOHOPK 274. Hopkins Microbiology Course. 3-12 Units.

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents. Same as: BIO 274S, CEE 274S, EESS 253S

BIOHOPK 274H. Experimental Design and Probability. 3 Units.

(Graduate students register for 274H.) Variability is an integral part of biology. Introduction to probability and its use in designing experiments to address biological problems. Focus is on analysis of variance, when and how to use it, why it works, and how to interpret the results. Design of complex, but practical, asymmetrical experiments and environmental impact studies, and regression and analysis of covariance. Computer-based data analysis. Prerequisite: Biology core or consent of instructor. Same as: BIOHOPK 174H

BIOHOPK 275H. Synthesis in Ecology. 2 Units.

Introduction to frameworks and approaches to synthesizing large data sets, including meta-analysis and permutational multivariate analysis of variance. Hands-on data analysis sessions. May be repeated for credit.

BIOHOPK 276H. Estimates and Errors: The Theory of Scientific Measurement. 3 Units.

Measurement plays a fundamental role in science, but many biologists have no formal training in what it means to measure something. Errors are inevitable in any measurement. Which are inherent, and which can be controlled? How do errors propagate? How can you decide which data to reject? When are uncertainties normal? In this course we will work our way into the theory of measurement, covering some topics that overlap with inferential statistics (but from a new and perhaps more intuitive perspective), and extending beyond those basics to include spectral analysis and the dangers of measurement in the digital realm.

BIOHOPK 277H. Dynamics and Management of Marine Populations. 4 Units.

(Graduate students register for 277H.) Course examines the ecological factors and processes that control natural and harvested marine populations. Course emphasizes mathematical models as tools to assess the dynamics of populations and to derive projections of their demographic fate under different management scenarios. Course objectives will be met by a combination of theoretical lectures, assigned readings and class discussions, case study analysis and interactive computer sessions. Same as: BIOHOPK 177H

BIOHOPK 279H. Physiological Ecology of Marine Megafauna. 3 Units.

(Graduate students register for 279H.) The ocean is home to the largest animals of all-time. How, when, and why did gigantism evolve in different taxa? What are the consequences of large body size? This course will focus on how biological processes scale with body size, with an emphasis on oceanic megafauna including marine mammals, birds, fishes, and reptiles. In particular, the course will explore the functional mechanisms that generate the scaling relationships for physiological and ecological traits, such as metabolism, ecosystem function and body size evolution. Students will also be introduced to state-of-the-art technologies used to student marine megafauna in some of the most logistically challenging habitats on earth. Same as: BIOHOPK 179H

BIOHOPK 280. Short Course on Ocean Policy. 3 Units.

The course will introduce graduate students in the natural and social sciences to ocean policy and governance in the US at national, regional, state, and local levels. Together with leaders in ocean science and policy, students will examine pressing issues in ocean sustainability from natural science, social science, and legal and policy perspectives, with an emphasis on the role of science in the policy and governance processes. Students will learn and apply practical skills in communication, leadership and interdisciplinary problem-solving through participation in a group project, interactive discussions and simulations, and field trips. Prerequisite: consent of instructor.

BIOHOPK 280H. Air and Water. 3 Units.

(Graduate students register for 280H.) Introduction to environmental physics. The physical properties of life's fluids compared and contrasted. How and why life has evolved differently on land than in water. Topics: density, viscosity, diffusion, thermal properties, sound, light, evaporation, and surface tension. Recommended: PHYSICS 21, 23, or 51, 53; calculus; Biology core; or consent of instructor. Same as: BIOHOPK 180H

BIOHOPK 284H. Holistic Biology. 16 Units.

(Graduate students register for 284H.) For majors and non-majors. Complexity in natural systems is examined from complementary points of view, including scientific, historical, philosophical and literary. Lectures and discussions will focus on the writings of Ed Ricketts and John Steinbeck, poetry of Robinson Jeffers and on historical and contemporary works concerning marine and fresh-water systems, resource management and climate change. A group project with individual contributions will be carried out and presented at a symposium. This course will involve a significant amount of creative writing, and it satisfies the Writing in Major requirement for Biology. It is open to all majors and classes. Only 6 units may count towards the Biology major. Same as: BIOHOPK 184H

BIOHOPK 285H. Ecology and Conservation of Kelp Forest Communities. 5 Units.

(Graduate students register for 285H.) Five week course. Daily lectures, labs, and scuba dives focused on kelp forest biology. Topics include identification and natural history of resident organisms, ecological processes that maintain biodiversity and community organization, field methods, data analysis, and research diving techniques. Class projects contribute to ongoing studies associated with Hopkins Marine Life Observatory. It is recommended that students complete Stanford's Scientific Diver Training workshop, offered during spring break and the week before the course starts, although this is not a requirement. Prerequisites: consent of instructor; advanced scuba certification and scuba equipment. Same as: BIOHOPK 185H

BIOHOPK 287H. Sensory Ecology. 4 Units.

(Graduate students register for 287H.) Topics: the ways animals receive, filter, and process information gleaned from the environment, sensory receptor mechanisms, neural processing, specialization to life underwater, communication within and between species, importance of behavior to ecosystem structure and dynamics, impact of acoustic and light pollution on marine animals. Emphasis is on the current scientific literature. The laboratory portion of the class explores sensory mechanisms using neurobiological methods and methods of experimental animal behavior. Same as: BIOHOPK 187H

BIOHOPK 289H. Sustainability and Marine Ecosystems. 3 Units.

(Graduate students register for 289H.) The health of marine ecosystems is in decline due to overfishing, pollution, habitat damage, invasive species, and climate change. Because human communities are tightly coupled to coastal marine resources, understanding pathways to sustainability require understanding as much about humans as about the ocean. In this course, we explore factors that contribute to the sustainability and resilience of marine ecosystems and the human communities that depend upon them. This course is based on readings in the primary literature, discussions, and student projects.

Same as: BIOHOPK 189H

BIOHOPK 290H. Teaching of Biological Science. 1-15 Unit.

Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. Prerequisite: consent of instructor.nn (Staff).

BIOHOPK 300H. Research. 1-15 Unit.

Graduate study involving original work undertaken with staff in the fields indicated. B. Block: Comparative Vertebrate Physiology (biomechanics, metabolic physiology and phylogeny of pelagic fishes, evolution of endothermy); L. Crowder: Marine ecology, fisheries, bycatch, integrating science and policy, marine conservation; G. De Leo: Population dynamics and management, wildlife diseases, environmental policies and sustainable development; M. Denny: Biomechanics (the mechanical properties of biological materials and their consequences for animal size, shape, and performance); W. Gilly: Neurobiology (analysis of giant axon systems in marine invertebrates from molecular to behavioral levels); J. Goldbogen: Physiological and Behavioral Ecology (functional morphology and biomechanics of marine organisms); C. Lowe: Evolution of Development (origin of chordates, early evolution of body plans); F. Micheli: Marine Ecology (species interactions and community ecology, scale-dependent aspects of community organization, marine conservation and design of multi-species marine protected areas, behavioral ecology); S. Palumbi: Molecular Evolution (mechanisms of speciation, genetic differentiations of populations, use of molecular tools in conservation biology, design of marine protected areas); S. Thompson: Neurobiology (neuronal control of behavior and mechanisms of ion permeation, signal transduction, calcium homeostasis, and neurotransmission); J. Watanabe: Marine Ecology (kelp forest ecology and invertebrate zoology).

BIOHOPK 315H. Career Development for Graduate Students. 2 Units.

The course will cover multiple skills required to succeed in graduate school and beyond, including fund raising, publishing, selecting career options, job application and negotiation, and teaching, through lectures, group discussions, and practical exercises.

BIOHOPK 320H. Physical Biology. 3 Units.

Physics, mathematics, and biology are often studied as separate subjects. In this two-week intensive course we will attempt to bring them together in a dynamic combination of lectures and hands on projects. We will draw on the diverse flora and fauna of Monterey Bay for our experimental organisms, and will take advantage of the facilities at Hopkins Marine Station to explore questions at levels ranging from molecules to ecological communities.

BIOHOPK 323H. Stanford at Sea. 16 Units.

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

Same as: BIOHOPK 182H, EARTHSSYS 323, EESS 323

BIOHOPK 801H. TGR Project. 0 Units.

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BIOHOPK 802H. TGR Dissertation. 0 Units.

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Biomedical Informatics Courses

BIOMEDIN 156. Economics of Health and Medical Care. 5 Units.

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51.

Same as: BIOMEDIN 256, ECON 126, HRP 256

BIOMEDIN 200. Biomedical Informatics Colloquium. 1 Unit.

Series of colloquia offered by program faculty, students, and occasional guest lecturers. May be repeated three times for credit.

BIOMEDIN 201. Biomedical Informatics Student Seminar. 1 Unit.

Participants report on recent articles from the Biomedical Informatics literature or their research projects. Goals are to teach critical reading of scientific papers and presentation skills. May be repeated three times for credit.

BIOMEDIN 205. Precision Practice with Big Data. 1 Unit.

Primarily for M.D. students; open to other graduate students. Provides an overview of how to leverage large amounts of clinical, molecular, and imaging data within hospitals and in cyberspace--big data--to practice medicine more effectively. Lectures by physicians, researchers, and industry leaders survey how the major methods of informatics can help physicians leverage big data to profile disease, to personalize treatment to patients, to predict treatment response, to discover new knowledge, and to challenge established medical dogma and the current paradigm of clinical decision-making based solely on published knowledge and individual physician experience. May be repeated for credit. Prerequisite: background in biomedicine. Background in computer science can be helpful but not required.

BIOMEDIN 206. Informatics in Industry. 1 Unit.

Effective management, modeling, acquisition, and mining of biomedical information in healthcare and biotechnology companies and approaches to information management adopted by companies in this ecosystem. Guest speakers from pharmaceutical/biotechnology companies, clinics/hospitals, health communities/portals, instrumentation/software vendors. May be repeated for credit.

BIOMEDIN 207. Smart Health through Digital Medicine. 1 Unit.

The widespread use of Health IT, such as electronic health records, and of health applications on the part of patients and consumers, will radically alter the practice of medicine in the coming decades. This seminar, comprised of guest lectures from healthcare professionals in industry and academia, will highlight the practical challenges and successes of health IT design and transformed care delivery programs. The goal of the course is to provide an understanding of how technology designs can advance the delivery and quality of healthcare. In addition to attending lectures, students will be asked to think through a health IT solution to a care delivery problem in a short report.

BIOMEDIN 208. Clinical Informatics Literature Review Seminar. 1 Unit.

Focus is on reading and discussing seminal papers in clinical and health informatics. Topics include biomedical informatics methods, systems design, implementation and evaluation. Limited enrollment.

BIOMEDIN 210. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving. 3 Units.

Methods for modeling biomedical systems and for making those models explicit in the context of building software systems. Emphasis is on intelligent systems for decision support and Semantic Web applications. Topics: knowledge representation, controlled terminologies, ontologies, reusable problem solvers, and knowledge acquisition. Recommended: exposure to object-oriented systems, basic biology.

Same as: CS 270

BIOMEDIN 212. Introduction to Biomedical Informatics Research Methodology. 3 Units.

Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Because the team projects start in the first week of class, attendance that week is strongly recommended. Prerequisites: BIOMEDIN 210 or 211 or 214 or 217 or consent of instructor.

Same as: BIOE 212, CS 272, GENE 212

BIOMEDIN 214. Representations and Algorithms for Computational Molecular Biology. 3-4 Units.

Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units.

Same as: BIOE 214, CS 274, GENE 214

BIOMEDIN 215. Data Driven Medicine. 3 Units.

With the spread of electronic health records and increasingly low cost assays for patient molecular data, powerful data repositories with tremendous potential for biomedical research, clinical care and personalized medicine are being built. But these databases are large and difficult for any one specialist to analyze. To find the hidden associations within the full set of data, we introduce methods for data-mining at the internet scale, the handling of large-scale electronic medical records data for machine learning, methods in natural language processing and text-mining applied to medical records, methods for using ontologies for the annotation and indexing of unstructured content as well as semantic web technologies. Prerequisites: CS 106A; familiarity with statistics (STATS 202) and biology. Recommended: one of CS 246 (previously CS 345A), STATS 305, or CS 229.

BIOMEDIN 216. Representations and Algorithms for Molecular Biology: Lectures. 1-2 Unit.

Lecture component of BIOMEDIN 214. One unit for medical and graduate students who attend lectures only; may be taken for 2 units with participation in limited assignments and final project. Lectures also available via internet. Prerequisite: familiarity with biology recommended.

BIOMEDIN 217. Translational Bioinformatics. 4 Units.

Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine using bioinformatics. Case studies. Prerequisites: programming ability at the level of CS 106A and familiarity with statistics and biology.

Same as: CS 275

BIOMEDIN 218. Translational Bioinformatics Lectures. 2 Units.

Same content as BIOMEDIN 217; for medical and graduate students who attend lectures and participate in limited assignments and final project. Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine using bioinformatics. Case studies. Prerequisites: programming at the level of CS 106A; familiarity with statistics and biology.

BIOMEDIN 219. Mathematical Models and Medical Decisions. 2 Units.

Analytic methods for determining the optimal diagnostic and therapeutic decisions for the care of individual patients and for the design of policies affecting the care of patient populations. Topics: utility theory and probability modeling, empirical methods for estimating disease prevalence, probability models for periodic processes, binary decision-making techniques, Markov models of dynamic disease state problems, utility assessment techniques, parametric utility models, utility models for multidimensional outcomes, analysis of time-varying clinical outcomes, and the design of cost-constrained clinical policies. Extensive problem sets compliment course materials. Prerequisites: introduction to calculus and basic statistics.

BIOMEDIN 224. Principles of Pharmacogenomics. 3 Units.

Introduction to the relevant pharmacology, genomics, experimental methods for high-throughput measurements (sequencing, expression, genotyping), analysis methods for GWAS, cheminformatics, and natural language processing. Review of key gene classes (cytochromes, transporters, GPCRs), key drugs for which genetics is critical (warfarin, clopidogrel, statins, NSAIDs, neuropsychiatric drugs and cancer drugs). Also reviews resources for pharmacogenomics (PharmGKB, Drugbank, CMAP, and others) as well as issues in doing clinical implementation of pharmacogenomics testing. Reading of key papers, including student presentations of this work. Problem sets; final project selected with approval of instructor. Prerequisites: two of BIO 41, BIO 42, BIO 43, BIO 44X, BIO 44Y or consent of instructor.

Same as: GENE 224

BIOMEDIN 225. Data Driven Medicine: Lectures. 2 Units.

With the spread of electronic health records and increasingly low cost assays for patient molecular data, powerful data repositories with tremendous potential for biomedical research, clinical care and personalized medicine are being built. But these databases are large and difficult for any one specialist to analyze. To find the hidden associations within the full set of data, we introduce methods for data-mining at the internet scale, the handling of large-scale electronic medical records data for machine learning, methods in natural language processing and text-mining applied to medical records, methods for using ontologies for the annotation and indexing of unstructured content as well as semantic web technologies. Prerequisites: familiarity with statistics (STATS 202) and biology.

BIOMEDIN 231. Computational Molecular Biology. 3 Units.

Practical, hands-on approach to field of computational molecular biology. Recommended for molecular biologists and computer scientists desiring to understand the major issues concerning analysis of genomes, sequences and structures. Various existing methods critically described and strengths and limitations of each. Practical assignments utilizing tools described. Prerequisite: BIO 41 or consent of instructor. All homework and coursework submitted electronically. Course webpage: <http://biochem218.stanford.edu/>.

BIOMEDIN 233. Intermediate Biostatistics: Analysis of Discrete Data. 3 Units.

Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference. Same as: HRP 261, STATS 261

BIOMEDIN 245. Statistical and Machine Learning Methods for Genomics. 3 Units.

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets. Same as: BIO 268, CS 373, GENE 245, STATS 345

BIOMEDIN 251. Outcomes Analysis. 4 Units.

Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics. Same as: HRP 252, MED 252

BIOMEDIN 256. Economics of Health and Medical Care. 5 Units.

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51.

Same as: BIOMEDIN 156, ECON 126, HRP 256

BIOMEDIN 258. Genomics, Bioinformatics and Medicine. 3 Units.

Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIOC 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>. Same as: BIOC 158, BIOC 258, HUMBIO 158G

BIOMEDIN 260. Computational Methods for Biomedical Image Analysis and Interpretation. 3-4 Units.

The latest biological and medical imaging modalities and their applications in research and medicine. Focus is on computational analytic and interpretive approaches to optimize extraction and use of biological and clinical imaging data for diagnostic and therapeutic translational medical applications. Topics include major image databases, fundamental methods in image processing and quantitative extraction of image features, structured recording of image information including semantic features and ontologies, indexing, search and content-based image retrieval. Case studies include linking image data to genomic, phenotypic and clinical data, developing representations of image phenotypes for use in medical decision support and research applications and the role that biomedical imaging informatics plays in new questions in biomedical science. Includes a project. Enrollment for 3 units with reduced project requirements requires instructor consent. Prerequisites: programming ability at the level of CS 106A, familiarity with statistics, basic biology. Knowledge of Matlab highly recommended. Same as: RAD 260

BIOMEDIN 262. Computational Genomics. 3 Units.

Applications of computer science to genomics, and concepts in genomics from a computer science point of view. Topics: dynamic programming, sequence alignments, hidden Markov models, Gibbs sampling, and probabilistic context-free grammars. Applications of these tools to sequence analysis: comparative genomics, DNA sequencing and assembly, genomic annotation of repeats, genes, and regulatory sequences, microarrays and gene expression, phylogeny and molecular evolution, and RNA structure. Prerequisites: 161 or familiarity with basic algorithmic concepts. Recommended: basic knowledge of genetics. Same as: CS 262

BIOMEDIN 273A. A Computational Tour of the Human Genome. 3 Units.

Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing (technologies, assembly, personalized sequencing); functional landscape (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures from genomic researchers. No prerequisites. See <http://cs273a.stanford.edu/>. Same as: CS 273A, DBIO 273A

BIOMEDIN 290. Biomedical Informatics Teaching Methods. 1-6 Unit.

Hands-on training in biomedical informatics pedagogy. Practical experience in pedagogical approaches, variously including didactic, inquiry, project, team, case, field, and/or problem-based approaches. Students create course content, including lectures, exercises, and assessments, and evaluate learning activities and outcomes. Prerequisite: instructor consent.

BIOMEDIN 299. Directed Reading and Research. 1-18 Unit.

For students wishing to receive credit for directed reading or research time. Prerequisite: consent of instructor. (Staff).

BIOMEDIN 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

BIOMEDIN 374. Algorithms in Biology. 2-3 Units.

Algorithms and computational models applied to molecular biology and genetics. Topics vary annually. Possible topics include biological sequence comparison, annotation of genes and other functional elements, molecular evolution, genome rearrangements, microarrays and gene regulation, protein folding and classification, molecular docking, RNA secondary structure, DNA computing, and self-assembly. May be repeated for credit. Prerequisites: 161, 262 or 274, or BIOCHEM 218, or equivalents. Same as: CS 374

BIOMEDIN 390A. Curricular Practical Training. 1 Unit.

Provides educational opportunities in biomedical informatics research. Qualified biomedical informatics students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-up on projects they expect to perform. BIOMEDIN 390A, B, and C may each be taken only once.

BIOMEDIN 390B. Curricular Practical Training. 1 Unit.

Provides educational opportunities in biomedical informatics research. Qualified biomedical informatics students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-up on projects they expect to perform. BIOMEDIN 390A, B, and C may each be taken only once.

BIOMEDIN 390C. Curricular Practical Training. 1 Unit.

Provides educational opportunities in biomedical informatics research. Qualified biomedical informatics students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-up on projects they expect to perform. BIOMEDIN 390A, B, and C may each be taken only once.

BIOMEDIN 432. Analysis of Costs, Risks, and Benefits of Health Care. 4 Units.

(Same as MGTECON 332) For graduate students. How to do cost/benefit analysis when the output is difficult or impossible to measure. How do M.B.A. analytic tools apply in health services? Literature on the principles of cost/benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application. Same as: HRP 392

BIOMEDIN 801. TGR Master's Project. 0 Units.

Project credit for masters students who have completed all course requirements and minimum of 45 Stanford units.

BIOMEDIN 802. TGR PhD Dissertation. 0 Units.

Biophysics Courses

BIOPHYS 227. Functional MRI Methods. 3 Units.

Basics of functional magnetic resonance neuroimaging, including data acquisition, analysis, and experimental design. Journal club sections. Cognitive neuroscience and clinical applications. Prerequisites: basic physics, mathematics; neuroscience recommended. Same as: RAD 227

BIOPHYS 228. Computational Structural Biology. 3 Units.

Interatomic forces and interactions such as electrostatics and hydrophobicity, and protein structure in terms of amino acid properties, local chain conformation, secondary structure, domains, and families of folds. How protein motion can be simulated. Bioinformatics introduced in terms of methods that compare proteins via their amino acid sequences and their three-dimensional structures. Structure prediction via simple comparative modeling. How to detect and model remote homologues. Predicting the structure of a protein from knowledge of its amino acid sequence. Via Internet. Same as: SBIO 228

BIOPHYS 232. Advanced Imaging Lab in Biophysics. 4 Units.

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor. Same as: APPPHYS 232, BIO 132, BIO 232, GENE 232

BIOPHYS 241. Biological Macromolecules. 3-5 Units.

The physical and chemical basis of macromolecular function. Topics include: forces that stabilize macromolecular structure and their complexes; thermodynamics and statistical mechanics of macromolecular folding, binding, and allostery; diffusional processes; kinetics of enzymatic processes; the relationship of these principles to practical application in experimental design and interpretation. The class emphasizes interactive learning, and is divided equally among lectures, in-class group problem solving, and discussion of current and classical literature. Enrollment limited to 50. Prerequisites: Background in biochemistry and physical chemistry recommended but material available for those with deficiency in these areas; undergraduates with consent of instructor only. Same as: BIOC 241, GENE 241, SBIO 241

BIOPHYS 242. Methods in Molecular Biophysics. 3 Units.

Experimental methods in molecular biophysics from theoretical and practical standpoints. Emphasis is on X-ray diffraction, nuclear magnetic resonance, and fluorescence spectroscopy. Prerequisite: physical chemistry or consent of instructor. Same as: SBIO 242

BIOPHYS 250. Seminar in Biophysics. 1 Unit.

Required of Biophysics graduate students. Presentation of current research projects and results by faculty in the Biophysics program. May be repeated for credit.

BIOPHYS 297. Bio-Inorganic Chemistry. 3 Units.

Overview of metal sites in biology. Metalloproteins as elaborated inorganic complexes, their basic coordination chemistry and bonding, unique features of the protein ligand, and the physical methods used to study active sites. Active site structures are correlated with function. Prerequisites: 153 and 173, or equivalents. Same as: CHEM 297

BIOPHYS 300. Graduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

BIOPHYS 311. Biophysics of Multi-cellular Systems and Amorphous Computing. 2-3 Units.

Provides an interdisciplinary perspective on the design, emergent behavior, and functionality of multi-cellular biological systems such as embryos, biofilms, and artificial tissues and their conceptual relationship to amorphous computers. Students discuss relevant literature and introduced to and apply pertinent mathematical and biophysical modeling approaches to various aspect multi-cellular systems, furthermore carry out real biology experiments over the web. Specific topics include: (Morphogen) gradients; reaction-diffusion systems (Turing patterns); visco-elastic aspects and forces in tissues; morphogenesis; coordinated gene expression, genetic oscillators and synchrony; genetic networks; self-organization, noise, robustness, and evolvability; game theory; emergent behavior; criticality; symmetries; scaling; fractals; agent based modeling. The course is geared towards a broadly interested graduate and advanced undergraduates audience such as from bio / applied physics, computer science, developmental and systems biology, and bio / tissue / mechanical / electrical engineering. Prerequisites: Previous knowledge in one programming language - ideally Matlab - is recommended; undergraduate students benefit from BIOE 41, BIOE 42, or equivalent. Same as: BIOE 211, BIOE 311, DBIO 211

BIOPHYS 399. Directed Reading in Biophysics. 1-18 Unit.

Prerequisite: consent of instructor.

BIOPHYS 801. TGR Project. 0 Units.

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BIOPHYS 802. TGR Dissertation. 0 Units.

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Biosciences Interdisciplinary Courses

BIOS 200. Foundations in Experimental Biology. 6 Units.

This course is divided into three 3-week cycles and is focused on the broad themes of Evolution, Energy and Information. During each cycle, students work in small teams and will be coached by faculty to develop an original research project and compose a brief written proposal explaining the research. Skills emphasized include: 1) reading for breadth and depth; 2) developing compelling, creative arguments; 3) communicating with the spoken and written word; 4) working in teams. Peer assessment and workshops; substantial face-to-face discussion with faculty drawn from across the Biosciences programs.

BIOS 201. Next Generation Sequencing and Applications. 2 Units.

Usher in the golden age of biological discovery with next generation sequencing (NGS) through its wide spectrum of applications. Modules include general introduction of Next Generation Sequencing (NGS) technologies, applications of these sequencing technologies, caveats and comparisons with previous approaches, analysis and interpretation of sequencing data, principles of tools and resources and practical ways to utilize them, and features and pitfalls. Prerequisite: background in molecular biology.

BIOS 202. Hippocampal Field Potentials, an Introduction to CNS in Vitro Electrophysiology. 1-3 Unit.

Enrollment limited to graduate students in the School of Medicine; undergraduates may enroll with instructor consent. Introduces students to theory and practice of in vitro CNS electrophysiology. Lectures cover basic electrical and electrode theory, hippocampal anatomy, interpretation of these potentials, common pitfalls and misinterpretations, design of experiments using field potentials and other related topics. Practicum is hands on training in obtaining, recording and interpreting field potentials from in vitro hippocampal slices. Students develop skills in data collection, analysis and evaluation, art and design of electrophysiological studies of the brain.

BIOS 203. Introduction to Atomistic Simulations for Biochemical Applications. 3 Units.

Theory and application of atomistic simulations needed to model and understand systems of biological relevance (proteins, DNA, small molecule therapeutic drug properties) for beginners. Topics: molecular interactions and classical force fields, first principles energy approaches, molecular dynamics, rare event and transition-state finding techniques, protein folding, and solvation methods. Hands-on tutorials based on key topics in biochemical simulation that use variety of state-of-the-art software packages on both standard and new, advanced graphical processing unit hardware for simulation and analysis of biochemical properties. Prerequisites: Some knowledge of quantum mechanics, biochemistry, and shell scripting (BASH or python) preferred.

BIOS 204. Practical Tutorial on the Modeling of Signal Transduction Motifs. 2 Units.

Basics of ordinary differential equation modeling of signal transduction motifs, small circuits of regulatory proteins and genes that serve as building blocks of complex regulatory circuits. Morning session covers numerical modeling experiments. Afternoon session explores theory underpinning that day's modeling session. Modeling done using Mathematica, Standard Edition provided to enrolled students.

BIOS 205. Introductory Data Analysis in R for Biomedical Students. 1 Unit.

Topics include: basics of R (widely used, open-source programming and data analysis environment) programming language and data structures, reading/writing files, graphics tools for figure generation, basic statistical and regression operations, survey of relevant R library packages. Interactive format combining lectures and computer lab. For course and enrollment information, see <http://bios205.stanford.edu>.

BIOS 206. Stem Cells and Regeneration: Transitioning from Basic Research to Clinical Therapies. 1-2 Unit.

Presents emerging therapies based on stem cell by the scientists leading these pioneering efforts, including academic and industry-based groups. Provides hands-on instruction in laboratory methods valuable in development of stem cell therapies.

BIOS 207. Interdisciplinary Approaches to Biochemistry: Single Molecule Biophysics to Clinical Outcomes. 1 Unit.

Interdisciplinary analysis from basic biochemistry and biophysics to clinical outcomes of disease states and potential therapeutic interventions. Focus on cardiac system. Single molecule biophysics and classical enzyme kinetics and use of induced pluripotent stem (iPS) cells and single cell studies lay foundation for discussions of effects of cardiomyopathy mutations on heart function. Analytical approaches discussed include genetic analysis, reconstitution of functional assemblies, x-ray diffraction, 3D reconstruction of electron microscope images, spectroscopic methods, computational approaches, single molecule biophysics, use of induced pluripotent stem cells in research.

BIOS 208. Computational Macromolecule Structure Modeling. 2 Units.

Concepts, workflow, and methodology of protein structure modeling presented through short lectures followed by hands-on exercises with the Rosetta software package. Several problem types demonstrate how to formulate and test well-defined hypotheses, in addition to the design and engineering of structure, function, and interactions.

BIOS 209. Practical Protein NMR Structure Determination. 2 Units.

Work toward solving a high-resolution 3D structure from unprocessed NMR data acquired on a small well-characterized protein. Short lectures followed by hands-on computer exercises demonstrate best practices for data processing, spectra interpretation, and structure calculation with attention to troubleshooting and validation methods. Students should be familiar with fundamental concepts of protein structure and NMR spectroscopy and comfortable with the command-line environment. Prerequisite: SBIO242/BIOPHYS 242 strongly recommended, but not required.

BIOS 210. Axonal Transport and Neurodegenerative Diseases. 1-2 Unit.

Introduction to mechanisms underlying axonal transport, significance of proper regulation in maintaining neuronal activities, and its implication in disease pathology. Lab section: visualize axonal transport of various axonal organelles such as mitochondria, synaptic vesicles and dense core vesicles in live cells and tissues.

BIOS 211. Histology for Biosciences. 1 Unit.

Fundamentals of tissue organization as seen by light microscopy. Includes: epithelium, connective tissue, muscle, bone, cartilage, blood cells, nerve, and quick overview of several major organs. Each session has interactive 30 min presentation followed by 1.5 hours viewing glass histology slides using individual microscopes and a multi-shy;headed microscope. Slide sessions interspersed with interactive exercises to stimulate discussions. Supporting materials include select readings from histology atlas, electron micrographs, and virtual (whole-slide) images provided online.

BIOS 212. Plant Genetics: Large Scale Experiments and Clonal Analysis. 2 Units.

Using sectored dahlia flowers student teams perform clonal analysis of petals. Brief lectures introduce key topics and dahlia biology (http://www.stanford.edu/group/dahlia_genetics/). Discussion topics: papers on clonal analysis and specification of floral parts in advanced and primitive Angiosperms, theory and best practices for structuring maize crosses in transposon tagging, allelism with 20 loci, and bulk segregant and fine mapping. Genes likely contributing to petal form and pigmentation nominated from RNA-Seq data and qRT-PCR validated. Genetic screen of ~105 plants to find tagged male-sterile alleles and puton validation performed. Prerequisite: graduate Genetics course.

BIOS 213. Scientific Illustration and Animation. 1 Unit.

Techniques of presenting big picture ideas and detailed experiments as simple cartoons. Mixed lecture/lab course culminates with students producing figures and animations for an introduction/conclusion of a research presentation. Covers basic design principles to help produce figures useful for broad and focused audiences. Includes static illustrations, Flash style, and stop motion animation.

BIOS 214. Molecules & Math. 1 Unit.

Introduction to molecular systems and their behavior as well as fundamental mathematical and computational tools for modeling molecular systems. Application of tools to critical medical areas: modeling of cardiovascular physiology; simulation of protein interactions; modeling of cellular differentiation; extraction of useful information from anatomic, functional and molecular images. Weekly lectures, group discussions, and individual project work.

BIOS 215. Transplantation Immunology and Tolerance. 2 Units.

Extensive literature review of experimental strategies to promote tolerance, including limitations involved in translating tolerance-promoting strategies to the clinic and targets of Immunosuppression. State of art approaches and limitations of current approaches. Discussions with prominent scientists and clinicians in field of transplantation. Student presentations on novel concepts and approaches in basic science, translational and clinical transplant.

BIOS 216. Structural Biology and Vaccine Design. 1 Unit.

Structural biology is playing an increasing role in the development and analysis of vaccines and deepening understanding of challenging vaccine targets. Structural studies of target antigens have allowed mapping of neutralizing antibody epitopes and antigenic variation. Studies of antibody:antigen complexes have clarified how rare antibodies can confer broad neutralization to highly variant viruses, such as influenza virus and HIV. Course explores current structure-based efforts to improve vaccines to highly potent neutralizing epitopes, utilizing protein fragments, carbohydrate engineering and epitope scaffolding. Research from current literature on viruses including HIV, influenza virus, RSV and others examined.

BIOS 217. The Ultimate Face Book: Understanding Normal and Abnormal Craniofacial Development. 1 Unit.

How the face is assembled during embryonic development to gain insights into facial birth defects and new "regenerative medicine" approaches to reconstruct the face following disease or injury. Learn how "a man finds room in the few square inches of the face for the traits of all his ancestors; for the expression of all his history, and his wants."

BIOS 218. Molecular basis of membrane traffic. 2 Units.

Transport of proteins through the secretory and endocytic pathways is essential for life; dysregulation causes disease and pathogens hijack these pathways to their best advantage. 5 international experts present didactic lectures and engage with students. Topics include: history of genetic and biochemical experiments to identify key components; reconstitution approaches; coated vesicle formation and cargo selection; control of membrane traffic by Rab GTPases; siRNA screens; high throughput microscopy analysis and systems biology approaches. Students devise and present research proposals based on the research of the guest speakers.

BIOS 219. Human Gene Regulation: Genomic Thinking and Genomic Tools for Experimentalists. 1 Unit.

Focused look at the promoter/enhancer and related landscape of the human genome. Genomics and epigenomics of human gene regulation - truth, myths and mysteries. Genomic tools for the interpretation of vertebrate gene regulation experiments and predictions, and the insights behind them. Genomic thinking: purity vs. comprehensiveness, genome-wide vs. single locus. Prerequisites: undergraduate Biology or equivalent. Programming skills not required or taught.

BIOS 220. Adventures in the Human Virophere. 3 Units.

Structure and function of viruses focusing on viruses that infect humans. Explore the interaction of humans and viruses from diverse perspectives: historical, cultural, political, demographic, organismal, molecular biological, biochemical, immunological, taxonomic. Emphasis on general principles of biology and matters of decision-making and policy. Selected case studies illustrate course material. Full-time immersive format of lectures, discussions, videos and model building. Recommended for non-virology students.

BIOS 221. Modern Statistics for Modern Biology. 3 Units.

Application based course in nonparametric statistics. Modern toolbox of visualization and statistical methods for the analysis of data, examples drawn from immunology, microbiology, cancer research and ecology. Methods covered include multivariate methods (PCA and extensions), sparse representations (trees, networks, contingency tables) as well as nonparametric testing (Bootstrap, permutation and Monte Carlo methods). Hands on, use R and cover many Bioconductor packages. Prerequisite: Minimal familiarity with computers. Instructor consent. Same as: STATS 366

BIOS 222. Authentic Courage for Constructive Change: Skills and Practice for Leadership. 1 Unit.

Explores concepts in decision making and constructive conflict as a mechanism for desired change via purposeful actions. Students assess personal conflict comfort zones and use case studies and class activities to develop skills with authenticity, active and intentional decision making, and other related topics.

BIOS 223. Introduction to Quantitative Reasoning in Biology. 1 Unit.

Mini-course. Focus on development of basic skills for quantitative reasoning in biology, including order-of-magnitude estimation and use of the broad spectrum of time scales to enable understanding. Primary examples include going from molecular size and energy scales to functions of single cells and going from mutational and selective processes acting on organisms to evolution of populations on laboratory global scales.

BIOS 224. Big Topics in Stem Cell Ethics. 2 Units.

Mini-course. Focuses on framing the major ethical issues, legal issues, normative ethical guidelines and oversight in stem cell research. Includes discussion of religious and ethical debates around the moral status of the human embryo.

BIOS 225. Gender in Science. 1 Unit.

Introduction to the social science literature on factors contributing to gender disparities in the scientific workplace (e.g. implicit bias and stereotype threat). Discussions focus on steps that individuals and institutions can take to promote the advancement of women and other underrepresented groups in science, and thus promote the advancement of science.

BIOS 226. Introduction to Force Spectroscopy. 1 Unit.

Mini-course. Covers the fundamentals of major single-molecule manipulation methods (optical tweezers, magnetic tweezers, and atomic force microscopy), principles of force measurement signal and noise, and applications to studies of folding, binding, measurement signal and noise, and applications to studies of folding, binding, polymer elasticity, and structural transitions in proteins and nucleic acids. Intended for students with no previous exposure to single-molecule manipulation or for beginning practitioners. Lectures and discussion of current literature.

BIOS 227. Mass Spectrometry and Proteomics: Opening the Black Box. 2 Units.

Focus on designing and analyzing effective proteomics experiments using mass spectrometry and critically evaluating published mass spectrometry-based studies and datasets. Introduces students to the instrumentation, experimental strategies, and computational methods used for identifying and quantifying proteins and protein post-translational modifications using mass spectrometry. Topics include comparative evaluation of mass spectrometer instrument configurations, tandem mass spectrum interpretation, relative and absolute quantitation, and proteome-scale data set analysis. Laboratory time will focus on sample preparation methods, real-time data acquisition, and data analysis software and techniques.

BIOS 228. Understanding Chemistry in Biology and Biological Experiments. 2 Units.

Chemical transformations are central to biology and function and chemical methods provide some of the most powerful tools for everyday experimental biology. Focuses on the concepts and principles underlying biological chemical transformations, allowing students to generalize and understand cell metabolism and regulation. Topics include basic principles and procedures to evaluate and utilize in practice chemical approaches in biological experiments. In-class problems and evaluation of literature. Three-week mini-course.

BIOS 229. Drug Discovery and Development Project Simulation. 2 Units.

Two-day short course. Focus is on the progression of a drug discovery project from target identification through pre-clinical research, early and late clinical development, and registration with the health authorities. Presented by Novartis. Enrollment limited to postdoctoral students and graduate students with research experience.

BIOS 230. Biomedical Data Analysis in MATLAB. 2 Units.

Focuses on empowering biomedical scientists and engineers with MATLAB tools that are directly useful in their research. Topics include linear- and non-linear-parameter estimation, ordinary- and partial-differential equations, Simulink, GUI design and image processing. Weekly hands-on tutorials accompany lectures and help students code more efficiently and elegantly. Weekly problems sets use MATLAB to interrogate a biomedical phenomenon. Pre-requisites: permission of instructor required.

BIOS 231. Neuroimaging Genomics. 3 Units.

Preference to graduate students and medical students. Emphasis is on introducing students to the field of neuroimaging genomics, characterizing large-scale genomic and imaging datasets to uncover relationships between imaging features, molecular genomic profiles, and phenotype.

BIOS 232. Two-photon Imaging of Neural Circuits. 2 Units.

Focuses on application of two-photon imaging to modern neuroscience. Topics include microscopy and imaging.

BIOS 233. Experimental Metagenomics: Nectar Microbes as a Model System. 3 Units.

Preference to graduate students and post-docs; open to upper-level undergraduates with instructor consent. Emphasis on developing a practical understanding of how to conduct metagenomic research by combining cutting-edge molecular sequencing with experimental ecological approaches. Focuses on the community ecology of the bacterial and yeast species that colonize floral nectar via pollinators and the implications for plant-pollinator interactions within an agriculturally relevant framework. Ecological, evolutionary, and phylogenetic principles and microbiological and molecular techniques that will be taught are broadly applicable in many biological fields, including the medical ecology of the human microbiome. Inquiry-based with individual student-led projects.

BIOS 234. Personalized Genomic Medicine. 1 Unit.

Focuses on next-generation sequencing and its implications for personalized genomic medicine. Students gain hands-on experience with popular DNA sequence analysis tools as well as a practical understanding of the underlying algorithms and biomedicine.

BIOS 235. Metabolism and Metabolic Ecology: Microbes, Gut and Cancer. 2 Units.

Preference to graduate students. Focuses on modern aspects of metabolism and metabolic biochemistry as it affects fitness and ecology of cells and organisms on a systems level. Students obtain a broad understanding of the governing principles and logic of metabolic pathways and their networks as well as an intuition of metabolism in context of natural selection and fitness acting on the cell or host. Emphasis is primarily on microorganisms and their habitats in nature and the human gut, but topics also include metabolism of cancer cells and of engineered microbes.

BIOS 236. Developmental Biology in the Ocean: Comparative Embryology and Larval Development. 4 Units.

Three-week course at Hopkins Marine Station. Focuses on the embryology and larval development of a broad range of marine invertebrate phyla. The goal of the course is to give students an appreciation of the range of developmental strategies and larval forms in the ocean and why this is critical for constructing hypotheses of EvoDevo and animal evolution. Includes observation and documentation of the development of embryos and larvae by scientific illustration and photo/video microscopy. Pre-requisite: Developmental Biology coursework and instructor consent.

BIOS 237. Investigating Biology with Fluorescent Proteins. 1 Unit.

Focuses on fluorescent proteins, a proven research tool for imaging a wide range of biological phenomena and continuously uncover exciting discoveries in many areas. Students gain practical expertise in concepts, methodology, and data analysis through lectures, literature discussion, and hands-on computer exercises with "real world" data.

BIOS 238. Quantitative single cell analysis of live cell images. 1 Unit.

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BIOS 239. Synapse Development. 3 Units.

Focuses on the mechanisms of synapse development, including the role of adhesion molecules in establishing neuronal contacts, the function of synapse-inducing molecules, how pre- and postsynaptic material is transported to nascent synapses, synapse maturation, synapse elimination as well as how synaptic dysfunction may lead to neurological disorders. Readings from primary literature.

BIOS 240. Cellular Metabolism: An Emerging Hallmark of Cancer and Aging. 1 Unit.

Introduction to cellular metabolism, including changes in metabolic flux that drive diverse disease states from cancer to aging. Topics covered include cancer metabolism, cellular nutrient sensing, metabolism in aging, and the influence of metabolism on stem cell fate. This course uses discussion of recent advances in the field to place an emphasis on practical applications, including the integration of metabolomics into the era of iquest;Big Dataiquest;. This mini-course culminates with a lab section allowing the students to conduct an extracellular flux experiment using the Seahorse analyzer to study changes in mitochondrial respiration and glycolysis in cancer cells.

BIOS 241. Dissecting algorithms for RNA Sequencing. 2 Units.

Class focuses on a few popular and commonly used algorithms for RNA-Seq analysis. The course dissects the algorithmic assumptions, statistical methods they use to test hypotheses about RNA expression and evaluates properties such as robustness, sensitivity and specificity, highlighting some large "blind spots" in many algorithms.

BIOS 242. Writing Successful NIH Fellowships and K Awards. 2 Units.

An overview of principles and fundamentals for writing competitive NIH Kirschstein NRSA fellowships (F31, F32) and career-development awards (K). Topics include: developing specific aims and career development plans; using the review criteria to inform writing; timelines and resources. Participants develop F or K proposals through guided exercises with an emphasis on in-class peer review and focused faculty feedback.

BIOS 243. Grant Writing Academy Mini Course: Specific Aims. 1 Unit.

Concise overview of the fundamentals for writing competitive NIH Kirschstein NRSA fellowships (F31, F32) and K Awards. Topics include developing specific aims; outlining research and career development plans; and using the review criteria to inform writing. Participants develop their one-page NIH-Specific Aims document with an emphasis on in-class peer review and protected daily proposal writing. Students enroll for units in one small-group section, and also attend two mandatory lectures as noted in class schedule.

Cancer Biology Courses

CBIO 101. Cancer Biology. 4 Units.

Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor.

Same as: PATH 101

CBIO 241. Molecular, Cellular, and Genetic Basis of Cancer. 4 Units.

Core course required for first-year Cancer Biology graduate students. Focus is on key experiments and classic primary research papers in cancer biology. Letter grade required. Undergraduates require consent of course director.

CBIO 242. Scientific and Translational Basis for Clinical Cancer Therapy. 3 Units.

Required for first- and second-year medical students who wish to join the Cancer Biology Scholarly Concentration Program. Also open to advanced undergraduates with instructor consent; limited enrollment. The curriculum includes a sampling of recent biomedical research discoveries that led to the current cancer diagnosis and therapeutic treatments.

CBIO 243. Principles of Cancer Systems Biology. 3 Units.

Focus is on the study of cancer that integrates experimental and computational methods when synthesizing and testing biological hypothesis. Covers basic principles of cancer systems biology research with an emphasis on network biology and pathway analysis. Topics include reconstruction of regulatory networks from multi-omic data (gene expression, methylation, miRNA, CNV) from the Cancer Genome Atlas (TCGA), functional approaches to large scale sequencing, single cell systems analysis of the tumor microenvironment, oncogene-specific synthetic lethal interactions, signaling analysis of targeted drugs and cancer proteomics.

CBIO 260. Teaching in Cancer Biology. 1-10 Unit.

Practical experience in teaching by serving as a teaching assistant in a cancer biology course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student.

CBIO 275. Tumor Immunology. 3 Units.

Focuses on the ability of innate and adaptive immune responses to recognize and control tumor growth. Topics include: tumor antigens, tumor immunosurveillance and immunoediting, tumor immunotherapy, cancer vaccines and dendritic cell therapy. Tracks the historical developments of our understanding of modulating tumor immune response and discusses their relative significance in the light of current research findings. Prerequisite: for undergraduates, human biology or biology core. Same as: IMMUNOL 275

CBIO 280. Cancer Biology Journal Club. 1 Unit.

Required of and limited to first- and second-year graduate students in Cancer Biology. Recent papers in the literature presented by graduate students. When possible, discussion relates to and precedes cancer-related seminars at Stanford. Attendance at the relevant seminar required.

CBIO 299. Directed Reading in Cancer Biology. 1-18 Unit.

Prerequisite: consent of instructor.

CBIO 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Cancer Biology Ph.D. students must register as soon as they begin dissertation-related research work.

CBIO 801. TGR Project. 0 Units.

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CBIO 802. TGR Dissertation. 0 Units.

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Cardiothoracic Surgery Courses

CTS 199. Undergraduate Research. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

CTS 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

CTS 399. Graduate Research. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Catalan Language Courses

CATLANG 1A. Accelerated First-Year Catalan, Part 1. 5 Units.

First quarter of the two-quarter sequence. For students with knowledge of another Romance language, preferably Spanish. Emphasis is on developing beginning proficiency in interpersonal, interpretive, and presentational spheres. Prerequisite: consent of instructor.

CATLANG 2A. Accelerated First-Year Catalan, Part 2. 5 Units.

Continuation of CATLANG 1A. For students with knowledge of another Romance language, preferably Spanish. Further development of socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Completion of CATLANG 2A fulfills the University language requirement. Prerequisite: CATLANG 1A.

CATLANG 11A. Accelerated Second-Year Catalan, Part A. 4-5 Units.

Continuation of CATLANG 2A. Sequence integrating culture and language of the Catalan-speaking world. Socially and culturally appropriate forms in narrations, descriptions, and expression of ideas and opinions. Emphasis is on oral and written proficiency in formal, informal, academic, and professional contexts. Prerequisite: CATLANG 2A.

CATLANG 199. Individual Work. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

CATLANG 395. Graduate Studies in Catalan. 2-5 Units.

May be repeated for credit. Prerequisite consent of instructor.

Center for Teaching Learning Courses

CTL 53. Working Smarter. 2 Units.

Once you get into the school of your dreams, how will you be sure you can succeed there? College coursework often entails work of higher complexity, volume, and intensity than in high school settings, and students need a different set of skills in order to succeed. This class will use research-based practices to help students gain insight into effective learning strategies and will help students gain comfort with college level writing, oral presentations, reading and study skills, note-taking techniques, and time management.

CTL 120. Peer Tutor Training. 1 Unit.

Goal is to help students become effective peer tutors for course material already mastered by articulating aims; developing practical tutoring skills including strategies for drop-in sessions; observing experienced tutors; discussing reading assignments; role playing; and reflecting on experiences as a peer tutor intern. Prerequisite: consent of instructor.

CTL 165. Race, Athletics and College Achievement. 3 Units.

How does racial group membership affect academic experiences, and how do race and athletic participation intersect with collegiate life? In this class, we will explore the relationships among race, athletic status, and academic experiences, with a focus on social science data and the specific experiences of Stanford students. Readings will draw from psychology, sociology, education, and popular press. This class is a seminar format with no prerequisites.

Same as: AFRICAAM 165, CSRE 165

CTL 199. Independent Study. 1-3 Unit.

Special study under lecturer direction, usually leading to a written report or an oral presentation. Prerequisite: consent of instructor.

CTL 221. Practicum for fellows in the Stanford-SJSU Preparing Future Professors Program. 1 Unit.

Nine weekly one-hour sessions consisting of discussions of: (1) the previous week's SJSU shadowing experiences and (2) readings related to session themes.

CTL 231. Preparing for Faculty Careers. 1 Unit.

For graduate students from all disciplines who are considering a faculty career of any type and at any of a broad range of institutions. Postdoctoral fellows may audit by consent of instructor. Begins with a methodology to help determine if a faculty career is a good fit for the values, interests and abilities of each participant. Progresses to an exploration of different types of faculty roles and different institutional contexts (e.g., tenure-track vs. non-tenure-track; research-intensive vs. teaching-intensive; large vs. small; etc.). Discusses how to identify and land a faculty position. Ends with concrete tips on how to thrive in such a role. May be repeated for credit.

CTL 297. Teaching and Learning in Higher Education. 3-4 Units.

This course is co-taught by Mariatte Denman, Associate Director of the Center on Teaching and Learning. It provides POLS students with an opportunity to focus on teaching and learning along with doctoral students from many disciplines throughout the university. Students watch and interview master teachers at Stanford, prepare a syllabus module for a workshop or class they might teach, and learn a range of effective pedagogical methods. Preparing an analytic paper is an alternative for those who do not want to prepare a syllabus module. The course is open not only to POLS students who expect to work in higher education, but also to students interested in K-12 education, and they may develop a teaching module for use in those schools.

Same as: EDUC 297

CTL 299. Independent Study. 1-3 Unit.

Special study under lecturer direction, usually leading to a written report or an oral presentation. Prerequisite: consent of instructor.

CTL 312. Science and Engineering Course Design. 2-3 Units.

For students interested in an academic career and who anticipate designing science or engineering courses at the undergraduate or graduate level. Goal is to apply research on science and engineering learning to the design of effective course materials. Topics include syllabus design, course content and format decisions, assessment planning and grading, and strategies for teaching improvement.

Same as: ENGR 312

Chemical Systems Biology Courses

CSB 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

CSB 201. Chemical and Systems Biology Bootcamp. 1 Unit.

In this "boot camp" students perform hands-on original research in small groups, combining chemical biology systems-level approaches to investigate current biological problems. This year's course will investigate the function and regulation of uncharacterized genes. Students will acquire conceptual and methodological training in a wide range of modern techniques, including "omics" approaches, fluorescence microscopy, genome editing, computational approaches, and quantitative data analysis.

CSB 210. Cell Signaling. 4 Units.

The molecular mechanisms through which cells receive and respond to external signals. Emphasis is on principles of cell signaling, the systems-level properties of signal transduction modules, and experimental strategies through which cell signaling pathways are being studied. Prerequisite: working knowledge of biochemistry and genetics.

CSB 220. Chemistry of Biological Processes. 3 Units.

The principles of organic and physical chemistry as applied to biomolecules. The goal is a working knowledge of chemical principles that underlie biological processes, and chemical tools used to study and manipulate biological systems. Current topics may include chemical genetics, activity-based probes, DNA/RNA chemistry and molecular evolution, protein labeling, carbohydrate engineering, fluorescent proteins and sensors, optochemical/optogenetic methods, mass spectrometry, and genome-editing technologies. Prerequisites: organic chemistry and biochemistry, or consent of instructor.

Same as: BIOC 220

CSB 240A. A Practical Approach to Drug Discovery and Development. 3-4 Units.

Advancing a drug from discovery of a therapeutic target to human trials and commercialization. Topics include: high throughput assay development, compound screening, lead optimization, protecting intellectual property, toxicology testing, regulatory issues, assessment of clinical need, defining the market, conducting clinical trials, project management, and commercialization issues, including approach to licensing and raising capital. Maximum units are available by taking an additional contact hour.

CSB 240B. A Practical Approach to Drug Discover and Development. 3-4 Units.

(Continuation of 240A) Advancing a drug from discovery of a therapeutic target to human trials and commercialization. Topics include: high throughput assay development, compound screening, lead optimization, protecting intellectual property, toxicology testing, regulatory issues, assessment of clinical need, defining the market, conducting clinical trials, project management, and commercialization issues, including approach to licensing and raising capital. Maximum units are available by taking an additional contact hour. Prerequisite: 240A.

CSB 242. Drug Discovery and Development Seminar Series. 1 Unit.

The scientific principles and technologies involved in making the transition from a basic biological observation to the creation of a new drug emphasizing molecular and genetic issues. Prerequisite: biochemistry, chemistry, or bioengineering.

CSB 244. Drug Discovery and Development: A Case-based Approach. 2 Units.

Provides an overview of the drug discovery and development process through use of case examples--successful and unsuccessful attempts to integrate the scientific, clinical, regulatory, and commercial requirements to bring a new drug to patients. Focus on the complex array of independent tasks that must be accomplished to bring a new drug to the clinic. Specific cases discussed in a seminar format.

CSB 245. Economics of Biotechnology. 2 Units.

Focuses on translation of promising research discovery into marketed drugs and the integration of scientific method, clinical needs assessment, clinical and regulatory strategy, market analysis, economic considerations, and the influence of the healthcare economic ecosystem necessary for successful translation. Explores the economic perspectives of various stakeholders--patients, providers, payers, biotechnology and pharmaceutical companies, FDA, and financial markets--and how they influence drug development.

CSB 250. The Biology of Chromatin Templated Processes. 3 Units.

Topics include mechanisms of DNA replication; gene expressions regulation; DNA damage sensing and DNA repair; chromatin structure and function; and epigenetics and nuclear reprogramming. Prerequisite: working knowledge of molecular biology, biochemistry and genetics, or instructor consent.

CSB 260. Concepts and Applications in Chemical Biology. 3 Units.

Current topics include chemical genetics, activity-based probes, inducible protein degradation, DNA/RNA chemistry and molecular evolution, protein labeling, carbohydrate engineering, fluorescent proteins and sensors, optochemical/optogenetic methods, mass spectrometry, and genome-editing technologies.

CSB 270. Research Seminar. 1 Unit.

Guest speakers and discussion on current research in pharmacology.

CSB 271. Principles of Cell Cycle Control. 3 Units.

Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2.

Same as: BIO 171, BIO 271

CSB 299. Directed Reading in Chemical and Systems Biology. 1-18 Unit.

Prerequisite: consent of instructor.

CSB 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

CSB 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

CSB 801. TGR Project. 0 Units.

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CSB 802. TGR Dissertation. 0 Units.

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Chemical Engineering Courses

CHEMENG 10. The Chemical Engineering Profession. 1 Unit.

Open to all undergraduates. Overview of and careers in chemical engineering; opportunities to develop networks with working professionals. Panel discussions on career paths and post-graduation opportunities available. Areas include biotechnology, electronics, energy, environment, management consulting, nanotechnology, and graduate school in business, law, medicine, and engineering.

CHEMENG 12SC. An Exploration of Art Materials: The Intersection of Art and Science. 2 Units.

There is growing interest in the intersection of art and science, whether from artists adapting technology to suit their visions or from scientists and engineers seeking to explain various visual effects. To take advantage of possible creative sparks at the art/science interface, it is necessary for fuzzies and techies to have some knowledge of the language used by the other side. This interface will be explored through examining approaches used by an artist and an engineer in the context of the materials science of cultural objects. In-class lectures, hands-on studio practice, and field trips will be used to illustrate these different perspectives. At the heart of the scientific approach is the notion that a cultural object, e.g., a painting, is a physical entity comprising materials with different physical properties and different responses to environmental stresses presented by light, heat, and water. In support of this outlook, in-class lectures and discussions will focus on the basic concepts of color, optics, mechanics, composite structures, and response of the object to environmental stress, and we will visit Bay Area museums to see how artists employ such techniques. The hands-on studio experience is designed to increase students' confidence and develop their appreciation of differences in materials. It is not necessary to have any artistic training, only a willingness to experiment. The in-class studio projects will include working with line and shadow; color, binders, and mordants; global sources of pigments; substrates and writing; and material failure. Students will make one technical presentation on a topic in one of the five areas relevant to a painting: color, optics, mechanics, composites, and stress response. In addition, they will prepare one essay on the issues surrounding the intersection of art and science. Finally, they will complete a project related to one of the thematic areas covered in the hands-on studio sessions and make a final oral presentation describing their project. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

CHEMENG 20. Introduction to Chemical Engineering. 3 Units.

Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, energy, production of chemicals, materials processing, and purification. Prerequisite: CHEM 31.

Same as: ENGR 20

CHEMENG 25B. Biotechnology. 3 Units.

Biology and chemistry fundamentals, genetic engineering, cell culture, protein production, pharmaceuticals, genomics, viruses, gene therapy, evolution, immunology, antibodies, vaccines, transgenic animals, cloning, stem cells, intellectual property, governmental regulations, and ethics. Prerequisites: CHEM 31 and MATH 41 or equivalent course.

Same as: ENGR 25B

CHEMENG 25E. Energy: Chemical Transformations for Production, Storage, and Use. 3 Units.

An introduction and overview to the challenges and opportunities of energy supply and consumption. Emphasis on energy technologies where chemistry and engineering play key roles. Review of energy fundamentals along with historical energy perspectives and current energy production technologies. In depth analyses of solar thermal systems, biofuels, photovoltaics and electrochemical devices (batteries and fuel cells). Prerequisites: high school chemistry or equivalent.

Same as: ENGR 25E

CHEMENG 35N. Renewable Energy for a Sustainable World. 3 Units.

Preference to freshmen. Organized to prepare a renewable energy plan for California. Energy concepts and quantitation approaches are learned, energy needs and natural resources are assessed, and renewable energy technologies are evaluated for economic performance and environmental impact. An investment plan is developed along with implementation and research recommendations. The same concepts are then applied to Mexico as a second model system.

CHEMENG 60Q. Environmental Regulation and Policy. 3 Units.

Preference to sophomores. How environmental policy is formulated in the U.S. How and what type of scientific research is incorporated into decisions. How to determine acceptable risk, the public's right to know of chemical hazards, waste disposal and clean manufacturing, brownfield redevelopment, and new source review regulations. The proper use of science and engineering including media presentation and misrepresentation, public scientific and technical literacy, and emotional reactions. Alternative models to formulation of environmental policy. Political and economic forces, and stakeholder discussions.

CHEMENG 70Q. Masters of Disaster. 3 Units.

Preference to sophomores. For students interested in science, engineering, politics, and the law. Learn from past disasters to avoid future ones. How disasters can be tracked to failures in the design process. The roles of engineers, artisans, politicians, lawyers, and scientists in the design of products. Failure as rooted in oversight in adhering to the design process. Student teams analyze real disasters and design new products presumably free from the potential for disastrous outcomes.

CHEMENG 80Q. Art, Chemistry, and Madness: The Science of Art Materials. 3 Units.

Preference to sophomores. Chemistry of natural and synthetic pigments in five historical palettes: earth (paleolithic), classical (Egyptian, Greco-Roman), medieval European (Middle Ages), Renaissance (old masters), and synthetic (contemporary). Composite nature of paints using scanning electron microscopy images; analytical techniques used in art conservation, restoration, and determination of provenance; and inherent health hazards. Paintings as mechanical structures. Hands-on laboratory includes stretching canvas, applying gesso grounds, grinding pigments, preparing egg tempera paint, bamboo and quill pens, gilding and illumination, and papermaking.

CHEMENG 100. Chemical Process Modeling, Dynamics, and Control. 3 Units.

Mathematical methods applied to engineering problems using chemical engineering examples. The development of mathematical models to describe chemical process dynamic behavior. Analytical and computer simulation techniques for the solution of ordinary differential equations. Dynamic behavior of linear first- and second-order systems. Introduction to process control. Dynamics and stability of controlled systems. Prerequisites: CHEMENG 20 or ENGR 20; CME 102 or MATH 53.

CHEMENG 110. Equilibrium Thermodynamics. 3 Units.

Thermodynamic properties, equations of state, properties of non-ideal systems including mixtures, and phase and chemical equilibria. Prerequisite: CHEM 171 or equivalent.

CHEMENG 120A. Fluid Mechanics. 4 Units.

The flow of isothermal fluids from a momentum transport viewpoint. Continuum hypothesis, scalar and vector fields, fluid statics, non-Newtonian fluids, shell momentum balances, equations of motion and the Navier-Stokes equations, creeping and potential flow, parallel and nearly parallel flows, time-dependent parallel flows, boundary layer theory and separation, introduction to drag correlations. Prerequisites: junior in Chemical Engineering or consent of instructor; 100 and CME 102 or equivalent.

CHEMENG 120B. Energy and Mass Transport. 4 Units.

General diffusive transport, heat transport by conduction, Fourier's law, conduction in composites with analogies to electrical circuits, advection-diffusion equations, forced convection, boundary layer heat transport via forced convection in laminar flow, forced convection correlations, free convection, free convection boundary layers, free convection correlations and application to geophysical flows, melting and heat transfer at interfaces, radiation, diffusive transport of mass for dilute and non-dilute transfer, mass and heat transport analogies, mass transport with bulk chemical reaction, mass transport with interfacial chemical reaction, evaporation. Prerequisite 120A or consent of instructor.

CHEMENG 130. Separation Processes. 3 Units.

Analysis and design of equilibrium and non-equilibrium separation processes. Possible examples: distillation, liquid-liquid extraction, flash distillation, electrophoresis, centrifugation, membrane separations, chromatography, and reaction-assisted separation processes.

CHEMENG 140. Micro and Nanoscale Fabrication Engineering. 3 Units.

(Same as CHEMENG 140) Survey of fabrication and processing technologies in industrial sectors, such as semiconductor, biotechnology, and energy. Chemistry and transport of electronic and energy device fabrication. Solid state materials, electronic devices and chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, thin film deposition, plasma processing. Micro and nanopatterning involving photolithography, unconventional soft lithography and self assembly. Recommended: CHEM 33, 171, and PHYSICS 55. Same as: CHEMENG 240

CHEMENG 142. Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations. 3 Units.

(Formerly 124/224) Introduction to heterogeneous catalysis, including models of surface reactivity, surface equilibria, kinetics of surface reactions, electronic and geometrical effects in heterogeneous catalysis, trends in reactivity, catalyst structure and composition, electro-catalysis and photocatalysis. Selected applications and challenges in energy transformations will be discussed. Prerequisites: CHEM 31AB or 31X, CHEM 171, CHEM 175 or CHEMENG 170 or equivalents. Recommended: CHEM 173. Same as: CHEMENG 242

CHEMENG 150. Biochemical Engineering. 3 Units.

Systems-level combination of chemical engineering concepts with biological principles. The production of protein pharmaceuticals as a paradigm to explore quantitative biochemistry and cellular physiology, the elemental stoichiometry of metabolism, recombinant DNA technology, synthetic biology and metabolic engineering, fermentation development and control, product isolation and purification, protein folding and formulation, and biobusiness and regulatory issues. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41 or equivalent.

CHEMENG 160. Polymer Science and Engineering. 3 Units.

Interrelationships among molecular structure, morphology, and mechanical behavior of polymers. Topics include amorphous and semicrystalline polymers, glass transitions, rubber elasticity, linear viscoelasticity, and rheology. Applications of polymers in biomedical devices and microelectronics. Prerequisites: CHEM 31 A,B or CHEM 31X, CHEM 33 and 171, or equivalent.

Same as: CHEMENG 260

CHEMENG 162. Polymers for Clean Energy and Water. 3 Units.

The first five weeks of this course will be devoted to the fundamental aspects of polymers necessary to understand the applications in energy and the environment. These include: polymer chain configuration, morphology of semi-crystalline and amorphous solids, thermal transition behavior, thermodynamics of polymer blends and block copolymers, and the time/temperature dependence of linear viscoelasticity. The remaining five weeks of class will be devoted to applications, with special emphasis on membrane transport, including ion transport in fuel cell exchange membranes, gas transport in hydrogen enrichment membranes, and water transport in desalination membranes. In addition, completely degradable biocomposites will be discussed. Prerequisites: CHEM 31 A,B or CHEM 31X, CHEM 33, CHEM 171.

Same as: CHEMENG 262

CHEMENG 170. Kinetics and Reactor Design. 3 Units.

Chemical kinetics, elementary reactions, mechanisms, rate-limiting steps, and quasi-steady state approximations. Ideal isothermal and non-isothermal reactors; design principles. Steady state and unsteady state operation of reactors; conversion and limitations of thermodynamic equilibrium. Enzymes and heterogeneous catalysis and catalytic reaction mechanisms. Prerequisites: 110, 120A, 120B.

CHEMENG 174. Environmental Microbiology I. 3 Units.

Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents.

Same as: CEE 274A, CHEMENG 274

CHEMENG 180. Chemical Engineering Plant Design. 4 Units.

Open to seniors in chemical engineering or by consent of instructor. Application of chemical engineering principles to the design of practical plants for the manufacture of chemicals and related materials. Topics: flow-sheet development from a conceptual design, equipment design for distillation, chemical reactions, heat transfer, pumping, and compression; estimation of capital expenditures and production costs; plant construction.

CHEMENG 181. Biochemistry I. 3 Units.

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. (CHEMENG offerings formerly listed as 188/288.) Prerequisites: CHEM 33, 35, 131, and 135 or 171.

Same as: BIO 188, BIO 288, CHEM 181, CHEMENG 281

CHEMENG 183. Biochemistry II. 3 Units.

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288).

Same as: BIO 189, BIO 289, CHEM 183, CHEMENG 283

CHEMENG 185A. Chemical Engineering Laboratory A. 4 Units.

Experimental aspects of chemical engineering science. Emphasizes laboratory work and development of communication skills. Lab work in student groups. Student presentations. In addition to lectures, students are required to attend one weekly lab section (5 hours each); to be arranged separately. Prerequisites: 120A,B. Corequisite: 170.

CHEMENG 185B. Chemical Engineering Laboratory B. 4 Units.

Methods and techniques in molecular biology and biochemical engineering. Emphasis is on team organization, communication skills, experimental design, and project execution. Creation of presentations, experiments, and demonstrations for high school students. Additional laboratory times to be arranged. Prerequisite: BIO 41, CHEMENG 181, or equivalent.

CHEMENG 190. Undergraduate Research in Chemical Engineering. 1-6 Unit.

Laboratory or theoretical work for undergraduates under the supervision of a faculty member. Research in one of the graduate research groups or other special projects in the undergraduate chemical engineering lab. Students should consult advisers for information on available projects. Course may be repeated.

CHEMENG 190H. Undergraduate Honors Research in Chemical Engineering. 1-5 Unit.

For Chemical Engineering majors pursuing a B.S. with Honors degree who have submitted an approved research proposal to the department. Unofficial transcript must document BSH status and at least 9 units of 190H research for a minimum of 3 quarters. May be repeated for credit.

CHEMENG 191H. Undergraduate Honors Seminar. 1 Unit.

For Chemical Engineering majors approved for B.S. with Honors research program. Honors research proposal must be submitted and unofficial transcript document BSH status prior to required concurrent registration in 190H and 191H. May be repeated for credit. Corequisite: 190H.

CHEMENG 196. Creating New Ventures in Engineering and Science-based Industries. 3 Units.

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 196, CHEM 296, CHEMENG 296

CHEMENG 240. Micro and Nanoscale Fabrication Engineering. 3 Units.

(Same as CHEMENG 140) Survey of fabrication and processing technologies in industrial sectors, such as semiconductor, biotechnology, and energy. Chemistry and transport of electronic and energy device fabrication. Solid state materials, electronic devices and chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, thin film deposition, plasma processing. Micro and nanopatterning involving photolithography, unconventional soft lithography and self assembly. Recommended: CHEM 33, 171, and PHYSICS 55. Same as: CHEMENG 140

CHEMENG 242. Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations. 3 Units.

(Formerly 124/224) Introduction to heterogeneous catalysis, including models of surface reactivity, surface equilibria, kinetics of surface reactions, electronic and geometrical effects in heterogeneous catalysis, trends in reactivity, catalyst structure and composition, electro-catalysis and photo-catalysis. Selected applications and challenges in energy transformations will be discussed. Prerequisites: CHEM 31AB or 31X, CHEM 171, CHEM 175 or CHEMENG 170 or equivalents. Recommended: CHEM 173. Same as: CHEMENG 142

CHEMENG 260. Polymer Science and Engineering. 3 Units.

Interrelationships among molecular structure, morphology, and mechanical behavior of polymers. Topics include amorphous and semicrystalline polymers, glass transitions, rubber elasticity, linear viscoelasticity, and rheology. Applications of polymers in biomedical devices and microelectronics. Prerequisites: CHEM 31 A,B or CHEM 31X, CHEM 33 and 171, or equivalent. Same as: CHEMENG 160

CHEMENG 262. Polymers for Clean Energy and Water. 3 Units.

The first five weeks of this course will be devoted to the fundamental aspects of polymers necessary to understand the applications in energy and the environment. These include: polymer chain configuration, morphology of semi-crystalline and amorphous solids, thermal transition behavior, thermodynamics of polymer blends and block copolymers, and the time/temperature dependence of linear viscoelasticity. The remaining five weeks of class will be devoted to applications, with special emphasis on membrane transport, including ion transport in fuel cell exchange membranes, gas transport in hydrogen enrichment membranes, and water transport in desalination membranes. In addition, completely degradable biocomposites will be discussed. Prerequisites: CHEM 31 A,B or CHEM 31X, CHEM 33, CHEM 171. Same as: CHEMENG 162

CHEMENG 274. Environmental Microbiology I. 3 Units.

Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents. Same as: CEE 274A, CHEMENG 174

CHEMENG 281. Biochemistry I. 3 Units.

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. (CHEMENG offerings formerly listed as 188/288.) Prerequisites: CHEM 33, 35, 131, and 135 or 171. Same as: BIO 188, BIO 288, CHEM 181, CHEMENG 181

CHEMENG 283. Biochemistry II. 3 Units.

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288). Same as: BIO 189, BIO 289, CHEM 183, CHEMENG 183

CHEMENG 296. Creating New Ventures in Engineering and Science-based Industries. 3 Units.

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects. Same as: CHEM 196, CHEM 296, CHEMENG 196

CHEMENG 300. Applied Mathematics in the Chemical and Biological Sciences. 3 Units.

Mathematical solution methods via applied problems including chemical reaction sequences, mass and heat transfer in chemical reactors, quantum mechanics, fluid mechanics of reacting systems, and chromatography. Topics include generalized vector space theory, linear operator theory with eigenvalue methods, phase plane methods, perturbation theory (regular and singular), solution of parabolic and elliptic partial differential equations, and transform methods (Laplace and Fourier). Prerequisites: CME 102/ENGR 155A and CME 104/ENGR 155B, or equivalents. Same as: CME 330

CHEMENG 310. Microhydrodynamics. 3 Units.

Transport phenomena on small-length scales appropriate to applications in microfluidics, complex fluids, and biology. The basic equations of mass, momentum, and energy, derived for incompressible fluids and simplified to the slow-flow limit. Topics: solution techniques utilizing expansions of harmonic and Green's functions; singularity solutions; flows involving rigid particles and fluid droplets; applications to suspensions; lubrication theory for flows in confined geometries; slender body theory; and capillarity and wetting. Prerequisites: 120A,B, 300, or equivalents. Same as: ME 451D

CHEMENG 320. Chemical Kinetics and Reaction Engineering. 3 Units.

Theoretical and experimental tools useful in understanding and manipulating reactions mediated by small-molecules and biological catalysts. Theoretical: first classical chemical kinetics and transition state theory; then RRKM theory and Monte Carlo simulations. Experimental approaches include practical application of modern spectroscopic techniques, stopped-flow measurements, temperature-jump experiments, and single-molecule approaches to chemical and biological systems. Both theory and application are framed with regard to systems of particular interest, including industrially relevant enzymes, organometallic catalysts, heterogeneous catalysis, electron transfer reactions, and chemical kinetics within living cells.

CHEMENG 340. Molecular Thermodynamics. 3 Units.

Classical thermodynamics and quantum mechanics. Development of statistical thermodynamics to address the collective behavior of molecules. Establishment of theories for gas, liquid, and solid phases, including phase transitions and critical behavior. Applications include electrolytes, ion channels, surface adsorption, ligand binding to proteins, hydrogen bonding in water, hydrophobicity, polymers, and proteins.

CHEMENG 345. Fundamentals and Applications of Spectroscopy. 3 Units.

Development of theoretical approaches to spectroscopy, including spectroscopic transitions, transition probabilities, and selection rules. Application to photon and electron spectroscopies of the gas and solid phases. Topics: rotational spectroscopy; infrared and Raman vibrational spectroscopies; fluorescence spectroscopy; Auger, x-ray and ultraviolet photoelectron spectroscopies. Prerequisite: CHEM 271 or course in quantum mechanics.

Same as: PHOTON 345

CHEMENG 355. Advanced Biochemical Engineering. 3 Units.

Combines biological knowledge and methods with quantitative engineering principles. Quantitative review of biochemistry and metabolism; recombinant DNA technology and synthetic biology (metabolic engineering). The production of protein pharmaceuticals as a paradigm for the application of chemical engineering principles to advanced process development within the framework of current business and regulatory requirements. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41, or equivalent.

Same as: BIOE 355

CHEMENG 399. Graduate Research Rotation in Chemical Engineering. 1 Unit.

Introduction to graduate level laboratory and theoretical work. Performance in this course comprises part of the mandatory evaluation for pre-candidacy standing and suitability to continue in the chemical engineering Ph.D. program.

CHEMENG 410. Public Communication of Research. 1 Unit.

Develop skills for communicating complex science to the public through writing, video, and public speaking. Learn how to work with the media to explain scientific discoveries without overselling the science. Work in small groups and one-on-one with writers and guest speaker; develop a short written piece and video explaining own research; develop skills that will translate to future scientific projects. Open to graduate students in the biosciences, chemistry, and engineering. Enrollment limited to 20.

CHEMENG 420. Growth and Form. 3 Units.

Advanced topics course examining the role of physical forces in shaping living cells, tissues, and organs, making use of D'Arcy Thompson's classic text *On Growth and Form*. The course begins with a review of relevant physical principles drawn from statistical physics, polymer theory, rheology and materials science. We then examine current knowledge of cellular mechanotransduction pathways, the roles of physical forces in guiding embryonic development, and the contribution of aberrant cellular response to mechanical cues in heart disease and cancer. The course concludes by examining current frontiers in stem cell biology and tissue engineering.

CHEMENG 432. Electrochemical Energy Conversion. 3 Units.

Electrochemistry is playing an increasingly important role in renewable energy. This course aims to cover the fundamentals of electrochemistry, and then build on that knowledge to cover applications of electrochemistry in energy conversion. Topics to be covered include fuel cells, solar water-splitting, CO₂ conversion to fuels and chemicals, batteries, redox flow cells, and supercapacitors. Prerequisites: CHEM 31AB or 31 X, CHEM 33, CHEM 171, CHEM 175 or CHEMENG 170, or equivalents. Recommended: CHEM 173.

CHEMENG 442. Structure and Reactivity of Solid Surfaces. 3 Units.

The structure of solid surfaces including experimental methods for determining the structure of single crystal surfaces. The adsorption of molecules on these surfaces including the thermodynamics of adsorption processes, surface diffusion, and surface reactions. Molecular structure of adsorbates. Current topics in surface structure and reactivity, including systems for heterogeneous catalysis and electronic materials.

CHEMENG 444. Electronic Structure Theory and Applications to Chemical Kinetics. 3 Units.

Fundamentals of electronic structure theory as it applies to chemical reaction kinetics in homogeneous and heterogeneous reaction systems. Development and application of the theory of chemical kinetics, including traditional and harmonic transition state theories. Relationships between thermodynamics and kinetics to overall mechanism predictions. Lab involves chemical modeling including *ab initio* electronic structure calculations (Hartree-Fock, configuration interaction, coupled cluster, and many-body perturbation theory) and thermodynamic predictions. DFT calculations for catalysis applications are also covered. Prerequisite: quantum mechanics.

Same as: ENERGY 256

CHEMENG 450. Advances in Biotechnology. 3 Units.

Guest academic and industrial speakers. Latest developments in fields such as bioenergy, green process technology, production of industrial chemicals from renewable resources, protein pharmaceutical production, industrial enzyme production, stem cell applications, medical diagnostics, and medical imaging. Biotechnology ethics, business and patenting issues, and entrepreneurship in biotechnology.

Same as: BIOE 450

CHEMENG 454. Synthetic Biology and Metabolic Engineering. 3 Units.

Principles for the design and optimization of new biological systems. Development of new enzymes, metabolic pathways, other metabolic systems, and communication systems among organisms. Example applications include the production of central metabolites, amino acids, pharmaceutical proteins, and isoprenoids. Economic challenges and quantitative assessment of metabolic performance. Pre- or corequisite: CHEMENG 355 or equivalent.

Same as: BIOE 454

CHEMENG 456. Microbial Bioenergy Systems. 3 Units.

Introduction to microbial metabolic pathways and to the pathway logic with a special focus on microbial bioenergy systems. The first part of the course emphasizes the metabolic and biochemical principles of pathways, whereas the second part is more specifically directed toward using this knowledge to understand existing systems and to design innovative microbial bioenergy systems for biofuel, biorefinery, and environmental applications. There also is an emphasis on the implications of rerouting of energy and reducing equivalents for the fitness and ecology of the organism. Prerequisites: CHEMENG 174 or 181 and organic chemistry, or equivalents.

Same as: CEE 274B

CHEMENG 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOC 459, BIOE 459, CHEM 459, PSYCH 459

CHEMENG 462. Complex Fluids and Non-Newtonian Flows. 3 Units. Definition of a complex liquid and microrheology. Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal. Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor. Same as: ME 455

CHEMENG 464. Polymer Chemistry. 3 Units. Polymer material design, synthesis, characterization, and application. Topics include organic and kinetic aspects of polymerization, polymer characterization techniques, and structure and properties of bulk polymers for commercial applications and emerging technologies.

CHEMENG 466. Polymer Physics. 3 Units. Concepts and applications in the equilibrium and dynamic behavior of complex fluids. Topics include solution thermodynamics, scaling concepts, semiflexibility, characterization of polymer size (light scattering, osmotic pressure, size-exclusion chromatography, intrinsic viscosity), viscoelasticity, rheological measurements, polyelectrolytes, liquid crystals, biopolymers, and gels.

CHEMENG 469. Solid Structure and Properties of Polymers. 3 Units. Fundamental structure-properties relationships of solid polymers in bulk and thin films. Topics include chain conformations in bulk amorphous polymers, glass transition, crystallization, semi-crystalline morphology, liquid crystalline order, polymer blends, block copolymers, polymer networks/gels, semiconducting polymers, and experimental methods of characterizing polymer structure.

CHEMENG 470. Complex Fluid Interfaces: Capillarity and Interfacial Dynamics. 3 Units. Complex fluid interfaces arise whenever amphiphiles (surfactants, phospholipids, polymers, colloidal particles) collect at liquid-fluid surfaces, imbuing them with nonlinear mechanical responses. Examples in nature include the cell membrane, lung surfactants, and the tear film. Industrial applications include emulsions and foams that require stabilization. The course discusses concepts in capillarity and wetting, interfacial fluid dynamics, thin film stability, the microstructure of self-organized monolayers and bilayers. Experimental microstructural methods (Brewster angle microscopy, fluorescence microscopy, grazing incidence x-ray diffraction) will be described. Prerequisite: 310 or equivalent.

CHEMENG 482. The Startup Garage: Design. 4 Units. (Same as STRAMGT 356) The Startup Garage is an experiential lab course that focuses on the design, testing and launch of a new venture. Multidisciplinary student teams work through an iterative process of understanding user needs, creating a point of view statement, ideating and prototyping new product and services and their business models, and communicating the user need, product, service and business models to end-users, partners, and investors. In the autumn quarter, teams will identify and validate a compelling user need and develop very preliminary prototypes for a new product or service and business models. Students form teams, conduct field work and iterate on the combination of business model -- product -- market. Teams will present their first prototypes (business model - product - market) at the end of the quarter to a panel of entrepreneurs, venture capitalists, angel investors and faculty. Same as: SOMGEN 282

CHEMENG 484. The Startup Garage: Testing and Launch. 4 Units. (Same as STRAMGT 366) This is the second quarter of the two-quarter series. In this quarter, student teams expand the field work they started in the fall quarter. They get out of the building to talk to potential customers, partners, distributors, and investors to test and refine their business model, product/service and market. This quarter the teams will be expected to develop and test a minimally viable product, iterate, and focus on validated lessons on: the market opportunity, user need and behavior, user interactions with the product or service, business unit economics, sale and distribution models, partnerships, value proposition, and funding strategies. Teams will interact with customers, partners, distributors, investors and mentors with the end goal of developing and delivering a funding pitch to a panel of entrepreneurs, venture capitalists, angel investors and faculty. Same as: SOMGEN 284

CHEMENG 500. Special Topics in Protein Biotechnology. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 501. Special Topics in Semiconductor Processing. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 503. Special Topics in Biocatalysis. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 505. Special Topics in Microrheology. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 507. Special Topics in Polymer Physics and Molecular Assemblies. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 510. Special Topics in Transport Mechanics. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 513. Special Topics in Functional Organic Materials for Electronic and Optical Devices. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 514. Special Topics in Biopolymer Physics. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 515. Special Topics in Molecular and Systems Biology. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 516. Special Topics in Energy and Catalysis. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 517. Special Topics in Microbial Physiology and Metabolism. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 518. Special Topics in Advanced Biophysics and Protein Design. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 519. Special Topics in Interface Science and Catalysis. 1 Unit. Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

CHEMENG 520. Special Topics in Biological Chemistry. 1 Unit.
Recent developments and current research. May be repeated for credit.
Prerequisite: graduate standing and consent of instructor.

CHEMENG 521. Special Topics in Nanostructured Materials for Energy and the Environment. 1 Unit.
Recent developments and current research. May be repeated for credit.
Prerequisite: graduate standing and consent of instructor.

CHEMENG 600. Graduate Research in Chemical Engineering. 1-12 Unit.
Laboratory and theoretical work leading to partial fulfillment of requirements for an advanced degree. Course may be repeated for credit.

CHEMENG 699. Colloquium. 1 Unit.
Weekly lectures by experts from academia and industry in the field of chemical engineering. Course may be repeated for credit.

CHEMENG 801. TGR Project. 0 Units.

CHEMENG 802. TGR Dissertation. 0 Units.

Chemistry Courses

CHEM 1. Structure and Reactivity. 4 Units.
First lecture class in summer organic series. Organic chemistry, functional groups, hydrocarbons, stereochemistry, thermochemistry, kinetics and chemical equilibria. Recitation. Prerequisite: 31 A, B or 31 X or an AP Chemistry score of 5. Course equivalent: Chem 33.

CHEM 1L. Introduction to Organic Chemistry Lab. 2 Units.
Techniques for separation of compounds: distillation, crystallization, extraction and chromatographic procedures in the context of reactions learned in Chem 1. Use of GC instrumentation for the analysis of reactions. Lecture treats theory; lab provides practice. Prerequisite: Chem 33 or Chem 1 co-requisite.

CHEM 2. Organic Monofunctional Compounds. 4 Units.
Second lecture class in summer organic series. Organic chemistry of oxygen and nitrogen aliphatic compounds. Recitation. Prerequisite: Chem 33 or Chem 1. Course equivalent: Chem 35.

CHEM 2L. Organic Chemistry Lab I. 2 Units.
Application of separation techniques in the context of reactions learned in Chem 2. Use of IR instrumentation for the analysis of reactions. Lecture treats theory; lab provides practice. Prerequisite: Chem 1L. Co-requisite: Chem 35 or Chem 2. Course equivalent in conjunction with Chem 3L: Chem 130.

CHEM 3. Organic Polyfunctional Compounds. 4 Units.
Last lecture class in summer organic series. Aromatic compounds, polysaccharides, amino acids, proteins, natural products, dyes, purines, pyrimidines, nucleic acids and polymers. Recitation. Prerequisite: Chem 35 or Chem 2. Course equivalent: Chem 131.

CHEM 3L. Organic Chemistry Lab II. 2 Units.
Qualitative and analytical techniques applied to reactions learned in Chem 3. Use of NMR instrumentation for the analysis of reactions. Lecture treats theory; lab provides practice. Prerequisite: Chem 2L. Co-requisite: Chem 131 or Chem 3. Course equivalent in conjunction with Chem 2L: Chem 130.

CHEM 4. Biochemistry: Chemistry of Life. 4 Units.
A four-week intensive biochemistry course from a chemical perspective. The chemical basis of life, including thermodynamics, amino acids, proteins, carbohydrates, lipids, nucleic acids, and metabolism. Recitation includes group work on case studies that support the daily lecture material. Prerequisites: CHEM 33,35,131 or 1 year of organic chemistry; Math 19, 20, 21 or 41, 42 or 1 year of single variable calculus.

CHEM 10. Exploring Research and Problem Solving Across the Sciences. 2 Units.
Development and practice of critical problem solving and study skills using wide variety of scientific examples that illustrate the broad yet integrated nature of current research. Student teams will have the opportunity to explore and present on topics revolving around five central issues: energy, climate change, water resources, medicine, and food & nutrition from a chemical perspective. Course offered in August prior to start of fall quarter.

CHEM 24N. Nutrition and History. 3 Units.
Preference to freshmen. Intended to broaden the introductory chemistry experience. Fundamentals of human nutrition with emphasis on the chemistry and biochemistry of the known macro- and micronutrients (carbohydrate, protein, lipid, vitamins, minerals). Historical context in which food sources are discovered and developed, and sociological and economic effects of those events on human populations. Prerequisite: high school chemistry. Recommended: 31A,B, or 31X, or 33.

CHEM 25N. Science in the News. 3 Units.
Preference to freshmen. Possible topics include: diseases such as avian flu, HIV, and malaria; environmental issues such as climate change, atmospheric pollution, and human population; energy sources in the future; evolution; stem cell research; nanotechnology; and drug development. Focus is on the scientific basis for these topics as a basis for intelligent discussion of societal and political implications. Sources include the popular media and scientific media for the nonspecialist, especially those available on the web.

CHEM 25Q. Science-in-Theatre: A New Genre?. 3 Units.
Preference to sophomores. Contrasts through selected "science-in-theatre" plays what Theatre can do for science compared to what Science occasionally does for the theatre as well as emphasizing in that regard some unique features of the theatre compared to films. Illustrates why more intellectually challenging "science-in-theatre" plays have appeared in recent times where scientific behavior and scientists are presented accurately rather than just as Frankensteins, Strangeloves or nerds. Students also engage in a modest playwriting experiment.

CHEM 26N. The What, Why, How and wow's of Nanotechnology. 3 Units.
Preference to freshmen. Introduction to nanotechnology with discussion of basic science at the nanoscale, its difference from molecular and macroscopic scales, and implications and applications. Developments in nanotechnology in the past two decades, from imaging and moving single atoms on surfaces to killing cancer cells with nanoscale tools and gadgets.

CHEM 27N. Light and Life. 3 Units.
Preference given to freshmen. Light plays a central role in many biological processes. In this course, we will discuss the nature of light, how it is measured, how it is generated in the laboratory, how molecules are excited, and the fate of this excitation in biological chromophores. We will take a chemical perspective on the molecules that absorb and emit light in biological systems, focusing on the "primary" light-driven processes of electron transfer, proton transfer, energy transfer, and isomerization. Chem 31X or 31A preferred, but not required.

CHEM 28N. Science Innovation and Communication. 3 Units.
Preference to freshmen. The course will explore evolutionary and revolutionary scientific advances; their consequences to society, biotechnology, and the economy; and mechanisms for communicating science to the public. The course will engage academic and industrial thought leaders and provide an opportunity for students to participate in communicating science to the public.

CHEM 31A. Chemical Principles I. 5 Units.
For students with moderate or no background in chemistry. Stoichiometry; periodicity; electronic structure and bonding; gases; enthalpy; phase behavior. Emphasis is on skills to address structural and quantitative chemical questions; lab provides practice. Recitation.

CHEM 31AC. Problem Solving in Science. 1 Unit.

Development and practice of critical problem solving skills using chemical examples. Limited enrollment. Prerequisite: consent of instructor. Corequisite: CHEM 31A.

CHEM 31B. Chemical Principles II. 5 Units.

Chemical equilibrium; acids and bases; oxidation and reduction reactions; chemical thermodynamics; kinetics. Lab. Prerequisite: 31A.

CHEM 31BC. Problem Solving in Science. 1 Unit.

Development and practice of critical problem solving skills using chemical examples. Students should also be concurrently enrolled in the parent course 31B. Limited enrollment and with permission of the instructor.

CHEM 31X. Chemical Principles Accelerated. 5 Units.

Accelerated; for students with substantial chemistry background. Chemical equilibria concepts, equilibrium constants, acids and bases, chemical thermodynamics, quantum concepts, models of ionic and covalent bonding, atomic and molecular orbital theory, periodicity, and bonding properties of matter. Recitation. Prerequisites: AP chemistry score of 5 or passing score on chemistry placement test, and AP Calculus AB score of 4 or Math 41. Recommended: high school physics.

CHEM 33. Structure and Reactivity. 5 Units.

Organic chemistry, functional groups, hydrocarbons, stereochemistry, thermochemistry, kinetics, chemical equilibria. Recitation. Prerequisite: 31A,B, or 31X, or an AP Chemistry score of 5.

CHEM 33C. Problem Solving in Science. 1 Unit.

Development and practice of critical problem solving skills using chemical examples. Limited enrollment. Prerequisite: consent of instructor. Corequisite: CHEM 33.

CHEM 35. Synthetic and Physical Organic Chemistry. 5 Units.

The structure and reactivity of mono- and polyfunctionalized molecules; retrosynthetic analysis and multi-step chemical synthesis. Course will emphasize deductive logic and reasoning skills through conceptual learning. Students gain an appreciation for the profound impact of organic chemistry on humankind in fields ranging from biology and medicine to gastronomy, agriculture, and materials science. A three hour lab section provides hands on experience with modern chemical methods for preparative and analytical chemistry. Prerequisite: Chem 33.

CHEM 36. Organic Chemistry Laboratory I. 3 Units.

Techniques for separations of compounds: distillation, crystallization, extraction, and chromatographic procedures. Lecture treats theory; lab provides practice. Prerequisite: CHEM 35.

CHEM 110. Directed Instruction/Reading. 1-2 Unit.

Undergraduates pursue a reading program under supervision of a faculty member in Chemistry; may also involve participation in lab. Prerequisites: superior work in 31A,B, 31X, or 33; and consent of instructor and the Chemistry undergraduate study committee.

CHEM 111. Exploring Chemical Research at Stanford. 1 Unit.

Preference to freshmen and sophomores. Department faculty describe their cutting-edge research and its applications.

CHEM 130. Organic Chemistry Laboratory. 3 Units.

Diels-Alder, reduction, and Wittig reactions; qualitative analysis. Lab. Limited enrollment Autumn Quarter. Prerequisite: Chem 35 taken in Aut 2014-15 or later, or Chem 35 and 36. Corequisite: 131.

CHEM 131. Organic Polyfunctional Compounds. 3 Units.

Aromatic compounds, polysaccharides, amino acids, proteins, natural products, dyes, purines, pyrimidines, nucleic acids, and polymers. Prerequisite: 35.

CHEM 132. Synthesis Laboratory. 3 Units.

Advanced synthetic methods in organic and inorganic laboratory chemistry. Prerequisites: 35, 130.

CHEM 134. Analytical Chemistry Laboratory. 5 Units.

Methods include gravimetric, volumetric, spectrophotometric, and chromatographic. Writing instruction includes communications, full papers, research proposals, and referee papers. Lab. Prerequisite: 130.

CHEM 135. Physical Chemical Principles. 3 Units.

Introductory physical chemistry intended for students of the life sciences, geology and environmental engineering. Chemical kinetics: rate laws, integration of rate laws, reaction mechanisms, enzyme kinetics. Chemical thermodynamics: first, second and third laws, thermochemistry, entropy, free energy, chemical equilibrium, physical equilibrium, osmotic pressure, other colligative properties. Prerequisites: 31A,B, or 31X, calculus.

CHEM 137. Special Topics in Synthesis. 3 Units.

The course covers the basic toolbox for construction of more complex structures for function, largely directed towards molecules of biological relevance. The focus will be the ability to perform structural changes efficiently in order to enable the design of the best structure for a function. The concepts of catalytic processes are at the heart of the how small molecule drug discovery is performed. Fundamentals of the pertinent catalytic processes are discussed. The inter-relationship of synthetic chemistry and pharmaceuticals is emphasized. See more at: <http://library.stanford.edu/guides/chem-137-special-topics-organic-chemistry#sthash.vi9khNU5.dpuf>. Prerequisite CHEM 35.

CHEM 151. Inorganic Chemistry I. 3 Units.

Theories of electronic structure, stereochemistry, and symmetry properties of inorganic molecules. Topics: ionic and covalent interactions, electron-deficient bonding, and molecular orbital theories. Emphasis is on the chemistry of the metallic elements. Prerequisites: 35. Recommended: 171.

CHEM 153. Inorganic Chemistry II. 3 Units.

The theoretical aspects of inorganic chemistry. Group theory; many-electron atomic theory; molecular orbital theory emphasizing general concepts and group theory; ligand field theory; application of physical methods to predict the geometry, magnetism, and electronic spectra of transition metal complexes. Prerequisites: 151, 173.

CHEM 155. Advanced Inorganic Chemistry. 3 Units.

Chemical reactions of organotransition metal complexes and their role in homogeneous catalysis. Analogous patterns among reactions of transition metal complexes in lower oxidation states. Physical methods of structure determination. Prerequisite: one year of physical chemistry. Same as: CHEM 255

CHEM 171. Physical Chemistry I. 3 Units.

Chemical thermodynamics and kinetic molecular models; fundamental principles, Gibbsian equations, systematic deduction of equations, equilibrium conditions, gases, phase changes, solutions and chemical equilibrium. Introduction to chemical kinetics: roles of thermal motion and energy barriers, relationship between rate and reaction mechanism, and modeling of specific reactions. The MATLAB programming language will be used for modeling, analysis and visualization throughout. Optional discussion section. Prerequisites: 31A,B, or 31X; 33; PHYS 41; either CME 100 or MATH 51 and (MATH 51M or CME 192 or CS 106A).

CHEM 173. Physical Chemistry II. 3 Units.

Introduction to quantum chemistry: the basic principles of wave mechanics, the harmonic oscillator, the rigid rotator, infrared and microwave spectroscopy, the hydrogen atom, atomic structure, molecular structure, valence theory. Prerequisites: CHEM 171; CME 102, 104 or MATH 53; PHYSICS 41, 43.

CHEM 174. Electrochemical Measurements Lab. 3 Units.

This course provides an introduction to modern electrochemical measurement in a hands-on, laboratory setting. Students assemble and use electrochemical cells including indicator, reference, working and counter electrodes, with macro, micro and ultramicro geometries, salt bridges, ion-selective membranes, electrometers, potentiostats, galvanostats, and stationary and rotated disk electrodes. The later portion of the course will involve a student-generated project to experimentally characterize some electrochemical system. Prerequisites: 134, 171, MATH 51, PHYSICS 44 or equivalent.

Same as: CHEM 274

CHEM 175. Physical Chemistry III. 3 Units.

Molecular theory of kinetics and statistical mechanics: transport and reactions in gases and liquids, ensembles and the Boltzmann distribution law, partition functions, molecular simulation, structure and dynamics of liquids. Diffusion and activation limited reactions; potential energy surfaces, collision theory and transition-state theory of reaction rates.

Prerequisites: 171, 173.

CHEM 176. Physical Chemistry Laboratory. 3 Units.

Use of spectroscopic instrumentation to study molecular properties and physical chemical time-dependent processes. Experiments include electronic ultraviolet/visible absorption, fluorescence, Raman, infrared vibrational and nuclear magnetic resonance spectroscopies. Prerequisite: 173.

CHEM 181. Biochemistry I. 3 Units.

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. (CHEMENG offerings formerly listed as 188/288.) Prerequisites: CHEM 33, 35, 131, and 135 or 171.

Same as: BIO 188, BIO 288, CHEMENG 181, CHEMENG 281

CHEM 183. Biochemistry II. 3 Units.

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288).

Same as: BIO 189, BIO 289, CHEMENG 183, CHEMENG 283

CHEM 184. Biological Chemistry Laboratory. 4 Units.

Modern techniques in biological chemistry including protein purification, characterization of enzyme kinetics, heterologous expression of His-tagged fluorescent proteins, site-directed mutagenesis, and single-molecule fluorescence microscopy. Prerequisite: 181.

CHEM 185. Biochemistry III. 3 Units.

Advanced biophysical chemistry. Topics include: protein and DNA structure, stability, and folding, membrane lateral organization and dynamics, and transmembrane transport. Prerequisites: 171, 173, 183.

CHEM 187. Chemistry of Posttranslational Modification of Proteins. 1 Unit.

This short course runs for the first four weeks of the quarter, January only. This course examines the chemical principles and mechanisms of major classes of covalent PTMs. Up to 2000 enzyme catalysts are dedicated to PTM creation and reversal, including phosphorylations, acylations, alkylations, glycosylations, oxygenations, automodifications such as green fluorescent protein formation, and controlled proteolysis, including protein splicing. The different PTM chemistries both constrain and enable the diverse biological functions of modified protein substrates. Prerequisite: Chem 181 or equivalent.

Same as: CHEM 287

CHEM 190. Introduction to Methods of Investigation. 1-5 Unit.

Limited to undergraduates who have completed Chem 35 and/or Chem 134, or by special arrangement with a member of the teaching staff. May be repeated 8 times for a max of 27 units. For general character and scope, see Chem 200. Prerequisite: 35 or 134. Corequisite: 300.

CHEM 196. Creating New Ventures in Engineering and Science-based Industries. 3 Units.

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 296, CHEMENG 196, CHEMENG 296

CHEM 200. Research and Special Advanced Work. 1-15 Unit.

Qualified graduate students undertake research or advanced lab work not covered by listed courses under the direction of a member of the teaching staff. For research and special work, students register for 200.

CHEM 221. Advanced Organic Chemistry. 3 Units.

Physical organic chemistry: experimental and theoretical aspects of molecular structures, bonding and interactions, thermodynamic and kinetic understanding of reactivity and reaction mechanism. Prerequisites: 137, 175.

CHEM 223. Advanced Organic Chemistry. 3 Units.

Continuation of 221. Modern synthetic organic chemistry with an emphasis on structure, reactivity, and stereocontrol. Prerequisite: 221 or consent of instructor.

CHEM 225. Advanced Organic Chemistry. 3 Units.

Continuation of 223. Organic reactions, new synthetic methods, selectivity analysis, and exercises in the syntheses of complex molecules. Prerequisite: 223 or consent of instructor.

CHEM 227. Synthesis and Analysis at the Chemistry-Biology Interface. 3 Units.

Focus on organic chemistry of biomacromolecules. Synthetic methods and conjugation chemistry; labeling and chemical modification of nucleic acids and peptides; combinatorial library construction and selection methods. Completion of a course in molecular biology is helpful but not required. Prerequisite: One year of undergraduate organic chemistry.

CHEM 229. Organic Chemistry Seminar. 1 Unit.

Required of graduate students majoring in organic chemistry. Students giving seminars register for 231.

CHEM 231. Organic Chemistry Seminar Presentation. 1 Unit.

Required of graduate students majoring in organic chemistry for the year in which they present their organic seminar. Second-year students must enroll all quarters.

CHEM 233A. Creativity in Organic Chemistry. 1 Unit.

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr.

CHEM 233B. Creativity in Organic Chemistry. 1 Unit.

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr.

CHEM 233C. Creativity in Organic Chemistry. 1 Unit.

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr.

CHEM 235. Applications of NMR Spectroscopy. 3 Units.

The uses of NMR spectroscopy in chemical and biochemical sciences, emphasizing data acquisition for liquid samples and including selection, setup, and processing of standard and advanced experiments.

CHEM 251. Advanced Inorganic Chemistry. 3 Units.

Primarily intended for first-year graduate students, as a review of some of the basic concepts in inorganic chemistry. Specific topics covered will include: symmetry, group theory, electronic structure of molecules and solids, and reactivity of coordination complexes. Prerequisite: Advanced undergraduate-level inorganic chemistry.

CHEM 253. Advanced Inorganic Chemistry. 3 Units.

Electronic structure and physical properties of transition metal complexes. Ligand field and molecular orbital theories, magnetism and magnetic susceptibility, electron paramagnetic resonance including hyperfine interactions and zero field splitting and electronic absorption spectroscopy including vibrational interactions. Prerequisite: 153 or the equivalent.

CHEM 255. Advanced Inorganic Chemistry. 3 Units.

Chemical reactions of organotransition metal complexes and their role in homogeneous catalysis. Analogous patterns among reactions of transition metal complexes in lower oxidation states. Physical methods of structure determination. Prerequisite: one year of physical chemistry. Same as: CHEM 155

CHEM 258A. Research Progress in Inorganic Chemistry. 1 Unit.

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

CHEM 258B. Research Progress in Inorganic Chemistry. 1 Unit.

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

CHEM 258C. Research Progress in Inorganic Chemistry. 1 Unit.

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

CHEM 259. Inorganic Chemistry Seminar. 1 Unit.

Required of graduate students majoring in inorganic chemistry.

CHEM 271. Advanced Physical Chemistry. 3 Units.

The principles of quantum mechanics. General formulation, mathematical methods, and applications of quantum theory. Exactly solvable problems and approximate methods including time independent perturbation theory and the variational method. Time dependent methods including exactly solvable problems, time dependent perturbation theory, and density matrix formalism. Different representations of quantum theory including the Schrouml;inger, matrix, and density matrix methods. Absorption and emission of radiation Angular momentum. Atomic structure calculations and simple molecular structure methods. Prerequisite: 175 or equivalent course.

CHEM 273. Advanced Physical Chemistry. 3 Units.

Statistical mechanics is a fundamental bridge that links microscopic world of quantum mechanics to macroscopic thermodynamic properties. We discuss the principles and methods of statistical mechanics from the ensemble point of view. Applications include statistical thermodynamics, quantum systems, heat capacities of gases and solids, chemical equilibrium, pair correlation functions in liquids, and phase transitions. Prerequisite: 271.

CHEM 274. Electrochemical Measurements Lab. 3 Units.

This course provides an introduction to modern electrochemical measurement in a hands-on, laboratory setting. Students assemble and use electrochemical cells including indicator, reference, working and counter electrodes, with macro, micro and ultramicro geometries, salt bridges, ion-selective membranes, electrometers, potentiostats, galvanostats, and stationary and rotated disk electrodes. The later portion of the course will involve a student-generated project to experimentally characterize some electrochemical system. Prerequisites: 134, 171, MATH 51, PHYSICS 44 or equivalent. Same as: CHEM 174

CHEM 275. Advanced Physical Chemistry. 3 Units.

Topics in molecular modeling. Molecular simulation: molecular dynamics in various ensembles, Monte Carlo. Extracting properties from simulations: free energy, dynamical properties from time-correlation functions. Advanced simulation techniques: multiple time-scale methods and rare event sampling. Electronic structure theory: Hartree-Fock, configuration interaction and density functional theory. Non classical nuclei: path integral representation, quantum-classical dynamics. Recommended: Chem 273 and either Chem 271 or Physics 230.

CHEM 277. Materials Chemistry and Physics. 3 Units.

Topics: structures and symmetries and of solid state crystalline materials, chemical applications of group theory in solids, quantum mechanical electronic band structures of solids, phonons in solids, synthesis methods and characterization techniques for solids including nanostructured materials, selected applications of solid state materials and nanostructures. May be repeated for credit.

CHEM 278A. Research Progress in Physical Chemistry. 1 Unit.

Required of all second- and third-year Ph.D. candidates in physical and biophysical chemistry and chemical physics. Second-year students present their research progress and plans in brief written and oral summaries (A); third-year students prepare a written progress report (B). A: Win, B: Win.

CHEM 278B. Research Progress in Physical Chemistry. 1 Unit.

Required of all second- and third-year Ph.D. candidates in physical and biophysical chemistry and chemical physics. Second-year students present their research progress and plans in brief written and oral summaries (A); third-year students prepare a written progress report (B). A: Win, B: Win.

CHEM 279. Physical Chemistry Seminar. 1 Unit.

Required of graduate students majoring in physical chemistry. May be repeated for credit.

CHEM 280. Single-Molecule Spectroscopy and Imaging. 3 Units.

Theoretical and experimental techniques necessary to achieve single-molecule sensitivity in laser spectroscopy: interaction of radiation with spectroscopic transitions; systematics of signals, noise, and signal-to-noise; modulation and imaging methods; and analysis of fluctuations; applications to modern problems in biophysics, cellular imaging, physical chemistry, single-photon sources, and materials science. Prerequisites: 271, previous or concurrent enrollment in 273.

CHEM 287. Chemistry of Posttranslational Modification of Proteins. 1 Unit.

This short course runs for the first four weeks of the quarter, January only. This course examines the chemical principles and mechanisms of major classes of covalent PTMs. Up to 2000 enzyme catalysts are dedicated to PTM creation and reversal, including phosphorylations, acylations, alkylations, glycosylations, oxygenations, automodifications such as green fluorescent protein formation, and controlled proteolysis, including protein splicing. The different PTM chemistries both constrain and enable the diverse biological functions of modified protein substrates. Prerequisite: Chem 181 or equivalent.

Same as: CHEM 187

CHEM 291. Introduction to Nuclear Magnetic Resonance. 3 Units.

Introduction to quantum and classical descriptions of NMR; analysis of pulse sequences and nuclear spin coherences via density matrices and the product operator formalism; NMR spectrometer design; Fourier analysis of time-dependent observable magnetization; NMR relaxation in liquids and solids; NMR strategies for biological problem solving. Prerequisite: Chem 173.

CHEM 296. Creating New Ventures in Engineering and Science-based Industries. 3 Units.

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 196, CHEMENG 196, CHEMENG 296

CHEM 297. Bio-Inorganic Chemistry. 3 Units.

Overview of metal sites in biology. Metalloproteins as elaborated inorganic complexes, their basic coordination chemistry and bonding, unique features of the protein ligand, and the physical methods used to study active sites. Active site structures are correlated with function. Prerequisites: 153 and 173, or equivalents.

Same as: BIOPHYS 297

CHEM 299. Teaching of Chemistry. 1-3 Unit.

Required of all teaching assistants in Chemistry. Techniques of teaching chemistry by means of lectures and labs.

CHEM 300. Department Colloquium. 1 Unit.

Required of graduate students. May be repeated for credit.

CHEM 301. Research in Chemistry. 2 Units.

Required of graduate students who have passed the qualifying examination. Open to qualified graduate students with the consent of the major professor. Research seminars and directed reading deal with newly developing areas in chemistry and experimental techniques. May be repeated for credit. Search for adviser name on AxBess.

CHEM 390. Curricular Practical Training for Chemists. 1 Unit.

For Chemistry majors who need work experience as part of their program of study. Confer with Chem student services office for signup.

CHEM 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOC 459, BIOE 459, CHEMENG 459, PSYCH 459

CHEM 802. TGR Dissertation. 0 Units.

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Chicana/o Studies Courses

Chicana/o-Latina/o Studies Courses

CHILATST 13SL. Second-Year Spanish: Emphasis on Service Learning, Third Quarter. 4-5 Units.

Continuation of SPANLANG 12. Integration of community engagement and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, community and professional contexts. SL content focuses on immersion in civics-based reciprocity and service learning in the Spanish-speaking local community. Service Learning Course (certified by Haas Center). Prerequisite: Placement Test, SPANLANG 12C, 12R, 12M or 12S. Fulfills the IR major Language Requirement.

Same as: SPANLANG 13SL

CHILATST 14N. Growing Up Bilingual. 3 Units.

This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

Same as: CSRE 14N, EDUC 114N

CHILATST 53J. Love Notes: Queers of Color on Politics of the Heart. 3 Units.

This course unfolds in three ways. First, we will begin by examining theories of love by women of color feminists and queer theorists. Secondly, we will position these theories alongside art, literature, photography, comics, and film by and about queers of color who partake in the cultural representation of the love story. Finally, we will interrogate the aesthetic politics of each work in order engage with the ways that the writers, artists, and filmmakers contribute to the theorization of love.

Same as: CSRE 53J

CHILATST 120. Queer Raza. 3-5 Units.

Examination of cultural representations by U.S. Latin@s that explore the following questions: How is the mutual constitution of race/sex/class/gender theorized and represented? How is desire racialized? How is racial difference produced through sex acts and what is the function of sex in racial (self)formation? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and other structures of power? How do these texts reinforce or contest stereotypes and the "ideal" bodies of national identity? How do these texts produce queerness as a web of social relations?

Same as: FEMGEN 120, ILAC 287

CHILATST 125S. Chicano/Latino Politics. 5 Units.

The political position of Latinos and Latinas in the U.S.. Focus is on Mexican Americans, with attention to Cuban Americans, Puerto Ricans, and other groups. The history of each group in the American polity; their political circumstances with respect to the electoral process, the policy process, and government; the extent to which the demographic category Latino is meaningful; and group identity and solidarity among Americans of Latin American ancestry. Topics include immigration, education, affirmative action, language policy, and environmental justice.

Same as: POLISCI 125S

CHILATST 140. Migration in 21st Century Latin American Film. 3-5 Units.

Focus on how images and narratives of migration are depicted in recent Latin American film. It compares migration as it takes place within Latin America to migration from Latin America to Europe and to the U.S. We will analyze these films, and their making, in the global context of an evergrowing tension between "inside" and "outside"; we consider how these films represent or explore precariousness and exclusion; visibility and invisibility; racial and gender dynamics; national and social boundaries; new subjectivities and cultural practices. Films include: *El nintilde;opez*, *Bolivia*, *Ulises*, *Faustino* *Mayta visita a su prima*, *Copacabana*, *Chico y Rita*, *Sin nombre*, *Los que se quedan*, *Amador*, and *En la puta calle*. Films in Spanish, with English subtitles. Discussions and assignments in Spanish. Same as: ILAC 140

CHILATST 160N. Chican@/Latin@ Performance in the U.S.. 4 Units.

This course will introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece.

Same as: TAPS 160N

CHILATST 164. Immigration and the Changing United States. 4 Units.

The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration.

Same as: CSRE 164, SOC 164, SOC 264

CHILATST 168. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: ANTHRO 169A, CSRE 168, FEMGEN 140H

CHILATST 171. Mexicans in the United States. 5 Units.

This course explores the lives and experiences of Mexicans living in the United States, from 1848 to the present. Themes and topics include: the legacies of colonialism, the Mexican-American War, transnational migration, the effects of economic stratification, race and racialization, and the impact of sexual and gender ideologies on the lives of Mexicans residing north of the border.

Same as: AMSTUD 271, CSRE 171H, HISTORY 271

CHILATST 172. Theories of Citizenship and Sovereignty in a Transnational Context. 4-5 Units.

This course explores the multiple meanings of citizenship and the ways in which they change when examined using different geographic scales (from the local to the transnational). The course will pair theoretical readings on citizenship with case studies that focus on North America. Topics include: definitions of citizenship; the interrelation of ideas of citizenship with those of race, ethnicity, gender, and sexuality; the relationship between sovereignty and territoriality; human and civil rights; and immigration. Same as: AMSTUD 272E, CSRE 172H, FEMGEN 272E, HISTORY 272E, HISTORY 372E

CHILATST 177A. Well-Being in Immigrant Children & Youth: A Service Learning Course. 3 Units.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CSRE 177E, EDUC 177A, HUMBIO 29A

CHILATST 177B. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CSRE 177F, EDUC 177B

CHILATST 177C. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CSRE 177G, EDUC 177C

CHILATST 179. Chicano & Chicana Theater: Politics In Performance. 3-5 Units.

This is a practicum course, where the basic tenets and evolving politic and philosophies of Chicano and Latin American liberationist theater are examined through direct engagement with its theatrical forms, including, social protest & agit-prop, myth & ritual, scripting through improvisation, in-depth character and solo work, collective conceptualization and more. The course will culminate in an end-of-the quarter play performance in the Niterly Theater (Old Union) and at a Mission District theater in San Francisco.

Same as: TAPS 179, TAPS 379

CHILATST 179F. Flor y Canto: Poetry Workshop. 3-5 Units.

Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as *flor y canto*, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlacut;n. Required 20-page poetry manuscript.

Same as: CSRE 179F, TAPS 179F, TAPS 279F

CHILATST 180E. Introduction to Chicana/o-Latina/o Studies. 5 Units. Historical and contemporary experiences that have defined the status of Latina/o peoples living in the U.S. Topics include the U.S./Mexico border and the borderlands; immigration and transnational migrations; literary and cultural traditions; music; labor; historical perspectives on Latina/o peoples in the U.S. and the Chicano movement; urban realities; gender relations; political and economic changes; and inter- and intra-group interactions. Sources include social science and humanities scholarship.

CHILATST 183X. Practicum in English-Spanish School & Community Interpreting. 3-4 Units.

This practicum will assist students in developing a set of skills in English-Spanish interpreting that will prepare them to provide interpretation services in school and community settings. The course will build students' abilities to transfer intended meanings between two or more monolingual individuals of who are physically present in a school or community setting and who must communicate with each other for professional (and personal) purposes.

Same as: EDUC 183X, EDUC 283X

CHILATST 189W. Language and Minority Rights. 3 Units.

Language as it is implicated in migration and globalization. The effects of globalization processes on languages, the complexity of language use in migrant and indigenous minority contexts, the connectedness of today's societies brought about by the development of communication technologies. Individual and societal multilingualism; preservation and revival of endangered languages.

Same as: CSRE 189W, EDUC 189X

CHILATST 198. Internship for Public Service. 1-5 Unit.

Students should consult with CCSRE Director of Service-Learning (nadiad@stanford.edu) to develop or sign-up for a community service internship. Group meetings may be required. May be repeated for credit. Service Learning Course (certified by Haas Center).

Same as: CSRE 198

CHILATST 200. Latin@ Literature. 3-5 Units.

Examines a diverse set of narratives by U.S. Latin@s of Mexican, Puerto Rican, Cuban, Guatemalan, and Dominican heritage through the lens of latinidad. All share the historical experience of Spanish colonization and U.S. imperialism, yet their im/migration patterns differ, affecting social, cultural, and political trajectories in the US and relationships to "home" and "homeland," nation, diaspora, history, and memory. Explores how racialization informs genders as well as sexualities. Emphasis on textual analysis. Taught in English.

Same as: CSRE 200, ILAC 280, ILAC 382

CHILATST 200R. Directed Research. 1-5 Unit.

CHILATST 200W. Directed Reading. 1-5 Unit.

(Staff).

CHILATST 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era. 5 Units.

How creative projects build and strengthen communities of common concern. Projects focus on cultural reclamation, multiculturalism, cultural equity and contemporary cultural wars, media literacy, independent film, and community-based art. Guest artists and organizers, films, and case studies.

Same as: CSRE 201B

CHILATST 201C. Critical Concepts in Chican@ Literature. 3-5 Units.

Combines primary texts of Chican@ literature with a metacritical interrogation of key concepts informing Chican@ literary criticism, the construction of Chican@ literary history, and a Chican@ literary canon. Interrogates the resistance paradigm and the "proper" subject of this literature, and critiques established genealogies and foundational authors and texts, as well as issues of periodization, including the notion of "emergence" (e.g. of feminist voices or dissident sexualities). Considers texts, authors and subjects that present alternatives to the resistance paradigm.

Same as: CSRE 201C, ILAC 380E

CHILATST 275B. Governance, Resistance, and Identity in Modern Mexico. 5 Units.

Surveys the history of governance, resistance, and identity formation in Mexico from the nineteenth century to the present. Explores Mexico's historical struggles to achieve political stability, economic prosperity, and social justice and examines how regional, class, ethnic, and gender differences have figured prominently in the shaping of Mexican affairs. Topics include Mexico's wars and their legacies, the power of the state, violence and protest, debates over the meaning of "Mexicanness," youth culture, and the politics of indigenismo.

Chinese General Courses

CHINGEN 10SC. The Cult of Happiness: Pursuing the Good Life in America and China. 2 Units.

The 2006 film *Pursuit of Happiness*, an unabashed celebration of the American Dream, was enthusiastically embraced by Chinese audiences. It seems that the pursuit of happiness has become truly globalized, even as the American Dream is slipping away for many. Are Americans still convinced that their conception of happiness is a self-evident truth and a universal gospel? Is there anything that Americans might learn about what it means to live a good life from not only the distant past, but also cultures in which happiness is conceptualized and sought after very differently? This course takes a multi-disciplinary approach to the question of happiness and invites undergraduate students to reflect on its relationship to virtue, wisdom, health, love, prosperity, justice, and solidarity. Giving equal weight to Chinese and Western sources, it seeks to defamiliarize some of the most deeply held ideas and values in American society through the lens of cross-cultural inquiry. nDuring the summer, students will read a selection of novels, memoirs, and reflections by philosophers, psychologists, and sociologists. In September, we will review these texts and place them alongside movies, short fiction, news stories, and social commentary while we interrogate the chimera of happiness. In addition to daily seminars, we will experiment with meditation, short-form life writing, and service learning with participation of local elders. Furthermore, there will be at least three guest speakers, including a prominent Confucian philosopher and a Stanford alum now running a happiness-related enterprise. nSophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

Same as: COMPLIT 10SC

CHINGEN 70N. Animal Planet and the Romance of the Species. 3-4 Units.

Preference to freshmen. This course considers a variety of animal characters in Chinese and Western literatures as potent symbols of cultural values and dynamic sites of ethical reasoning. What does pervasive animal imagery tell us about how we relate to the world and our neighbors? How do animals define the frontiers of humanity and mediate notions of civilization and culture? How do culture, institutions, and political economy shape concepts of human rights and animal welfare? And, above all, what does it mean to be human in the pluralistic and planetary 21st century?.

Same as: COMPLIT 70N

CHINGEN 73. Chinese Language, Culture, and Society. 4 Units.

Topics include the origin of Chinese, development of dialects, emergence of the standard, preferred formulaic expressions, the evolution of writing, and language policies in greater China. Prerequisite: CHINLANG 1 or 1B, or equivalent.

Same as: CHINGEN 173

CHINGEN 73N. Chinese Language, Culture, and Society. 4 Units.

Functions of languages in Chinese culture and society, origin of the Chinese language, genetic relations with neighboring languages, development of dialects, language contacts, evolution of Chinese writing, language policies in Greater China. Prerequisite: one quarter of Chinese 1 or 1B or equivalent recommended. Freshman seminar.

Same as: CHINGEN 170

CHINGEN 91. Introduction to China. 5 Units.

Required for Chinese and Japanese majors. Introduction to Chinese culture in a historical context. Topics include political and socioeconomic institutions, religion, ethics, education, and art and literature.

CHINGEN 95. Beauty and Decadence in China. 4-5 Units.

An inquiry into the conception of aesthetic beauty in China. Special attention to the coupling of aesthetics ("beauty") and morality ("goodness") in the visual and literary arts, as well as the frequent dissonance or rivalry between them.

Same as: CHINGEN 195

CHINGEN 101. How to Be Modern in China: A Gateway to the World Course. 3-4 Units.

A gateway course on China, with a focus on the politics of everyday life, in the capital city of Beijing. Introduction to the history and politics of modern China. The pleasures, frictions, and challenges of daily living in the penumbra of power in Beijing as reported, represented, and reflected upon in fiction, film, reportage, social commentary, and scholarly writings. Priority to those preparing to participate in BOSP-Beijing Program or returning from the program.

CHINGEN 118. Constructing National History in East Asian Archaeology. 3-5 Units.

Archaeological studies in contemporary East Asia share a common concern, to contribute to building a national narrative and cultural identity. This course focuses on case studies from China, Korea, and Japan, examining the influence of particular social-political contexts, such as nationalism, on the practice of archaeology in modern times.

Same as: ARCHLGY 135, ARCHLGY 235, CHINGEN 218

CHINGEN 119. Popular Culture and Casino Capitalism in China. 3-4 Units.

Examination of different forms of Chinese popular culture used to gauge or control fate and uncertainty, from geomancy and qigong to ghost culture and mahjong. Ways in which Chinese are incorporating these cultural forms into the informal economy to get rich quick: rotating credit associations, stock market speculation, pyramid schemes, underground lotteries, counterfeiting. Impact of casino capitalism on Chinese culture and social life today.

Same as: CHINGEN 219

CHINGEN 120. Soldiers and Bandits in Chinese Culture. 3-5 Units.

Social roles and literary images of two groups on the margins of traditional Chinese society; historical and comparative perspectives.

Same as: CHINGEN 220

CHINGEN 121. Classical Chinese Rituals. 3-5 Units.

Meanings of rituals regarding death, wedding, war, and other activities; historical transformations of classical rituals throughout the premodern period; legacy of the Chinese ritual tradition. Sources include canonical texts.

Same as: CHINGEN 221

CHINGEN 131. Chinese Poetry in Translation. 4 Units.

From the first millennium B.C. through the 12th century. Traditional verse forms representative of the classical tradition; highlights of the most distinguished poets. History, language, and culture. Chinese language not required.

Same as: CHINGEN 231

CHINGEN 132. Chinese Fiction and Drama in Translation. 4 Units.

From early times to the 18th century, emphasizing literary and thematic discussions of major works in English translation.

Same as: CHINGEN 232

CHINGEN 133. Literature in 20th-Century China. 4-5 Units.

(Graduate students register for 233.) How modern Chinese culture evolved from tradition to modernity; the century-long drive to build a modern nation state and to carry out social movements and political reforms. How the individual developed modern notions of love, affection, beauty, and moral relations with community and family. Sources include fiction and film clips. WIM course.

Same as: CHINGEN 233

CHINGEN 134. Early Chinese Mythology. 3-5 Units.

The definition of a myth. Major myths of China prior to the rise of Buddhism and Daoism including: tales of the early sage kings such as Yu and the flood; depictions of deities in the underworld; historical myths; tales of immortals in relation to local cults; and tales of the patron deities of crafts.

Same as: CHINGEN 234

CHINGEN 135. Chinese Bodies, Chinese Selves. 3-5 Units.

Interdisciplinary. The body as a contested site of representational practices, identity politics, cultural values, and social norms. Body images, inscriptions, and practices in relation to health, morality, gender, sexuality, nationalism, consumerism, and global capitalism in China and Taiwan. Sources include anthropological, literary, and historical studies, and fiction and film. No knowledge of Chinese required.

Same as: CHINGEN 235

CHINGEN 136. The Chinese Family. 3-5 Units.

History and literature. Institutional, ritual, affective, and symbolic aspects. Perspectives of gender, class, and social change.

Same as: CHINGEN 236

CHINGEN 137. Tiananmen Square: History, Literature, Iconography. 3-5 Units.

Multidisciplinary. Literary and artistic representations of this site of political and ideological struggles throughout the 20th century. Tiananmen-themed creative, documentary, and scholarly works that shed light on the dynamics and processes of modern Chinese culture and politics. No knowledge of Chinese required. Held in Knight Bldg. Rm. 18.

Same as: CHINGEN 237

CHINGEN 138. Love and Politics in Chinese Cinema. 4-5 Units.

How films work as expressions of desire, impulse, emotional connection, and communal attachment during times of social upheaval and reconstruction. Film theory and aesthetics, and alternative paradigms about world and social relations. Chinese language not required.

Same as: CHINGEN 238

CHINGEN 139. Cultural Revolution as Literature. 4 Units.

Literary form, aesthetic sensibility, and themes of trauma, identity, and the limits of representation in major literary works concerning the Cultural Revolution in China. Recommended: background in Chinese history or literature.

Same as: CHINGEN 239

CHINGEN 140. Chinese Justice: Law, Morality, and Literature. 3-5 Units.

Explores the relationship between law and morality in Chinese literature, culture, and society. Readings include court case romances, crime plays, detective novels, and legal dramas from traditional era and modern and contemporary periods. Prior coursework in Chinese history, civilization, or literature is recommended. All readings are in English.

Same as: CHINGEN 240

CHINGEN 141. Emergence of Chinese Civilization from Caves to Palaces. 3-4 Units.

Introduces processes of cultural evolution from the Paleolithic to the Three Dynasties in China. By examining archaeological remains, ancient inscriptions, and traditional texts, four major topics will be discussed: origins of modern humans, beginnings of agriculture, development of social stratification, and emergence of states and urbanism.

Same as: ARCHLGY 111, CHINGEN 241

CHINGEN 143. Images of Women in Ancient China and Greece. 3-5 Units.

(Formerly CLASSGEN 153/253.) Representation of women in ancient Chinese and Greek texts. How men viewed women and what women had to say about themselves and their societies. Primary readings in poetry, drama, and didactic writings. Relevance for understanding modern concerns; use of comparison for discovering historical and cultural patterns.

Same as: CHINGEN 243, CLASSICS 143, CLASSICS 243

CHINGEN 146. Gods, Ghosts, and Ancestors: Anthropology of Chinese Folk Religion. 3-5 Units.

Same as: CHINGEN 246

CHINGEN 150. Sex, Gender, and Power in Modern China. 3-5 Units.

Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English.

Same as: CHINGEN 250, FEMGEN 150, FEMGEN 250

CHINGEN 151. Manuscripts, Circulation of Texts, Printing. 3-4 Units.

History of texts before the advent of printing as well as during the early period of printing, focus on Tang and Song periods. Attention to the material existence of texts, their circulation, reading habits before and after printing, the balance between orality and writing, the role of memorization, and rewriting during textual transmission. Readings in English.

Same as: CHINGEN 251

CHINGEN 152. Beijing: Microcosm of Modern China. 3-4 Units.

Uses Beijing as a microcosm of China to examine the political, social, and cultural transformations of modern China. Explores critical issues affecting modern Chinese history and contemporary Chinese society through lectures, videos, presentations, and discussions.

Same as: CHINGEN 252

CHINGEN 155. Cultural Images in China-US Relations. 3-5 Units.

This course is designed to examine Chinese and American cultural images of each other during various historical periods and discuss the relationship between image building and policy orientations.

Same as: CHINGEN 255

CHINGEN 160. New Directions in the Study of Poetry and Literary Culture. 3-4 Units.

Inquiry into new approaches and interpretations of the poetic tradition in China in the context of cultural history. Readings in recent scholarship and criticism that situate poetry in print history, manuscript culture, gender studies, social history, etc. Readings in English. Reading knowledge of Chinese desirable but not required.

Same as: CHINGEN 260

CHINGEN 169. What is Chinese Theater? The Formation of a Tradition. 3-4 Units.

A survey of Chinese drama from its origins to late imperial China. Explores theories of the origins of Chinese drama, contrasting theories with the documented beginnings of theater and its first texts. How traditions turned into "elite theater" in the Ming and Qing dynasties, and how esthetic norms and moral values went into the process of theatrical transformation.

Same as: CHINGEN 269

CHINGEN 170. Chinese Language, Culture, and Society. 4 Units.

Functions of languages in Chinese culture and society, origin of the Chinese language, genetic relations with neighboring languages, development of dialects, language contacts, evolution of Chinese writing, language policies in Greater China. Prerequisite: one quarter of Chinese 1 or 1B or equivalent recommended. Freshman seminar.

Same as: CHINGEN 73N

CHINGEN 173. Chinese Language, Culture, and Society. 4 Units.

Topics include the origin of Chinese, development of dialects, emergence of the standard, preferred formulaic expressions, the evolution of writing, and language policies in greater China. Prerequisite: CHINLANG 1 or 1B, or equivalent.

Same as: CHINGEN 73

CHINGEN 193E. Female Divinities in China. 3-5 Units.

The role of powerful goddesses, such as the Queen Mother of the West, Guanyin, and Chen Jinggu, in Chinese religion. Imperial history to the present day. What roles goddesses played in the spirit world, how this related to the roles of human women, and why a civilization that excluded women from the public sphere granted them such a major, even dominant place, in the religious sphere. Readings in English-language secondary literature.

Same as: CHINGEN 393E

CHINGEN 194. The History and Culture of Peking Opera. 3-4 Units.

Explores the history and culture of Peking opera from its regional origins to a major national form. It will focus on genre formation, the professional and social position of actors and the political role of Peking opera. In addition to academic texts, we will read memoirs, biographies and watch videos and movies.

Same as: CHINGEN 294

CHINGEN 195. Beauty and Decadence in China. 4-5 Units.

An inquiry into the conception of aesthetic beauty in China. Special attention to the coupling of aesthetics ("beauty") and morality ("goodness") in the visual and literary arts, as well as the frequent dissonance or rivalry between them.

Same as: CHINGEN 95

CHINGEN 196. The Culture of Entertainment in China. 3-4 Units.

Sophisticated, organized entertainment in China is evident at least as early as the second century B.C. in the court spectacles described in the early histories and in the depictions of jugglers, dancers and acrobats represented in tomb reliefs. The importance attached to entertainment from ancient times both at court and in society at large is manifest not just in the establishment of imperial institutions such as the Music Bureau, but also in the appearance of large entertainment districts within the cities where people would invest extraordinary amount of resources in the pursuit of pleasure, and in small scale gatherings. This class will look at the representation of play and pleasure in Chinese culture from a variety of sources (art, history, literature and performance) in different periods of Chinese history. In the process we will address the place of pleasure in Chinese culture, as well as ethical, socio-political and economical concerns. Held in old Knight Bldg., 521 Memorial Way, Rm. 102.

Same as: CHINGEN 296

CHINGEN 198. Senior Colloquium in Chinese Studies. 1 Unit.

Students research, write, and present a capstone essay or honors thesis.

CHINGEN 200. Directed Readings in Asian Languages. 1-12 Unit.

For Chinese literature. Prerequisite: consent of instructor. (Staff).

CHINGEN 201. Teaching Chinese Humanities. 1 Unit.

Prepares graduate students to teach humanities at the undergraduate level. Topics include syllabus development and course design, techniques for generating discussion, effective grading practices, and issues particular to the subject matter.

CHINGEN 218. Constructing National History in East Asian Archaeology. 3-5 Units.

Archaeological studies in contemporary East Asia share a common concern, to contribute to building a national narrative and cultural identity. This course focuses on case studies from China, Korea, and Japan, examining the influence of particular social-political contexts, such as nationalism, on the practice of archaeology in modern times.

Same as: ARCHLGY 135, ARCHLGY 235, CHINGEN 118

CHINGEN 219. Popular Culture and Casino Capitalism in China. 3-4 Units.

Examination of different forms of Chinese popular culture used to gauge or control fate and uncertainty, from geomancy and qigong to ghost culture and mahjong. Ways in which Chinese are incorporating these cultural forms into the informal economy to get rich quick: rotating credit associations, stock market speculation, pyramid schemes, underground lotteries, counterfeiting. Impact of casino capitalism on Chinese culture and social life today.

Same as: CHINGEN 119

CHINGEN 220. Soldiers and Bandits in Chinese Culture. 3-5 Units.

Social roles and literary images of two groups on the margins of traditional Chinese society; historical and comparative perspectives.

Same as: CHINGEN 120

CHINGEN 221. Classical Chinese Rituals. 3-5 Units.

Meanings of rituals regarding death, wedding, war, and other activities; historical transformations of classical rituals throughout the premodern period; legacy of the Chinese ritual tradition. Sources include canonical texts.

Same as: CHINGEN 121

CHINGEN 231. Chinese Poetry in Translation. 4 Units.

From the first millennium B.C. through the 12th century. Traditional verse forms representative of the classical tradition; highlights of the most distinguished poets. History, language, and culture. Chinese language not required.

Same as: CHINGEN 131

CHINGEN 232. Chinese Fiction and Drama in Translation. 4 Units.

From early times to the 18th century, emphasizing literary and thematic discussions of major works in English translation.

Same as: CHINGEN 132

CHINGEN 233. Literature in 20th-Century China. 4-5 Units.

(Graduate students register for 233.) How modern Chinese culture evolved from tradition to modernity; the century-long drive to build a modern nation state and to carry out social movements and political reforms. How the individual developed modern notions of love, affection, beauty, and moral relations with community and family. Sources include fiction and film clips. WIM course.

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The definition of a myth. Major myths of China prior to the rise of Buddhism and Daoism including: tales of the early sage kings such as Yu and the flood; depictions of deities in the underworld; historical myths; tales of immortals in relation to local cults; and tales of the patron deities of crafts.

Same as: CHINGEN 134

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Interdisciplinary. The body as a contested site of representational practices, identity politics, cultural values, and social norms. Body images, inscriptions, and practices in relation to health, morality, gender, sexuality, nationalism, consumerism, and global capitalism in China and Taiwan.

Sources include anthropological, literary, and historical studies, and fiction and film. No knowledge of Chinese required.

Same as: CHINGEN 135

CHINGEN 236. The Chinese Family. 3-5 Units.

History and literature. Institutional, ritual, affective, and symbolic aspects. Perspectives of gender, class, and social change.

Same as: CHINGEN 136

CHINGEN 237. Tiananmen Square: History, Literature, Iconography. 3-5 Units.

Multidisciplinary. Literary and artistic representations of this site of political and ideological struggles throughout the 20th century. Tiananmen-themed creative, documentary, and scholarly works that shed light on the dynamics and processes of modern Chinese culture and politics. No knowledge of Chinese required. Held in Knight Bldg. Rm. 18.

Same as: CHINGEN 137

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How films work as expressions of desire, impulse, emotional connection, and communal attachment during times of social upheaval and reconstruction. Film theory and aesthetics, and alternative paradigms about world and social relations. Chinese language not required.

Same as: CHINGEN 138

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Literary form, aesthetic sensibility, and themes of trauma, identity, and the limits of representation in major literary works concerning the Cultural Revolution in China. Recommended: background in Chinese history or literature.

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Introduces processes of cultural evolution from the Paleolithic to the Three Dynasties in China. By examining archaeological remains, ancient inscriptions, and traditional texts, four major topics will be discussed: origins of modern humans, beginnings of agriculture, development of social stratification, and emergence of states and urbanism.

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Same as: CHINGEN 143, CLASSICS 143, CLASSICS 243

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Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English.

Same as: CHINGEN 150, FEMGEN 150, FEMGEN 250

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History of texts before the advent of printing as well as during the early period of printing, focus on Tang and Song periods. Attention to the material existence of texts, their circulation, reading habits before and after printing, the balance between orality and writing, the role of memorization, and rewriting during textual transmission. Readings in English.

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CHINGEN 252. Beijing: Microcosm of Modern China. 3-4 Units.

Uses Beijing as a microcosm of China to examine the political, social, and cultural transformations of modern China. Explores critical issues affecting modern Chinese history and contemporary Chinese society through lectures, videos, presentations, and discussions.

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CHINGEN 255. Cultural Images in China-US Relations. 3-5 Units.

This course is designed to examine Chinese and American cultural images of each other during various historical periods and discuss the relationship between image building and policy orientations.

Same as: CHINGEN 155

CHINGEN 260. New Directions in the Study of Poetry and Literary Culture. 3-4 Units.

Inquiry into new approaches and interpretations of the poetic tradition in China in the context of cultural history. Readings in recent scholarship and criticism that situate poetry in print history, manuscript culture, gender studies, social history, etc. Readings in English. Reading knowledge of Chinese desirable but not required.

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A survey of Chinese drama from its origins to late imperial China. Explores theories of the origins of Chinese drama, contrasting theories with the documented beginnings of theater and its first texts. How traditions turned into "elite theater" in the Ming and Qing dynasties, and how esthetic norms and moral values went into the process of theatrical transformation.

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Explores the history and culture of Peking opera from its regional origins to a major national form. It will focus on genre formation, the professional and social position of actors and the political role of Peking opera. In addition to academic texts, we will read memoirs, biographies and watch videos and movies.

Same as: CHINGEN 194

CHINGEN 296. The Culture of Entertainment in China. 3-4 Units.

Sophisticated, organized entertainment in China is evident at least as early as the second century B.C. in the court spectacles described in the early histories and in the depictions of jugglers, dancers and acrobats represented in tomb reliefs. The importance attached to entertainment from ancient times both at court and in society at large is manifest not just in the establishment of imperial institutions such as the Music Bureau, but also in the appearance of large entertainment districts within the cities where people would invest extraordinary amount of resources in the pursuit of pleasure, and in small scale gatherings. This class will look at the representation of play and pleasure in Chinese culture from a variety of sources (art, history, literature and performance) in different periods of Chinese history. In the process we will address the place of pleasure in Chinese culture, as well as ethical, socio-political and economical concerns. Held in old Knight Bldg., 521 Memorial Way, Rm. 102.

Same as: CHINGEN 196

CHINGEN 393E. Female Divinities in China. 3-5 Units.

The role of powerful goddesses, such as the Queen Mother of the West, Guanyin, and Chen Jinggu, in Chinese religion. Imperial history to the present day. What roles goddesses played in the spirit world, how this related to the roles of human women, and why a civilization that excluded women from the public sphere granted them such a major, even dominant place, in the religious sphere. Readings in English-language secondary literature.

Same as: CHINGEN 193E

Chinese Language Courses

CHINLANG 1. First-Year Modern Chinese, First Quarter. 5 Units.

Conversation, grammar, reading, elementary composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements.

CHINLANG 1B. First-Year Modern Chinese for Bilingual Students, First Quarter. 3 Units.

For students with elementary comprehension and speaking skills who need work on conversation, grammar, reading, and composition.

CHINLANG 2. First-Year Modern Chinese, Second Quarter. 5 Units.

Continuation of CHINLANG 1. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: placement test, CHINLANG 1.

CHINLANG 2B. First-Year Modern Chinese for Bilingual Students, Second Quarter. 3 Units.

Continuation of CHINLANG 1B. For students with elementary comprehension and speaking skills who need work on conversation, grammar, reading, and composition. Prerequisite: Placement Test, CHINLANG 1B.

CHINLANG 3. First-Year Modern Chinese, Third Quarter. 5 Units.

Continuation of CHINLANG 2. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Fulfills the University language requirement. Prerequisite: Placement Test, CHINLANG 2.

CHINLANG 3B. First-Year Modern Chinese for Bilingual Students, Third Quarter. 3 Units.

Continuation of CHINLANG 2B. For students with elementary comprehension and speaking skills who need work on conversation, grammar, reading, and composition. Prerequisite: Placement Test, CHINLANG 2B or consent of instructor. Fulfills University language requirement.

CHINLANG 5. Intensive First-Year Modern Chinese. 8 Units.

Equivalent to 1,2,3 combined if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University.

CHINLANG 6. Beginning Conversational Chinese, First Quarter. 2 Units.

Three quarter sequence. Basic language skills in Mandarin to function abroad.

CHINLANG 7. Beginning Conversational Chinese, Second Quarter. 2 Units.

Continuation of CHINLANG 6. Basic language skills in Mandarin to function abroad. Prerequisite: CHINLANG 6.

CHINLANG 8. Beginning Conversational Chinese, Third Quarter. 2 Units.

Continuation of CHINLANG 7. Basic language skills in Mandarin to function abroad. Prerequisite: CHINLANG 7.

CHINLANG 10. Beginning Southern Min (Taiwanese) Conversation, First Quarter. 2 Units.

Three quarter sequence. Basic language skills for everyday life situations.

CHINLANG 11. Beginning Southern Min (Taiwanese) Conversation, Second Quarter. 2 Units.

Continuation of CHINLANG 10. Prerequisite: CHINLANG 10.

CHINLANG 12. Beginning Southern Min (Taiwanese) Conversation, Third Quarter. 2 Units.

Continuation of 11. Prerequisite: 11.

CHINLANG 13A. Intermediate Southern Min (Taiwanese) Conversation, First Quarter. 2 Units.

Continuation of CHINLANG 12. Vocabulary including business-related terms, grammatical structures, and spontaneous conversations. Prerequisite: CHINLANG 12.

CHINLANG 13B. Intermediate Southern Min (Taiwanese) Conversation, Second Quarter. 2 Units.

Continuation of CHINLANG 13A. Vocabulary including business-related terms, grammatical structures, and spontaneous conversations. Prerequisite: CHINLANG 13A.

CHINLANG 13C. Intermediate Southern Min (Taiwanese) Conversation, Third Quarter. 2 Units.

Continuation of CHINLANG 13B. Vocabulary including business-related terms, grammatical structures, and spontaneous conversations. Prerequisite: CHINLANG 13B.

CHINLANG 15. Beginning Conversational Cantonese, First Quarter. 2 Units.

This is the first of the 3-course series on beginning Cantonese. The primary objective of the beginning series is to help students build up a repertoire of vocabulary and basic grammatical structures so that they can: (a) introduce themselves in an informal social situation, (b) engage in simple transactions, (c) converse about themselves, their friends and families, and (d) talk about activities in daily lives. Authentic materials such as Cantopop and movie clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim-sum restaurant, or a Cantonese community every quarter to experience Cantonese culture.

CHINLANG 15M. Beginning Conversational Cantonese for Mandarin Speakers, First Quarter. 2 Units.

This is the first of the 3-course series on beginning Cantonese for Mandarin speakers. The primary objective of the beginning series is to help students build up a repertoire of vocabulary so that they can: (a) introduce themselves in an informal social situation, (b) engage in simple transactions, (c) converse about themselves, their friends and families, and (d) talk about activities in daily lives. Authentic materials such as Cantopop and movie clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. In addition, students work on common pronunciation and grammatical errors due to influences from Mandarin. Cantonese-Chinese characters will also be taught.

CHINLANG 16. Beginning Cantonese Conversation, Second Quarter. 2 Units.

Continuation of CHINLANG 15. This is the second of the 3-course series on beginning Cantonese. The primary objective of the beginning series is to help students build up a repertoire of vocabulary and basic grammatical structures so that they can: (a) introduce themselves in an informal social situation, (b) engage in simple transactions, (c) converse about themselves, their friends and families, and (d) talk about activities in daily lives. Authentic materials such as Cantopop and movie clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim-sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 15.

CHINLANG 16M. Beginning Conversational Cantonese for Mandarin Speakers, Second Quarter. 2 Units.

Continuation of CHINLANG 15M. This is the second of the 3-course series on beginning Cantonese for Mandarin speakers. The primary objective of the beginning series is to help students build up a repertoire of vocabulary so that they can: (a) introduce themselves in an informal social situation, (b) engage in simple transactions, (c) converse about themselves, their friends and families, and (d) talk about activities in daily lives. Authentic materials such as Cantopop and movie clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. In addition, students work on common pronunciation and grammatical errors due to influences from Mandarin. Cantonese-Chinese characters will also be taught. Prerequisite: CHINLANG 15M.

CHINLANG 17. Beginning Conversational Cantonese, Third Quarter. 2 Units.

Continuation of CHINLANG 16. This is the third of the 3-course series on beginning Cantonese. The primary objective of the beginning series is to help students build up a repertoire of vocabulary and basic grammatical structures so that they can: (a) introduce themselves in an informal social situation, (b) engage in simple transactions, (c) converse about themselves, their friends and families, and (d) talk about activities in daily lives. Authentic materials such as Cantopop and movie clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim-sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 16.

CHINLANG 17M. Beginning Conversational Cantonese for Mandarin Speakers, Third Quarter. 2 Units.

Continuation of CHINLANG 16M. This is the third of the 3-course series on beginning Cantonese for Mandarin speakers. The primary objective of the beginning series is to help students build up a repertoire of vocabulary so that they can: (a) introduce themselves in an informal social situation, (b) engage in simple transactions, (c) converse about themselves, their friends and families, and (d) talk about activities in daily lives. Authentic materials such as Cantopop and movie clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. In addition, students work on common pronunciation and grammatical errors due to influences from Mandarin. Cantonese-Chinese characters will also be taught. Prerequisite: CHINLANG 16M.

CHINLANG 18. Intermediate Cantonese Conversation, First Quarter. 2 Units.

Continuation of CHINLANG 17. This is the first of the 3-course series on intermediate Cantonese. The primary objective of the intermediate series is to help students acquire the vocabulary: (a) to engage in conversations about less concrete topics, (b) to give directions and instructions, and (c) to carry out transactions in linguistically unfamiliar situations. Students will work on more complex grammar that allows them to express their ideas in a variety of sentence structures. Authentic materials such as Cantopop, movies, and news clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 17.

CHINLANG 19. Intermediate Conversational Cantonese, Second Quarter. 2 Units.

Continuation of CHINLANG 18. This is the second of the 3-course series on intermediate Cantonese. The primary objective of the intermediate series is to help students acquire the vocabulary: (a) to engage in conversations about less concrete topics, (b) to give directions and instructions, and (c) to carry out transactions in linguistically unfamiliar situations. Students will work on more complex grammar that allows them to express their ideas in a variety of sentence structures. Authentic materials such as Cantopop, movies, and news clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 18.

CHINLANG 20. Intermediate Conversational Cantonese, Third Quarter. 2 Units.

Continuation of CHINLANG 19. This is the third of the 3-course series on intermediate Cantonese. The primary objective of the intermediate series is to help students acquire the vocabulary: (a) to engage in conversations about less concrete topics, (b) to give directions and instructions, and (c) to carry out transactions in linguistically unfamiliar situations. Students will work on more complex grammar that allows them to express their ideas in a variety of sentence structures. Authentic materials such as Cantopop, movies, and news clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 19.

CHINLANG 20A. Advanced Conversational Cantonese, First Quarter. 2 Units.

Continuation of CHINLANG 20. This is the first of the 3-course series on advanced Cantonese. The primary objective of the advanced series is to help students become proficient speakers so that they can talk about a wide range of topics: students (a) review movies, (b) describe their communities, (c) narrate events in different time frames, and (d) talk about current events and topics of interest to them. Linguistic structures for textual cohesion, subordinating and coordinating sentences, and foregrounding and backgrounding information are emphasized. Authentic materials such as movies and news clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 20.

CHINLANG 20B. Advanced Conversational Cantonese, Second Quarter. 2 Units.

Continuation of CHINLANG 20A. This is the second of the 3-course series on advanced Cantonese. The primary objective of the advanced series is to help students become proficient speakers so that they can talk about a wide range of topics: students (a) review movies, (b) describe their communities, (c) narrate events in different time frames, and (d) talk about current events and topics of interest to them. Linguistic structures for textual cohesion, subordinating and coordinating sentences, and foregrounding and backgrounding information are emphasized. Authentic materials such as movies and news clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 20A.

CHINLANG 20C. Advanced Cantonese Conversation - Third Quarter. 2 Units.

Continuation of CHINLANG 20B. This is the third of the 3-course series on advanced Cantonese. The primary objective of the advanced series is to help students become proficient speakers so that they can talk about a wide range of topics: students (a) review movies, (b) describe their communities, (c) narrate events in different time frames, and (d) talk about current events and topics of interest to them. Linguistic structures for textual cohesion, subordinating and coordinating sentences, and foregrounding and backgrounding information are emphasized. Authentic materials such as movies and news clips are incorporated in the courses and Internet tools are used to enhance learning. There is also an optional field trip to a karaoke bar, a dim sum restaurant, or a Cantonese community every quarter to experience Cantonese culture. Prerequisite: CHINLANG 20B.

CHINLANG 21. Second-Year Modern Chinese, First Quarter. 5 Units.

Continuation of CHINLANG 3. Grammar, reading, conversation, composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: Placement Test, CHINLANG 3.

CHINLANG 21B. Second-Year Modern Chinese for Bilingual Students, First Quarter. 3 Units.

Continuation of CHINLANG 3B. For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Equivalent to CHINLANG 21. Prerequisite: Placement Test, CHINLANG 3B.

CHINLANG 22. Second-Year Modern Chinese, Second Quarter. 5 Units.

Continuation of CHINLANG 21. Grammar, reading, conversation, composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: Placement Test, CHINLANG 21.

CHINLANG 22B. Second-Year Chinese for Bilingual Students, Second Quarter. 3 Units.

Continuation of CHINLANG 21B. For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Prerequisite: Placement Test, CHINLANG 21B.

CHINLANG 23. Second-Year Modern Chinese, Third Quarter. 5 Units.

Continuation of CHINLANG 22. Grammar, reading, conversation, composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: Placement Test, CHINLANG 22.

CHINLANG 23B. Second-Year Chinese for Bilingual Students, Third Quarter. 3 Units.

Continuation of CHINLANG 22B. For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Prerequisite: Placement Test, CHINLANG 22B.

CHINLANG 25. Intensive Second-Year Modern Chinese. 8 Units.
Equivalent to 21,22,23 combined if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 3 or equivalent.

CHINLANG 27. Intermediate Chinese Conversation, First Quarter. 2 Units.

This course is designed for students with basic conversational skills in Mandarin Chinese. It focuses on developing learners communicative competence in Chinese by means of language practices, oral reports, discussions and group projects. The students will learn functional language skills for daily communication, and study a variety of topics related to school life, Chinese culture and society. Prerequisite: CHINLANG 3.

CHINLANG 28. Intermediate Chinese Conversation, Second Quarter. 2 Units.

This course is designed for students with basic conversational skills in Mandarin Chinese. It focuses on developing learners' communicative competence in Chinese by means of language practices, oral reports, discussions and group projects. The students will learn functional language skills for daily communication, and study a variety of topics related to school life, Chinese culture and society. Continuation of CHINLANG 27. Prerequisite: CHINLANG 27. Consent of instructor.

CHINLANG 29. Intermediate Chinese Conversation, Third Quarter. 2 Units.

This course is designed for students with basic conversational skills in Mandarin Chinese. It focuses on developing learners' communicative competence in Chinese by means of language practices, oral reports, discussions and group projects. The students will learn functional language skills for daily communication, and study a variety of topics related to school life, Chinese culture and society. Continuation of CHINLANG 28. Prerequisite: CHINLANG 28. Consent of instructor.

CHINLANG 31E. Accelerated Beginning Mandarin for Engineering Students, First Quarter. 4 Units.

Restricted to engineering students participating in the China Internship Program. Grad students enroll in CHINLANG 331E.

CHINLANG 33G. Accelerated Beginning Mandarin III. 4 Units.

For GSB students only.

CHINLANG 41. Intermediate-to-Advanced Chinese Conversation, First Quarter. 2 Units.

Repeatable once for units. Prerequisite: CHINLANG 23.

CHINLANG 42. Intermediate-to-Advanced Chinese Conversation, Second Quarter. 2 Units.

Continuation of CHINLANG 41. Repeatable once for units. Prerequisite: CHINLANG 41.

CHINLANG 43. Intermediate-to-Advanced Chinese Conversation, Third Quarter. 2 Units.

Continuation of CHINLANG 42. Repeatable once for units. Prerequisite: CHINLANG 42.

CHINLANG 99. Language Specials. 1-5 Unit.

Prerequisite: consent of instructor. (Staff).

CHINLANG 101. Third-Year Modern Chinese, First Quarter. 5 Units.

Continuation of CHINLANG 23. Written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural topics; newspaper reports, radio, and TV broadcasts and films; online Chinese software and email network to facilitate study. Prerequisite: Placement Test, CHINLANG 23.

CHINLANG 101B. Third-Year Modern Chinese for Bilingual Students, First Quarter. 3 Units.

Continuation of CHINLANG 23B. Equivalent to CHINLANG 101. For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Prerequisite: Placement Test, CHINLANG 23B.

CHINLANG 102. Third-Year Modern Chinese, Second Quarter. 5 Units.

Continuation of CHINLANG 101. Written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural topics; newspaper reports, radio, and TV broadcasts and films; online Chinese software and email network to facilitate study. Prerequisite: Placement Test, CHINLANG 101.

CHINLANG 102B. Third-Year Modern Chinese for Bilingual Students, Second Quarter. 3 Units.

Continuation of CHINLANG 101B. Equivalent to CHINLANG 102. For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Prerequisite: Placement Test, CHINLANG 101B.

CHINLANG 103. Third-Year Modern Chinese, Third Quarter. 5 Units.

Continuation of CHINLANG 102. Written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural topics; newspaper reports, radio, and TV broadcasts and films; online Chinese software and email network to facilitate study. Prerequisite: Placement Test, CHINLANG 102.

CHINLANG 103B. Third-Year Modern Chinese for Bilingual Students, Third Quarter. 3 Units.

Continuation of CHINLANG 102B. Equivalent of CHINLANG 103. For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Prerequisite: CHINLANG 102B.

CHINLANG 105. Intensive Third-Year Modern Chinese. 8 Units.

Equivalent to 101,102,103 combined if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 23 or equivalent.

CHINLANG 121. Advanced Chinese Conversation, First Quarter. 2 Units.

Continuation of CHINLANG 29. This is the first quarter of a three-quarter sequence designed for students who have completed Third-year Chinese, or its equivalent, and wish to continue to develop their speaking and listening skills. Content for the course is drawn from a wide variety of current multimedia materials. Topics include general interest and social issues, international relations, and others that lend themselves to lively and in-depth discussion. New grammatical structures and vocabulary will be regularly introduced, with occasional written assignments to support students, development of conversational skills. Placement Test, CHINLANG 103.

CHINLANG 122. Advanced Chinese Conversation, Second Quarter. 2 Units.

Continuation of CHINLANG 121. Second quarter of Advanced Conversational Chinese. It is designed for students who have completed Third-year Chinese, or its equivalent, and wish to continue to develop their speaking and listening skills. Content for the course is drawn from a wide variety of current multimedia materials. Topics include general interest and social issues, international relations, and others that lend themselves to lively and in-depth discussion. New grammatical structures and vocabulary will be regularly introduced, with occasional written assignments to support students, development of conversational skills. Prerequisite: CHINLANG 121.

CHINLANG 123. Advanced Chinese Conversation, Third Quarter. 2 Units.

Continuation of CHINLANG 122. Third quarter of Advanced Conversational Chinese. It is designed for students who have completed Third-year Chinese, or its equivalent, and wish to continue to develop their speaking and listening skills. Content for the course is drawn from a wide variety of current multimedia materials. Topics include general interest and social issues, international relations, and others that lend themselves to lively and in-depth discussion. New grammatical structures and vocabulary will be regularly introduced, with occasional written assignments to support students' development of conversational skills. Prerequisite: CHINLANG 122.

CHINLANG 131. Business Chinese, First Quarter. 3-4 Units.

Commercial, economic, and business-related vocabulary. Materials include formal business conversations, newspaper and journal articles, and TV news on trade and economic. Technical language and business etiquette. Student oral and written reports on their own research regarding recent economic developments, using sources in China. Prerequisite: CHINLANG 103 or equivalent.

CHINLANG 132. Business Chinese, Second Quarter. 3-4 Units.

Continuation of CHINLANG 131. Commercial, economic, and business-related vocabulary. Materials include formal business conversations, newspaper and journal articles, and TV news on trade and economic. Technical language and business etiquette. Student oral and written reports on their own research regarding recent economic developments, using sources in China. Prerequisite: CHINLANG 131.

CHINLANG 133. Business Chinese, Third Quarter. 3-4 Units.

Continuation of CHINLANG 132. Commercial, economic, and business-related vocabulary. Materials include formal business conversations, newspaper and journal articles, and TV news on trade and economic. Technical language and business etiquette. Student oral and written reports on their own research regarding recent economic developments, using sources in China. Prerequisite: CHINLANG 132.

CHINLANG 199. Individual Reading. 1-5 Unit.

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CHINLANG 200. Directed Reading. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

CHINLANG 205S. Intensive Third-Year Modern Chinese. 7 Units.

Equivalent to 101, 102, 103 if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 23 or equivalent. Grads only.

CHINLANG 211. Fourth-Year Modern Chinese, First Quarter. 5 Units.

Continuation of CHINLANG 103. This is the first quarter of a three-quarter sequence designed for students with advanced-level proficiency in Chinese. Discussions are based on short stories, essays and newspaper articles, and academic journal articles. Emphasis is on social and cultural issues in contemporary China. Students will learn speed-reading techniques and explore more subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language. Having completed one year of study at this level, students will acquire sufficient skills in reading, writing, and speaking on various topics of personal, or academic, interest more effectively and accurately. Prerequisite: placement test, CHINLANG 103.

CHINLANG 211B. Fourth-Year Modern Chinese for Bilingual Students, First Quarter. 3 Units.

Continuation of CHINLANG 103B. This is the first quarter of a three-quarter sequence designed for bilingual students with advanced-level proficiency in Chinese. Discussions are based on short stories, essays and newspaper articles, along with related media materials. Emphasis is on social and cultural issues in contemporary China. Students will learn speed-reading techniques and explore more subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language. Having completed one year of study at this level, students will acquire sufficient skills in reading, writing, and speaking on various topics of personal, or public, interests more effectively and accurately. Prerequisite: CHINLANG 103B.

CHINLANG 212. Fourth-Year Modern Chinese, Second Quarter. 5 Units.

Continuation of CHINLANG 211. Second quarter of fourth year Chinese. Discussions are based on short stories, essays and newspaper articles, and academic journal articles. Emphasis is on social and cultural issues in contemporary China. Students will learn speed-reading techniques and explore more subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language. Having completed one year of study at this level, students will acquire sufficient skills in reading, writing, and speaking on various topics of personal or academic interest more effectively and accurately. Prerequisite: Placement Test, CHINLANG 211.

CHINLANG 212B. Fourth-Year Modern Chinese for Bilingual Students, Second Quarter. 3 Units.

Continuation of CHINLANG 211B. Second quarter of Fourth Year Chinese for bilingual students. Discussions are based on short stories, essays and newspaper articles, along with related media materials. Emphasis is on social and cultural issues in contemporary China. Students will learn speed-reading techniques and explore more subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language. Having completed one year of study at this level, students will acquire sufficient skills in reading, writing, and speaking on various topics of personal, or public, interests more effectively and accurately. Prerequisite: CHINLANG 211B.

CHINLANG 213. Fourth-Year Modern Chinese, Third Quarter. 5 Units.

Continuation of CHINLANG 212. Third quarter of Fourth Year Chinese. Discussions are based on short stories, essays and newspaper articles, and academic journal articles. Emphasis is on social and cultural issues in contemporary China. Students will learn speed-reading techniques and explore more subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language. Having completed one year of study at this level, students will acquire sufficient skills in reading, writing, and speaking on various topics of personal, or academic, interests more effectively and accurately. Prerequisite: Placement Test, CHINLANG 212.

CHINLANG 213B. Fourth-Year Modern Chinese for Bilingual Students, Third Quarter. 3 Units.

Continuation of CHINLANG 212B. Third quarter of Fourth Year Chinese for bilingual students. Discussions are based on short stories, essays and newspaper articles, along with related media materials. Emphasis is on social and cultural issues in contemporary China. Students will learn speed-reading techniques and explore more subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language. Having completed one year of study at this level, students will acquire sufficient skills in reading, writing, and speaking on various topics of personal, or public, interests more effectively and accurately. Prerequisite: CHINLANG 212B.

CHINLANG 231. Fifth-Year Modern Chinese: Cultural China, First Quarter. 4 Units.

Continuation of CHINLANG 213. Year-long sequence. Rhetorical devices through essays about China's cultural journey in relationship to geographical regions. Prerequisite: CHINLANG 213, 223B.

CHINLANG 232. Fifth-Year Modern Chinese: Cultural China, Second Quarter. 4 Units.

Continuation of CHINLANG 231. Year-long sequence. Rhetorical devices through essays about China's cultural journey in relationship to geographical regions. Prerequisite: CHINLANG 231.

CHINLANG 233. Fifth-Year Modern Chinese: Cultural China, Third Quarter. 4 Units.

Continuation of CHINLANG 232. Year-long sequence. Rhetorical devices through essays about China's cultural journey in relationship to geographical regions. Prerequisite: CHINLANG 232.

CHINLANG 331E. Accelerated Beginning Mandarin for Engineering Students, First Quarter. 2-5 Units.

Restricted to graduate engineering students participating in the China Internship Program.

CHINLANG 394. Graduate Studies in Chinese Conversation. 1-3 Unit.

Prerequisite: consent of instructor.

CHINLANG 395. Graduate Studies in Chinese. 1-5 Unit.

Prerequisite: consent of instructor.

Chinese Literature Courses

CHINLIT 93. Late Imperial China. 3 Units.

(Same as HISTORY 193. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: FEMGEN 93, HISTORY 93

CHINLIT 125. Beginning Classical Chinese, First Quarter. 2-5 Units.

Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127 to satisfy Chinese major requirements must begin with 125. Prerequisite: CHINLANG 23 or equivalent.

Same as: CHINLIT 205

CHINLIT 126. Beginning Classical Chinese, Second Quarter. 2-5 Units.

Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 125/205 or equivalent.

Same as: CHINLIT 206

CHINLIT 127. Beginning Classical Chinese, Third Quarter. 2-5 Units.

Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 126/206 or equivalent.

Same as: CHINLIT 207

CHINLIT 130. Lyrical and Local Prose. 3-5 Units.

Informal and personal prose of Tang and Song dynasties, with special attention to lyrical expression (prose as close alternative to poetry) and local interest (e.g., in travel diaries). These new uses and styles of prose will be compared with more formal expository prose and with poetry written by the same authors, to better understand the distribution of expressive aims and effects. Prerequisite: Classical Chinese or advanced reading knowledge of Chinese.

Same as: CHINLIT 230

CHINLIT 132. Chinese Biographies of Women. 2-5 Units.

Generic and historical analysis of the two-millennia long biographical tradition inaugurated by Liu Xiang, ca. 79-8 B.C.E. Chinese women's history, intellectual history, historiography, and literary studies.

Same as: CHINLIT 232

CHINLIT 135. Ghost Stories and Other Strange Tales. 3-4 Units.

Study of the zhiguai tradition, with readings in landmark collections from different dynastic periods (e.g., Tang, Song, Qing). Consideration of the cultural significance as well as the literary qualities of this tradition of storytelling in China. Readings in English.

Same as: CHINLIT 235

CHINLIT 155. Classical Poetry: Reading, Theory, Interpretation. 4 Units.

Introduction to the reading and interpretation of classical Chinese poetry, with attention to the language of poetry, aesthetics, expressive purposes, and social roles. Readings in Chinese. Prerequisite: three years of modern Chinese or equivalent.

Same as: CHINLIT 255

CHINLIT 165. Major Figures in Classical Chinese Poetry. 4 Units.

Focus is on a major poet and relationships to previous and later poetry. Poetic form, including meter and rhyme schemes. Historical context. This year's poet is Du Fu. Prerequisite: 3 years Modern Chinese or equivalent.

Same as: CHINLIT 265

CHINLIT 166. Chinese Ci Poetry (Song Lyrics). 3-4 Units.

Introduction to poetry in the ci "song lyrics" form. This year the focus is on song lyrics of Li Qingzhao (1084-1150s), read against song lyrics composed by male writers of her day. Attention to the special challenges she faced as a woman writer, and the ways that the tradition struggled to accommodate this "talented woman." Prerequisite: Classical Chinese or advanced reading knowledge of Chinese.

Same as: CHINLIT 266

CHINLIT 174. Modern Chinese Novel: Theory, Aesthetics, History. 4 Units.

From the May Fourth movement to the 40s. Themes include enlightenment, democracy, women's liberation, revolution, war, urban culture, and love.

Prerequisite: advanced Chinese.

Same as: CHINLIT 274, COMPLIT 254

CHINLIT 189A. Honors Research. 2-5 Units.

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CHINLIT 189B. Honors Research. 5 Units.

Open to senior honors students to write thesis.

CHINLIT 190. Chinese Cultural Revolution: Performance, Politics, and Aesthetics. 4 Units.

Events, arts, films, and operas of the Chinese Cultural Revolution. Analysis of political passion, aesthetics, and psychology of mass movements. Places the Cultural Revolution in the long-range context of art, social movements, and politics. Chinese language is not required.

Same as: CHINLIT 290, COMPLIT 135

CHINLIT 191. The Structure of Modern Chinese. 2-4 Units.

Focus is on syntax and semantics. Prerequisite: CHINLANG 3 or equivalent, or consent of instructor.

Same as: CHINLIT 291

CHINLIT 192. The History of Chinese. 4 Units.

Emphasis is on syntactic and semantic changes in the last 2,000 years and grammaticalization. Students use a computer corpus to do research on the history of Chinese. Prerequisite: 126 or consent of instructor.

Same as: CHINLIT 292

CHINLIT 199. Individual Reading in Chinese. 1-4 Unit.

Asian Language majors only. Prerequisite: CHINLANG 103 or consent of instructor. Units by arrangement.

CHINLIT 200. Directed Reading in Chinese. 1-12 Unit.

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CHINLIT 201. Proseminar: Bibliographic and Research Methods in Chinese Studies. 3-5 Units.

Bibliographic, pedagogical, and research methods in Chinese studies. Prerequisite: 127/207 or equivalent.

CHINLIT 205. Beginning Classical Chinese, First Quarter. 2-5 Units.

Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127 to satisfy Chinese major requirements must begin with 125. Prerequisite: CHINLANG 23 or equivalent. Same as: CHINLIT 125

CHINLIT 206. Beginning Classical Chinese, Second Quarter. 2-5 Units.

Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 125/205 or equivalent. Same as: CHINLIT 126

CHINLIT 207. Beginning Classical Chinese, Third Quarter. 2-5 Units.

Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 126/206 or equivalent. Same as: CHINLIT 127

CHINLIT 221. Advanced Classical Chinese: Philosophical Texts. 3-5 Units.

Prerequisite: 207 or equivalent.

CHINLIT 222. Advanced Classical Chinese: Historical Narration. 2-5 Units.

Prerequisite: 127/207 or equivalent.

CHINLIT 223. Advanced Classical Chinese: Literary Essays. 2-5 Units.

Readings and grammatical analyses of literary essays throughout imperial China. Prerequisite: CHINLIT 127/207 or equivalent.

CHINLIT 230. Lyrical and Local Prose. 3-5 Units.

Informal and personal prose of Tang and Song dynasties, with special attention to lyrical expression (prose as close alternative to poetry) and local interest (e.g., in travel diaries). These new uses and styles of prose will be compared with more formal expository prose and with poetry written by the same authors, to better understand the distribution of expressive aims and effects. Prerequisite: Classical Chinese or advanced reading knowledge of Chinese.

Same as: CHINLIT 130

CHINLIT 232. Chinese Biographies of Women. 2-5 Units.

Generic and historical analysis of the two-millennia long biographical tradition inaugurated by Liu Xiang, ca. 79-8 B.C.E. Chinese women's history, intellectual history, historiography, and literary studies.

Same as: CHINLIT 132

CHINLIT 235. Ghost Stories and Other Strange Tales. 3-4 Units.

Study of the zhiguai tradition, with readings in landmark collections from different dynastic periods (e.g., Tang, Song, Qing). Consideration of the cultural significance as well as the literary qualities of this tradition of storytelling in China. Readings in English.

Same as: CHINLIT 135

CHINLIT 255. Classical Poetry: Reading, Theory, Interpretation. 4 Units.

Introduction to the reading and interpretation of classical Chinese poetry, with attention to the language of poetry, aesthetics, expressive purposes, and social roles. Readings in Chinese. Prerequisite: three years of modern Chinese or equivalent.

Same as: CHINLIT 155

CHINLIT 261. Sources of Chinese Poetry. 4 Units.

The Book of Songs (ca. 1000-500 B.C.E.) and Songs of Chu (ca. 400 B.C.E.), the earliest anthologies of Chinese poetry.

CHINLIT 263. Lyric (Shih) I. 2-4 Units.

Han through Sui dynasties.

CHINLIT 265. Major Figures in Classical Chinese Poetry. 4 Units.

Focus is on a major poet and relationships to previous and later poetry. Poetic form, including meter and rhyme schemes. Historical context. This year's poet is Du Fu. Prerequisite: 3 years Modern Chinese or equivalent. Same as: CHINLIT 165

CHINLIT 266. Chinese Ci Poetry (Song Lyrics). 3-4 Units.

Introduction to poetry in the ci "song lyrics" form. This year the focus is on song lyrics of Li Qingzhao (1084-1150s), read against song lyrics composed by male writers of her day. Attention to the special challenges she faced as a woman writer, and the ways that the tradition struggled to accommodate this "talented woman." Prerequisite: Classical Chinese or advanced reading knowledge of Chinese.

Same as: CHINLIT 166

CHINLIT 272. Traditional Chinese Fiction: Novels. 2-4 Units.

Major novels of late imperial China. Prerequisite: 127/207 or consent of instructor.

CHINLIT 273. Readings in Chinese Drama. 2-4 Units.

Yuan, Ming, and Qing periods emphasizing literary not theatrical qualities. Prerequisite: 127/207 or consent of instructor.

CHINLIT 274. Modern Chinese Novel: Theory, Aesthetics, History. 4 Units.

From the May Fourth movement to the 40s. Themes include enlightenment, democracy, women's liberation, revolution, war, urban culture, and love. Prerequisite: advanced Chinese.

Same as: CHINLIT 174, COMPLIT 254

CHINLIT 279. For Love of Country: National Narratives in Chinese Literature and Film. 3-5 Units.

Explores the nation as it is constructed, deconstructed, and continuously contested in novels, short stories, films, and other media from the second half of the 20th century in mainland China and Taiwan. Asks how the trope of the nation and the ideology of nationalism mediate the relationships between politics and aesthetics. Explores the nation's internal fault lines of gender, ethnicity, geography, language, and citizenship.

Same as: CHINLIT 379

CHINLIT 283. China's Dynastic Founders. 3-5 Units.

This course examines the lives of China's dynastic founders, among whom we find the most influential, the most celebrated, the most complicated, and the most controversial rulers in premodern Chinese history. We seek to understand the ideas of leadership and legitimacy, the relationships among statecraft, military might, and moral virtue, and the importance of precedents and exemplars in traditional Chinese political culture. Primary readings are the biographies of the dynastic founders in the official histories, supplemented by the representations of these rulers in other genres of writings. Prerequisite: Two years of classical Chinese, or consent of instructor.

CHINLIT 289. The Poetics and Politics of Affect in Modern China. 3-5 Units.

The role of affect in modern Chinese aesthetics and politics. Cultural and social theories of affect (love, hate, fear, grief, resentment, rage, sympathy, sincerity, shame, and nostalgia); affective discourses across genres and media including fiction, poetry, film, journalism, and television; and mass social movements such as protest, uprising, and revolution. Advanced undergraduates requires consent of instructor. Recommended: reading knowledge of Chinese.

CHINLIT 290. Chinese Cultural Revolution: Performance, Politics, and Aesthetics. 4 Units.

Events, arts, films, and operas of the Chinese Cultural Revolution. Analysis of political passion, aesthetics, and psychology of mass movements. Places the Cultural Revolution in the long-range context of art, social movements, and politics. Chinese language is not required.

Same as: CHINLIT 190, COMPLIT 135

CHINLIT 291. The Structure of Modern Chinese. 2-4 Units.

Focus is on syntax and semantics. Prerequisite: CHINLANG 3 or equivalent, or consent of instructor.

Same as: CHINLIT 191

CHINLIT 292. The History of Chinese. 4 Units.

Emphasis is on syntactic and semantic changes in the last 2,000 years and grammaticalization. Students use a computer corpus to do research on the history of Chinese. Prerequisite: 126 or consent of instructor.

Same as: CHINLIT 192

CHINLIT 299. Master's Thesis or Translation. 1-5 Unit.

A total of 5 units taken in one or more quarters.

CHINLIT 369. Late Imperial Chinese Fiction. 2-5 Units.

Primary works examined include Jin Ping Mei, Xingshi yinyuan zhuan, Hongloumeng, Qilu deng, Rulin waishi, and Ernu yingxiong zhuan.

Secondary readings focus on social dimensions of the Chinese novel (ca. 1600-1850), but students may explore other aspects of the texts in their presentations and research papers. Comparisons with the English novel, particularly on the rise of the novel and the advent of modernity.

CHINLIT 371. Aesthetics, Politics, Modernity and China. 2-5 Units.

The making of global heroes--and the many bodies of Chairman Mao. This course explores a number of key motifs of critical theory relevant to Chinese studies. It introduces some seminal theories of visuality and the making of (global) heroes and problematizes the writing of visual histories and the uses of Digital Humanities for this purpose. Part of an ongoing research project which focuses on two hyper-visible male protagonists of the twentieth century--Mohandas Gandhi and Mao Zedong. How have these flesh and blood men been transformed through the work of visual imagery into globally recognizable, transcultural "bio-icons"? Prerequisite: CHINLIT 127/207 or consent of instructor.

Same as: COMPLIT 371

CHINLIT 379. For Love of Country: National Narratives in Chinese Literature and Film. 3-5 Units.

Explores the nation as it is constructed, deconstructed, and continuously contested in novels, short stories, films, and other media from the second half of the 20th century in mainland China and Taiwan. Asks how the trope of the nation and the ideology of nationalism mediate the relationships between politics and aesthetics. Explores the nation's internal fault lines of gender, ethnicity, geography, language, and citizenship.

Same as: CHINLIT 279

CHINLIT 391. Seminar in Chinese Syntax. 4 Units.

May be repeated for credit.

CHINLIT 392B. Law and Society in Late Imperial China. 4-5 Units.

(Same as LAW 773.) Connections between legal and social history. Ideology and practice, center and periphery, and state-society tensions and interactions. Readings introduce the work of major historians on concepts and problems in Ming-Qing history.

Same as: HISTORY 392B

CHINLIT 399. Dissertation Research. 1-12 Unit.

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Civil Environmental Engineering Courses

CEE 1. Introduction to Environmental Systems Engineering. 1 Unit.

Field trips visiting environmental systems installations in Northern California, including coastal, freshwater, and urban infrastructure. Requirements: Several campus meetings, and field trips. Enrollment limited; priority given to undergraduates who have declared Environmental Systems Engineering major. Contact hildemann@stanford.edu to request enrollment/permission code.

CEE 1A. Graphics Course. 1 Unit.

This course, intended for students taking a design studio, will focus on presentation theories, skills and design approaches. Through readings and exercises, and ultimately the student's own work, students will develop skill and complexity in their graphic and verbal presentations.

CEE 10. Introduction to the Civil & Environmental Engineering Majors. 1 Unit.

Open to freshman and sophomores; limited enrollment. Overview of undergraduate majors and possible career paths in Civil Engineering, Environmental Engineering, Atmosphere/Energy, and Architectural Design. Panel discussions with current undergraduate majors, and with alums. Hands-on activities with faculty in CEE. For students with interest areas such as water resources, environmental biotechnologies, sustainability, architecture, infrastructure planning, global warming, green energy, structures, and construction.

CEE 10A. Introduction to Architecture. 2 Units.

This class introduces students to the discipline of architecture and to the fundamental question: What is an architect and how is architecture distinct from other arts and sciences? To answer this question, the class will focus on concepts important to the practice of architecture including: project conception, drawing, modeling, materials, structure, form, and professionalism. These terms will be investigated through short talks, site visits, historical precedent, in-class exercises, panel discussions and two on-campus case studies. No prior knowledge of architecture is required.

CEE 10AX. Chicago Architecture: History and Form. 2 Units.

Chicago is America's architectural hub. Rebuilt, phoenix-like, out of a devastating fire, but at a moment of great technological change, Chicago is the birthplace of grand American planning - the high-rise, construction technologies - and continues to this day to be a place of urban and architectural innovation. In this course students will be introduced to the history of Chicago including the Burnham Plan, the technological developments of the iron structure, modern curtain wall, and elevator that allowed for the first high-rises, the subsequent development of innovative structural systems, and the modern high-rise. Further investigation will include the legacies of Louis Sullivan, Frank Lloyd Wright, Mies Van Der Rohe, SOM, and others. Based at a Chicago Architecture firm, the class will mix a short high-rise design exercise on a real site with discussions with local architects, field trips to landmark structures, and exploration of current development and planning issues. The course will include extensive walks and trips using local transit. This course is open to all students regardless of their experience in architecture.

CEE 10B. Presentation Skills. 0 Units.

TBD.

CEE 11SC. People, Land, and Water in the Heart of the West. 2 Units.

Salmon River. Sun Valley. Pioneer Mountains. The names speak of powerful forces and ideas in the American West. Central Idaho - a landscape embracing snow-capped mountains, raging rivers, sagebrush deserts, farms, ranches, and resort communities - is our classroom for this field-based seminar led by David Freyberg, professor of Civil and Environmental Engineering, and David Kennedy, professor emeritus of History. This course focuses on the history and future of a broad range of natural resource management issues in the western United States. We will spend a week on campus preparing for a two-week field course in Idaho exploring working landscapes, private and public lands, water and fisheries, conservation, and the history and literature of the relationship between people and the land in the American West. After the first week spent on campus, we will drive to Idaho to begin the field portion of our seminar. In Idaho, we will spend time near Twin Falls, at Lava Lake Ranch near Craters of the Moon National Monument, in Custer County at the Upper Salmon River, and near Stanley in the Sawtooth National Forest. No prior camping experience is required, but students should be comfortable living outdoors in mobile base camps for periods of several days. Students will investigate specific issues in-depth and present their findings at the end of the course. Same as: EARTHYSYS 13SC

CEE 12SC. Good Food, Fast Cars, Great Spaces: Connections Between Architecture, Cooking, Photography, Design. 2 Units.

Why is it that architects almost routinely share passions for cuisine, vehicles, photography, and sailing? Many chefs were trained as architects, most architects are excellent cooks and photographers, and a stunning number of architects own boats. This course will explore the key design ideas, notions of creativity, and interest in form that thread through each of these professions. The first half of the course will focus on readings and discussion about creativity and form; the second half will test a single conceptual idea through a series of projects in two or three fields. Possible field trips may include a visit to Tesla, America's Cup events in SF, Baume (2 Michelin Star restaurant in Palo Alto), IDEO, and architecture firms.

CEE 13SC. Energizing a Sustainable Future. 2 Units.

The economic advancement, social equity, and planet earth habitat of your and future generations depend in major part on preparing for sustainable supply and efficient use of energy. The objective of this course is to provide a foundation for your future scholarship and action to increase energy sustainability. We will explore three major energy activities: development of fossil and renewable resources; conversion to useful forms; and use in buildings, transportation, and industry. All are strongly influenced by the energy markets, technologies, and policies that we will also study. Our quest for a sustainable energy future will begin at Stanford's Bass Center in Washington D.C. and conclude back on the Farm. This will allow access to policy makers and major organizations along with plans for major improvements to Stanford's energy system and buildings. The course requires: query responses on the readings in advance of class sessions; participation in morning class discussions and afternoon activities with key energy players; in teams of two, analysis of a self-selected topic related to an energy market or technology; and a group course project to analyze an energy policy or proposal. It is offered for two units with Satisfactory/No Credit grading. Students cover their own travel to the Bass center and arrive by 5 p.m. on September 6. The program will cover your travel to campus on September 16. Students planning to observe religious holidays during September Studies should check with the instructor to work through potential conflicts.

CEE 13SI. Introduction to Architectural Modeling. 2 Units.

Architecture is half design, half communicating design. In this course, students will gain the skills necessary to communicate architectural concepts through 3D modeling. From foam core to basswood to less known materials, students will gain a tactile understanding of material qualities and present their study models in portfolio format. Special focus will also be placed on techniques incorporating both computer-aided drafting and physical modeling through the laser cutter machine. No prior experience is necessary, but students will be expected to work in the studio outside of class time. Limited enrollment. Please contact Derek Ouyang at derekouyang@gmail.com for more info.. Class meets in PRL 36.

CEE 14SC. When Engineers Go Sailing: the Science and Technology of America's Cup Yachts and Matches. 2 Units.

Intense competition drives technological advancement in many sports; the America's Cup sailing competition stands out as a leading venue for innovation. The 34th AC competition will take place in San Francisco Bay during September 2013, providing close proximity, great timing, and the showcasing of major new technologies to create a special learning opportunity for Sophomore College students. This seminar will introduce students to engineering fundamentals, computer-based modeling and design, and advanced materials, using America's Cup technology as examples. The course will include guest speakers from America's Cup teams, visits to facilities, and field trips to matches. Students will complete readings and queries prior to the class sessions; class and laboratory exercises for sailing, modeling, and materials testing; group observation and analysis of America's Cup races; and group course projects analyzing a part of the technology for an America's Cup yacht. The course will also explore how students can apply engineering fundamentals, modeling techniques, advanced materials, and processes of innovation to other activities and industries. The seminar is offered for 2 units with S/NC grading.

CEE 16SC. Energy in the Southwest. 2 Units.

We will examine the technical, social, and political issues surrounding energy management and use in the West, using California, Nevada, and Arizona as our field laboratory. Students will explore a number of energy narratives, such as: Who supplies our energy and from what sources? How is it transported? Who distributes to users and how do they do it? Water for energy and energy for water; two intertwined natural resources; Meeting carbon emission goals by 2020; Conflicts between desert ecosystems and renewable energy development. We will place particular emphasis on renewable energy sources and the water-energy nexus, a critically important issue for the arid and semi-arid southwest. Central to the course will be field exploration in northern and southern California, as well as neighboring areas in Arizona and Nevada, to tour sites such as wind and solar facilities, geothermal plants, hydropower pumped storage, desalination plants, water pumping stations, a liquid fuels distribution operations center, and California's Independent System Operator. Students will have the opportunity to meet with community members and with national, state, and regional authorities to discuss Western energy challenges and viable solutions. We will also take advantage of Stanford's own energy systems with site visits to the new energy facilities. Woven throughout will be an introduction to the basics of energy and energy politics through discussions, lectures, and with the help of guest speakers. Over the summer, students will be responsible for assigned readings, online interactive materials, and relevant recent news articles. Participants will return to Stanford by September 19. Travel expenses during the course will be provided (except incidentals) by the Bill Lane Center for the American West and Sophomore College.

Same as: ENERGY 11SC, POLISCI 25SC

CEE 20. Elementary Surveying. 0-60 Units.

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CEE 29N. Managing Natural Disaster Risk. 3 Units.

Natural disasters arise from the interaction of natural processes, such as earthquakes or floods, with human development that suffers safety-related and economic losses. We cannot predict exactly when those disasters will occur, or prevent them entirely, but we have a number of engineering and policy options that can reduce the impacts of such events.

CEE 31. Accessing Architecture Through Drawing. 4 Units.

Preference to Architectural Design and CEE majors; others by consent of instructor. Drawing architecture to probe the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment.

CEE 31B. Architectural Drawing and Rendering. 4 Units.

Course will expand on basics taught in CEE 31. Refresher on the basics of plans, sections, elevations, axonometrics, and perspectives. Students will be encouraged in conceptual thinking and translating concepts into Architecture. Introduction of computers for renderings and drafting as well as expanding on early model building. Field trip.

CEE 31Q. Accessing Architecture Through Drawing. 4 Units.

Preference to sophomores. Drawing architecture provides a deeper understanding of the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment.

CEE 32A. Psychology of Architecture. 3 Units.

This course argues that architecture often neglects the interdisciplinary investigation of our internal psychological experience and the way it impacts our creation of space. How does our inner life influence external design? How are we impacted emotionally, physically, psychologically by the spaces we inhabit day to day? How might we intentionally imbue personal and public spaces with specific emotions? This seminar serves as a call to action for students interested in approaching architecture with a holistic understanding of the emotional impact of space. Sample topics addressed will include: conscious vs. unconscious design; the ego of architecture; psycho-spatial perspectives; ideas of home; integral/holistic architecture; phenomenology of inner and outer spaces; exploring archetypal architecture; and translating emotion through environment.

CEE 32B. Design Theory. 4 Units.

This seminar focuses on the key themes, histories, and methods of architectural theory -- a form of architectural practice that establishes the aims and philosophies of architecture. Architectural theory is primarily written, but it also incorporates drawing, photography, film, and other media. One of the distinctive features of modern and contemporary architecture is its pronounced use of theory to articulate its aims. One might argue that modern architecture is modern because of its incorporation of theory. This course focuses on those early-modern, modern, and late-modern writings that have been and remain entangled with contemporary architectural thought and design practice. Rather than examine the development of modern architectural theory chronologically, it is explored architectural through thematic topics. These themes enable the student to understand how certain architectural theoretical concepts endure, are transformed, and can be furthered through his/her own explorations.

CEE 32D. Construction: The Writing of Architecture. 4 Units.

This seminar focuses on the construction of architectural writing. The class will analyze this idea through four topics: formal analysis, manifesto, translation, and preservation. The seminar is divided into two-week modules with each of these four concepts functioning as organizing principles. The first week of each module will involve familiarizing the seminar with both the terms and rhetorical tactics of the given theme by reading and analyzing specific texts and completing a short written analysis (1-2 pages). The second week will expand upon this foundation and involve further analysis in addition to each student writing a short paper (3-4 pages) drawing on the examples discussed and their own experiences in the discipline. The goal of the seminar is for each student to be able to analyze how an architectural writing is constructed and to develop his/her skills in the construction of his/her own writing.

CEE 32F. Light, Color, and Space. 3 Units.

This course explores color and light as a medium for spatial perception. Through the introduction of color theory, color mixing, and light analyses, students will learn to see and use light and color fields as a way to shape experience. We will examine the work of a range of architects and artist who use light and color to expand the field of perception (i.e. Rothko, Turrell, Eliasson, Holl, Aalto).

CEE 32G. Architecture Since 1900. 4 Units.

Art 142 is an introduction to the history of architecture since 1900 and how it has shaped and been shaped by its cultural contexts. The class also investigates the essential relationship between built form and theory during this period.

Same as: ARTHIST 142

CEE 32H. Transparent Structures: Design-Build Seminar Proposal. 2 Units.

This design-build seminar investigates the use of glass as a structural system and spatial medium. We will examine the physical and visual properties of engineered high-strength glass, and develop structural systems and spatial configurations that will expand our understanding of what glass can do. The seminar will culminate in a full-scale installation of the developed design on campus. The experiential objectives of the seminar draw upon Colin Rowe's definition of phenomenal transparency as a unique spatial order, in which the perception of space is fluctuating and in constant activity. The installation will act as a filter through which the surrounding context will be redefined, resulting in a complex spatial experience.

CEE 32Q. Place: Making Space Now. 3 Units.

This seminar argues that architects are ultimately "placemakers," and questions what that means in the contemporary world. Part I investigates the meaning of the word "place." Additional background for understanding contemporary place making will include a critique of the history of modern place-making through an examination of modern form. Part II examines two traditional notions of place by scale: from "home" to "the city." What elements give these conceptions of space a sense of place? To answer this question, themes such as memory, mapping, and boundary, among others, will be investigated. Part III presents challenges to the traditional notions of place discussed in Part II. Topics addressed include: What does it mean to be "out of place"? What sense of place does a nomad have, and how is this represented? What are the "non-places" and how can architects design for these spaces? Part IV addresses the need to re-conceptualize contemporary space. The role of digital and cyber technologies, the construction of locality in a global world, and the in-between places that result from a world in flux are topics discussed in this section of the seminar. Learning goals: Specific goals include close reading of texts, understanding of philosophical thinking and writing, argument under uncertainty, and developed concepts of place, space and architecture.

CEE 44Q. Critical Thinking and Career Skills. 3 Units.

Factors required for successful careers. Guest speakers. Case studies. Participation in real world corporate interviews, testing and reviews conducted by industry trainers. Limited enrollment.

CEE 46Q. Fail Your Way to Success. 3 Units.

Preference to sophomores. How to turn failures into successes; cases include minor personal failures and devastating engineering disasters. How personalities and willingness to take risks influence the way students approach problems. Field trips, case studies, and guest speakers applied to students day-to-day interactions and future careers. Goal is to redefine what it means to fail.

CEE 48N. Managing Complex, Global Projects. 3 Units.

This freshman seminar highlights the challenges associated with planning and executing complex and challenging global projects in private, governmental and nonprofit/NGO settings. Covers organization and project management theory, methods, and tools to optimize the design of work processes and organizations to enhance complex, global project outcomes. Student teams model and analyze the work process and organization of a real-world project team engaged in a challenging local or global project.

CEE 50N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay. 3 Units.

This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

Same as: EARTHSYS 49N, EESS 49N

CEE 63. Weather and Storms. 3 Units.

Daily and severe weather and global climate. Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, wind energy, global circulation, jet streams, high and low pressure systems, inversions, el Nintilde;o, la Nintilde;a, atmosphere/ocean interactions, fronts, cyclones, thunderstorms, lightning, tornadoes, hurricanes, pollutant transport, global climate and atmospheric optics. Same as: CEE 263C

CEE 64. Air Pollution and Global Warming: History, Science, and Solutions. 3 Units.

Survey of Survey of air pollution and global warming and their renewable energy solutions. Topics: evolution of the Earth's atmosphere, history of discovery of chemicals in the air, bases and particles in urban smog, visibility, indoor air pollution, acid rain, stratospheric and Antarctic ozone loss, the historic climate record, causes and effects of global warming, impacts of energy systems on pollution and climate, renewable energy solutions to air pollution and global warming. UG Reqs: GER: DBNatSci. Same as: CEE 263D

CEE 70. Environmental Science and Technology. 3 Units.

Introduction to environmental quality and the technical background necessary for understanding environmental issues, controlling environmental degradation, and preserving air and water quality. Material balance concepts for tracking substances in the environmental and engineering systems.

Same as: ENGR 90

CEE 70N. Water, Public Health, and Engineering. 3 Units.

Preference to sophomores. Linkages between water, wastewater and public health, with an emphasis on engineering interventions. Topics include the history of water and wastewater infrastructure development in the U.S. and Europe; evolution of epidemiological approaches for water-related health challenges; biological and chemical contaminants in water and wastewater and their management; and current trends and challenges in access to water and sanitation around the world. Identifying ways in which freshwater contributes to human health; exposure routes for water- and sanitation-illness. Classifying illnesses by pathogen type and their geographic distribution. Identifying the health and economic consequences of water- and sanitation-related illnesses; costs and benefits of curative and preventative interventions. Interpreting data related to epidemiological and environmental concepts. No previous experience in engineering is required.

CEE 73. Foundations of Water Science and Engineering. 3 Units.

Water physics and chemistry shape our world. Without water there is no life, no biology. This class provides an introduction to these basic sciences as applied to water and considers how they interact to give water its critical role in the processes that sustain, and sometimes poison, our planet. We will explore both the natural world and the engineered systems critical to civilization.

CEE 100. Managing Sustainable Building Projects. 4 Units.

Managing the life cycle of buildings from the owner, designer, and contractor perspectives emphasizing sustainability goals; methods to define, communicate, coordinate, and manage multidisciplinary project objectives including scope, quality, life cycle cost and value, schedule, safety, energy, and social concerns; roles, responsibilities, and risks for project participants; virtual design and construction methods for product, organization, and process modeling; lifecycle assessment methods; individual writing assignment related to a real world project.

CEE 101A. Mechanics of Materials. 4 Units.

Introduction to beam and column theory. Normal stress and strain in beams under various loading conditions; shear stress and shear flow; deflections of determinate and indeterminate beams; analysis of column buckling; structural loads in design; strength and serviceability criteria. Lab experiments. Prerequisites: ENGR 14.

CEE 101B. Mechanics of Fluids. 4 Units.

Physical properties of fluids and their effect on flow behavior; equations of motion for incompressible ideal flow, including the special case of hydrostatics; continuity, energy, and momentum principles; control volume analysis; laminar and turbulent flows; internal and external flows in specific engineering applications including pipes, open channels, estuaries, and wind turbines. Prerequisites: E14, PHYSICS 41 (formerly 53), MATH 51.

CEE 101C. Geotechnical Engineering. 3-4 Units.

Introduction to the principles of soil mechanics. Soil classification, shear strength and stress-strain behavior of soils, consolidation theory, analysis and design of earth retaining structures, introduction to shallow and deep foundation design, slope stability. Lab projects. Prerequisite: ENGR 14. Recommended: 101A.

CEE 101D. Computations in Civil and Environmental Engineering. 3 Units.

Computational and visualization methods in the design and analysis of civil and environmental engineering systems. Focus is on applications of MATLAB. How to develop a more lucid and better organized programming style.

Same as: CEE 201D

CEE 101S. Science & Engineering Problem-Solving with MatLab.. 3 Units.

Introduction to the application of MATLAB to an array of engineering systems. Emphasis on computational and visualization methods in the design, modeling and analysis of engineering problems.

Same as: CEE 201S

CEE 102. Legal Principles in Design, Construction, and Project Delivery. 3 Units.

Introduction to the key legal principles affecting design, construction and the delivery of infrastructure projects. The course begins with an introduction to the structure of law, including principles of contract, negligence, professional responsibility, intellectual property, land use and environmental law, then draws on these concepts to examine current and developing means of project delivery.

CEE 107S. Energy Resources: Fuels and Tools. 3 Units.

Energy is a vital part of our daily lives. This course examines where that energy comes from, and the advantages and disadvantages across different fuels. Contextual analysis of energy decisions for transportation and electricity generation around the world. Energy resources covered include oil, biomass, natural gas, nuclear, hydropower, wind, solar, geothermal, and emerging technologies. Prerequisites: Algebra. Note: may not be taken by students who have completed CEE 173A, CEE 207 or EARTHSYS 103. Same as: CEE 207S

CEE 109. Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision. 2 Units.

Examination of program-based local actions that promote resource conservation and an educational environment for sustainability. Examination of building-level actions that contribute to conservation, lower utility costs, and generate understanding of sustainability consistent with Stanford's commitment to sustainability as a core value. Overview of operational sustainability including energy, water, buildings, waste, and food systems. Practical training to enable students to become sustainability coordinators for their dorms or academic units.

Same as: EARTHSYS 109, ENVRINST 109

CEE 110A. Building Information Modeling and Short Course. 2-4 Units.

Creation, management, and application of building information models. Process and tools available for creating 2D and 3D computer representations of building components and geometries. Organizing and operating on models to produce architectural views and construction documents, renderings and animations, and interface with analysis tools. Lab exercises, class projects. Limited enrollment /instructor consent required.

Same as: CEE 210A

CEE 112A. Industry Applications of Virtual Design & Construction. 2-4 Units.

Building upon the concept of VDC Scorecard, CEE 112A/212A investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Interacting with experts and professionals in real estate, architecture, engineering, construction and technology providers, students will learn from the industry applications of Building Information Modeling and its relationship with Integrated Project Delivery, Sustainable Design and Construction. Students will conduct case studies to evaluate the maturity of VDC planning, adoption, technology and performance in practice. Students taking 3 or 4 units will be paired up with independent research or case study projects on the industry applications of VDC. No prerequisite. See CEE112B/212B in the Winter Quarter and CEE 112C/212C in the Spring Quarter.

CEE 112B. Industry Applications of Virtual Design & Construction. 2-4 Units.

CEE 112B/212B is a practicum on the Industry Applications on Virtual Design and Construction (VDC). Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC and Building Information Modeling (BIM). Students can choose between one of the two project topics: [1] Industrialized Construction with Virtual Parts (No Prerequisite) or [2] Industry Benchmarking & Applications of the VDC Management Scorecard (Suggested Prerequisite: CEE 112A/212A).

Same as: CEE 212B

CEE 112C. Industry Applications of Virtual Design & Construction. 2-4 Units.

Following the Autumn- and Winter-quarter course series, CEE 112C/212C is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 112B/212B, CEE 159C/259C, CEE 159D/259D, or Instructor's Approval.

Same as: CEE 212C

CEE 112D. Industry Applications of Virtual Design and Construction. 2-4 Units.

A continuation of the CEE 112/212 series, CEE 112D/212D is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC research or application opportunities with public owners and private developers, professional associations, and/or other member organizations of the Center for Integrated Facility Engineering at Stanford. Independently, students will conduct case studies, research activities, and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE110/210, CEE 112C/212C, CEE 122B/222B, or Instructor's Approval.

Same as: CEE 212D

CEE 113. Patterns of Sustainability. 1-4 Unit.

This seminar examines the interrelated sustainability of the natural, built and social environments of places in which we live. Several BOSP centers and the home Stanford campus will hold this 1-2 unit seminar simultaneously and collaborate with a shared curriculum, assignments, web conference and a Wiki. The goal of the collaborative arrangement is to expose, share, compare and contrast views of sustainability in different parts of the world. We will look at and assess aspects of sustainability of the places we are living from a theoretical perspective from the literature, from observations and interviews in the countries in which we study.

Same as: CEE 213

CEE 115. Goals and Methods of Sustainable Building Projects. 3 Units.

(Graduate students register for 215.) Goals related to sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and economic and social sustainability. Methods to integrate these goals and enhance the economic, ecological, and equitable value of building projects. Industry and academic rating systems, project case studies, guest lecturers, and group project.

Same as: CEE 215

CEE 120A. Building Information Modeling Workshop. 2-4 Units.

The foundational Building Information Modeling course introduces techniques for creating, managing, and applying of building information models in the building design and construction process. The course covers processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components and geometries to produce models used in architectural design, construction planning and documentation, rendering and visualization, simulation and analysis.

Same as: CEE 220A

CEE 120B. Building Information Modeling Workshop. 2-4 Units.

This course builds upon the Building Information Model concepts introduced in 110A/220A and illustrates how BIM modeling tools are used to design, analyze, and model building systems including structural, mechanical, electrical, plumbing and fire protection. The course covers the essential physical principles, design criteria, and design strategies for each system and explores processes and tools for modeling those systems and analyzing their performance.

Same as: CEE 220B

CEE 120C. Parametric Design and Optimization. 2-4 Units.

This course explores tools and techniques for computational design and parametric modeling as a foundation for design optimization. Class sessions will introduce several parametric design modeling platforms and scripting environments that enable rapid generation of 3D models and enable rapid evaluation of parametrically-driven design alternatives. Topics to be featured include: Principles of parametric design vs. direct modeling-Design exploration using parametric modeling platforms (Revit/FormIt, Rhino)-Visual scripting languages and environments (Dynamo, Grasshopper, DesignScript)-Single- and multi-dimensional optimization techniques and guidance strategies.

Same as: CEE 220C

CEE 120S. Building Information Modeling Special Study. 2-4 Units.
Special studies of Building Information Modeling strategies and techniques focused on creating, managing, and applying models in the building design and construction process. Processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components to produce models used in design, construction planning, visualization, and analysis.
Same as: CEE 220S

CEE 122A. Computer Integrated Architecture/Engineering/Construction. 2 Units.
Undergraduates serve as apprentices to graduate students in the AEC global project teams in CEE 222A. Apprentices participate in all activities of the AEC team, including the goals, objectives, constraints, tasks, and process of a crossdisciplinary global AEC teamwork in the concept development phase of a comprehensive building project. Prerequisite: consent of instructor.
Same as: A/E/C

CEE 122B. Computer Integrated A/E/C. 2 Units.
Undergraduates serve as apprentices to graduate students in the AEC global project teams in CEE 222B. Project activity focuses on modeling, simulation, life-cycle cost, and cost benefit analysis in the project development phase. Prerequisite: CEE 122A.

CEE 124. Sustainable Development Studio. 1-5 Unit.
(Graduate students register for 224A.) Project-based. Sustainable design, development, use and evolution of buildings; connections of building systems to broader resource systems. Areas include architecture, structure, materials, energy, water, air, landscape, and food. Projects use a cradle-to-cradle approach focusing on technical and biological nutrient cycles and information and knowledge generation and organization. May be repeated for credit.

CEE 127A. Energy System Design in Eastern Europe. 2 Units.
Field-based seminar to evaluate and design future energy systems for Eastern Europe. 14-day field trip during early September 2013. Site visits, fact-finding, stakeholder meetings, presentation to policy makers. One unit for field trip; one unit for project deliverable. Prerequisite: consent of instructor.
Same as: CEE 227A

CEE 127E. Infrastructure, Disruptive Technologies and Entrepreneurship.. 1 Unit.
Silicon Valley provides a dynamic environment perfectly suited for developing the disruptive technologies that are changing the faces of today's mainstream infrastructure systems and essential service industries. This course will provide an overview of the most exciting technologies emerging from Silicon Valley right now and the potential that exists to disrupt mainstream transportation, electricity, intelligence gathering, and banking infrastructure systems that were dominant in the 20th Century. Guest speakers include prominent CEOs, visionaries, investors, and serial entrepreneurs who are building game changing companies.
Same as: CEE 227E

CEE 129. Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future. 3 Units.
How will climate change affect cities and how will cities respond? Includes an exploration of the threat of climate change to coastal cities worldwide and the potential engineering and policy responses. Understanding of the nature of the challenge of city adaptation planning in terms of earth systems, infrastructure development, urban planning, and social systems. Consideration of economic, social, legal and environmental implications. Student projects will contribute to on-going research. Interdisciplinary. Guest speakers, case studies, and readings.
Same as: CEE 229

CEE 129S. Climate Change Adaptation in the Coastal Built Environment. 1 Unit.
How will climate change impact coastal ports and harbors around the world? Leading experts discuss the latest science, policy, and engineering research on this important issue, including the necessary response to protect ports and harbors from significant sea-level rise and storm surge. Focus is on the built environment. Guest speakers. CEE 229/129 for research option. See www.groupspaces.com/seaports2100.
Same as: CEE 229S

CEE 130. Architectural Design: 3-D Modeling, Methodology, and Process. 4 Units.
Preference to Architectural Design majors; others by consent of instructor. Projects investigate conceptual approaches to the design of key architectural elements, such as wall and roof. Functional and structural considerations. Focus is on constructing 3-D models in a range of materials; 3-D computer modeling. Students keep a graphic account of the evolution of their design process. Final project entails design of a simple structure. Limited enrollment. Pre- or corequisite: CEE 31 or 31Q.

CEE 131. Architectural Design Process. 4 Units.
Preference to Architectural Design and CEE majors; others by consent of instructor. Issues in the architectural profession including programming, site analysis, design process, and professional practice concerns. Building/landscape design case study project using architectural graphics and models. Limited enrollment.

CEE 131A. Professional Practice: Mixed-Use Design in an Urban Setting. 4 Units.
The delivery of a successful building design program involves unique collaboration between architect and client. This course will endeavor to teach the skills necessary for a designer to identify, evaluate, conceptualize and fully document a complex mixed-use urban design. Students will complete the course with a detailed knowledge of the consultants, engineers and other professionals needed for a complete program. Course deliverables will include three short assignments and a final project consisting of basic schematic drawings for the selected project. Guest presenters will cover topics of interest. Lectures, discussions, in-class studio-work and an oral presentation. Pre-requisite: CEE 130.

CEE 131B. Financial Management of Sustainable Urban Systems. 3 Units.
Focus is on financial management of sustainable urban systems. The course will study different kinds of financial services available, the management of financial resources, and relationships to financial service providers. The course will also study how financial services and relationships to financial service providers can be used to accomplish construction management, energy, and architecture work in sustainable urban systems. The learning outcome is an understanding of how financial services can be used in development of sustainable urban systems. The course work is structured so that there are three modules: 1) general knowledge of financial management, 2) in-depth application in construction management, energy, or architecture, and 3) comparison of similarities and differences in-between the in-depth applications. Students will focus on one of the in-depth applications in a group work, and present the result of this application to students that make other applications. A key learning aspect is the understanding of how finance is used in construction management, energy, and architecture work. Students should be able to show the value, financial viability, and risk management of sustainable urban system development in construction management, energy, and architecture. Students should be able to finance construction management, energy, and architecture work. Readings include applications of finance and management to construction management, energy, or architecture. Guest speakers include developers, financial managers at construction firms, managers at energy firms, construction managers.

CEE 132. Interplay of Architecture and Engineering. 4 Units.

The range of requirements that drive a building's design including architecture, engineering, constructability, building codes, and budget. Case studies illustrate how structural and mechanical systems are integrated into building types including residential, office, commercial, and retail. In-class studio work.

Same as: CEE 232

CEE 132Q. Office of Metropolitan Architecture: Workshop of the New. 4-5 Units.

This seminar investigates all aspects of the work of the Office of Metropolitan Architecture (OMA) and its leader Rem Koolhaas. Topics for class research and inquiry include but are not be limited to: Koolhaas's early work at the Architectural Association and the founding of OMA, the publications of OMA and their style of presentation and theoretical foundations, the importance of AMO, and the architects who have left OMA and founded their own practices and how these differ from OMA. Each student completes an in-depth research paper and an in-class presentation.

Same as: ARTHIST 262

CEE 133. Advanced Rhinoceros Modeling and Workflows. 3 Units.

Rhinoceros is a powerful 3D modeling program that provides great control and accuracy, and also allows great flexibility and creativity in the design process. Rhinoceros is used by many top-level architecture firms because it can be customized, it can be integrated with many other design programs, and has the potential to create unique and detailed forms. The course will concentrate on introducing students to the Rhinoceros platform in great depth so that they may comfortably utilize the program for any type of design project. In addition to basic and advanced modeling skills in Rhinoceros, the course will explore an integrated workflow between design environments. Comprehension will be expanded from simple 3D modeling to a process that optimizes the strengths of different design platforms. Students will study and implement an integrated workflow that connects powerful conceptual modeling with building information models in order to produce a quality design product ready for documentation and presentation. Same as: CEE 233

CEE 133F. Principles of Freehand Drawing. 3 Units.

Traditional methods of depicting shape, form, and surface are applied to the discipline of architectural drawing. Students develop abilities to observe visual phenomenon analytically and translate subjects onto a two-dimensional surface in a variety of media. Drawing techniques such as modeling form, shading, rendering materials, and articulating landscaping are explored. Linear perspective exercises provide a foundation for the construction of drawings to illustrate cohesive design proposals. Step-by-step constructions, quick freehand sketches from slides, and on-location studies.

CEE 134A. Site and Space. 4 Units.

Preference to Architectural Design and CEE majors; others by consent of instructor. An architectural design studio exploring the Stanford Green Dorm project. Initial sessions develop a working definition of sustainable design and strategies for greening the built environment in preparation for design studio work. Enrollment limited to 14. Prerequisites: 31 or 31Q, and 110 and 130.

CEE 134B. Intermediate Arch Studio. 4 Units.

This studio offers students experience in working with a real site and a real client program to develop a community facility. Students will develop site analysis, review a program for development and ultimately design their own solutions that meet client and community goals. Sustainability, historic preservation, community needs and materials will all play a part in the development of students final project. Students will also gain an understanding of graphic conventions, verbal and presentation techniques. Course may be repeated for credit.

Same as: CEE 234B

CEE 135. Parametric Modeling and Optimization. 4 Units.

This course introduces and explores tools and techniques for computational design and parametric modeling as a foundation for design optimization. The course covers several parametric design modeling platforms and scripting environments that enable rapid generation and evaluation of parametrically-driven design alternatives. Topics include: Parametric modeling platforms ((Revit/FormIt, Rhino, Digital Project); Scripting languages and environments (Dynamo, Grasshopper, DesignScript); Single-goal optimization; and Multi-dimensional optimization techniques and selection/guidance strategies.

CEE 135A. Parametric Modeling and Optimization. 4 Units.

This course introduces and explores tools and techniques for computational design and parametric modeling as a foundation for design optimization. The course covers several parametric design modeling platforms and scripting environments that enable rapid generation and evaluation of parametrically-driven design alternatives.

CEE 136. Green Architecture. 4 Units.

Preference to Architectural Design and CEE majors; others by consent of instructor. An architectural design studio exploring green design and green design processes. Initial sessions develop a working definition of sustainable design and strategies for greening the built environment in preparation for design studio work. Prerequisites: 31 or 31Q, and 110 and 130. Enrollment is limited to 14 (or possibly 16) students. Please do not enroll in the class until after attending the first class meeting. If the number of students interested in taking the class is greater than 14 (or possibly 16), space will be assigned based on requirements for graduation.

Same as: CEE 236

CEE 137A. Form and Structure. 4 Units.

Preference to Architectural Design and CEE majors; others by consent of instructor. Intermediate architectural studio. The integration of structure, form, site, and program. Emphasis is on developing a schematic design in the context of site topography and structural systems. Limited enrollment. Prerequisites: 31 or 31Q, and 130.

CEE 137B. Advanced Architecture Studio. 5 Units.

This course will focus on the topic of interdisciplinary collaboration and its role in the development of design concepts. Specifically, the integration of structural with architectural considerations to produce a unified urban, spatial, tectonic and structural proposition will be our field of investigation. This course is an architecture studio course where class time will be spent primarily in individual or group desk critiques and pin-up sessions. Additionally, there will be lectures, case study presentations and a field trip. Prerequisites: required: CEE 31 (or 31Q) Drawing, CEE 110 BIM and CEE 130 Design.

Same as: CEE 237B

CEE 138A. Contemporary Architecture: Materials, Structures, and Innovations. 3 Units.

Structural and material bases for contemporary architecture; its roots in modern innovations. Recent technological developments; new materials and structural expressions. Sources include specific buildings and construction techniques. How to think critically about design strategies, material properties, and structural techniques.

CEE 139. Design Portfolio Methods. 2 Units.

Students present designs completed in other studio courses to communicate design intentions and other aspects of their work. Instruction in photography; preparation of a design portfolio; and short essays that characterize portfolio contents. Oral presentation workshops offered through the Center for Teaching and Learning. Limited enrollment. Prerequisites: two Art or Architecture studio courses, or consent of instructor.

CEE 140. Field Surveying Laboratory. 3 Units.

Graduate students register for 225. Friday afternoon laboratory provides practical surveying experience. Additional morning classes to prepare for the afternoon sessions. Hands-on operation of common traditional field survey tools ; introduction to the newest generation of digital measuring, positioning, and mapping tools. Emphasis is on the concept of using the data collected in the field as the basis for subsequent engineering and economic decisions.

Same as: CEE 225

CEE 141A. Infrastructure Project Development. 3 Units.

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of the condition of the nation's infrastructure and how projects are planned and financed. Focus is on public works in the U.S. The role of public and private sectors through a step-by-step study of the project development process. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare project environmental impact statements.

Same as: CEE 241A

CEE 141B. Infrastructure Project Delivery. 3 Units.

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities ,and communications sectors. Analysis of how projects are designed, constructed, operated, and maintained. Focus is on public works projects in the U.S. Alternative project delivery approaches and organizational strategies. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare finance/design/build/operate/maintain project proposals.

Same as: CEE 241B

CEE 141C. Global Infrastructure Projects Seminar. 1-2 Unit.

Real infrastructure projects presented by industry guest speakers. Energy, transportation, water, public facilities and communications projects are featured. Course provides comparisons of project development and delivery approaches for mega-projects around the world. Alternative project delivery methods, the role of public and private sector, different project management strategies, and lessons learned. Field trips to local projects.

Same as: CEE 241C

CEE 142A. Negotiating Sustainable Development. 3 Units.

How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

Same as: CEE 242A, EARTH SYS 142A, EARTH SYS 242A

CEE 144. Design and Innovation for the Circular Economy. 3 Units.

The last 150 years of our industrial evolution have been material and energy intensive. The linear model of production and consumption manufactures goods from raw materials, wells and uses them, and then discards the products as waste. Circular economy provides a framework for systems-level redesign. It builds on schools of thought including regenerative design, performance economy industrial ecology, blue economy, biomimicry, and cradle to cradle. This course introduces the concepts of the circular economy and applies them to case studies of consumer products, household goods, and fixed assets. nStudents will conduct independent projects on circular economy. Students may work alone or in small teams under the guidance of the teaching team and various collaborators worldwide. Class is limited to 14 students. All disciplines are welcome. This class fulfills the Writing & Rhetoric 2 requirement. Prerequisite: PWR 1.

CEE 146A. Engineering Economy. 3 Units.

Fundamentals of financial and economic analysis. Engineering Economy Principles. Interest rates, Present value, annual cash flow, internal rate of return, benefit-cost analysis. Economic Life, Life Cycle Costs. Replacement analysis. Project Selection - Mutually Exclusive Alternatives, Multiple Objective Criteria. Depreciation. Inflation and Taxes. Sensitivity and risk analysis. Uncertainty and Probability. Decision Trees. Capital Budgeting. For CEE 146A: enrollment is limited to juniors and seniors. Attendance to the first class is mandatory (for both CEE 146A and CEE 246A).

Same as: CEE 246A

CEE 147. Cases in Personality, Leadership, and Negotiation. 3 Units.

Case studies target personality issues, risk willingness, and life skills essential for real world success. Failures, successes, and risk willingness in individual and group tasks based on the professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Application downloaded from coursework must be submitted before first class; mandatory first class attendance. No auditors.

Same as: CEE 247

CEE 151. Negotiation. 3 Units.

Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; see Coursework.

Same as: CEE 251, EARTH SCI 251

CEE 154. Cases in Estimating Costs. 3 Units.

Students participate in bidding contests requiring cost determination in competitive markets. Monetary forces driving the construction industry as general principles applicable to any competitive business. Cases based on field trips and professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Limited enrollment; no auditors. Prerequisites: consent or instructor and application downloaded from CourseWork prior to start of class.

Same as: CEE 254

CEE 155. Introduction to Sensing Networks for CEE. 3-4 Units.

Introduce the design and implementation of sensor networks for monitoring the built and natural environment. Emphasis on the integration of modern sensor and communication technologies, signal processing and statistical models for network data analysis and interpretation to create practical deployments to enable sustainable systems, in areas such as energy, weather, transportation and buildings. Students will be involved in a practical project that may involve deploying a small sensor system, data models and analysis and signal processing. Limited enrollment.

Same as: CEE 255

CEE 156. Building Systems. 4 Units.

HVAC, lighting, and envelope systems for commercial and institutional buildings, with a focus on energy efficient design. Knowledge and skills required in the development of low-energy buildings that provide high quality environment for occupants.

Same as: CEE 256

CEE 160. Mechanics of Fluids Laboratory. 2 Units.

Lab experiments illustrate conservation principles and flows of real fluids, analysis of error and modeling of simple fluid systems. Corequisite: 101B.

CEE 161A. Rivers, Streams, and Canals. 3-4 Units.

Introduction to the movement of water through natural and engineered channels, streams, and rivers. Basic equations and theory (mass, momentum, and energy equations) for steady and unsteady descriptions of the flow. Application of theory to the design of flood-control and canal systems. Flow controls such as weirs and sluice gates; gradually varied flow; Saint-Venant equations and flood waves; and method of characteristics. Open channel flow laboratory experiments: controls such as weirs and gates, gradually varied flow, and waves. Limited enrollment in lab section. Prerequisite: CEE 101B.

Same as: CEE 264A

CEE 164. Introduction to Physical Oceanography. 4 Units.

The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

Same as: CEE 262D, EARTHYSYS 164, EESS 148

CEE 165C. Water Resources Management. 3 Units.

Examination of the basic principles of surface and ground water resources management in the context of increasing water scarcity and uncertainty due to climate change and other factors. Specific topics include reservoir, river basin and aquifer management, conjunctive use of surface and ground water, and treated wastewater reuse. Special emphasis is placed on demand management through conservation, increased water use efficiency and economic measures. Besides the technical aspects of water management, an overview of its legal and institutional framework is provided.

Same as: CEE 265C

CEE 166A. Watersheds and Wetlands. 3 Units.

Introduction to the occurrence and movement of water in the natural environment and its role in creating and maintaining terrestrial, wetland, and aquatic habitat. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Rivers and lakes, springs and swamps. Emphasis is on observation and measurement, data analysis, modeling, and prediction. Prerequisite: 101B or equivalent. (Freyberg).

Same as: CEE 266A

CEE 166B. Floods and Droughts, Dams and Aqueducts. 3 Units.

Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, hydroelectric power generation, rural and urban water supply systems, storm water management, flood damage mitigation, and water law and institutions. Emphasis is on engineering design. Prerequisite: 166A or equivalent. (Freyberg).

Same as: CEE 266B

CEE 166D. Water Resources and Water Hazards Field Trips. 2 Units.

Introduction to water use and water hazards via weekly field trips to local and regional water resources facilities (dams, reservoirs, fish ladders and hatcheries, pumping plants, aqueducts, hydropower plants, and irrigation systems) and flood damage mitigation facilities (storm water detention ponds, channel modifications, flood control dams, and reservoirs). Each trip preceded by an orientation lecture.

Same as: CEE 266D

CEE 169. Environmental and Water Resources Engineering Design. 5 Units.

Application of fluid mechanics, hydrology, water resources, environmental sciences, and engineering economy fundamentals to the design of a system addressing a complex problem of water in the natural and constructed environment. Problem changes each year, generally drawn from a challenge confronting the University or a local community. Student teams prepare proposals, progress reports, oral presentations, and a final design report. Prerequisite: senior in Civil Engineering or Environmental Engineering; 166B.

CEE 171. Environmental Planning Methods. 3 Units.

For juniors and seniors. Use of microeconomics and mathematical optimization theory in the design of environmental regulatory programs; tradeoffs between equity and efficiency in designing regulations; techniques for predicting adverse effects in environmental impact assessments; information disclosure requirements; and voluntary compliance of firms with international regulating norms. Prerequisites: MATH 51. Recommended: 70.

CEE 171E. Environmental Challenges and Policies in Europe. 3 Units.

Current and future environmental challenges in Europe and related public policies in the European Union (EU). State of the European environment and human development, European environmental policy-making (multi-level ecological governance), global ecological role of the EU. Specific challenges include climate change adaptation, mitigation (carbon taxes, carbon market), climate change and European cities, biodiversity and ecosystems preservation (economics of biodiversity), energy management. Specific policies include environmental justice (environmental inequalities), human development and environmental sustainability indicators (beyond GDP) and absolute and relative decoupling (carbon intensity and resource productivity improvement). Open to undergraduates (freshmen, sophomores, juniors and seniors) as CEE 171E.

Same as: CEE 271E

CEE 171F. New Indicators of Well-Being and Sustainability. 3 Units.

Explore new ways to better measure human development, comprehensive wealth and sustainability beyond standard economic indicators such as income and GDP. Examine how new indicators shape global, national and local policy worldwide. Well-being topics include health, happiness, trust, inequality and governance. Sustainability topics include sustainable development, environmental performance indicators, material flow analysis and decoupling, and inclusive wealth indicators. Students will build their own indicator of well-being and sustainability for a term paper.

Same as: CEE 271F

CEE 172. Air Quality Management. 3 Units.

Quantitative introduction to the engineering methods used to study and seek solutions to current air quality problems. Topics: global atmospheric changes, urban sources of air pollution, indoor air quality problems, design and efficiencies of pollution control devices, and engineering strategies for managing air quality. Prerequisites: 70, MATH 51.

CEE 172A. Indoor Air Quality. 2-3 Units.

Factors affecting the levels of air pollutants in the built indoor environment. The influence of ventilation, office equipment, floor coverings, furnishings, cleaning practices, and human activities on air quality including carbon dioxide, VOCs, resuspended dust, and airborne molds and fungi.

Recommended: 172 or 278A.

Same as: CEE 278C

CEE 172S. Green House Gas Mitigation. 1-3 Unit.

This course will introduce the main concepts of greenhouse gas (GHG) emissions measurement and management, and it will explore the main mitigation options for reducing emissions or sequestering carbon dioxide. It will address technical aspects of GHG mitigation via energy efficiency and demand-side management, energy in high-technology industry, distributed power and co-generation, the role of renewable energy in GHG management, carbon sequestration in forestry, agriculture, and geological formations. The course explores policy options, carbon trading and business strategies for GHG mitigation.

Same as: CEE 272S

CEE 173A. Energy Resources. 3-5 Units.

Comprehensive overview of fossil and renewable energy resources and energy efficiency. Topics covered for each resource: resource abundance, location, recovery, conversion, consumption, end-uses, environmental impacts, economics, policy, and technology. Applied lectures in specific energy sectors: buildings, transportation, the electricity industry, and energy in the developing world. Required field trips to local energy facilities. Optional discussion section for extra unit. CEE 173 is offered for 4-5 units; ES 103 is offered for 4-5 units; CEE 207A is offered for 3-5 units: instructor approval required for 3-unit option.

Same as: CEE 207A, EARTHSYS 103

CEE 173C. Introduction to Membrane Technology for Water / Wastewater Treatment. 3 Units.

This course equips students with a basic understanding of membrane processes and their application in the water industry. Topics covered include: introduction to membrane separation, reverse osmosis, nanofiltration, membrane characterization techniques (XPS, TEM, ATR-FTIR, streaming potential), mass transport phenomena (concentration polarization, solution-diffusion, pore-flow) fouling processes (scaling, biofouling), rejection of salts and trace organics, brine disposal, system design, energy and cost considerations of membrane treatment, pre- and post-treatment, case studies. The course includes a field trip to a reverse osmosis pilot plant and evaluation of field data.

Same as: CEE 273C

CEE 174A. Providing Safe Water for the Developing and Developed World. 3 Units.

This course will cover basic hydraulics and the fundamental processes used to provide and control water, and will introduce the basics of engineering design. In addition to understanding the details behind the fundamental processes, students will learn to feel comfortable developing initial design criteria (30% designs) for fundamental processes. Students should also develop a feel for the typical values of water treatment parameters and the equipment involved. The course should enable students to work competently in environmental engineering firms or on non-profit projects in the developing world such as Engineers without Borders. Pre-requisite: Chem31B/X.

CEE 174B. Wastewater Treatment: From Disposal to Resource Recovery. 3 Units.

This course builds upon CEE 174A, covering basic hydraulics and the fundamental processes used to treat wastewater. In addition to understanding the details behind the fundamental processes, students will learn to feel comfortable developing initial design criteria (30% designs) for fundamental processes. Students should also develop a feel for the typical values of water treatment parameters and the equipment involved. After covering conventional processes, the class addresses newer processes used to meet emerging treatment objectives, including nutrient removal, composting of biosolids and recycling of wastewater for beneficial uses, including potable reuse. Pre-requisites: CEE 174A.

CEE 175A. California Coast: Science, Policy, and Law. 3-4 Units.

Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

Same as: CEE 275A, EARTHSYS 175, EARTHSYS 275

CEE 175S. Environmental Entrepreneurship and Innovation. 2 Units.

Our current infrastructure for provision of critical services-clean water, energy, transportation, environmental protection; requires substantial upgrades. As a complement to the scientific and engineering innovations taking place in the environmental field, this course emphasizes the analysis of economic factors and value propositions that align value chain stakeholder interests.

Same as: CEE 275S

CEE 176A. Energy Efficient Buildings. 3-4 Units.

Analysis and design. Thermal analysis of building envelope, heating and cooling requirements, HVAC, and building integrated PV systems. Emphasis is on residential passive solar design and solar water heating. Lab.

CEE 176B. Electric Power: Renewables and Efficiency. 3-4 Units.

Renewable and efficient electric power systems emphasizing analysis and sizing of photovoltaic arrays and wind turbines. Basic electric power generation, transmission and distribution, distributed generation, combined heat and power, fuel cells. End use demand, including lighting and motors. Lab.

CEE 176C. Energy Storage Integration - Vehicles, Renewables, and the Grid. 3-4 Units.

This course will describe the background on existing energy storage solutions being used on the electric grid and in vehicles with a primary focus on batteries and electrochemical storage. It will discuss the operating characteristics, cost and efficiency of these technologies and how tradeoff decisions can be made. The course will describe the system-level integration of new storage technologies, including chargers, inverters, battery management systems and controls, into the existing vehicle and grid infrastructure. Specific focus will be given to the integration of electric vehicle charging combined with demand-side management, scheduled renewable energy absorption and local grid balancing. This course may be taken for 3 units; or 4 units if taken with the optional laboratory session.

CEE 176D. Advanced Topics in Integrated Demand Side Management. 2 Units.

The American economy is highly inefficient: between 14-39% of the energy inputs into the US economy are ultimately used to create goods and services, while the remaining energy is lost in energy conversion and other inefficiencies. While this inefficiency results in a heavy social, environmental, and economic burden on both individuals and society as a whole, it also presents an tremendous opportunity to re-imagine how we use and manage our energy consumption. Recent technological advances, including the rise of information technology, sensors, controls, are dramatically re-shaping how energy is utilized, controlled, stored and integrated with traditional supply side resources. These emerging technologies and energy management techniques provide some of the greatest opportunities to improve the efficiency of our economy and address climate change. This course begins with an overview of demand side management (the application of efficiency, demand reduction, distributed generation, storage, and other resource to shape energy demand) practice to date and a detailed look at how energy is used throughout each sector of the economy. Based on this starting point, the course explores emerging technologies and optimization strategies that enable greater insight and control of energy use both at the device and aggregate level, including integration with renewables, storage, and electric vehicles. It then quantifies and monetizes these optimization strategies into revenue streams to both utility and end-user, and culminates in a discussion of how the intersection of these new technologies, optimization strategies, and revenue streams can help de-carbonize the American economy and shape energy use and the utility of the future. Prerequisites: This course is intended for students who wish to gain an understanding of how energy efficiency and demand management occurs in practice. While there are no formal prerequisites, it is expected that students will have familiarity with energy resources and building energy end uses, such as topics covered in CEE 176A/276A, CEE 173A/207A, CEE 156/256, and CEE226E.

Same as: CEE 276C

CEE 176F. Energy Systems Field Trips: China Energy Systems. 1-2 Unit.

Energy resources and policies in use and under development in China. 12-day field trip to China during Spring Break. One unit for seminar and readings; one unit for field trip. Tuesday section is required for all students, Thursday section is also required for students attending the field trip. Prerequisite: consent of instructor for field trip. Same as: CEE 276F

CEE 176S. Instrumental Analysis of Emerging Contaminants in the Environment. 3 Units.

Introduction to the occurrence and behavior of trace organic compounds in the environment and focus on research approaches to investigate these compounds. Principles of analytical techniques and experimental approaches to detect and monitor trace organic contaminants in the environment will be examined. Students will critically review published original research and prepare and an original research project proposal. Same as: CEE 276S

CEE 177. Aquatic Chemistry and Biology. 4 Units.

Introduction to chemical and biological processes in the aqueous environment. Basic aqueous equilibria; the structure, behavior, and fate of major classes of chemicals that dissolve in water; redox reactions; the biochemistry of aquatic microbial life; and biogeochemical processes that govern the fate of nutrients and metals in the environment and in engineered systems. Prerequisite: CHEM 31.

CEE 177K. Environmental Information Engineering. 2-3 Units.

The role of information technology (IT) in enabling mankind to understand its impact on the planet and balance that with improving the quality of life of a rapidly growing population. After surveying the field, the course will examine the specific impacts that IT may have, by reference to case studies from energy, transportation, water and urban design fields. While some specific information technologies will be examined, this will be from a business perspective - detailed technical knowledge of IT not required. Same as: CEE 277K

CEE 177L. Smart Cities & Communities. 2-3 Units.

The role of information technology (IT) in enabling mankind to improve the operations and sustainability of cities and communities. Review of what a "smarter" city of community might be, the role of IT in enabling them to become "smarter" (including what IT cannot achieve). Case studies on water, energy, transportation urban design and resilience. Same as: CEE 277L

CEE 177S. Design for a Sustainable World. 1-5 Unit.

Technology-based problems faced by developing communities worldwide. Student groups partner with organizations abroad to work on concept, feasibility, design, implementation, and evaluation phases of various projects. Past projects include a water and health initiative, a green school design, seismic safety, and medical device. Admission based on written application and interview. See <http://esw.stanford.edu> for application. (Staff). Same as: CEE 277S

CEE 177X. Current Topics in Sustainable Engineering. 1-3 Unit.

This course is the first half of a two quarter, project-based design course that addresses the cultural, political, organizational, technical, and business issues at the heart of implementing sustainable engineering projects in the developing world. Students will be placed into one of three project teams and tackle a real-world design challenge in partnership with social entrepreneurs and NGOs. In CEE 177X/277X, students will gain the background skills and context necessary to effectively design engineering projects in developing nations. Instructor consent required. Same as: CEE 277X

CEE 178. Introduction to Human Exposure Analysis. 3 Units.

(Graduate students register for 276.) Scientific and engineering issues involved in quantifying human exposure to toxic chemicals in the environment. Pollutant behavior, inhalation exposure, dermal exposure, and assessment tools. Overview of the complexities, uncertainties, and physical, chemical, and biological issues relevant to risk assessment. Lab projects. Recommended: MATH 51. Apply at first class for admission. Same as: CEE 276

CEE 179A. Water Chemistry Laboratory. 3 Units.

(Graduate students register for 273A.) Laboratory application of techniques for the analysis of natural and contaminated waters, emphasizing instrumental techniques. Same as: CEE 273A

CEE 179C. Environmental Engineering Design. 5 Units.

Application of engineering fundamentals including environmental engineering, hydrology, and engineering economy to a design problem. Enrollment limited; preference to seniors in Civil and Environmental Engineering.

CEE 179S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings. Same as: CEE 279S, EARTHSYS 179S, EESS 179S

CEE 179X. Sustainable Urban System Seminar. 1 Unit.

SYSTEM OF SYSTEMS: Cities are based on several different systems; infrastructures, networks and environments. The effectiveness and efficiency of these systems determine how cities work and how successful a city is at delivering critical services. These systems are not discrete and must be considered holistically as well as individually. These core systems are interconnected and must be treated as such. Understanding one system and making it work better means that cities must comprehend the larger context and how the various systems are interconnected. This seminar series will explore various aspects of these critical systems and how we can make them more resilient and robust, to meet future challenges. Guest speakers, discussion and critical readings. Same as: CEE 279X

CEE 180. Structural Analysis. 4 Units.

Analysis of beams, trusses, frames; method of indeterminate analysis by consistent displacement, least work, superposition equations, moment distribution. Introduction to matrix methods and computer methods of structural analysis. Prerequisite: 101A and ENGR 14.

CEE 181. Design of Steel Structures. 4 Units.

Concepts of the design of steel structures with a load and resistance factor design (LRFD) approach; types of loading; structural systems; design of tension members, compression members, beams, beam-columns, and connections; and design of trusses and frames. Prerequisite: 180.

CEE 182. Design of Reinforced Concrete Structures. 3-4 Units.

Properties of concrete and reinforcing steel; behavior of structural elements subject to bending moments, shear forces, torsion, axial loads, and combined actions; design of beams, slabs, columns and footings; strength design and serviceability requirements; design of simple structural systems for buildings. Prerequisite: 180.

CEE 183. Integrated Civil Engineering Design Project. 4 Units.

Studio format. Design concepts for civil engineering facilities from schematic design through construction, taking into account sustainable engineering issues. Design exercises culminating in the design of a civil engineering facility, emphasizing structural systems and materials and integration with construction and other project requirements. Prerequisites: CEE 180, 181, 182; civil engineering major; architectural design major with instructor consent.

CEE 195. Fundamentals of Structural Geology. 3 Units.

Techniques for mapping using GPS and differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; measurement and analysis of stress; elastic deformation and properties of rock; brittle deformation including fracture and faulting; linear viscous flow including folding and magma dynamics; model development and methodology. Models of tectonic processes are constructed and solutions visualized using MATLAB.

Prerequisites: GES 1, MATH 51.

Same as: GES 111

CEE 196. Engineering Geology and Global Change. 3 Units.

The application of geology and global change to the planning, design, and operation of engineering projects. Case histories taught in a seminar setting and field trips emphasize the impact of geology and global change on both individual engineering works and the built environment by considering Quaternary history and tectonics, anthropogenic sea level rise, active geologic processes, engineering properties of geologic deposits, site exploration, and professional ethics. Prerequisite: GES 1 or consent of instructor.

Same as: GES 115

CEE 198. Directed Reading or Special Studies in Civil Engineering. 1-4 Unit.

Written report or oral presentation required. Students must obtain a faculty sponsor.

CEE 199. Undergraduate Research in Civil and Environmental Engineering. 1-4 Unit.

Written report or oral presentation required. Students must obtain a faculty sponsor.

CEE 199A. Special Projects in Architecture. 1-4 Unit.

Faculty-directed study or internship. May be repeated for credit.

Prerequisite: consent of instructor.

CEE 199B. Directed Studies in Architecture. 1-4 Unit.

Projects may include studio-mentoring activities, directed reading and writing on topics in the history and theory of architectural design, or investigations into design methodologies.

CEE 199E. Outreach and Mentoring Program Development in CEE. 1-2 Unit.

Open to undergraduates who are declared majors in Civil Engineering, Environmental Engineering, Atmosphere/Energy, and Architectural Design. Will brainstorm and develop an innovative curriculum and engaging activities for CEE 10 (Intro. to the Civil & Environmental Engineering Professions).

CEE 199H. Undergraduate Honors Thesis. 2-3 Units.

For students who have declared the Civil Engineering B.S. honors major and have obtained approval of a topic for research under the guidance of a CEE faculty adviser. Letter grade only. Written thesis or oral presentation required. (Staff).

CEE 199L. Independent Project in Civil and Environmental Engineering. 1-4 Unit.

Prerequisite: Consent of Instructor.

CEE 200A. Teaching of Civil and Environmental Engineering. 1 Unit.

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. 200A. Aut, 200B. Win, 200C. Spr.

CEE 200B. Teaching of Civil and Environmental Engineering. 1 Unit.

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. May be repeated for credit. 200A. Aut, 200B. Win, 200C. Spr.

CEE 200C. Teaching of Civil and Environmental Engineering. 1 Unit.

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. May be repeated for credit. 200A. Aut, 200B. Win, 200C. Spr.

CEE 201D. Computations in Civil and Environmental Engineering. 3 Units.

Computational and visualization methods in the design and analysis of civil and environmental engineering systems. Focus is on applications of MATLAB. How to develop a more lucid and better organized programming style.

Same as: CEE 101D

CEE 201S. Science & Engineering Problem-Solving with MatLab.. 3 Units.

Introduction to the application of MATLAB to an array of engineering systems. Emphasis on computational and visualization methods in the design, modeling and analysis of engineering problems.

Same as: CEE 101S

CEE 202. Construction Law and Claims. 3 Units.

Concepts include the preparation and analysis of construction claims, cost overrun and schedule delay analysis, general legal principles, contracts, integrated project delivery, public private partnerships and the resolution of construction disputes through ADR and litigation. Requires attendance of the ten weeks of Monday classes (1/6/14 - 3/10/14) and the first five weeks of Tuesday classes (1/7/14 - 2/4/14).

CEE 203. Probabilistic Models in Civil Engineering. 3-4 Units.

Introduction to probability modeling and statistical analysis in civil engineering. Emphasis is on the practical issues of model selection, interpretation, and calibration. Application of common probability models used in civil engineering including Poisson processes and extreme value distributions. Parameter estimation. Linear regression.

CEE 204. Structural Reliability. 3-4 Units.

Procedures for evaluating the safety of structural components and systems. First- and second-order estimates of failure probabilities of engineered systems. Sensitivity of failure probabilities to assumed parameter values. Measures of the relative importance of random variables. Reliability of systems with multiple failure modes. Reliability updating. Simulation methods and variance reduction techniques. Prerequisite: 203 or equivalent.

CEE 205A. Structural Materials Testing and Simulation. 3-4 Units.

Hands-on laboratory experience with fabrication, computer simulation, and experimental testing of material and small-scale structural components. Comparison of innovative and traditional structural materials. Behavior and application of high-performance fiber reinforced concrete materials for new design, fiber-reinforced polymeric materials for structural retrofits and introduction to sustainable, bio-based composites. Prerequisites: basic course in reinforced concrete design CEE 182 or equivalent.

CEE 205B. Advanced Topics in Structural Concrete. 3 Units.

Concepts and application of strut and tie modeling including deep beams, design for torsion resistance, beam-column joints, bridge components, and post-tensioned anchor zones. Course project integrating computer simulation and physical experimentation of a structural concrete component. Prerequisites: CEE 285A or equivalent.

CEE 206. Decision Analysis for Civil and Environmental Engineers. 3 Units.

Current challenges in selecting an appropriate site, alternate design, or retrofit strategy based on environmental, economic, and social factors can be best addressed through applications of decision science. Basics of decision theory, including development of decision trees with discrete and continuous random variables, expected value decision making, utility theory value of information, and elementary multi-attribute decision making will be covered in the class. Examples will cover many areas of civil and environmental engineering problems. Prerequisite: CEE 203 or equivalent.

CEE 206A. Decision Models in Civil Engineering. 2 Units.

For advanced graduate students in CEE. Applications of decision science to address current challenges in selecting an appropriate site and appropriate design or retrofit strategy based on environmental, economic, and social factors. Examples from everyday civil and environmental engineering problems. Prerequisite: CEE 203 or equivalent.

CEE 207A. Energy Resources. 3-5 Units.

Comprehensive overview of fossil and renewable energy resources and energy efficiency. Topics covered for each resource: resource abundance, location, recovery, conversion, consumption, end-uses, environmental impacts, economics, policy, and technology. Applied lectures in specific energy sectors: buildings, transportation, the electricity industry, and energy in the developing world. Required field trips to local energy facilities. Optional discussion section for extra unit. CEE 173 is offered for 4-5 units; ES 103 is offered for 4-5 units; CEE 207A is offered for 3-5 units; instructor approval required for 3-unit option.

Same as: CEE 173A, EARTHYSYS 103

CEE 207S. Energy Resources: Fuels and Tools. 3 Units.

Energy is a vital part of our daily lives. This course examines where that energy comes from, and the advantages and disadvantages across different fuels. Contextual analysis of energy decisions for transportation and electricity generation around the world. Energy resources covered include oil, biomass, natural gas, nuclear, hydropower, wind, solar, geothermal, and emerging technologies. Prerequisites: Algebra. Note: may not be taken by students who have completed CEE 173A, CEE 207 or EARTHYSYS 103. Same as: CEE 107S

CEE 208. Structural Health Monitoring Using Statistical Methods. 1-2 Unit.

Structural health monitoring systems, which enables us to automatically diagnose structural damage, are important to ensure safe and functional built environment. This course provides theoretical background on damage diagnosis algorithms using model-based and signal-based methods for civil structures with an emphasis on the underlying physical interpretations and their practical usage.

CEE 209. Risk Quantification and Insurance. 2 Units.

Principles of risk management along with concepts of frequency and severity and various risk measures such as probabilities of exceeding given loss level, probabilities of insolvency, and expected value of shortfall will be introduced. Various risk handling techniques will be discussed with particular emphasis on insurance. Ability to express preferences between random future gains or losses, will be presented in the context of stochastic ordering of risks. Credibility theory and generalized linear models will be used for claims predictions. Prerequisites: CEE 203 or equivalent.

CEE 210A. Building Information Modeling and Short Course. 2-4 Units.

Creation, management, and application of building information models. Process and tools available for creating 2D and 3D computer representations of building components and geometries. Organizing and operating on models to produce architectural views and construction documents, renderings and animations, and interface with analysis tools. Lab exercises, class projects. Limited enrollment /instructor consent required.

Same as: CEE 110A

CEE 212A. Industry Applications of Virtual Design & Construction. 2-4 Units.

Building upon the concept of the VDC Scorecard, CEE 112A/212A investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Interacting with experts and professionals in real estate, architecture, engineering, construction and technology providers, students will learn from the industry applications of Building Information Modeling and its relationship with Integrated Project Delivery, Sustainable Design and Construction, and Virtual Design and Construction. Students will conduct case studies to evaluate the maturity of VDC planning, adoption, technology and performance in practice. Students taking 3 or 4 units will be paired up with independent research or case study projects on the industry applications of VDC. No prerequisite. See CEE 112B/212B in the Winter Quarter and CEE 112C/212C in the Spring Quarter.

CEE 212B. Industry Applications of Virtual Design & Construction. 2-4 Units.

CEE 112B/212B is a practicum on the Industry Applications on Virtual Design and Construction (VDC). Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC and Building Information Modeling (BIM). Students can choose between one of the two project topics: [1] Industrialized Construction with Virtual Parts (No Prerequisite) or [2] Industry Benchmarking & Applications of the VDC Management Scorecard (Suggested Prerequisite: CEE 112A/212A). Same as: CEE 112B

CEE 212C. Industry Applications of Virtual Design & Construction. 2-4 Units.

Following the Autumn- and Winter-quarter course series, CEE 112C/212C is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 112B/212B, CEE 159C/259C, CEE 159D/259D, or Instructor's Approval. Same as: CEE 112C

CEE 212D. Industry Applications of Virtual Design and Construction. 2-4 Units.

A continuation of the CEE 112/212 series, CEE 112D/212D is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC research or application opportunities with public owners and private developers, professional associations, and/or other member organizations of the Center for Integrated Facility Engineering at Stanford. Independently, students will conduct case studies, research activities, and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE110/210, CEE 112C/212C, CEE 122B/222B, or Instructor's Approval. Same as: CEE 112D

CEE 213. Patterns of Sustainability. 1-4 Unit.

This seminar examines the interrelated sustainability of the natural, built and social environments of places in which we live. Several BOSP centers and the home Stanford campus will hold this 1-2 unit seminar simultaneously and collaborate with a shared curriculum, assignments, web conference and a Wiki. The goal of the collaborative arrangement is to expose, share, compare and contrast views of sustainability in different parts of the world. We will look at and assess aspects of sustainability of the places we are living from a theoretical perspective from the literature, from observations and interviews in the countries in which we study.

Same as: CEE 113

CEE 214. Introduction to Modeling and Analysis in CEE. 3 Units.

Introduces students to modeling of products, processes and organizations in the AEC industry. Modeling and analysis purposes include support of technical, social, psychological and ethical decision making for different stakeholders. Different purposes and levels of detail for different models. CEM/DCI integrated approach to building using physical, mathematical, graphical and computer models of products, organizations and processes.

CEE 215. Goals and Methods of Sustainable Building Projects. 3 Units.

(Graduate students register for 215.) Goals related to sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and economic and social sustainability. Methods to integrate these goals and enhance the economic, ecological, and equitable value of building projects. Industry and academic rating systems, project case studies, guest lecturers, and group project.

Same as: CEE 115

CEE 217. Renewable Energy Infrastructure. 3 Units.

Construction of renewable energy infrastructure: geothermal, solar thermal, solar photovoltaic, wind, biomass. Construction and engineering challenges and related issues and drivers for performance, cost, and environmental impact. Context of renewable energy infrastructure development including comparison of the types of renewable energy, key economic, environmental, and social contextual factors, applicability of a type of renewable energy given a context, related barriers and opportunities. Class project to plan a start-up for developing a type of energy infrastructure based on an engineering innovation.

CEE 220A. Building Information Modeling Workshop. 2-4 Units.

The foundational Building Information Modeling course introduces techniques for creating, managing, and applying of building information models in the building design and construction process. The course covers processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components and geometries to produce models used in architectural design, construction planning and documentation, rendering and visualization, simulation and analysis.

Same as: CEE 120A

CEE 220B. Building Information Modeling Workshop. 2-4 Units.

This course builds upon the Building Information Model concepts introduced in 110A/220A and illustrates how BIM modeling tools are used to design, analyze, and model building systems including structural, mechanical, electrical, plumbing and fire protection. The course covers the essential physical principles, design criteria, and design strategies for each system and explores processes and tools for modeling those systems and analyzing their performance.

Same as: CEE 120B

CEE 220C. Parametric Design and Optimization. 2-4 Units.

This course explores tools and techniques for computational design and parametric modeling as a foundation for design optimization. Class sessions will introduce several parametric design modeling platforms and scripting environments that enable rapid generation of 3D models and enable rapid evaluation of parametrically-driven design alternatives. Topics to be featured include: Principles of parametric design vs. direct modeling; Design exploration using parametric modeling platforms (Revit/ FormIt, Rhino); Visual scripting languages and environments (Dynamo, Grasshopper, DesignScript); Single- and multi-dimensional optimization techniques and guidance strategies.

Same as: CEE 120C

CEE 220S. Building Information Modeling Special Study. 2-4 Units.

Special studies of Building Information Modeling strategies and techniques focused on creating, managing, and applying models in the building design and construction process. Processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components to produce models used in design, construction planning, visualization, and analysis.

Same as: CEE 120S

CEE 221A. Planning Tools and Methods in the Power Sector. 3-4 Units.

This course covers the planning methods most commonly used in the power sector today. It covers both the fundamental methods used and their applications to electricity generation, transmission and distribution planning, integrated resource planning using both energy efficiency and renewable resources as well as utility finance and ratemaking. The methods covered will include forecasting (time series, regression and the use of markets), resource assessment (including energy efficiency and demand-side management) optimization (in power markets operation and in expansion planning) and the processes used in decision-making.

CEE 222A. Computer Integrated Architecture/Engineering/Construction (AEC) Global Teamwork. 3 Units.

AEC students engage in a crossdisciplinary, collaborative, geographically distributed, and multicultural project-based teamwork. AEC teams exercise their domain knowledge and information technologies in a multidisciplinary context focusing on the design and construction concept development phase of a comprehensive building project. Prerequisite: interview with Instructor in Autumn Quarter.

CEE 222B. Computer Integrated Architecture/Engineering/Construction (AEC) Global Teamwork. 2 Units.

Global AEC student teams continue their project activity focusing on the most challenging concept developed in 222A and chosen jointly with their client. Comprehensive team project focusing on design and construction, including: project development and documentation; detailing, 3D and 4D modeling, simulation, sustainable concepts, cost benefit analysis, and life-cycle cost analysis; and final project presentation of product and process. Prerequisite: CEE 222A.

CEE 223. Materials for Sustainable Urban Systems. 3 Units.

Students will learn to evaluate alternate materials and make a case for materials selection for given urban infrastructure projects considering the material's performance over time, life cycle impacts, and effect on humans. Limited enrollment. Pre-requisites: CEE 226, CEE 101A or equivalent.

CEE 223A. Based Materials, Properties and Durability. 2 Units.

Students will develop an understanding of the chemical and physical processes of cement and concrete hydration, strength development, mechanical performance and durability. Students will learn how the properties of materials and admixture combine to create a wide range of cement-based materials used in the built environment. The course will address sustainable construction, including the use of alternative cements, admixtures, and aggregates. Students will apply the principles in this course to various aspects of civil and structural engineering, including innovative mix design specification and review, structural investigations and failure analysis, and cementitious materials research.

CEE 224A. Sustainable Development Studio. 1-5 Unit.

(Undergraduates, see 124.) Project-based. Sustainable design, development, use and evolution of buildings; connections of building systems to broader resource systems. Areas include architecture, structure, materials, energy, water, air, landscape, and food. Projects use a cradle-to-cradle approach focusing on technical and biological nutrient cycles and information and knowledge generation and organization. May be repeated for credit.

CEE 225. Field Surveying Laboratory. 3 Units.

Graduate students register for 225. Friday afternoon laboratory provides practical surveying experience. Additional morning classes to prepare for the afternoon sessions. Hands-on operation of common traditional field survey tools ; introduction to the newest generation of digital measuring, positioning, and mapping tools. Emphasis is on the concept of using the data collected in the field as the basis for subsequent engineering and economic decisions.

Same as: CEE 140

CEE 226. Life Cycle Assessment for Complex Systems. 3-4 Units.

Life cycle modeling of products, industrial processes, and infrastructure/building systems; material and energy balances for large interdependent systems; environmental accounting; and life cycle costing. These methods, based on ISO 14000 standards, are used to examine emerging technologies, such as biobased products, building materials, building integrated photovoltaics, and alternative design strategies, such as remanufacturing, dematerialization, LEED, and Design for Environment: DfE. Student teams complete a life cycle assessment of a product or system chosen from industry.

CEE 226E. Advanced Topics in Integrated, Energy-Efficient Building Design. 2-3 Units.

Innovative methods and systems for the integrated design and evaluation of energy efficient buildings. Guest practitioners and researchers in energy efficient buildings. Student initiated final project. Prerequisites: CEE 156 or CEE 256. All students are expected to participate in the group project assignments. Students taking the course for two units will not be required to complete in-class assignments or individual homework assignments.

CEE 227. Global Project Finance. 3-5 Units.

Public and private sources of finance for large, complex, capital-intensive projects in developed and developing countries. Benefits and disadvantages, major participants, risk sharing, and challenges of project finance in emerging markets. Financial, economic, political, cultural, and technological elements that affect project structures, processes, and outcomes. Case studies. Limited enrollment.

CEE 227A. Energy System Design in Eastern Europe. 2 Units.

Field-based seminar to evaluate and design future energy systems for Eastern Europe. 14-day field trip during early September 2013. Site visits, fact-finding, stakeholder meetings, presentation to policy makers. One unit for field trip; one unit for project deliverable. Prerequisite: consent of instructor.

Same as: CEE 127A

CEE 227E. Infrastructure, Disruptive Technologies and Entrepreneurship.. 1 Unit.

Silicon Valley provides a dynamic environment perfectly suited for developing the disruptive technologies that are changing the faces of today's mainstream infrastructure systems and essential service industries. This course will provide an overview of the most exciting technologies emerging from Silicon Valley right now and the potential that exists to disrupt mainstream transportation, electricity, intelligence gathering, and banking infrastructure systems that were dominant in the 20th Century. Guest speakers include prominent CEOs, visionaries, investors, and serial entrepreneurs who are building game changing companies.

Same as: CEE 127E

CEE 228. Innovative Global Construction Technology. 2 Units.

(Formerly 245T.) Five-week class. How innovative companies invent new construction processes based on relative local labor, and materials and equipment cost, availability, and capabilities, and developed from experience and knowledge of construction technology in bridge, tunnel, and high-rise building. The process of generating new ideas. Industry guest speakers address the link between product/process innovation and construction technology.

CEE 228C. Design and Construction for Sustainability in Extreme Environments. 2 Units.

Course focuses on multi-disciplinary conceptual design of self-sustaining facilities in remote, extreme environments. Through this learn-by-doing course, students will apply an integrated sustainable design methodology for facility planning and operations. Research into environmental design criteria, opportunities, and constraints to logically guide facility form, shape, systems, and operational requirements. Additional independent study unit available for participation in process experiment. Guest lectures, discussion section, class project. Graduate only.

CEE 229. Climate Change Adaptation for Coastal Cities: Engineering and Policy for a Sustainable Future. 3 Units.

How will climate change affect cities and how will cities respond? Includes an exploration of the threat of climate change to coastal cities worldwide and the potential engineering and policy responses. Understanding of the nature of the challenge of city adaptation planning in terms of earth systems, infrastructure development, urban planning, and social systems. Consideration of economic, social, legal and environmental implications. Student projects will contribute to on-going research. Interdisciplinary. Guest speakers, case studies, and readings.

Same as: CEE 129

CEE 229S. Climate Change Adaptation in the Coastal Built Environment. 1 Unit.

How will climate change impact coastal ports and harbors around the world? Leading experts discuss the latest science, policy, and engineering research on this important issue, including the necessary response to protect ports and harbors from significant sea-level rise and storm surge. Focus is on the built environment. Guest speakers. CEE 229/129 for research option. See www.groupspaces.com/seaports2100.

Same as: CEE 129S

CEE 232. Interplay of Architecture and Engineering. 4 Units.

The range of requirements that drive a building's design including architecture, engineering, constructability, building codes, and budget. Case studies illustrate how structural and mechanical systems are integrated into building types including residential, office, commercial, and retail. In-class studio work.

Same as: CEE 132

CEE 233. Advanced Rhinoceros Modeling and Workflows. 3 Units.

Rhinoceros is a powerful 3D modeling program that provides great control and accuracy, and also allows great flexibility and creativity in the design process. Rhinoceros is used by many top-level architecture firms because it can be customized, it can be integrated with many other design programs, and has the potential to create unique and detailed forms. The course will concentrate on introducing students to the Rhinoceros platform in great depth so that they may comfortably utilize the program for any type of design project. In addition to basic and advanced modeling skills in Rhinoceros, the course will explore an integrated workflow between design environments. Comprehension will be expanded from simple 3D modeling to a process that optimizes the strengths of different design platforms.

Students will study and implement an integrated workflow that connects powerful conceptual modeling with building information models in order to produce a quality design product ready for documentation and presentation. Same as: CEE 133

CEE 234B. Intermediate Arch Studio. 4 Units.

This studio offers students experience in working with a real site and a real client program to develop a community facility. Students will develop site analysis, review a program for development and ultimately design their own solutions that meet client and community goals. Sustainability, historic preservation, community needs and materials will all play a part in the development of students final project. Students will also gain an understanding of graphic conventions, verbal and presentation techniques. Course may be repeated for credit.

Same as: CEE 134B

CEE 236. Green Architecture. 4 Units.

Preference to Architectural Design and CEE majors; others by consent of instructor. An architectural design studio exploring green design and green design processes. Initial sessions develop a working definition of sustainable design and strategies for greening the built environment in preparation for design studio work. Prerequisites: 31 or 31Q, and 110 and 130. Enrollment is limited to 14 (or possibly 16) students. Please do not enroll in the class until after attending the first class meeting. If the number of students interested in taking the class is greater than 14 (or possibly 16), space will be assigned based on requirements for graduation.

Same as: CEE 136

CEE 237B. Advanced Architecture Studio. 5 Units.

This course will focus on the topic of interdisciplinary collaboration and its role in the development of design concepts. Specifically, the integration of structural with architectural considerations to produce a unified urban, spatial, tectonic and structural proposition will be our field of investigation. This course is an architecture studio course where class time will be spent primarily in individual or group desk critiques and pin-up sessions. Additionally, there will be lectures, case study presentations and a field trip. Prerequisites: required: CEE 31 (or 31Q) Drawing, CEE 110 BIM and CEE 130 Design.

Same as: CEE 137B

CEE 241. Managing Fabrication and Construction. 4 Units.

Methods to manage the physical production of construction projects; design, analysis, and optimization of the fabricate-assemble process including performance metrics. Project management techniques and production system design including: push versus pull methods; master scheduling and look-ahead scheduling; scope, cost, and schedule control; earned value analysis; critical path method; location-based scheduling; 4D modeling; workflow; trade coordination; methods to understand uncertainty and reduce process variability; and supply chain systems including made-to-stock, engineered-to-order, and made-to-order. Prerequisite: 100 or consent of instructor. Recommended corequisite: 240.

CEE 241A. Infrastructure Project Development. 3 Units.

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of the condition of the nation's infrastructure and how projects are planned and financed. Focus is on public works in the U.S. The role of public and private sectors through a step-by-step study of the project development process. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare project environmental impact statements.

Same as: CEE 141A

CEE 241B. Infrastructure Project Delivery. 3 Units.

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of how projects are designed, constructed, operated, and maintained. Focus is on public works projects in the U.S. Alternative project delivery approaches and organizational strategies. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare finance/design/build/operate/maintain project proposals.

Same as: CEE 141B

CEE 241C. Global Infrastructure Projects Seminar. 1-2 Unit.

Real infrastructure projects presented by industry guest speakers. Energy, transportation, water, public facilities and communications projects are featured. Course provides comparisons of project development and delivery approaches for mega-projects around the world. Alternative project delivery methods, the role of public and private sector, different project management strategies, and lessons learned. Field trips to local projects.

Same as: CEE 141C

CEE 241P. Integrated Management of Fabrication and Construction. 3-4 Units.

Application of the fundamental fabrication and construction management concepts covered in CEE 241T to an actual project; integrated software environments; integration of scope, schedule, and cost information for scheduling, estimating, and progress control; scope management with BIM; off-site fabrication vs. on-site construction and supply chain coordination; group project; project permitting, potential for a joint project with CEE 242P. Prerequisites: CEE 210, CEE 241T.

CEE 241T. Fundamentals of Managing Fabrication and Construction. 2 Units.

Schedule representations including Gantt chart, critical path method (CPM), 4D modeling, and location-based schedules (LBS); activity definition; Product Breakdown Structure (PBS) and Work Breakdown Structure (WBS); consideration of resources constraints, variability, and types of materials in schedule definition; production systems including push, pull, and collaborative systems; project control including earned value analysis (EVA) and plan percent complete (PPC); schedule performance metrics. Class will be held during the first five weeks of Autumn Quarter only.

CEE 242A. Negotiating Sustainable Development. 3 Units.

How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

Same as: CEE 142A, EARTHYSYS 142A, EARTHYSYS 242A

CEE 242P. Designing Project Organizations. 2 Units.

Sequel to CEE 242T. Course develops information-processing approach for designing project and project-based company organizations to deliver sustainable construction projects; includes design of organizations and work processes for integrated project delivery and public-private partnership concession project delivery. Term project applies computer-based organization simulation to optimize design of project organization for a participating company.

CEE 242T. Organizational Behavior and Design for Construction. 2 Units.

Introduction to organizational behavior and organizational design for Architecture, Engineering and Construction projects and companies. Class incorporates readings, individual and group case study assignments. Students use computer simulation to analyze project organizations and predict schedule, cost and quality risks. This class is a prerequisite for CEE 242P.

CEE 244. Fundamentals of Construction Accounting and Finance. 2 Units.

Concepts of financial accounting and economics emphasizing the construction industry. Financial statements, accounting concepts, project accounting methods, and the nature of project costs. Case study of major construction contractor. Ownership structure, working capital, and the sources and uses of funds.

CEE 244A. Sustainable Banking Seminar. 1 Unit.

This seminar explores ideas for redesigning banks and the banking sector to achieve three goals: (1) keep the bank and its depositors safe, (2) keep the borrowers, communities, and societies affected by the bank's lending decisions safe, and (3) use bank transactions to improve the sustainability of natural ecosystems. Weekly speakers include bankers, bank regulators, and financial technology (fintech) innovators focused on sustainable banking.

CEE 245A. Global Project Seminar. 3 Units.

Issues related to large, complex, global development projects including infrastructure development, urban and rural development, and the development of new cities. Guest presentations by industry practitioners and academics, including: Sabeer Bhatia, founder of Hotmail and architect of NanoCity; Ian Bremmer, CEO of the Eurasia Group, and Greg Huger, managing director of AirliePartners. May be repeated for credit.

CEE 246. Entrepreneurship in Civil & Environmental Engineering. 3-4 Units.

CEE 246 is a team project-based course geared toward developing entrepreneurial businesses related to civil and environmental engineering. With support of industry mentors, students are guided through the process of identifying opportunities, developing business plans, and determining funding sources. The class culminates with presentations to industry experts and venture capitalists (VC) to mimic typical investor pitches. The goal is to provide students with the knowledge and network to realize their business idea.

CEE 246A. Engineering Economy. 3 Units.

Fundamentals of financial and economic analysis. Engineering Economy Principles. Interest rates, Present value, annual cash flow, internal rate of return, benefit-cost analysis. Economic Life, Life Cycle Costs. Replacement analysis. Project Selection - Mutually Exclusive Alternatives, Multiple Objective Criteria. Depreciation. Inflation and Taxes. Sensitivity and risk analysis. Uncertainty and Probability. Decision Trees. Capital Budgeting. For CEE 146A: enrollment is limited to juniors and seniors. Attendance to the first class is mandatory (for both CEE 146A and CEE 246A). Same as: CEE 146A

CEE 246B. Real Estate Finance Seminar. 1 Unit.

Real estate principles and process. Financial modeling. Feasibility analysis. Sources and uses of funds. Cash flow projections. Profit and loss reports. Financing issues for different types of real estate projects. Redevelopment projects. Financing green projects and technologies. Current challenges in financial markets. Group project and presentation. Limited enrollment with priority to CEM, DCI, and SDC students not enrolled in CEE 248. Prerequisites: CEE 246A or equivalent, ENGR 60. Recommended: knowledge of spreadsheets.

CEE 247. Cases in Personality, Leadership, and Negotiation. 3 Units.

Case studies target personality issues, risk willingness, and life skills essential for real world success. Failures, successes, and risk willingness in individual and group tasks based on the professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Application downloaded from coursework must be submitted before first class; mandatory first class attendance. No auditors. Same as: CEE 147

CEE 247A. Network Governance. 3-4 Units.

This course aims at providing students with insights, concepts and skills needed to understand the dynamics of multi-actor interaction processes in uncertain and often highly politicized contexts and to be able to cope with technological and strategic uncertainties and risks including the unpredictable behavior of actors. They will develop knowledge, skills and competences about how to manage divergent and conflicting interests of different actors including principles of integrative negotiation, communication and mediation.

CEE 248. Real Estate Development. 3 Units.

Critical activities and key participants. Topics: conceptual and feasibility studies, market perspectives, the public roles, steps for project approval, project finance, contracting and construction, property management, and sales. Group projects focus on actual developments now in the planning stage. Enrollment limited to 24; priority to graduate majors in the department's CEM and GSB programs. Prerequisites: 241, 244A or equivalent, ENGR 60.

CEE 248G. Certifying Green Buildings. 1 Unit.

Open to all disciplines. Goal is prepare students for the United States Green Building Council's professional accreditation exam. Basic metrics for project certification via USGBC's LEED rating system. Recommended: familiarity with design and construction terminology .

CEE 248S. Introduction to Real Estate Development Seminar. 1 Unit.

This seminar will offer students an introduction to Real Estate Development. Senior Principals from Sares Regis, a regional commercial and residential real estate development company, will cover topics on all aspects of the development process. Guest speakers from the fields of architecture and engineering, finance and marketing will participate in some of the classes. They will offer the students a window into the world of how houses, apartments, office buildings and public facilities are conceived of, brought through the design and approval process, financed, marketed and then sold and/or rented. There will be five one-and-a-half-hour lectures (robust class discussion encouraged). Classes commence on April 9th and complete on May 7th. There will be one written project assignment due prior to class on April 23rd. No prior knowledge of real estate is required.

CEE 249. Labor and Industrial Relations: Negotiations, Strikes, and Dispute Resolution. 2 Units.

Labor/management negotiations, content of a labor agreement, strikes, dispute resolution, contemporary issues affecting labor and management, and union versus open shop competitiveness in the marketplace. Case studies; presentations by union leaders, legal experts, and contractor principals. Simulated negotiation session with union officials and role play in an arbitration hearing.

CEE 251. Negotiation. 3 Units.

Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; see Coursework.

Same as: CEE 151, EARTHSCI 251

CEE 252. Construction Methods for Concrete and Steel Structures. 3 Units.

Providing technical support for concrete and steel construction operations on buildings or infrastructure projects. Concrete materials, construction properties of fresh concrete. Resources and operations for batching, transporting, placing, finishing, and curing concrete. Design, fabrication, and use of formwork. Special operations and formwork systems. Detailing, fabricating, erecting, and connecting structural steel. Lifting equipment and lift planning. Welding processes, operations, and quality control. Readings, exercises and course projects.

CEE 252P. Construction Engineering Practicum. 3 Units.

Construction engineering is a series of technical activities to meet project objectives related to cost and schedule, safety, quality, and sustainability. These activities include: 1) designing temporary works and construction work processes; 2) providing the required temporary and permanent resources; and 3) integrating activities to consider construction during all project phases and between projects. The objectives of CEE252P are to learn about the technical fundamentals, resources, and field operations required to complete construction engineering activities and to develop a foundation for continued related learning. The course requires reviewing recorded presentations and other online resources, completing queries, participating in class sessions with guest speakers and in field trips, completing group exercises and projects, and preparing an individual final paper. The exercises, completed by all groups, include construction engineering activities for earthwork, concrete construction, and steel erection. Each group will also complete a project to analyze one of the following types of systems or facilities: building electrical systems, lighting systems, HVAC systems, control systems, solar photovoltaic power plant, solar thermal power plant, and wind turbine power plant.

CEE 252Q. Construction Engineering Fundamentals. 2 Units.

Construction engineering is a series of technical activities to meet project objectives related to cost and schedule, safety, quality, and sustainability. These activities include: 1) designing temporary works and construction work processes; 2) providing the required temporary and permanent resources; and 3) integrating activities to consider construction during all project phases and between projects. The objectives of CEE 252Q are to learn about the technical fundamentals, resources, and field operations required to complete construction engineering activities and to develop a foundation for continued related learning. The course requires reviewing recorded presentations and other online resources, completing queries, participating in class sessions with guest speakers and in field trips, and completing group exercises and projects. The exercises, completed by all of the student groups, include construction engineering activities for earthwork, concrete construction, and steel erection. Each group will also complete a project to analyze one of the following types of systems or facilities: building electrical systems, lighting systems, HVAC systems, control systems, solar photovoltaic power plant, and wind turbine power plant.

CEE 253A. Earthwork Construction. 1 Unit.

Construction properties of soil. Technical fundamentals of operations and equipment for earthwork. Description of systems and machine forms for construction equipment. Application of modeling techniques in planning, selecting equipment, estimating production rates. Field trip to infrastructure contractor.

CEE 254. Cases in Estimating Costs. 3 Units.

Students participate in bidding contests requiring cost determination in competitive markets. Monetary forces driving the construction industry as general principles applicable to any competitive business. Cases based on field trips and professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Limited enrollment; no auditors. Prerequisites: consent or instructor and application downloaded from CourseWork prior to start of class. Same as: CEE 154

CEE 255. Introduction to Sensing Networks for CEE. 3-4 Units.

Introduce the design and implementation of sensor networks for monitoring the built and natural environment. Emphasis on the integration of modern sensor and communication technologies, signal processing and statistical models for network data analysis and interpretation to create practical deployments to enable sustainable systems, in areas such as energy, weather, transportation and buildings. Students will be involved in a practical project that may involve deploying a small sensor system, data models and analysis and signal processing. Limited enrollment. Same as: CEE 155

CEE 256. Building Systems. 4 Units.

HVAC, lighting, and envelope systems for commercial and institutional buildings, with a focus on energy efficient design. Knowledge and skills required in the development of low-energy buildings that provide high quality environment for occupants. Same as: CEE 156

CEE 258. Donald R. Watson Seminar in Construction Engineering and Management. 1 Unit.

Presentations from construction industry leaders. Discussions with speakers from various segments of industry regarding career options. Student groups interact with industry representatives after class.

CEE 258B. Donald R. Watson Seminar in Construction Engineering and Management. 1 Unit.

Weekly seminars and field trips focusing on technical aspects of concrete and steel construction. Submission of abstract and paper required.

CEE 259A. Construction Problems. 1-3 Unit.

Group-selected problems in construction techniques, equipment, or management; preparation of oral and written reports. Guest specialists from the construction industry. See 299 for individual studies. Prerequisites: graduate standing in CEM program and consent of instructor.

CEE 259B. Construction Problems. 1-3 Unit.

Group-selected problems in construction techniques, equipment, or management; preparation of oral and written reports. Guest specialists from the construction industry. See 299 for individual studies. Prerequisites: graduate standing in CEM program and consent of instructor.

CEE 260A. Physical Hydrogeology. 4 Units.

(Formerly GES 230.) Theory of underground water occurrence and flow, analysis of field data and aquifer tests, geologic groundwater environments, solution of field problems, and groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Lab. Prerequisite: elementary calculus. Same as: EESS 220

CEE 260B. Surface and Near-Surface Hydrologic Response. 3 Units.

Quantitative review of process-based hydrology and geomorphology. Introduction to finite-difference and finite-element methods of numerical analysis. Topics: biometeorology, unsaturated and saturated subsurface fluid flow, overland and open channel flow, and physically-based simulation of coupled surface and near-surface hydrologic response. Links hydrogeology, soil physics, and surface water hydrology. Same as: GES 237

CEE 260C. Contaminant Hydrogeology and Reactive Transport. 4 Units.

For earth scientists and engineers. Environmental, geologic, and water resource problems involving migration of contaminated groundwater through porous media and associated biogeochemical and fluid-rock reactions. Conceptual and quantitative treatment of advective-dispersive transport with reacting solutes. Predictive models of contaminant behavior controlled by local equilibrium and kinetics. Modern methods of contaminant transport simulation and reactive transport modeling using geochemical transport software. Some Matlab programming / program modification required. Prerequisite: Physical Hydrogeology EESS 220 / CEE 260A (Gorelick) or equivalent. Recommended: course work in environmental chemistry or geochemistry (e.g., one or more of the following: EESS 155, EESS 156/256 GES 90, GES 170/279, GES 171, CEE 177 or CEE 270). Same as: EESS 221, GES 225

CEE 262A. Hydrodynamics. 3-4 Units.

The flow of incompressible viscous fluid; emphasis is on developing an understanding of fluid dynamics that can be applied to environmental flows. Topics: kinematics of fluid flow; equations of mass and momentum conservation (including density variations); some exact solutions to the Navier-Stokes equations; appropriate analysis of fluid flows including Stokes flows, potential flows, and laminar boundary layers; and an introduction to the effects of rotation and stratification through scaling analysis of fluid flows. Prerequisites: 101B or consent of instructor; and some knowledge of vector calculus and differential equations.

CEE 262B. Transport and Mixing in Surface Water Flows. 3-4 Units.

Application of fluid mechanics to problems of pollutant transport and mixing in the water environment. Mathematical models of advection, diffusion, and dispersion. Application of theory to problems of transport and mixing in rivers, estuaries, and lakes and reservoirs. Recommended: 262A and CME 102 (formerly ENGR 155A), or equivalents.

CEE 262C. Modeling Environmental Flows. 3 Units.

Introduction to numerical methods for modeling surface water flows in rivers, lakes, estuaries and the coastal ocean. Topics include stability and accuracy analysis, curvilinear and unstructured grids, implicit/explicit methods, transport and diffusion, shallow water equations, nonhydrostatic equations, Navier-Stokes solvers, turbulence modeling. Prerequisites: CEE262A, CME206, or equivalent.

CEE 262D. Introduction to Physical Oceanography. 4 Units.

The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

Same as: CEE 164, EARTHSYS 164, EESS 148

CEE 262E. Lakes and Reservoirs. 2-3 Units.

Physics and water quality dynamics in lakes and reservoirs. Implementation of physical and biogeochemical processes in 1-D models. Recommended: 262B.

CEE 262F. Ocean Waves. 3 Units.

The fluid mechanics of surface gravity waves in the ocean of relevance to engineers and oceanographers. Topics include irrotational waves, wave dispersion, wave spectra, effects of bathymetry (shoaling), mass transport, effects of viscosity, and mean currents driven by radiation stresses. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

CEE 263A. Air Pollution Modeling. 3-4 Units.

The numerical modeling of urban, regional, and global air pollution focusing on gas chemistry and radiative transfer. Stratospheric, free-tropospheric, and urban chemistry. Methods for solving stiff systems of chemical ordinary differential, including the multistep implicit-explicit method, Gear's method with sparse-matrix techniques, and the family method. Numerical methods of solving radiative transfer, coagulation, condensation, and chemical equilibrium problems. Project involves developing a basic chemical ordinary differential equation solver. Prerequisite: CS 106A or equivalent.

CEE 263B. Numerical Weather Prediction. 3-4 Units.

Numerical weather prediction. Continuity equations for air and water vapor, the thermodynamic energy equation, and momentum equations derived for the atmosphere. Numerical methods of solving partial differential equations, including finite-difference, finite-element, semi-Lagrangian, and pseudospectral methods. Time-stepping schemes: the forward-Euler, backward-Euler, Crank-Nicolson, Heun, Matsuno, leapfrog, and Adams-Bashforth schemes. Boundary-layer turbulence parameterizations, soil moisture, and cloud modeling. Project developing a basic weather prediction model. Prerequisite: CS 106A or equivalent.

CEE 263C. Weather and Storms. 3 Units.

Daily and severe weather and global climate. Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, wind energy, global circulation, jet streams, high and low pressure systems, inversions, el Nintilde;o, la Nintilde;a, atmosphere/ocean interactions, fronts, cyclones, thunderstorms, lightning, tornadoes, hurricanes, pollutant transport, global climate and atmospheric optics. Same as: CEE 63

CEE 263D. Air Pollution and Global Warming: History, Science, and Solutions. 3 Units.

Survey of Survey of air pollution and global warming and their renewable energy solutions. Topics: evolution of the Earth's atmosphere, history of discovery of chemicals in the air, bases and particles in urban smog, visibility, indoor air pollution, acid rain, stratospheric and Antarctic ozone loss, the historic climate record, causes and effects of global warming, impacts of energy systems on pollution and climate, renewable energy solutions to air pollution and global warming. UG Reqs: GER: DBNatSci. Same as: CEE 64

CEE 263S. Atmosphere/Energy Seminar. 1 Unit.

Interdisciplinary seminar with talks by researchers and practitioners in the fields of atmospheric science and renewable energy engineering. Addresses the causes of climate, air pollution, and weather problems and methods of addressing these problems through renewable and efficient energy systems. May be repeated for credit.

CEE 264. Sediment Transport Modeling. 3 Units.

Mechanics of sediment transport in rivers, estuaries and coastal oceans, with an emphasis on development of models and application of three-dimensional software tools. Topics include bottom boundary layers in steady and wave-driven flows, bedform dynamics, suspended and bedload transport, cohesive sediments. Prerequisites: CEE262A or consent of instructor.

CEE 264A. Rivers, Streams, and Canals. 3-4 Units.

Introduction to the movement of water through natural and engineered channels, streams, and rivers. Basic equations and theory (mass, momentum, and energy equations) for steady and unsteady descriptions of the flow. Application of theory to the design of flood-control and canal systems. Flow controls such as weirs and sluice gates; gradually varied flow; Saint-Venant equations and flood waves; and method of characteristics. Open channel flow laboratory experiments: controls such as weirs and gates, gradually varied flow, and waves. Limited enrollment in lab section. Prerequisite: CEE 101B.

Same as: CEE 161A

CEE 265A. Sustainable Water Resources Development. 3 Units.

Alternative criteria for judging the sustainability of projects. Application of criteria to evaluate sustainability of water resources projects in several countries. Case studies illustrate the role of political, social, economic, and environmental factors in decision making. Influence of international aid agencies and NGOs on water projects. Evaluation of benefit-cost analysis and environmental impact assessment as techniques for enhancing the sustainability of future projects. Limited enrollment. Prerequisite: graduate standing in Environmental and Water Studies, or consent of instructor.

CEE 265C. Water Resources Management. 3 Units.

Examination of the basic principles of surface and ground water resources management in the context of increasing water scarcity and uncertainty due to climate change and other factors. Specific topics include reservoir, river basin and aquifer management, conjunctive use of surface and ground water, and treated wastewater reuse. Special emphasis is placed on demand management through conservation, increased water use efficiency and economic measures. Besides the technical aspects of water management, an overview of its legal and institutional framework is provided.

Same as: CEE 165C

CEE 265D. Water and Sanitation in Developing Countries. 1-3 Unit.

Economic, social, political, and technical aspects of sustainable water supply and sanitation service provision in developing countries. Service pricing, alternative institutional structures including privatization, and the role of consumer demand and community participation in the planning process. Environmental and public health considerations, and strategies for serving low-income households. Limited enrollment. Prerequisite: consent of instructor, see jennadavis.stanford.edu for application.

CEE 266A. Watersheds and Wetlands. 3 Units.

Introduction to the occurrence and movement of water in the natural environment and its role in creating and maintaining terrestrial, wetland, and aquatic habitat. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Rivers and lakes, springs and swamps. Emphasis is on observation and measurement, data analysis, modeling, and prediction. Prerequisite: 101B or equivalent. (Freyberg).

Same as: CEE 166A

CEE 266B. Floods and Droughts, Dams and Aqueducts. 3 Units.

Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, hydroelectric power generation, rural and urban water supply systems, storm water management, flood damage mitigation, and water law and institutions. Emphasis is on engineering design. Prerequisite: 166A or equivalent. (Freyberg).

Same as: CEE 166B

CEE 266C. Advanced Topics in Hydrology and Water Resources. 3 Units.

Graduate seminar. Focus is on one or more hydrologic processes or water resources systems. Topics vary based on student and instructor interest. Examples include freshwater wetland hydrology, watershed-scale hydrologic modeling, renaturalization of stream channels, reservoir sediment management, and dam removal. Enrollment limited. Prerequisites: 266A,B, or equivalents. Recommended: 260A or equivalent.

CEE 266D. Water Resources and Water Hazards Field Trips. 2 Units.

Introduction to water use and water hazards via weekly field trips to local and regional water resources facilities (dams, reservoirs, fish ladders and hatcheries, pumping plants, aqueducts, hydropower plants, and irrigation systems) and flood damage mitigation facilities (storm water detention ponds, channel modifications, flood control dams, and reservoirs). Each trip preceded by an orientation lecture.

Same as: CEE 166D

CEE 268. Groundwater Flow. 3-4 Units.

Flow and mass transport in porous media. Applications of potential flow theory and numerical modeling methods to practical groundwater problems: flow to and from wells, rivers, lakes, drainage ditches; flow through and under dams; streamline tracing; capture zones of wells; and mixing schemes for in-situ remediation. Prerequisites: calculus and introductory fluid mechanics.

CEE 269A. Environmental Fluid Mechanics and Hydrology Seminar. 1 Unit.

Problems in all branches of water resources. Talks by visitors, faculty, and students. May be repeated two times for credit.

CEE 269B. Environmental Fluid Mechanics and Hydrology Seminar. 1 Unit.

Problems in all branches of water resources. Talks by visitors, faculty, and students. May be repeated two times for credit.

CEE 269C. Environmental Fluid Mechanics and Hydrology. 1 Unit.

Problems in all branches of water resources. Talks by visitors, faculty, and students. May be repeated two times for credit.

CEE 270. Movement and Fate of Organic Contaminants in Waters. 3 Units.

Transport of chemical constituents in surface and groundwater including advection, dispersion, sorption, interphase mass transfer, and transformation; impacts on water quality. Emphasis is on physicochemical processes and the behavior of hazardous waste contaminants. Prerequisites: undergraduate chemistry and calculus. Recommended: 101B.

CEE 270B. Environmental Organic Reaction Chemistry. 2-3 Units.

With over 70,000 chemicals now in production worldwide, predicting their fate in the environment is a difficult task. The course focuses on developing two key skills. First, students should develop the ability to derive mass balance equations used to quantify the fate of chemicals in the environment. With so many chemicals having been introduced in the past ~60 years, many of the key parameters needed for mass balance models have not been measured experimentally. The class builds on CEE 270, which developed methods of predicting equilibrium partitioning coefficients. For many situations involving reactions of target contaminants, equilibrium is not attained. The course develops methods of predicting the reactivity of chemicals based upon their chemical structures both qualitatively and quantitatively. Natural reaction processes covered include acid-base speciation, nucleophilic substitution, oxidation/reduction reactions, and photochemical reactions. Key treatment reactions (ozone, UV treatment and advanced oxidation) are also covered. Prerequisites: CEE 270, Chem 31B/X.

CEE 271A. Physical and Chemical Treatment Processes. 3 Units.

Physical and chemical unit operations for water treatment, emphasizing process combinations for drinking water supply. Application of the principles of chemistry, rate processes, fluid dynamics, and process engineering to define and solve water treatment problems by flocculation, sedimentation, filtration, disinfection, oxidation, aeration, and adsorption. Investigative paper on water supply and treatment. Prerequisites: 101B, 270. Recommended: 273.

CEE 271B. Environmental Biotechnology. 4 Units.

Stoichiometry, kinetics, and thermodynamics of microbial processes for the transformation of environmental contaminants. Design of dispersed growth and biofilm-based processes. Applications include treatment of municipal and industrial waste waters, detoxification of hazardous chemicals, and groundwater remediation. Prerequisites: 270; 177 or 274A or equivalents.

CEE 271D. Introduction to Wastewater Treatment Process Modeling. 2 Units.

The course will present a structured protocol for simulator application comprising project definition, data collection and reconciliation, model set-up, calibration and validation, and simulation and result interpretation. This course will include a series of guided simulation exercises evaluating resource consumption (e.g., electrical energy, natural gas, chemicals) and resource recovery (e.g., biogas, struvite, biosolids, recycled water) from a variety of treatment plant configurations. Coursework for all students will comprise guided simulation exercises begun in class. Students may elect to take the course for 2 units by completing a group project evaluating an assigned plant configuration and presenting the results before the class.

CEE 271E. Environmental Challenges and Policies in Europe. 3 Units.

Current and future environmental challenges in Europe and related public policies in the European Union (EU). State of the European environment and human development, European environmental policy-making (multi-level ecological governance), global ecological role of the EU. Specific challenges include climate change adaptation, mitigation (carbon taxes, carbon market), climate change and European cities, biodiversity and ecosystems preservation (economics of biodiversity), energy management. Specific policies include environmental justice (environmental inequalities), human development and environmental sustainability indicators (beyond GDP) and absolute and relative decoupling (carbon intensity and resource productivity improvement). Open to undergraduates (freshmen, sophomores, juniors and seniors) as CEE 171E.

Same as: CEE 171E

CEE 271F. New Indicators of Well-Being and Sustainability. 3 Units.

Explore new ways to better measure human development, comprehensive wealth and sustainability beyond standard economic indicators such as income and GDP. Examine how new indicators shape global, national and local policy worldwide. Well-being topics include health, happiness, trust, inequality and governance. Sustainability topics include sustainable development, environmental performance indicators, material flow analysis and decoupling, and inclusive wealth indicators. Students will build their own indicator of well-being and sustainability for a term paper.

Same as: CEE 171F

CEE 271M. Transport Phenomena: Momentum, heat and mass transport. 3 Units.

Heat, mass and momentum transfer theory from the viewpoint of basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory. Prerequisites: fluid mechanics, ordinary differential equations.

Same as: CEE 371M

CEE 272. Coastal Contaminants. 3-4 Units.

Coastal pollution and its effects on ecosystems and human health. The sources, fate, and transport of human pathogens and nutrients. Background on coastal ecosystems and coastal transport phenomena including tides, waves, and cross shelf transport. Introduction to time series analysis with MATLAB. Undergraduates require consent of instructor.

CEE 272R. Modern Power Systems Engineering. 3 Units.

Focus is on Power Engineering from a systems point of view. Topics covered may include modeling of generation, transmission and distribution systems, load flow analysis, transient and steady-state stability analysis. Special emphasis given to modern market operations and dispatch, modeling intermittent controllable power sources, storage technologies, mechanisms for demand response, sensing the grid and the role of market mechanisms for deep integration. Course content may vary year to year.

CEE 272S. Green House Gas Mitigation. 1-3 Unit.

This course will introduce the main concepts of greenhouse gas (GHG) emissions measurement and management, and it will explore the main mitigation options for reducing emissions or sequestering carbon dioxide. It will address technical aspects of GHG mitigation via energy efficiency and demand-side management, energy in high-technology industry, distributed power and co-generation, the role of renewable energy in GHG management, carbon sequestration in forestry, agriculture, and geological formations. The course explores policy options, carbon trading and business strategies for GHG mitigation.

Same as: CEE 172S

CEE 272T. SmartGrids and Advanced Power Systems Seminar. 1-2 Unit.

A series of seminar and lectures focused on power engineering. Renowned researchers from universities and national labs will deliver bi-weekly seminars on the state of the art of power system engineering. Seminar topics may include: power system analysis and simulation, control and stability, new market mechanisms, computation challenges and solutions, detection and estimation, and the role of communications in the grid. The instructors will cover relevant background materials in the in-between weeks. The seminars are planned to continue throughout the next academic year, so the course may be repeated for credit.

Same as: EE 292T

CEE 272W. Wind Power project Development. 1 Unit.

Introduction to wind power resource assessment and project development. Topics include the dynamics of large-scale and small-scale wind systems, vertical scaling of winds in the boundary layer, measurement instruments used for resource assessments, wind turbine technology, and wind farm siting, planning and economics. Analysis methods of wind data, use of industry-standard software for optimizing turbine siting and project feasibility studies. Project work using existing resource assessment from local areas. Prerequisite: Math41/42 or equivalent. Limited enrollment.

CEE 273. Aquatic Chemistry. 3 Units.

Chemical principles and their application to the analysis and solution of problems in aqueous geochemistry (temperatures near 25deg; C and atmospheric pressure). Emphasis is on natural water systems and the solution of specific chemical problems in water purification technology and water pollution control. Prerequisites: CHEM 31 and 33, or equivalents.

CEE 273A. Water Chemistry Laboratory. 3 Units.

(Graduate students register for 273A.) Laboratory application of techniques for the analysis of natural and contaminated waters, emphasizing instrumental techniques.

Same as: CEE 179A

CEE 273C. Introduction to Membrane Technology for Water/Wastewater Treatment. 1 Unit.

Membrane separation processes focusing on their use for water and wastewater purification. Topics will include membrane types and materials; transport across and rejection by membranes; membrane fouling, cleaning and degradation; and design and operation of membrane systems.

CEE 273D. Wastewater Treatment Process Simulators and Their Use for Emerging Technologies. 2 Units.

Process simulators are used widely for analysis and design of municipal and industrial wastewater treatment facilities. The current generation of simulators integrates biological, chemical, and physical process models that enable steady-state and dynamic "whole plant" simulation of liquid and solids treatment process performance. This course reinforces the concepts presented in CEE 271A, CEE 271B, and CEE 273 and shows how these concepts are applied to analyze and design treatment systems for BOD removal, energy recovery, phosphorus removal and recovery, and nitrogen removal using BioWin TM 4, a commercially-available software package. A process-specific model for anaerobic treatment of domestic wastewater will also be developed for the new Staged Anaerobic Fluidized Membrane Bioreactor (SAF-MBR) based on the International Water Association (IWA) Anaerobic Digester Model No. 1 (ADM1) and implemented using the simulation software Aquasim.

CEE 273S. Chemical Transformation of Environmental Organic Compounds. 3 Units.

This course provides an introduction to the chemistry of organic compounds focusing on chemical transformation and the application of this knowledge to understand and predict the fate of environmentally relevant organic chemicals. The course will cover fundamental rules that govern chemical transformations of organic compounds and will familiarize students with the major physical/chemical factors influencing the kinetics of organic reactions in nature. Prerequisites: CEE 270.

CEE 274A. Environmental Microbiology I. 3 Units.

Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents.

Same as: CHEMENG 174, CHEMENG 274

CEE 274B. Microbial Bioenergy Systems. 3 Units.

Introduction to microbial metabolic pathways and to the pathway logic with a special focus on microbial bioenergy systems. The first part of the course emphasizes the metabolic and biochemical principles of pathways, whereas the second part is more specifically directed toward using this knowledge to understand existing systems and to design innovative microbial bioenergy systems for biofuel, biorefinery, and environmental applications. There also is an emphasis on the implications of rerouting of energy and reducing equivalents for the fitness and ecology of the organism. Prerequisites: CHEMENG 174 or 181 and organic chemistry, or equivalents.

Same as: CHEMENG 456

CEE 274D. Pathogens and Disinfection. 3 Units.

Introduction to epidemiology, major pathogens and infectious diseases, the immune system, movement and survival of pathogens in the environment, transfer of virulence and antibiotic resistance genes, and pathogen control, with an emphasis on public health engineering measures (disinfection). Prerequisite: 274A.

CEE 274E. Pathogens in the Environment. 3 Units.

Sources, fates, movement, and ecology of waterborne pathogens in the natural environment and disinfection systems; epidemiology and microbial risk assessment. No microbiology background required; undergraduates may enroll with consent of instructor.

CEE 274P. Environmental Health Microbiology Lab. 3-4 Units.

Microbiology skills including culture-, microscope-, and molecular-based detection techniques. Focus is on standard and EPA-approved methods to enumerate and isolate organisms used to assess risk of enteric illnesses, such as coliforms, enterococci, and coliphage, in drinking and recreational waters including lakes, streams, and coastal waters. Student project to assess the microbial water quality of a natural water. Limited enrollment; priority to CEE graduate students. An application form must be filed and approved before admission to the class.

CEE 274S. Hopkins Microbiology Course. 3-12 Units.

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

Same as: BIO 274S, BIOHOPK 274, EESS 253S

CEE 275A. California Coast: Science, Policy, and Law. 3-4 Units.

Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

Same as: CEE 175A, EARTHSYS 175, EARTHSYS 275

CEE 275B. Process Design for Environmental Biotechnology. 3 Units.

Use of microbial bioreactors for degradation of contaminants and recovery of clean water, clean energy and/or green materials. Student teams design, operate, and analyze bioreactors and learn to write consulting style reports. Limited enrollment. Prerequisites: 271B.

CEE 275C. Water, Sanitation and Health. 1-4 Unit.

Students acquire basic knowledge to participate in a dialogue on water, sanitation and health issues in developing and developed countries. The focus is on enteric pathogenic pollutants. Material includes: Important pathogens, their modes of transmission and the diseases they cause, their fate and transport in the environment, and the means by which they are measured; statistical methods for processing and interpreting waterborne pollutant concentrations, and interpreting data from epidemiology studies; microbial source tracking; epidemiology and quantitative microbial risk assessment; reduction of pathogens in water and sludge; and non-experimental water, sanitation, and hygiene research. Several laboratory sessions will allow students to measure indicator bacteria and viruses using culture-based techniques and expose students to molecular methods for measuring health-relevant targets in water.

CEE 275K. The Practice of Environmental Consulting. 2 Units.

Class consists of eight interactive two-hour seminars with discussions, and will cover the evolution of the environmental consulting business, strategic choices and alternative business models for private and public firms, a review of the key operational issues in managing firm, organizational strategies, knowledge management and innovation, and ethical issues in providing professional services. Case studies will be used to illustrate key concepts. Selected reading materials drawn from the technical and business literature on the consulting business. Student groups will prepare and present an abbreviated business plan for an environmental based business. Enrollment limited to CEE MS and PHD students.

CEE 275S. Environmental Entrepreneurship and Innovation. 2 Units.

Our current infrastructure for provision of critical services-clean water, energy, transportation, environmental protection; requires substantial upgrades. As a complement to the scientific and engineering innovations taking place in the environmental field, this course emphasizes the analysis of economic factors and value propositions that align value chain stakeholder interests.

Same as: CEE 175S

CEE 276. Introduction to Human Exposure Analysis. 3 Units.

(Graduate students register for 276.) Scientific and engineering issues involved in quantifying human exposure to toxic chemicals in the environment. Pollutant behavior, inhalation exposure, dermal exposure, and assessment tools. Overview of the complexities, uncertainties, and physical, chemical, and biological issues relevant to risk assessment. Lab projects.

Recommended: MATH 51. Apply at first class for admission.

Same as: CEE 178

CEE 276C. Advanced Topics in Integrated Demand Side Management. 2 Units.

The American economy is highly inefficient: between 14-39% of the energy inputs into the US economy are ultimately used to create goods and services, while the remaining energy is lost in energy conversion and other inefficiencies. While this inefficiency results in a heavy social, environmental, and economic burden on both individuals and society as a whole, it also presents a tremendous opportunity to re-imagine how we use and manage our energy consumption. Recent technological advances, including the rise of information technology, sensors, controls, are dramatically re-shaping how energy is utilized, controlled, stored and integrated with traditional supply side resources. These emerging technologies and energy management techniques provide some of the greatest opportunities to improve the efficiency of our economy and address climate change. This course begins with an overview of demand side management (the application of efficiency, demand reduction, distributed generation, storage, and other resource to shape energy demand) practice to date and a detailed look at how energy is used throughout each sector of the economy. Based on this starting point, the course explores emerging technologies and optimization strategies that enable greater insight and control of energy use both at the device and aggregate level, including integration with renewables, storage, and electric vehicles. It then quantifies and monetizes these optimization strategies into revenue streams to both utility and end-user, and culminates in a discussion of how the intersection of these new technologies, optimization strategies, and revenue streams can help de-carbonize the American economy and shape energy use and the utility of the future. Prerequisites: This course is intended for students who wish to gain an understanding of how energy efficiency and demand management occurs in practice. While there are no formal prerequisites, it is expected that students will have familiarity with energy resources and building energy end uses, such as topics covered in CEE 176A/276A, CEE 173A/207A, CEE 156/256, and CEE226E.

Same as: CEE 176D

CEE 276E. Environmental Toxicants. 2-3 Units.

Chemicals in the environment that pose toxicity risk. Introduction to environmental toxicology principles for identifying and characterizing toxicants based on sources, properties, pathways, and toxic action. Past and present environmental toxicant issues.

CEE 276F. Energy Systems Field Trips: China Energy Systems. 1-2 Unit.

Energy resources and policies in use and under development in China. 12-day field trip to China during Spring Break. One unit for seminar and readings; one unit for field trip. Tuesday section is required for all students, Thursday section is also required for students attending the field trip. Prerequisite: consent of instructor for field trip. Same as: CEE 176F

CEE 276S. Instrumental Analysis of Emerging Contaminants in the Environment. 3 Units.

Introduction to the occurrence and behavior of trace organic compounds in the environment and focus on research approaches to investigate these compounds. Principles of analytical techniques and experimental approaches to detect and monitor trace organic contaminants in the environment will be examined. Students will critically review published original research and prepare and an original research project proposal. Same as: CEE 176S

CEE 277C. Environmental Governance. 3 Units.

This interdisciplinary course presents an overview of environmental governance through an examination of how and why societies manage the relationships between human beings and the natural world. By comparing regulatory, community-based, and incentive-based environmental management systems, we address why certain environmental problems are managed as they are, and what approaches to environmental management are more (or less) successful. Designed for graduate students and upper-level undergraduates with some exposure to both the natural sciences (ecology/environmental chemistry), and the social sciences (anthropology, economics, political science, or sociology). A pre-course incoming survey is required. Same as: ENVRES 250

CEE 277D. Water, Health & Development in Africa. 1 Unit.

Graduate seminar focused on emerging research in the areas of water supply, sanitation, hygiene and health in developing countries. Limited enrollment; instructor permission required.

CEE 277F. Advanced Field Methods in Water, Health and Development. 1-10 Unit.

Field methods for assessing household stored water quality, hand contamination, behaviors, and knowledge related to water, sanitation and health. Limited enrollment. Instructor consent required.

CEE 277K. Environmental Information Engineering. 2-3 Units.

The role of information technology (IT) in enabling mankind to understand its impact on the planet and balance that with improving the quality of life of a rapidly growing population. After surveying the field, the course will examine the specific impacts that IT may have, by reference to case studies from energy, transportation, water and urban design fields. While some specific information technologies will be examined, this will be from a business perspective - detailed technical knowledge of IT not required. Same as: CEE 177K

CEE 277L. Smart Cities & Communities. 2-3 Units.

The role of information technology (IT) in enabling mankind to improve the operations and sustainability of cities and communities. Review of what a "smarter" city of community might be, the role of IT in enabling them to become "smarter" (including what IT cannot achieve). Case studies on water, energy, transportation urban design and resilience. Same as: CEE 177L

CEE 277S. Design for a Sustainable World. 1-5 Unit.

Technology-based problems faced by developing communities worldwide. Student groups partner with organizations abroad to work on concept, feasibility, design, implementation, and evaluation phases of various projects. Past projects include a water and health initiative, a green school design, seismic safety, and medical device. Admission based on written application and interview. See <http://esw.stanford.edu> for application. (Staff). Same as: CEE 177S

CEE 277X. Current Topics in Sustainable Engineering. 1-3 Unit.

This course is the first half of a two quarter, project-based design course that addresses the cultural, political, organizational, technical, and business issues at the heart of implementing sustainable engineering projects in the developing world. Students will be placed into one of three project teams and tackle a real-world design challenge in partnership with social entrepreneurs and NGOs. In CEE 177X/277X, students will gain the background skills and context necessary to effectively design engineering projects in developing nations. Instructor consent required. Same as: CEE 177X

CEE 278A. Air Pollution Fundamentals. 3-4 Units.

The sources and health effects of gaseous and particulate air pollutants. The influence of meteorology on pollution: temperature profiles, stability classes, inversion layers, turbulence. Atmospheric diffusion equations, downwind dispersion of emissions from point and line sources. Removal of air pollutants via settling, diffusion, coagulation, precipitation, Mechanisms for ozone formation, in the troposphere versus in the stratosphere. Effects of airborne particle size and composition on light scattering/absorption, and on visual range. Prerequisites: MATH 51 or equivalent. Recommended: 101B, CHEM 31A, or equivalents.

CEE 278B. Atmospheric Aerosols. 3 Units.

The characterization of atmospheric particulate matter: size distributions, chemical composition, health effects. Atmospheric diffusion and transport of particles: removal by convection, impaction, gravitational settling. Effect of aerosols on visibility: light scattering and absorption, reduction of visual range. Mechanics influencing ambient size distributions: Brownian coagulation, laminar shear flow, homogeneous nucleation, heterogeneous condensation. Prerequisite: MATH 51, or equivalent. Recommended: 101B or equivalent.

CEE 278C. Indoor Air Quality. 2-3 Units.

Factors affecting the levels of air pollutants in the built indoor environment. The influence of ventilation, office equipment, floor coverings, furnishings, cleaning practices, and human activities on air quality including carbon dioxide, VOCs, resuspended dust, and airborne molds and fungi. Recommended: 172 or 278A. Same as: CEE 172A

CEE 279. Environmental Engineering Seminar. 1 Unit.

Current research, practice, and thinking in environmental engineering and science. Attendance at seminars is self-directed, the 20 hours of required seminar attendance may be accrued throughout the school year. Must prepare a publication synopsis, and maintain log of seminar attendance. See Aut Qtr CEE 279 syllabus for details on course requirements. Contact hildemann@stanford.edu to be added to Coursework website.

CEE 279S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings. Same as: CEE 179S, EARTHSYS 179S, EESS 179S

CEE 279W. Innovation in Water Sector. 1 Unit.

A project class on the diffusion of ReNUWI technologies into practice (David Sedlak is the overall course lead at UC Berkeley, Chris Higgins is the lead at Colorado School of Mines, and Dick Luthy is the lead at Stanford). Specifically, the class will examine the pathway through which ReNUWI technologies will be adopted by utilities and consultants beyond our current group of industrial partners. We will work together to prepare background information that will be used in a 2-day workshop involving ReNUWI researchers, utility leaders and technical experts in early 2015.

CEE 279X. Sustainable Urban System Seminar. 1 Unit.

SYSTEM OF SYSTEMS: Cities are based on several different systems; infrastructures, networks and environments. The effectiveness and efficiency of these systems determine how cities work and how successful a city is at delivering critical services. These systems are not discrete and must be considered holistically as well as individually. These core systems are interconnected and must be treated as such. Understanding one system and making it work better means that cities must comprehend the larger context and how the various systems are interconnected. This seminar series will explore various aspects of these critical systems and how we can make them more resilient and robust, to meet future challenges. Guest speakers, discussion and critical readings.
Same as: CEE 179X

CEE 280. Advanced Structural Analysis. 3-4 Units.

Theoretical development and computer implementation of direct stiffness method of structural analysis; virtual work principles; computation of element stiffness matrices and load vectors; direct assembly procedures; equation solution techniques. Analysis of two- and three-dimensional truss and frame structures, thermal loads, and substructuring and condensation techniques for large systems. Practical modeling techniques and programming assignments. Introduction to nonlinear analysis concepts. Prerequisites: elementary structural analysis and matrix algebra.

CEE 281. Mechanics and Finite Elements. 3 Units.

Fluid conduction and solid deformation; conservation laws: balance of mass and balance of momentum; generalized Darcy's law and Hooke's law in 3D; the use of tensors in mechanics; finite element formulation of boundary-value problems; variational equations and Galerkin approximations; basic shape functions, numerical integration, and assembly operations.

CEE 282. Nonlinear Structural Analysis. 3-4 Units.

Introduction to methods of geometric and material nonlinear analysis, emphasizing modeling approaches for framed structures. Large-displacement analysis, concentrated and distributed plasticity models, and nonlinear solution methods. Applications to frame stability and performance-based seismic design. Assignments emphasize computer implementation and applications. Prerequisites: 280 and an advanced course in structural behavior (e.g., 285A, 285B or equivalent).

CEE 283. Structural Dynamics. 3-4 Units.

Vibrations and dynamic response of simple structures under time dependent loads; dynamic analysis of single and multiple degrees of freedom systems; support motion; response spectra.

CEE 284. Finite Element Methods in Structural Dynamics. 3-4 Units.

Computational methods for structural dynamics analysis of discrete and continuous systems in free and forced vibration; finite element formulation; modal analysis; numerical methods; introduction to nonlinear dynamics; advanced topics. Prerequisites: 280, 283.

CEE 285A. Advanced Structural Concrete Behavior and Design. 3-4 Units.

Behavior and design of reinforced and prestressed concrete for building and bridge design. Emphasis on flexural behavior, prestressed concrete design, slender columns, and two-way slab design & analysis.

CEE 285B. Advanced Structural Steel Behavior and Design. 3-4 Units.

Advanced topics in structural steel design. Topics include composite floor systems; bolted and welded connections; beam-column connections; innovative lateral load resisting systems. As part of this course students design a 15-story steel building. Prerequisite: basic course in structural steel design CEE181 or equivalent.

CEE 287. Earthquake Resistant Design and Construction. 3-4 Units.

Evaluation, design, and construction of structures in seismic regions. Factors influencing earthquake ground motions, design spectra, design of linear and nonlinear single- and multiple-degree-of-freedom-system structures, force-based and displacement-based design methods, capacity design, detailing and construction of steel and reinforced concrete structures, introduction to performance-based design, seismic isolation, and energy dissipation. Prerequisites: 283 and either 285A or 285B.

CEE 288. Introduction to Performance Based Earthquake Engineering. 3-4 Units.

Earthquake phenomena, faulting, ground motion, earthquake hazard formulation, effects of earthquakes on manmade structures, response spectra, Fourier spectra, soil effects on ground motion and structural damage, methods for structural damage evaluation, and formulation of the performance-based earthquake engineering problems. Prerequisites: 203, 283.

CEE 289. Random Vibrations. 3-4 Units.

Introduction to random processes. Correlation and power spectral density functions. Stochastic dynamic analysis of multi-degree-of-freedom structures subjected to stationary and non-stationary random excitations. Crossing rates, first-exursion probability, and distributions of peaks and extremes. Applications in earthquake, wind, and ocean engineering. Prerequisite: 203 or equivalent.

CEE 290. Structural Performance and Failures. 2 Units.

Basic concepts in the definition of satisfactory structural performance; key elements in structural performance; types of failures, ranging from reduced serviceability to total collapse; failure sources and their root cause allocation, emphasizing design/construction process failures; failure prevention mechanisms; illustration with real life examples.

CEE 291. Solid Mechanics. 3 Units.

Introduction to vectors and tensors; kinematics, deformation, forces, and stress concept of continua and structures; balance principles; aspects of objectivity; hyperelastic materials; thermodynamics of materials; variational principles; applications to structural engineering.

CEE 292. Computational Micromechanics. 3 Units.

Thermodynamics of general internal variable formulations of inelasticity; 1D and 3D material models at small strains (nonlinear elasticity, viscoelasticity, plasticity, damage); development of efficient algorithms and finite element implementations; micromechanical based crystal plasticity models; review of nonlinear continuum mechanics; micromechanical based finite deformation rubber elasticity models; introduction to homogenization methods and micro-macro transitions. Prerequisite: CEE 281 or equivalent.

CEE 293. Foundations and Earth Structures. 3 Units.

Types, characteristics, analysis, and design of shallow and deep foundations; rigid and flexible retaining walls; braced excavations; settlement of footings in sands and clays; slope stability analysis by method of slices including search algorithms for the critical slip surface. Prerequisite: 101C or equivalent.

CEE 294. Computational Poromechanics. 3 Units.

Continuum and finite element formulations of steady-state and transient fluid conduction problems on geomechanics; elliptic, parabolic, and hyperbolic systems; variational inequality and free-boundary problems; three-dimensional consolidation theory; undrained condition, mesh locking, B-bar and strain projection methods; finite element formulations of multiphase dynamic problems. Computing assignments. Prerequisite: CEE 281 or equivalent.

CEE 295. Plasticity Modeling and Computation. 3 Units.

Rate-independent elastoplasticity; classical plasticity models for metals and cohesive-frictional materials; cap plasticity models for porous materials; return-mapping algorithm; shear bands, faults, and other discontinuities; Lagrange multipliers, penalty and augmented Lagrangian methods for frictional contact; multiscale techniques: extended finite element and strong discontinuity methods; fault rupture dynamics with bulk plasticity. Prerequisite: CEE 281 or equivalent.

CEE 296. Special Topics in Fluid-Solid Interactions. 2 Units.

Civil, mechanical, and biomedical engineering. Topics include surge and wave impact on structures, tsunami induced sediment transport and scour, wave-soil interactions, dam-reservoir-foundation interactions, shock and blast loads on composite structures, hydroelastic tailoring of composite structures, and blood-vessel interactions. Term project.

CEE 297. Issues in Geotechnical and Environmental Failures. 3 Units.

Causes and consequences of the failure of buildings, earth structures, waste storage, and high hazard facilities in contact with the environment; technical, ethical, economic, legal, and business aspects; failure analysis and forensic problems; prevention, liability, and dispute management. Case histories including earthquake, flood, and hazardous waste facilities. Student observation, participation in active lawsuits where possible.

CEE 297M. Managing Critical Infrastructure. 2 Units.

Safe and effective performance of infrastructure systems is critical to our economy, quality of life and safety. This course will present topics associated with risk analysis and management of critical civil infrastructure systems, tolerable risk and community resilience. Methods of risk analysis including systems analysis, reliability analysis, expert elicitation and systems analysis for spatially distributed infrastructure systems will be presented. Aspects of seismic and flood risk analysis will also be discussed. Case histories and lessons learned from Hurricane Katrina, Tohoku earthquake, among others will be presented. The evolution of change in the risk management of civil infrastructure systems; how they are analyzed, designed and operated is discussed. Guest speakers. Student presentations. (Prerequisite: CEE 203 or equivalent).

CEE 297Q. Large Deformation Computational Inelasticity. 3 Units.

Covers kinematics, thermodynamics, constitutive modeling, numerical time integration, and finite element implementation of large deformation inelasticity. Kinematics of multiplicative decomposition and resulting objective stress rates in the current configuration. Linearization for formulation and finite element implementation of algorithm (consistent) tangent moduli, and local Newton-Raphson iteration for solution of nonlinear constitutive models. Emphasis is on being able to formulate, and numerically implement within a nonlinear finite element program, a wide range of finite strain inelastic constitutive models for solid materials of interest.

CEE 297R. Structural Geology and Rock Mechanics. 4 Units.

Quantitative field and laboratory data integrated with solutions to boundary value problems of continuum mechanics to understand tectonic processes in Earth's crust that lead to the development of geological structures including folds, faults, fractures and fabrics. Topics include: techniques and tools for structural mapping; differential geometry to characterize structures; dimensional analysis and scaling relationships; kinematics of deformation and flow; traction and stress analysis, conservation of mass and momentum in a deformable continuum; linear elastic deformation and elastic properties; brittle deformation including fracture and faulting; model development and methodology. Data sets analyzed using MATLAB. Prerequisites: GES 1, MATH 53, MATLAB or equivalent.

Same as: GEOPHYS 251, GES 215

CEE 298. Structural Engineering and Geomechanics Seminar. 1 Unit.

Recommended for all graduate students. Lectures on topics of current interest in professional practice and research.

CEE 299. Independent Study in Civil Engineering for CEE-MS Students. 1-5 Unit.

Directed study for CEE-MS students on subjects of mutual interest to students and faculty. Student must obtain faculty sponsor.

CEE 299L. Independent Project in Civil and Environmental Engineering. 1-4 Unit.

Prerequisite: Consent of Instructor.

CEE 299S. Independent Project in Civil and Environmental Engineering. 1-4 Unit.

Prerequisite: consent of instructor.

CEE 300. Thesis. 1-15 Unit.

Research by Engineer candidates.

Same as: Engineer Degree

CEE 301. The Energy Seminar. 1 Unit.

Interdisciplinary exploration of current energy challenges and opportunities, with talks by faculty, visitors, and students. May be repeated for credit.

Same as: ENERGY 301

CEE 305. Damage and Failure Mechanics of Structural Systems. 3-4 Units.

Examine the mechanics and failure mechanisms of structural deterioration mechanisms and hazards. Overview of fracture mechanics concepts as a general basis for analyzing brittle failure modes in steel and concrete structures. Analysis and design theory for corrosion, fatigue, fire and other damage mechanisms in steel and concrete structures. New methods for mitigation of these failure modes and hazards will be introduced, including new construction materials, structural designs and protection methods.

CEE 306. Computational Fracture Mechanics. 3 Units.

Brief review continuum mechanics; energy principles of mechanics; introduction to fracture mechanics; constrained problems; advanced finite element concepts like mixed, assumed, and enhanced strain methods; computational fracture strategies like cohesive finite elements, embedded and extended finite element methods. Prerequisite: CEE 281 or equivalent.

CEE 316. Sustainable Built Environment Research. 3 Units.

Intended for early stage Ph.D. students in Sustainable Design and Construction (SDC). Covers dominant methodological approaches at the intersection of engineering, social management science and computer science. Overviews an array of methods available for research, focusing on methods commonly used in SDC. Publications using various methods will be analyzed, and journal review processes will be discussed. Major deliverable is research proposal using one or more of the methods discussed. Students will gain familiarity with the array of methods available for SDC research, know how to apply the methods in their own research area, and receive guidance on publishing their research in scientific journals.

CEE 320. Integrated Facility Engineering. 1 Unit.

Individual and group presentations on goals, research, and state-of-practice of virtual design and construction in support of integrated facility engineering, including objectives for the application and further development of virtual design and construction technologies. May be repeated for credit.

CEE 321. Formal Models for Design. 3 Units.

Theories, methods, and formal systems to support the design of buildings. Academic and industrial frameworks to represent and manage the products, organizations, and processes of building projects. May be repeated for credit.

CEE 322. Data Analytics for Urban Systems. 3 Units.

TBA.

CEE 323A. Infrastructure Finance and Governance. 1 Unit.

Presentation and discussion of early stage or more mature research on a variety of topics related to financing, governance and sustainability of civil infrastructure projects by researchers associated with the Global Projects Center and visiting speakers. To obtain one unit of credit, students must attend and participate in all seminars, with up to two excused absences. Seminar meets weekly during Autumn, Winter and Spring Quarters.

CEE 323B. Infrastructure Finance and Governance. 1 Unit.

Presentation and discussion of early stage or more mature research on a variety of topics related to financing, governance and sustainability of civil infrastructure projects by researchers associated with the Global Projects Center and visiting speakers. To obtain one unit of credit, students must attend and participate in all seminars, with up to two excused absences. Seminar meets weekly during Autumn, Winter and Spring Quarters.

CEE 323C. Infrastructure Finance and Governance. 1 Unit.

Presentation and discussion of early stage or more mature research on a variety of topics related to financing, governance and sustainability of civil infrastructure projects by researchers associated with the Global Projects Center and visiting speakers. To obtain one unit of credit, students must attend and participate in all seminars, with up to two excused absences. Seminar meets weekly during Autumn, Winter and Spring Quarters.

CEE 328A. Multidisciplinary Design and Simulation of Building Envelopes. 3 Units.

Curtain walls are a manufactured product ubiquitous in the world of architecture and engineering that must meet structural, thermal, acoustic, environmental, and economic performance requirements. This course focuses on design strategies for building envelopes and explores new design approaches including parametric 3D modeling, simulation, and Multidisciplinary Design Optimization (MDO) methods that leverage computation to augment human abilities to identify novel, high performing solutions. Prerequisite: CEE 220A or equivalent. Limited to 16 students.

CEE 342. Computational Modeling of Organizations. 4 Units.

For post-M.S. students interested in formal techniques for organization design. Computer simulations of organizations are used to conduct virtual experiments for developing organization theory or to analyze the performance of virtual organizations with different structures and decision support and communication technologies. Research on computational modeling and design of real-world organizations. Paper serves as a research proposal. Prerequisite: 242 or equivalent introductory organization design class.

CEE 345. Game Theory Modeling in Engineering. 2-3 Units.

Game theory involves the analysis of conflict, cooperation and communication, and is a novel and powerful tool for analyzing important issues in engineering management and engineering policy. Class will develop students' quest; game theory skills in an applied context. Learn how to set up and solve fundamental game models and apply these skills to building new theories in engineering management through game theory modeling. Class illustrates the arts of game modeling by applying game theory in: (1) contracting and opportunistic bidding; (2) renegotiation in public-private partnerships; (3) partner selection strategies in global projects; and (4) knowledge management and sharing. Students are encouraged to apply game theory to their own research issues or disciplines, and extend their term projects into research papers or theses. Limited class size. Priority for CEE, IPER and MS&E students.

CEE 361. Turbulence Modeling for Environmental Fluid Mechanics. 2-4 Units.

An introduction to turbulence and its modeling, including Reynolds-average and large-eddy simulation models. Derivation of closure approximations and models. Impact of numerical code truncation error on turbulence model value and accuracy. Discussion of typical models and their applications to turbulent flows in rivers, estuaries, the coastal ocean and the atmospheric boundary layer (e.g., wind turbines and weather models). Prerequisites: knowledge of hydrodynamics or atmosphere dynamics and the basics of transport and mixing in the environment; consent of instructor.

CEE 362. Numerical Modeling of Subsurface Processes. 3-4 Units.

Numerical modeling including: problem formulation, PDEs and weak formulations, and choice of boundary conditions; solution using the finite-element code COMSOL Multiphysics with a variety of solvers and pre- and postprocessing of data; and interpretation of results. Problems include: flow in saturated porous media with complex boundaries and heterogeneities; solute transport with common reaction models; effects of heterogeneity on dispersion, dilution, and mixing of solutes; variable-density flow and seawater intrusion; upscaling or coarsening of scale; and biofilm modeling. Enrollment limited to 5.

CEE 362G. Stochastic Inverse Modeling and Data Assimilation Methods. 3-4 Units.

Stochastic methods for the solution of inverse problems that are algebraically underdetermined or have solutions that are sensitive to data. Emphasis is on geostatistical methods that, in addition to using data, incorporate information about structure such as spatial continuity and smoothness. Methods for real-time processing of new data. Prerequisite: consent of instructor.

CEE 362H. Heterogeneity and Scale in Groundwater. 3-4 Units.

Geologic materials are complex and composite media, in the microscale, but modeled as continua at the macroscale. We examine how our understanding of processes and heterogeneity at the microscale support laws that describe fluxes and change of state variables at the macroscale. We study Darcy's law for porous media, Fickian dispersion, non-Fickian dispersion, dilution of solutes, and mixing of reactants under mass transfer (diffusional) limitations. We use mathematical tools such as homogenization theories and stochastic analysis to find relations among macroscopic quantities. To be taught in Winter, alternate years starting 2011-2012.

CEE 363A. Mechanics of Stratified Flows. 3 Units.

The effects of density stratification on flows in the natural environment. Basic properties of linear internal waves in layered and continuous stratification. Flows established by internal waves. Internal hydraulics and gravity currents. Turbulence in stratified fluids. Prerequisites: 262A,B, CME 204.

CEE 363C. Ocean and Estuarine Modeling. 3 Units.

Advanced topics in modeling for ocean and estuarine environments, including methods for shallow water, primitive, and nonhydrostatic equations on Cartesian, curvilinear, and unstructured finite-volume grid systems. Topics include free-surface methods, nonhydrostatic solvers, and advanced Eulerian and Lagrangian advection techniques. Focus is on existing techniques and code packages, and their methodologies, including POM, ROMS, TRIM, ELCOM, and SUNTANS. Prerequisites: CME 200, 206, or equivalents.

CEE 363F. Oceanic Fluid Dynamics. 3 Units.

Dynamics of rotating stratified fluids with application to oceanic flows. Topics include: inertia-gravity waves; geostrophic and cyclogeostrophic balance; vorticity and potential vorticity dynamics; quasi-geostrophic motions; planetary and topographic Rossby waves; inertial, symmetric, barotropic and baroclinic instability; Ekman layers; and the frictional spin-down of geostrophic flows. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

Same as: EESS 363F

CEE 363G. Field Techniques in Coastal Oceanography. 3 Units.

This course focuses on the design and implementation of coastal oceanographic field studies from implementation through analysis. A wide range of field instrumentation and techniques, including AUVs and scientific diving is covered. Field studies. Data collection and analysis under instructor guidance.

CEE 364F. Advanced Topics in Geophysical Fluid Dynamics. 2-3 Units.

A seminar-style class covering the classic papers on the theory of the large-scale ocean circulation. Topics include: wind-driven gyres, mesoscale eddies and geostrophic turbulence, eddy-driven recirculation gyres, homogenization of potential vorticity, the ventilated thermocline, subduction, and the abyssal circulation. Prerequisite: EESS 363F or CEE 363F. Recommended: EESS 246B.
Same as: EESS 364F

CEE 364Y. Advanced Topics in Coastal Oceanography. 1-2 Unit.

The dynamics and transport implications of features in estuaries and coastal oceans characterized by sharp gradients: fronts, interfaces, and layers. Analytic framework to describe the formation, maintenance, and dissipation of such features. Examples include tidal mixing fronts, buoyant plume fronts and tidal intrusions, biological thin layers, and axial convergent fronts. Second unit for students who give a presentation.

CEE 365A. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.

Students must obtain a faculty sponsor.

CEE 365B. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.

Students must obtain a faculty sponsor.

CEE 365C. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.

Students must obtain a faculty sponsor.

CEE 365D. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.

Students must obtain a faculty sponsor.

CEE 370A. Environmental Research. 5-6 Units.

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

CEE 370B. Environmental Research. 5-6 Units.

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

CEE 370C. Environmental Research. 5-6 Units.

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

CEE 370D. Environmental Research. 3-6 Units.

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

CEE 371. Frontiers in Environmental Research. 1-2 Unit.

How to evaluate environmental research.

CEE 371L. Helminthic Disease Monitoring and Control.. 5 Units.

Assessment will be based upon weekly written and/or oral reports, with a final written critical review due at the end of the quarter.

CEE 371M. Transport Phenomena: Momentum, heat and mass transport. 3 Units.

Heat, mass and momentum transfer theory from the viewpoint of basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory. Prerequisites: fluid mechanics, ordinary differential equations.

Same as: CEE 271M

CEE 374A. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

CEE 374B. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

CEE 374C. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

CEE 374D. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

CEE 374S. Advanced Topics in Microbial Pollution. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

CEE 374T. Advanced Topics in Coastal Pollution. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

CEE 374U. Advanced Topics in Submarine Groundwater Discharge. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

CEE 374V. Advanced Topics in Microbial Source Tracking. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

CEE 374W. Advanced Topics in Water, Health and Development. 1-12 Unit.

Advanced topics in water, health and development. Emphasis on low-and-middle-income countries. Class content varies according to interests of students. Instructor consent required.

CEE 374X. Advanced Topics in Multivariate Statistical Analysis. 1-6 Unit.

Analysis of experimental and non-experimental data using multivariate modeling approaches. May be repeated for credit. Permission of instructor required for enrollment.

CEE 375. Advanced Methods in Pathogen Detection. 2 Units.

Molecular and culture-based techniques for pathogen detection in water.

CEE 377. Research Proposal Writing in Environmental Engineering and Science. 1-3 Unit.

For first- and second-year post-master's students preparing for thesis defense. Students develop progress reports and agency-style research proposals, and present a proposal in oral form. Prerequisite: consent of thesis adviser.

CEE 378. Statistical Analysis of Environmental Data: Tools and Applications. 2-3 Units.

Preference to Environmental Engineering and Science Ph.D. students. Practical data analysis techniques applicable to environmental engineering. The role of statistics in data collection, experimental design, data exploration, and effective communication of results. Use of statistical packages such as Excel, Matlab, and R. Discussions partially based on student interest and available datasets. Topics may include summarizing data, hypothesis testing, nonparametric statistics, regression analysis, classification and regression trees, cluster analysis, and computationally intensive methods. Limited enrollment.

CEE 378D. Seminar of Statistical Analysis of Multidisciplinary Primary Data. 1-3 Unit.

Practical management and analysis techniques for primary data collected in multidisciplinary projects. Selection of appropriate statistical tests, interpretation of results, and effective communication of findings to lay audiences. Univariate, bivariate and multivariate techniques, including hypothesis testing, nonparametric statistics, regression analysis and matching. Use of SPSS statistical package. Limited enrollment. Prerequisite: consent of instructor.

CEE 381. Advanced Engineering Informatics. 1-4 Unit.

CEE 385. Performance-Based Earthquake Engineering. 3-4 Units. Synthesis and application of approaches to performance-based design and assessment that recently have been developed or are under development. Emphasis is on quantitative decision making based on life-cycle considerations that incorporate direct losses, downtime losses, and collapse, and the associated uncertainties. Hazard analysis, response simulation, damage and loss estimation, collapse prediction. Case studies. Prerequisites: 282, 287, and 288.

CEE 386. Fundamentals and Applications of Wind Engineering. 3 Units.

This course provides a basic understanding of how winds interact with the built environment. Knowledge of wind flow and the wind/structure interaction is introduced to understand the risks associated with extreme wind events (e.g., hurricanes, tornadoes, thunderstorm downbursts, etc.) and its application for design, damage mitigation, and risk management. In addition to providing an introduction to catastrophe risk modeling, this course will show how the principles of wind engineering are used to estimate the risk of the built environment subjected to catastrophic wind events. Prerequisites: undergraduate fluid mechanics, structural dynamics (CEE 283 or equiv), probability CEE 203.

CEE 398. Report on Civil Engineering Training. 1 Unit.

On-the-job training under the guidance of experienced, on-site supervisors; meets the requirements for Curricular Practical Training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. Prerequisite: qualified offer of employment and consent of adviser as per I-Center procedures.

CEE 399. Advanced Engineering Problems. 1-10 Unit.

Individual graduate work under the direction of a faculty member on a subject of mutual interest. For Engineer Degree students and Pre-quals Doctoral students. Student must have faculty sponsor. May be repeated for credit.

CEE 400. Thesis. 1-15 Unit.

For students who have successfully completed the department general qualifying examination. Research and dissertation for the Ph.D. degree. Same as: Ph.D. Degree

CEE 801. TGR Project. 0 Units.

Same as: Engineer Degree

CEE 802. TGR Dissertation. 0 Units.

Same as: PhD degree

Classics Courses

CLASSICS 1G. Beginning Greek. 5 Units.

(Formerly CLASSGRK 1.) No knowledge of Greek is assumed. Vocabulary and syntax of the classical language.

CLASSICS 1L. Beginning Latin. 5 Units.

(Formerly CLASSLAT 1.) Vocabulary and syntax of the classical language. No previous knowledge of Latin is assumed.

CLASSICS 2G. Beginning Greek. 5 Units.

(Formerly CLASSGRK 2.) Continuation of CLASSICS 1G. Vocabulary and syntax of the classical language.

CLASSICS 2L. Beginning Latin. 5 Units.

(Formerly CLASSLAT 2.) Vocabulary and syntax of the classical language. Prerequisite: CLASSICS 1L or equivalent placement.

CLASSICS 3G. Beginning Greek. 5 Units.

(Formerly CLASSGRK 3.) Vocabulary and syntax of the classical language. Prerequisite: CLASSICS 2G or equivalent placement. CLASSICS 3G fulfills University language requirement.

CLASSICS 3L. Beginning Latin. 5 Units.

(Formerly CLASSLAT 3.) Vocabulary and syntax of the classical language. Prerequisite: CLASSICS 2L or equivalent placement. CLASSICS 3L fulfills the University language requirement.

CLASSICS 4L. Intensive Beginning Latin. 12 Units.

(Formerly CLASSLAT 10/210) Equivalent to a year of beginning Latin (three quarters; CLASSICS 1L, 2: and 3L), this course is designed to teach the fundamentals of the Latin language in eight weeks. We will focus primarily on acquiring the basics of Latin grammar, morphology, and vocabulary and developing basic reading skills. At the end of the course, students should be able to read easy Latin prose and poetry. We will be using Wheelock's Latin textbook and meeting three hours a day, four days a week. Grades will depend on class participation and on performance in weekly quizzes and in a final written exam. Classics majors and minors must take course for letter grade. CLASSICS 4L fulfills the University language requirement.

CLASSICS 6G. Biblical Greek. 3-5 Units.

(Formerly CLASSGRK 5.) This is a one term intensive class in Biblical Greek. After quickly learning the basics of the language, we will then dive right into readings from the New Testament and the Septuagint, which is the ancient Greek translation of the Hebrew Bible. No previous knowledge of Greek required. If demand is high for a second term, an additional quarter will be offered in the Spring.

Same as: JEWISHST 5, RELIGST 171A

CLASSICS 6L. Latin 500-1600 CE. 5 Units.

The aim of the course is to familiarize students with medieval Latin and neo-Latin through a reading of various short texts drawn from philosophical, religious, political, historical, and literary works. Students will devote most of their efforts to preparing translations for class. We shall also discuss some peculiarities of post-classical Latin grammar. Prerequisite: CLASSLAT 1, 2 & 3, or equivalent.

Same as: ENGLISH 113L, PHIL 113L, PHIL 213L, RELIGST 173X

CLASSICS 7G. Biblical Greek. 3-5 Units.

(Formerly CLASSGRK 6) This is a continuation of the Winter Quarter Biblical Greek Course. Pre-requisite: CLASSICS 6G (Formerly CLASSGRK 5) or a similar introductory course in Ancient Greek.

Same as: JEWISHST 5B

CLASSICS 9G. Intensive Biblical Greek. 8 Units.

Equivalent to two quarters of Biblical Greek (CLASSICS 6G, 7G). Students will learn the core of New Testament Greek with the goal of learning to accurately translate and read the New Testament. Students will read one-third of the Gospel of John during the course and will be well-prepared to read the Greek New Testament independently after the course. Focus on knowledge of key vocabulary and grammar needed to read the Greek Bible with ease. No previous knowledge of Greek required. Course does not fulfill the Stanford language requirement.

Same as: JEWISHST 5G, RELIGST 171X

CLASSICS 11G. Intermediate Greek: Prose. 5 Units.

(Formerly CLASSGRK 101.) Transition to reading narrative: Lucian, with selections from Plato and New Testament. Grammar review and vocabulary-building.

CLASSICS 11L. Intermediate Latin: Introduction to Literature. 5 Units.

(Formerly CLASSLAT 101.) Phonology, morphology, semantics, and syntax. Readings in prose and poetry. Analysis of literary language, including rhythm, meter, word order, narrative, and figures of speech.

CLASSICS 12G. Intermediate Greek: Herodotus - the father of history?. 5 Units.

(Formerly CLASSGRK 102.) Herodotus of Halicarnassus (ca. 484 - 426) has often been celebrated as the "father of history." But the promised "display of his research" owes much to the Homeric poems, contemporary tragedy, and the medical discourse, and it contains lengthy passages quite fabulous and mysterious. We will read sections of book 1 and 8 in Greek, review morphology and syntax as needed, and reflect on the Ionic enlightenment, Herodotus' role therein, and his status as a historian. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 12L. Intermediate Latin: Plautus. 5 Units.

(Formerly CLASSLAT 102.) A close study of two plays by the brilliant comic dramatist of the 2nd Century BC. The course will develop confidence and expertise in translating Latin, with special attention to syntax. Topics to be considered include the relation of Plautine comedy to Greek models, issues in performance, and socio-political contexts. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 13G. Intermediate Greek: Homer. 5 Units.

(Formerly CLASSGRK 103.) We will read selected episodes from the Odyssey in Greek, and the entirety of the poem in translation. Our primary goal will be to master Homeric Greek's syntax, morphology, vocabulary, and meter, though we will also discuss narrative technique, poetic style, and the history of the scholarship. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 13L. Intermediate Latin: Cicero and Catullus. 5 Units.

(Formerly CLASSLAT 103.) In this class you will practice with and reinforce the advanced vocabulary, forms, and syntax of classical Latin you have previously acquired by reading continuous works of Latin prose (Cicero) and poetry (Catullus). While the primary emphasis of this course is on developing fluency in reading Latin, you will have opportunities to discuss and research the biographical, political, and literary issues raised by the readings. Your knowledge of the content and syntax of the readings will be assessed by several short translation/grammar quizzes. You will also sit for mid-quarter and end-quarter tests. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 14. Greek and Latin Roots of English. 3 Units.

(Formerly CLASSGEN 9) Goal is to improve vocabulary, comprehension of written English, and standardized test scores through learning the Greek and Latin components of English. Focus is on patterns and processes in the formation of the lexicon. Terminology used in medicine, business, education, law, and humanities; introduction to principles of language history and etymology. Greek or Latin not required.

CLASSICS 16N. Sappho: Erotic Poetess of Lesbos. 4-5 Units.

(Formerly CLASSGEN 24N.) Preference to freshmen. Sappho's surviving fragments in English; traditions referring to or fantasizing about her disputed life. How her poetry and legend inspired women authors and male poets such as Swinburne, Baudelaire, and Pound. Paintings inspired by Sappho in ancient and modern times, and composers who put her poetry to music.

Same as: FEMGEN 24N

CLASSICS 17N. To Die For: Antigone and Political Dissent. 4 Units.

(Formerly CLASSGEN 6N.) Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of *Antigone* by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta.

Same as: TAPS 12N

CLASSICS 18N. The Artist in Ancient Greek Society. 3 Units.

Given the importance of art to all aspects of their lives, the Greeks had reason to respect their artists. Yet potters, painters and even sculptors possessed little social standing. Why did the Greeks value the work of craftsmen but not the men themselves? Why did Herodotus dismiss those who worked with their hands as "mechanics?" What prompted Homer to claim that "there is no greater glory for a maniquest; than what he achieves with his own hands," provided that he was throwing a discus and not a vase on a wheel? Painted pottery was essential to the religious and secular lives of the Greeks. Libations to the gods and to the dead required vases from which to pour them. Economic prosperity depended on the export of wine and oil in durable clay containers. At home, depictions of gods and heroes on vases reinforced Greek values and helped parents to educate their children. Ceramic sets with scenes of Dionysian excess were reserved for elite symposia from which those who potted and painted them were excluded. Sculptors were still regarded as "mechanics," with soft bodies and soft minds (Xenophon) "indifferent to higher things" (Plutarch). The seminar addresses these issues. Students will read and discuss texts, write response papers and present slide lectures and gallery talks on aspects of the artist's profession.

Same as: ARTHIST 100N

CLASSICS 21Q. Eight Great Archaeological Sites in Europe. 3-5 Units.

(Formerly CLASSART 21Q.) Preference to sophomores. Focus is on excavation, features and finds, arguments over interpretation, and the place of each site in understanding the archaeological history of Europe. Goal is to introduce the latest archaeological and anthropological thought, and raise key questions about ancient society. The archaeological perspective foregrounds interdisciplinary study: geophysics articulated with art history, source criticism with analytic modeling, statistics interpretation. A web site with resources about each site, including plans, photographs, video, and publications, is the basis for exploring.

CLASSICS 24N. What is a Map?. 4 Units.

Exploration of the nature of maps via an overview of premodern mapping practices, combining theory and history of maps. Hands-on research involving Stanford's rare and historical maps, and chance to create own maps.

CLASSICS 26N. The Roman Empire: Its Grandeur and Fall. 4 Units.

(Formerly CLASSHIS 24N.) Preference to freshmen. Explore themes on the Roman Empire and its decline from the 1st through the 5th centuries C.E.. What was the political and military glue that held this diverse, multi-ethnic empire together? What were the bases of wealth and how was it distributed? What were the possibilities and limits of economic growth? How integrated was it in culture and religion? What were the causes and consequences of the conversion to Christianity? Why did the Empire fall in the West? How suitable is the analogy of the U.S. in the 21st century?.

Same as: HISTORY 11N

CLASSICS 28N. Inequality: the Last 100,000 Years. 3 Units.

(Formerly CLASSHIS 13N.) This seminar traces the evolution of resource inequality from the Stone Age to the present. Only this long-term perspective reveals the forces that drive inequality and allows us to address two key questions: what causes inequality, and what factors have been capable of reducing it, at least for a while? We are going to confront challenging arguments: that inequality has been closely tied up with overall economic and human development, and that over the long course of history, war, revolution and pestilence were the most effective equalizers of income and wealth. This class will help you appreciate contexts and complexities that are usually obscured by partisan polemics and short-term thinking. Seminar participants will be directly involved in the instructor's current research project on the history of inequality.
Same as: HISTORY 15N

CLASSICS 31. Greek Mythology. 3-5 Units.

(Formerly CLASSGEN 18.) The heroic and divine in the literature, mythology, and culture of archaic Greece. Interdisciplinary approach to the study of individuals and society. Illustrated lectures. Readings in translation of Homer, Hesiod, Herodotus, and the poets of lyric and tragedy. Weekly participation in a discussion section is required.

CLASSICS 32. Gender and Power in Ancient Greece. 4 Units.

(Formerly CLASSGEN 17.) Introduction to the sex-gender system of ancient Greece, with comparative material from modern America. How myths, religious rituals, athletics, politics and theater reinforced gender stereotypes and sometimes undermined them. Skills: finding clues, identifying patterns and making connections amongst the components of a strange and beautiful culture very different from our own. Weekly participation in a discussion section is required.
Same as: FEMGEN 17

CLASSICS 34. Ancient Athletics. 3-4 Units.

(Formerly CLASSGEN 34.) How the Olympic Games developed and how they were organized. Many other Greek festivals featured sport and dance competitions, including some for women, and showcased the citizen athlete as a civic ideal. Roman athletics in contrast saw the growth of large-scale spectator sports and professional athletes. Some toured like media stars; others regularly risked death in gladiatorial contests and chariot-racing. We will also explore how large-scale games were funded and how they fostered the development of sports medicine. Weekly participation in a discussion section is required; enroll in sections on coursework.

CLASSICS 35. Becoming Like God: An Introduction to Greek Ethical Philosophy. 3-5 Units.

(Formerly CLASSGEN 35.) This course investigates key ethical philosophies in classical Greece. After reading several Greek tragedies (representing traditional Greek values), we examine the Greek philosophers' rejection of this tradition and their radically new ethical theories. Socrates, Plato, and Aristotle offered different ethical theories, but they shared basic conceptions of goodness and happiness. They argue that we could "become like gods" by achieving philosophic wisdom. What kind of wisdom is this? How does it make us ethically good and supremely happy people?.

CLASSICS 36. Gender and Power in Ancient Rome. 3-5 Units.

(Formerly CLASSGEN 119.) Interactions of gender and power in ancient Roman politics, religion, spectacles, and daily life. Masculinity and femininity in founding legends and public rituals; the ambiguous status of Vestal Virgins; gendered behavior in the Roman Forum; the spatial logic of prostitution; sexual characterizations of good vs. bad emperors in ancient texts; gender and time in Roman houses; inversions of gender and space in early Christian martyr narratives. Readings include modern gender theory as well as ancient Roman texts and material culture.

CLASSICS 41. Herodotus. 4-5 Units.

For Ancient History field of study majors; others by consent of instructor. Close reading technique. Historical background to the Greco-Persian Wars; ancient views of empire, culture, and geography; the wars and their aftermath; ancient ethnography and historiography, including the first narrative of ancient Egypt.

CLASSICS 42. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English. Same as: COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

CLASSICS 51. Introduction to the Archaeology of Greece. 3-5 Units.

An introduction to the archaeology of ancient Greece, from the first city states through the cultural achievements of classical Athens to the conquest by Rome.
Same as: ARCHLGY 51

CLASSICS 52. Introduction to Roman Archaeology. 3-5 Units.

(Formerly CLASSART 81.) This course will introduce you to the material culture of the ancient Roman world, from spectacular imperial monuments in the city of Rome to cities and roads around the Mediterranean, from overarching environmental concerns to individual human burials, from elite houses and army forts to the lives of slaves, freedmen and gladiators. Key themes will be change and continuity over time; the material, spatial and visual workings of power; how Roman society was materially changed by its conquests and how conquered peoples responded materially to Roman rule.
Same as: ARCHLGY 81

CLASSICS 54. Introduction to World Architecture. 5 Units.

This lecture course surveys the history of architecture and urbanism, from the first societies to the present, in Europe, West and East Asia, the Americas, and Africa. The course progresses by case studies of exemplary monuments and cities, and examines the built environment as both cultural artifact and architectural event. It considers the social and political circumstances of architectural invention as well as plumbing the depth of artistic context by which particular formal choices resonate with an established representational culture.
Same as: ARTHIST 3

CLASSICS 56. Introduction to the Visual Arts: Prehistoric through Medieval. 5 Units.

A survey of the art and architecture from the cave paintings of Lascaux to the Gothic Cathedrals of France; the material is organized both chronologically and thematically and covers a multiplicity of religions: pagan, Christian, and Islamic.
Same as: ARTHIST 1A

CLASSICS 76. Global History: The Ancient World. 3-5 Units.

This course examines the emergence of "world empires"-- the first way of constituting a world-- in four regions of the eastern hemisphere from the first millennium BCE to the year 900 CE. It will study the pivotal role of cities, the importance of rulers, the incorporation of diverse peoples, and how the states that followed their collapse constituted new world orders through combining imitation of the vanished empire with the elaboration of the new "world religions."
Same as: HISTORY 1A

CLASSICS 81. Ancient Empires: Near East. 4-5 Units.

Why do imperialists conquer people? Why do some people resist while others collaborate? This course tries to answer these questions by looking at some of the world's earliest empires. The main focus is on the expansion of the Assyrian and Persian Empires between 900 and 300 BC and the consequences for the ancient Jews, Egyptians, and Greeks. The main readings come from the Bible, Herodotus, and Assyrian and Persian royal inscriptions, and the course combines historical and archaeological data with social scientific approaches. Weekly participation in a discussion section is required.

Same as: HISTORY 117

CLASSICS 82. The Egyptians. 3-5 Units.

Overview of ancient Egyptian pasts, from predynastic times to Greco-Roman rule, roughly 3000 BCE to 30 BCE. Attention to archaeological sites and artifacts; workings of society; and cultural productions, both artistic and literary. Weekly participation in a discussion section is required. Same as: AFRICAAM 30

CLASSICS 83. The Greeks. 4-5 Units.

(Formerly CLASSHIS 101.) 250 years ago, for almost the first time in history, a few societies rejected kings who claimed to know what the gods wanted and began moving toward democracy. Only once before had this happened--in ancient Greece. This course asks how the Greeks did this, and what they can teach us today. It uses texts and archaeology to trace the material and military sides of the story as well as cultural developments, and looks at Greek slavery and misogyny as well as their achievements. Weekly participation in a discussion section is required.

Same as: HISTORY 101

CLASSICS 84. The Romans. 3-5 Units.

(Formerly CLASSHIS 60.) How did a tiny village create a huge empire and shape the world, and why did it fail? Roman history, imperialism, politics, social life, economic growth, and religious change. Weekly participation in a discussion section is required; enroll in sections on Coursework.

Same as: HISTORY 102A

CLASSICS 87. Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years. 5 Units.

Why does Egypt fascinate us? From Napoleonic invasion to Katy Perry's latest music video, we have interpreted ancient Egyptian history and mythology for centuries; in fact, this obsession dates back to the Egyptians themselves. This seminar explores Egyptomania from the Pharaonic period to the 20th century. Topics include: ancient Egypt, Greek historians, medieval Arabic scholars, hieroglyphic decipherment, 19th century travel, 20th century pop culture, and how historians have interpreted this past over the centuries.

Same as: HISTORY 244

CLASSICS 88. Origins of History in Greece and Rome. 4-5 Units.

(Formerly CLASSHIS 117.) The beginnings and development of historical writing in the ancient world. Emphasis on major classical historians and various models of history they invented, from local to imperial, military, cultural, biographical, world history and church history. Focus on themes of power, war, loss, growth and decline, as put by the ancients into historical narrative forms and probed by way of historical questioning and explanation. Attention to how these models resonate still today. Readings in translation: Herodotus, Thucydides, Tacitus, Livy and others. Participation in a weekly discussion section is required.

Same as: HISTORY 114

CLASSICS 101G. Advanced Greek: Plato's Phaedrus. 3-5 Units.

(Formerly CLASSGRK 111.) The course will be an intensive and extensive reading of this intriguing dialogue. Focus will center on making sense of the Greek and polishing translation/grammar skills. However, the trees of language should not prevent us from gazing at the whole forest. As it is, the Phaedrus deals with the significant interplay between eros and logos; i.e. the far-reaching extents of a rhetoric on love. Topics opened by this vein of thought include: a unique pastoral setting, philosophy and myth, the origins of poetic creation, types of madness, maniqueism's relation to the divine, the nature of the soul, the art of writing as a cause of oblivion. Classics majors and minors must take for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 101L. Advanced Latin. 3-5 Units.

(Formerly CLASSLAT 111.) Full description TBD. Classics majors and minors must take for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 102G. Advanced Greek: Lyric Poetry. 3-5 Units.

(Formerly CLASSGRK 112.) Invectives, love songs, drinking songs, elegies, and choral odes from 700-500 B.C.E. Readings include Sappho, Alcaeus, Archilochus, Mimnermus, Alcman, Solon, and Pindar. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 102L. Advanced Latin: Livy. 4-5 Units.

(Formerly CLASSLAT 112.) Livy's Book VI tells the history of Republican Rome from 390 to 367 BCE, years of profound change in Roman society, as the city is reconstructed after being sacked by the Gauls. How does Livy make his story lifelike and convincing? What is the role of individuals in this narrative? How do moral readings of past events balance political ones? How does Livy involve his readers in reconstructing Rome and its past? Close attention to language, style and narrative techniques. Classics majors and minors must take for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 103G. Advanced Greek: Scientific Writing. 3-5 Units.

(Formerly CLASSGRK 113.) Euclid and Archimedes. Reading texts from Greek science. The relationship between form and meaning in the presentation of scientific information, introduction to Greek Paleography. Classics majors and minors must take for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 103L. Advanced Latin: Latin Lovers. 3-5 Units.

(Formerly CLASSLAT 113.) Four brilliant writers composed poetry on the thrills and pangs of love and loss: they are known as the Roman elegists. We will look at some of their predecessors and read their own works in Latin in selection, reflect on their choice of life in the service of love, and review grammar and syntax as necessary. Classics majors and minors must take course for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

CLASSICS 104A. Latin Syntax. 4 Units.

(Formerly CLASSLAT 175A/275A.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204A.

Same as: CLASSICS 204A

CLASSICS 104B. Latin Syntax. 2 Units.

(Formerly CLASSLAT 175B/275B) Intensive review of Latin syntax. Began with 104A/204A in Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204B.

Same as: CLASSICS 204B

CLASSICS 105A. Greek Syntax: Prose Composition. 2 Units.
(Formerly CLASSGRK 175A/275A.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Prerequisite for undergraduates: three years of Greek. First-year graduate students register for 205A/B.
Same as: CLASSICS 205A

CLASSICS 105B. Greek Syntax: Prose Composition. 4 Units.
(Formerly CLASSGRK 175B/275B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Prerequisite for undergraduates: three years of Greek. First-year graduate students register for 205A/B.
Same as: CLASSICS 205B

CLASSICS 112. Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice. 4 Units.
(Formerly CLASSGEN 110.) Gods and heroes, fate and free choice, gender conflict, the justice or injustice of the universe: these are just some of the fundamental human issues that we will explore in about ten of the tragedies of Aeschylus, Sophocles, and Euripides.
Same as: TAPS 167

CLASSICS 121. Ecology in Philosophy and Literature. 3-5 Units.
(Formerly CLASSGEN 116.) The basic principles of ecological thinking, exploring the ways that different writers represent and relate to the natural world. Some key questions: What is nature, and where do humans fit in the natural world? How exactly do humans differ from other animals? Do these differences make us superior beings? What are our ethical responsibilities towards the earth and its inhabitants? In what ways have the technologies of writing, television, and computers affected humankind's relationship to the natural world?.

CLASSICS 123. Ancient Medicine. 3-4 Units.
Contemporary medical practice traces its origins to the creation of scientific medicine by Greek doctors such as Hippocrates and Galen. Is this something of which modern medicine can be proud? The scientific achievements and ethical limitations of ancient medicine when scientific medicine was no more than another form of alternative medicine. Scientific medicine competed in a marketplace of ideas where the boundaries between scientific and social aspects of medicine were difficult to draw.

CLASSICS 124. Ancient and Modern Medicine. 3-4 Units.
Imagine a world where the Universe has a built-in purpose and point. How would this belief impact man's place in nature? Imagine a world where natural substances have "powers." How might this impact diet and pharmacology? Magical vs. scientific healing: a clear divide? Disease and dehumanization: epilepsy, rabies. Physical and mental health: black bile and melancholy. The ethical and scientific assumptions hidden in medical language and imagery. How ancient medicine and modern medicine (especially alternative medicine) illuminate each other.

CLASSICS 136. The Greek Invention of Mathematics. 3-5 Units.
(Formerly CLASSGEN 103.) How was mathematics invented? A survey of the main creative ideas of ancient Greek mathematics. Among the issues explored are the axiomatic system of Euclid's Elements, the origins of the calculus in Greek measurements of solids and surfaces, and Archimedes' creation of mathematical physics. We will provide proofs of ancient theorems, and also learn how such theorems are even known today thanks to the recovery of ancient manuscripts.
Same as: MATH 163

CLASSICS 137. Ancient Dance and its Modern Legacy. 3-5 Units.
Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.
Same as: CLASSICS 237, TAPS 165C, TAPS 265C

CLASSICS 142. Emperor, Explorer, and God: Alexander the Great in the Global Imagination. 3 Units.
(Formerly CLASSGEN 109.) This course will survey the changing image of Alexander the Great from the Hellenistic world to the contemporary. We shall study the appropriation of his life and legend in a variety of cultures both East and West and discuss his reception as both a divine and a secular figure by examining a variety of media including texts (primary and secondary) and images (statues, coins, mosaics, illuminated manuscripts, film, and TV) in the Hellenistic, Roman, Byzantine, Jewish, Islamic, Medieval, Renaissance, and Early Modern contexts. In concluding the quarter, students will evaluate contemporary representations in film and popular culture, such as Alexander directed by Oliver Stone and Pop Art in order to better appreciate his enduring legacy.
Same as: RELIGST 109

CLASSICS 143. Images of Women in Ancient China and Greece. 3-5 Units.
(Formerly CLASSGEN 153/253.) Representation of women in ancient Chinese and Greek texts. How men viewed women and what women had to say about themselves and their societies. Primary readings in poetry, drama, and didactic writings. Relevance for understanding modern concerns; use of comparison for discovering historical and cultural patterns.
Same as: CHINGEN 143, CHINGEN 243, CLASSICS 243

CLASSICS 145. Early Christian Gospels. 4 Units.
An exploration of Christian gospels of the first and second century. Emphasis on the variety of images and interpretations of Jesus and the good news, the broader Hellenistic and Jewish contexts of the gospels, the processes of developing and transmitting gospels, and the creation of the canon. Readings include the Gospel of John, the Gospel of Mark, the Gospel of Thomas, the Gospel of Mary and other canonical and non-canonical gospels.
Same as: RELIGST 132D

CLASSICS 146. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.
Stretching from India to Ethiopia, the Persian Empire; the largest empire before Rome; has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West; and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.
Same as: CLASSICS 246, RELIGST 229, RELIGST 329

CLASSICS 147. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.
From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past.
Same as: CLASSICS 247, RELIGST 309

CLASSICS 148. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the Book of Kings of Ferdowsi.

Same as: CLASSICS 248, RELIGST 209E, RELIGST 309E

CLASSICS 150. Majors Seminar. 5 Units.

(Formerly CLASSGEN 176.) Required of Classics majors and minors in junior or senior year; students contemplating honors should take this course in junior year. Advanced skills course involving close reading, critical thinking, editing, and writing. In-class and take-home writing and revising exercises. Final paper topic may be on any subject related to Classics. Fulfills WIM requirement for Classics.

CLASSICS 151. Ten Things: An Archaeology of Design. 3 Units.

(Formerly CLASSART 113/213.) Connections among science, technology, society and culture by examining the design of a prehistoric hand axe, Egyptian pyramid, ancient Greek perfume jar, medieval castle, Wedgwood teapot, Edison's electric light bulb, computer mouse, Sony Walkman, supersonic aircraft, and BMW Mini. Interdisciplinary perspectives include archaeology, cultural anthropology, science studies, history and sociology of technology, cognitive science, and evolutionary psychology.

Same as: ARCHLGY 151

CLASSICS 153. Ancient Urbanism. 5 Units.

(Formerly CLASSART 112/212.) Archaeology of Greek, Roman and early Islamic cities and urbanism in the Mediterranean and western Asia. Comparison and contrast of the shaping role of religion and politics; definitions of public and private space, monumental buildings, houses, streets, infrastructure. Special themes are city and country connections; the problems of giant cities; cities in the longue dureacute;e. Case studies include Athens, Olynthos, Rome, Pompeii, Constantinople, Damascus and Cairo.

Same as: ARCHLGY 153, URBANST 119

CLASSICS 154. Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean. 3-4 Units.

(Formerly CLASSART 145.) Why do we care about shipwrecks? What can sunken sites and abandoned ports tell us about our past? Focusing primarily on the archaeological record of shipwrecks and harbors, along with literary evidence and contemporary theory, this course examines how and why ancient mariners ventured across the "wine-dark seas" of the Mediterranean for travel, warfare, pilgrimage, and especially commerce. We will explore interdisciplinary approaches to the development of maritime contacts and communication from the Bronze Age through the end of Roman era. At the same time, we will engage with practical techniques of maritime archaeology, which allows us to explore the material record first hand.

Same as: ARCHLGY 145

CLASSICS 158. Iconoclasm. 5 Units.

Iconoclasm, iconophobia, and aniconism as markers of cultural transformation of the Mediterranean in the 7th-9th centuries. The identity crisis in the region as the Arabs established the Umayyad caliphate, conquering the Holy Land, Egypt, and Spain. The West consolidated around the Carolingians versus the East split between the Byzantines and the Arabs. How each of these three empires emerged from the ashes of late antique culture and carved an identity out of a common cultural foundation. The course will take place in the seminar room of the Art and Architectural Library located in the Cummings Art Building.

Same as: ARTHIST 209C, ARTHIST 409, CLASSICS 258, REES 409

CLASSICS 159. Appropriations of Greek Art. 4-5 Units.

Upper division seminar. The history of the appropriation of Greek art by Rome, the Renaissance, Lord Elgin, and Manet. Enrollment limited to 6. Prerequisite: ARTHIST 102 or consent of instructor.

CLASSICS 161. Archaic Greek Art. 4 Units.

In the decades 480-460, just before work began on the Parthenon, the sculptor Myron, creator of the Discus-Thrower, was even more celebrated for his bronze cow. Ancient authors describe an image so palpably alive that shepherds threw stones at her, thinking that she had strayed from the herd, and bulls vied for her attention. A century later, the quest for mimesis prompted a contest between two artists. Zeuxis painted a bunch of grapes seductive enough to attract hungry birds; Parrhasios then added a linen curtain, which Zeuxis asked to be removed from his painting. Zeuxis conceded defeat since he had fooled only birds, whereas Parrhasios had deceived an artist. This course explores the art and culture of the ancestors of these men. The Greeks of the archaic period (1000-480) would have understood the painters' competitive zeal, but only toward the end of the period would they have recognized naturalism as an artistic aim. Earlier Greek art is more abstract than life-like, closer to Calder than Michelangelo. In the eighth century Homer's descriptions of the rippling muscles (and egos) of his heroes, and the grief of Achilles; horses, evoke living men and sentient animals, but his fellow sculptors and painters prefer abstraction. This changes in the seventh century as a result of commercial contacts with the Near East and Egypt. Imported bronzes, ivories and other Near Eastern exotica alerted Greek artists to a wider range of subjects, techniques and intentions, including naturalism. Later in the century, Greek expatriates learned the art of carving hard stone from Egyptian masters and soon marble sculpture and architecture spread throughout Greece. In the course of the sixth and early fifth centuries Greek artists assimilate what they had borrowed, compete with one another, obey and disobey their teachers, test the tolerance of the gods and eventually produce works of art that speak with a Greek accent. When the Persians invaded the Acropolis in 480 and 479, they encountered artifacts with little trace of alien influence or imprint and, at Salamis and Plataea, fought decisive battles in which the Greeks prevailed. In the aftermath of the war, as the Greeks rebuilt their cities and their lives, Myron's work reminded them of their debts to other cultures and their resolve to remain true to their own.

Same as: ARTHIST 101

CLASSICS 162. Empire and Aftermath: Greek Art from the Parthenon to Scopas. 4 Units.

The class begins with the art, architecture and political ideals of Periclean Athens, from the emergence of the city as the political and cultural center of Greece in 450 to its defeat in the Peloponnesian War in 404. It then considers how Athens and the rest of Greece proceed in the fourth century to rebuild their lives and the monuments that define them. Earlier artistic traditions endure, with subtle changes, in the work of sculptors such as Kephisodotos. Less subtle are the outlook and output of his son Praxiteles. In collaboration with Phryne, his muse and mistress, Praxiteles challenged the canons and constraints of the past with the first female nude in the history of Greek sculpture. His gender-bending depictions of gods and men were equally audacious, their shiny surfaces reflecting Plato's discussion of Eros and androgyny. Scopas was also a man of his time but pursued different interests. Drawn to the inner lives of men and woman, his tormented Trojan War heroes and victims are still scared by memories of the Peloponnesian War, and a world away from the serene faces of the Parthenon. His famous Maenad, a devotee of Dionysos who has left this world for another, belongs to the same years as Euripides; Bacchae and, at the same time, anticipates the torsion and turbulence of Bernini and the Italian Baroque. In the work of these and other fourth century personalities, the stage is set for Alexander the Great and his conquest of a kingdom extending from Greece to the Indus River. (Formerly CLASSART 102).

Same as: ARTHIST 102, ARTHIST 302

CLASSICS 163. Greek Art In and Out of Context. 4-5 Units.

The seminar considers Greek artifacts in the context of Greek life (including the life of the workshop), and the endless ways in which craftsmen served the needs of Greek society. Their foundries, factories and ceramic studios produced the material goods that defined Greek life: temples, statues and other offerings for the gods; arms and armor for warriors; sporting equipment and prizes for athletes; houses, clothing and crockery for the family; ships and sailcloth, wagons and ploughs, wine and oil-presses for a thriving domestic and overseas economy; gravestones and funeral vases for the dead. (Formerly CLASSART 109.) Most of the antiquities exhibited in museums, or purchased by private collectors from galleries and auction houses, survive because they were buried with people who used and cherished them. The Greeks' quest; belief that the artifacts they valued in life would serve them in the afterlife informs the second part of the seminar, which is devoted to the recent history of tomb looting and the illicit trafficking in antiquities.

Same as: ARTHIST 203

CLASSICS 168. Engineering the Roman Empire. 4-5 Units.

(Formerly CLASSART 117.) Roman monuments and monumental space were designed to impress. This class explores the interrelated aesthetics and mechanics of construction that led to one of the most extensive building programs undertaken by a pre-modern state. Through case studies ranging from arches, columns and domes to road networks, machines and landscape modification, we investigate not only the materials, methods, and knowledge behind Roman architectural innovation, but the communication of imperial messages through designed space.

Same as: ARCHLGY 118

CLASSICS 169. Archaeology of Britannia. 3-4 Units.

Life in the Roman Empire: this course is a broad introduction to the archaeology of one of the best known provinces of the empire.

Same as: ARCHLGY 169

CLASSICS 171. Byzantine Art and Architecture, 300-1453 C.E.. 4 Units.

(Formerly CLASSART 106/206.) This course and its study trip to the Getty (Los Angeles) to view the new Byzantine exhibition explores the art and architecture of the Eastern Mediterranean: Constantinople, Jerusalem, Alexandria, Antioch, Damascus, Thessaloniki, and Palermo, 4th-15th centuries. Applying an innovative approach, we will probe questions of phenomenology and aesthetics, focusing our discussion on the performance and appearance of spaces and objects in the changing diurnal light, in the glitter of mosaics and in the mirror reflection and translucency of marble.

Same as: ARTHIST 106, ARTHIST 306

CLASSICS 172. Art & Architecture in the Medieval Mediterranean. 4 Units.

Chronological survey of Byzantine, Islamic, and Western Medieval art and architecture from the early Christian period to the Gothic age. Broad art-historical developments and more detailed examinations of individual monuments and works of art. Topics include devotional art, court and monastic culture, relics and the cult of saints, pilgrimage and crusades, and the rise of cities and cathedrals.

Same as: ARTHIST 105, ARTHIST 305

CLASSICS 173. Hagia Sophia. 5 Units.

By employing a methodology based in psychoacoustics, semiotics, and phenomenology, this course explores the relationship among sound, water, marble, meaning, and religious experience in the sixth-century church of Hagia Sophia built by emperor Justinian in Constantinople. We will read medieval sources describing the interior and ritual, make short movies exploring the shimmer of marble in buildings on campus, and study the acoustics of domed buildings through computer auralization done at Stanford's CCRMA (Center for Computer Research in Music and Acoustics).

Same as: ARTHIST 208

CLASSICS 174. Art and Religious Experience in Byzantium and Islam. 5 Units.

This course presents a comparative study of Christian and Islamic paradigms (sixth to the thirteenth centuries) in the construction of religious experience through the material fabric of the building, the interior decor, objects, and rituals. We will read medieval ekphrastic texts and poetry, which stirred the viewer/participant to experience the building/object as animate. Among the sites we will study are: Hagia Sophia, the Ka'ba, the Dome of the Rock, the Mosque at Damascus and at Cordoba. We will read Byzantine and Arabic writers such as Paul the Silentiary, Patriarch Germanos, Maximus Confessor, Shahrawardi, and Ibn Arabi.

Same as: ARTHIST 209, ARTHIST 309

CLASSICS 175. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

CLASSICS 181. Classical Seminar: Origins of Political Thought. 4-5 Units.

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 381, PHIL 176A, PHIL 276A, POLISCI 230A, POLISCI 330A

CLASSICS 183. Economy and Economics of Ancient Greece. 5 Units.

(Formerly CLASSHIS 114.) Cultural and political background for Athens of the 5th and 4th century BC. Athenian economy of the 4th century BC. Economic ideas of Plato, Aristotle, and Xenophon. Pros and Cons of utilitarianism in light of the ethical theories of Plato and Aristotle. Economy and economics of ancient Greece will be compared to the same of ancient China. There is an interesting parallel.

Same as: ECON 114

CLASSICS 184. Ancient and Modern Slavery. 3-5 Units.

The ancient Greeks and Roman created the largest and most durable slave system in world history. It formed one of the foundations of classical civilization. While cruelty and exploitation were ever-present features, ancient slavery was not race-based and many slaves came to be freed and fully integrated into society. We will investigate this complex institution from a comparative perspective and in the context of the experience of modern colonial slavery.

CLASSICS 198. Directed Readings. 1-15 Unit.

(Formerly CLASSGEN 160.) May be repeated for credit.

Same as: Undergraduate

CLASSICS 199. Undergraduate Thesis: Senior Research. 2-10 Units.

(Formerly CLASSGEN 199.)

CLASSICS 201G. Survey of Greek Literature: Archaic Greek. 3-5 Units.

(Formerly CLASSGEN 208A.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

CLASSICS 201L. Survey of Latin Literature: Literature of the Roman Republic. 3-5 Units.

(Formerly CLASSGEN 207A.) One-year sequence focusing on the origins, development, and interaction of Latin literature, history, and philosophy. Greek and Latin material taught in alternate years. Focus is on translation, textual criticism, genre, the role of Greece in shaping Roman literature, and oral versus written discourse.

CLASSICS 202G. Survey of Greek Literature: Classical Greek. 3-5 Units.

(Formerly CLASSGEN 208B.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

CLASSICS 202L. Survey of Latin Literature: Augustan Age Latin. 3-5 Units.

(Formerly CLASSGEN 207B.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Texts of Augustan literature required by the graduate syllabus, emphasizing poetry and major authors.

CLASSICS 203G. Survey of Greek Literature: Hellenistic and Late Greek. 3-5 Units.

(Formerly CLASSGEN 208C.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

CLASSICS 203L. Survey of Latin Literature: Imperial Latin. 3-5 Units.

(Formerly CLASSGEN 207C.) One-year sequence focusing on the origins, development, and interaction of Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

CLASSICS 204A. Latin Syntax. 4 Units.

(Formerly CLASSLAT 175A/275A.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204A.

Same as: CLASSICS 104A

CLASSICS 204B. Latin Syntax. 2 Units.

(Formerly CLASSLAT 175B/275B) Intensive review of Latin syntax. Began with 104A/204A in Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204B.

Same as: CLASSICS 104B

CLASSICS 205A. Greek Syntax: Prose Composition. 2 Units.

(Formerly CLASSGRK 175A/275A.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Prerequisite for undergraduates: three years of Greek. First-year graduate students register for 205A/B.

Same as: CLASSICS 105A

CLASSICS 205B. Greek Syntax: Prose Composition. 4 Units.

(Formerly CLASSGRK 175B/275B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Prerequisite for undergraduates: three years of Greek. First-year graduate students register for 205A/B.

Same as: CLASSICS 105B

CLASSICS 206A. The Semantics of Grammar. 2 Units.

(Formerly CLASSGEN 205A.) Supplements CLASSICS 104A/204A. 206A: Tense, Aspect, Argument Structure, Location. 206B: Quantification, Plurality, Modification, Negation, Modality.

CLASSICS 206B. The Semantics of Grammar. 2 Units.

(Formerly CLASSGEN 205B.) Supplements CLASSICS 104B/204B. 206A: Tense, Aspect, Argument Structure, Location. 206B: Quantification, Plurality, Modification, Negation, Modality.

CLASSICS 213. Proseminar: Documentary Papyrology. 3-5 Units.

The focus will be on documentary papyrology. Students will be introduced to the basics of the discipline.

CLASSICS 215. Paleography of Medieval and Early Modern Manuscripts. 3-5 Units.

Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.

Same as: DLCL 209, HISTORY 309G, RELIGST 204

CLASSICS 216. Advanced Paleography. 5 Units.

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment.

Same as: ENGLISH 300A, HISTORY 315, RELIGST 329X

CLASSICS 237. Ancient Dance and its Modern Legacy. 3-5 Units.

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.

Same as: CLASSICS 137, TAPS 165C, TAPS 265C

CLASSICS 243. Images of Women in Ancient China and Greece. 3-5 Units.

(Formerly CLASSGEN 153/253.) Representation of women in ancient Chinese and Greek texts. How men viewed women and what women had to say about themselves and their societies. Primary readings in poetry, drama, and didactic writings. Relevance for understanding modern concerns; use of comparison for discovering historical and cultural patterns.

Same as: CHINGEN 143, CHINGEN 243, CLASSICS 143

CLASSICS 244. Classical Seminar: Rethinking Classics. 4-5 Units.

Literary and philosophical texts from Antiquity (including Homer, the Greek tragedians, Plato, Aristotle, Virgil, and Augustine). In each case, we will examine the cultural contexts in which each text was composed (e.g. political regimes and ideologies; attitudes towards gender and sexuality; hierarchies of class and status; discourses on "barbarians" and resident aliens). We will study various theoretical approaches to these books in an effort to "rethink" these texts in the 21st century.

Same as: DLCL 321

CLASSICS 246. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.

Stretching from India to Ethiopia, the Persian Empire; the largest empire before Rome; has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West; and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.

Same as: CLASSICS 146, RELIGST 229, RELIGST 329

CLASSICS 247. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.

From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past.

Same as: CLASSICS 147, RELIGST 309

CLASSICS 248. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the *Book of Kings of Ferdowsi*.

Same as: CLASSICS 148, RELIGST 209E, RELIGST 309E

CLASSICS 258. Iconoclasm. 5 Units.

Iconoclasm, iconophobia, and aniconism as markers of cultural transformation of the Mediterranean in the 7th-9th centuries. The identity crisis in the region as the Arabs established the Umayyad caliphate, conquering the Holy Land, Egypt, and Spain. The West consolidated around the Carolingians versus the East split between the Byzantines and the Arabs. How each of these three empires emerged from the ashes of late antique culture and carved an identity out of a common cultural foundation. The course will take place in the seminar room of the Art and Architectural Library located in the Cummings Art Building.

Same as: ARTHIST 209C, ARTHIST 409, CLASSICS 158, REES 409

CLASSICS 298. Directed Reading in Classics. 1-15 Unit.

(Formerly CLASSGEN 260.)

Same as: Graduate Students

CLASSICS 301. Gateways to Classics. 1 Unit.

(Formerly CLASSGEN 300A.) Focus on skills, methodologies and approaches in the study of Classics topics, with attention both to histories of the disciplines and to new developments. Required for first-year Classics graduate students.

CLASSICS 302. Workshop on Teaching in Classics. 1 Unit.

Introduction to pedagogical theories and techniques relevant to careers as Classics instructors. Classics faculty and advanced graduate students will lead sessions on language instruction, class discussions, assignments and feedback, and course design. Participants will read selections from modern scholarship on teaching and learning and engage in hands-on exercises.

CLASSICS 304. Developing a Classics Dissertation Prospectus. 1-2 Unit.

This workshop concentrates on the development process of writing a successful dissertation proposal and clarifies expectations of the defense process. Includes peer reviews of draft proposals with an aim to present provisional proposals by the end of term. Highly recommended for current third-year Classics Ph.D. students.

CLASSICS 315. Aristotle and the Object of Mathematical Reasoning. 4 Units.

The concept of definition plays a central role in Aristotle's treatment of both philosophical and scientific inquiry, as well as explanation. A definition is an account of what something is, and some definitions are used to guide causal inquiry whereas others function as explanatory starting points.

In this course we will examine texts from his logic, natural science and metaphysics in order to see what the different kinds of definition are, how they are obtained, and how they capture the nature or essence of a definable object. Particular attention will be given to the role of matter in the definition of the form of a natural substance, state, process or activity. For instance, what role does a specification of physiological processes play in the definitions of emotions such as anger? No knowledge of Greek is required. May be repeat for credit.

Same as: PHIL 318

CLASSICS 318. Aristophanes: Comedy, and Democracy. 4-5 Units.

(Formerly CLASSGEN 304.) Intensive study of three plays in Greek (*Knights*, *Peace*, *Ecclesiazusae*) and the rest of the corpus in English, with reference to formal features and a focus on how Old Comedy related to the democratic practices of Athens.

CLASSICS 320. The Odes and Epodes of Horace. 3-5 Units.

Critical analysis of poetic texts, strengthening and updating the understanding of Latin language and style, and discussion of some of the most influential lyric poetry of all time. Topics include language, style and meter, and also poetics, historical context, gender, ethics, genre, and the history of Western lyric poetry. Classics undergraduates as well as graduate students familiar with other traditions of poetry are welcome.

CLASSICS 331. Words and Things in the History of Classical Scholarship. 4-5 Units.

How have scholars used ancient texts and objects since the revival of the classical tradition? How did antiquarians study and depict objects and relate them to texts and reconstructions of the past? What changed and what stayed the same as humanist scholarship gave way to professional archaeologists, historians, and philologists? Focus is on key works in the history of classics, such as Erasmus and Winckelmann, in their scholarly, cultural, and political contexts, and recent critical trends in intellectual history and the history of disciplines.

Same as: HISTORY 303F

CLASSICS 335. Ekphrasis in Antiquity. 3-5 Units.

What is "ekphrasis"? How was it theorized and practiced in antiquity? Description, interpretation, and the senses; The relationship between the verbal and the visual in antiquity from Homer to Philostratus.

CLASSICS 336. Plato on Eros and Beauty. 3-5 Units.

We read Plato's *Symposium* and *Phaedrus*; topics: love, beauty, language (oral and written). Graduate seminar, but open to seniors.

Same as: PHIL 306C

CLASSICS 337. The Second Sophistic. 3-5 Units.

The class will introduce students to the most important aspects of the Second Sophistic: linguistic and literary classicism, rhetoric and performance, typical literary forms. Particular emphasis will be on the social and political background of the movement (Greek identity, social distinction, sophists and gender). For students who wish to take the class for 4 or 5 units, part of the readings will be in the original Greek.

CLASSICS 352. Doing Business in Classical Antiquity: Mediterranean Exchange. 3-5 Units.

Exchange was everywhere in the Mediterranean, from the individual household to the state. Yet the specific models by which goods changed hands were as varied as the ideas and values that moved alongside them. This seminar will explore theoretical approaches to commercial and non-commercial exchange, drawing primarily on the crucial but uneven bodies of archaeological evidence and historical sources in an effort to investigate the simple but hardly straightforward question of how business was undertaken in the Greco-Roman world.

Same as: ARCHLGY 327

CLASSICS 353. Archaeology: Post-Humanist Agendas. 3-5 Units.

How do people and their artifacts connect? Just what is the subject of archaeological history? A seminar reviewing the latest materialist approaches in archaeology and heritage studies.

Same as: ARCHLGY 353

CLASSICS 367. Mediterranean Networks. 3-5 Units.

The ancient Mediterranean was highly interconnected is common knowledge, and the idea of integration has become a defining factory in current approaches to Greco-Roman cultural identities. Yet how connectivity functioned, and how we should effectively analyze it, are less well understood. This seminar highlights emerging network approaches--both broad theoretical network paradigms and specific network science methodologies--as conceptual tools for archaeological and historical investigations of cultural interaction (economic, religious, artistic, colonial, etc.) across the Mediterranean world.

Same as: ARCHLGY 367

CLASSICS 373. Reception and Literacy in Roman Art. 5 Units.

(Formerly CLASSART 322.) Beyond a focus on artists and patrons: how Roman art was seen and understood by its contemporary viewers. Themes include memory, performance, gender, replication, and constructions of space. Goal is to draft a differentiated model of viewing and literacy, with attention to collective experience, hierarchy, access, and subversion.

Same as: ARTHIST 422

CLASSICS 376. Art, Ekphrasis, and Music in Byzantium and Islam. 5 Units.

Focus is on the interrelation of art, architecture, verbal description, poetry, and music, including the singing of psalms and recitation of the Qur'an.

How ekphrasis, the style of writing vividly intended to transform the listeners into spectators, structures the perception of and response to artistic production be it an art object, building, or a musical performance.

The role of ekphrasis in animating the inanimate and the importance of breath and spirit, which become manifest in visual, acoustic, olfactory, and gustatory terms. Religious and courtly settings: Hagia Sophia, the Great Palace of Constantinople, the Dome of the Rock, the palaces of Baghdad and Samarra, the mosque at Cordoba, Medinat al-Zahra and the Alhambra. Greek and Arabic writers on ekphrasis in translation, juxtaposing the medieval material to the ancient theories of ekphrasis and modern scholarship.

Same as: ARTHIST 405

CLASSICS 377. Animation, Performance, Presence in Medieval Art. 5 Units.

(Formerly CLASSART 311.) This course will explore concepts of animacy, performance, and presence in the art of Byzantium, focusing on the concept of image understood as the living bodies of the saints, the space of Hagia Sophia and its Eucharist ritual, the polymorphism of the mixed-media icon, and the interaction with these objects in prayer and recitation of epigrams.

Same as: ARTHIST 411

CLASSICS 381. Classical Seminar: Origins of Political Thought. 4-5 Units.

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, PHIL 176A, PHIL 276A, POLISCI 230A, POLISCI 330A

CLASSICS 382. High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests. 3-5 Units.

Normative political theory combined with positive political theory to better explain how major texts may have responded to and influenced changes in formal and informal institutions. Emphasis is on historical periods in which catastrophic institutional failure was a recent memory or a realistic possibility. Case studies include Greek city-states in the classical period and the northern Atlantic community of the 17th and 18th centuries including upheavals in England and the American Revolutionary era.

Same as: POLISCI 231

CLASSICS 384A. Ancient Greek Economic Development. 4-5 Units.

(Formerly CLASSHIS 330A.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: POLISCI 430A

CLASSICS 384B. Ancient Greek Economic Development. 1-5 Unit.

(Formerly CLASSHIS 330B.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: POLISCI 430B

CLASSICS 391. Early Empires: Han and Rome. 4-5 Units.

(Formerly CLASSHIS 344.) This course systematically compares the Han Empire and the Roman Empire in order to provide insight into the distinctive features of the empires as a political and social type. Topics examined will include geographic frames, the nature of the ruler, the role of the city, the form and function of military forces, religious aspects, legal codes, structures of kinship, and the relation of these states to the outside world.

CLASSICS 396. Humanities+Design: Visualizing the Grand Tour. 4-5 Units.

Study of the eighteenth-century Grand Tour of Italy through visualization tools of the digital age. Critical readings in both visual epistemology and current Grand Tour studies; interrogating the relationship between quantitative and qualitative approaches in digital humanities; what new insights in eighteenth-century British travel to Italy does data visualization offer us? Students will transform traditional texts and documents into digital datasets, developing individual data analysis projects using text mining, data capture and visualization techniques.

Same as: DLCL 396, HISTORY 336E

CLASSICS 399. Dissertation Research in Classics. 1-10 Unit.

(Formerly CLASSGEN 360.)

CLASSICS 801. TGR M.A. Project. 0 Units.

(Formerly CLASSGEN 801.)

CLASSICS 802. TGR Ph.D. Dissertation. 0 Units.

(Formerly CLASSGEN 802.)

Communication Courses

COMM 1A. Mass Media, Society, and Democracy. 4-5 Units.

(Graduate students register for COMM 211.) Open to non-majors. This course examines the role of the news media in contemporary society, with particular attention to cross-national variation in the relationships between journalists, politicians, and citizens. We further consider the potentially transforming effects of technology on the media-politics nexus.

Same as: COMM 211

COMM 1B. Media, Culture, and Society. 5 Units.

The institutions and practices of mass media, including television, film, radio, and digital media, and their role in shaping culture and social life. The media's shifting relationships to politics, commerce, and identity.

Same as: AMSTUD 1B

COMM 86SI. College Media Lab: digital and reporting skills for student journalists. 1-2 Unit.

Journalism, especially college journalism, is undergoing rapid change in the 21st century. As native digital users, we are uniquely positioned to create and innovate in the new media landscape. This class is designed to provide students with a hands-on education in digitally-fluent college media reporting. Topics include photo, video and data reporting, media rights and responsibilities, and communications careers outside of journalism. The 'basics' of writing, blogging, and reporting the news will be taught and applied throughout the quarter. Guest lectures from professional reporters, academics, and communications professionals. Work completed for this class can be submitted to The Stanford Daily for publication. Pizza provided.

COMM 100S. Self-Representation in Digital Media. 3 Units.

Digital media allows ordinary people to document, publicize and reinvent themselves in ways previously only available to the elite. In the first half of this course, we will examine how Westerners have represented themselves as individuals. We will focus on photography, as indicative of a shift in prevalence of self-representation to the masses. In the second half of the course, we will examine how the ways in which individuals are represented may affect their understanding of themselves. Students will experiment with self-representation in different media, including creating virtual representations (avatars) of themselves to be inhabited in immersive virtual reality in the Virtual Human Interaction Lab. In the process, they will learn how the shared digital world shadows, interprets and sometimes overwrites the physical world and day-to-day life.

COMM 101S. Growing up Digital: Technology's role in Cognitive and Social Development. 3 Units.

Interactive digital technology infiltrates homes, schools, and entertainment venues, changing how people think, and socialize. What is the impact of growing up with greater access? How might age influence its use? This course focuses on technology's role in cognitive and social development and how that impacts its design. Topics include brain development, social cognition, symbolic processing, media usage, and self-representation. Coursework includes interacting with digital technologies such as virtual reality and social networking websites and completing a design project.

COMM 102S. Political Communication and Social Media. 3 Units.

This course will explore how social media and mobile computing platforms affect the modern political landscape. Topics: how these technologies change the mix of news, information and campaign materials we get; structure our relationships with candidates and representatives; augment modern politicians' fundraising and campaign efforts; and make possible new forms of political organization and collective action. Possible case studies: the Obama campaign's successful use of social/mobile technology to campaign in 2008 and 2012; how constituents use social media to communicate with their representatives; and the role of social-mobile technologies in modern revolutionary movements.

COMM 103S. Media Entertainment. 3 Units.

The impact of media entertainment on individuals, social groups, and societies. Sources include a diverse cross-section of entertainment. Introduction to psychological and socio-psychological theories. Empirical findings relating to media entertainment as a stimulus and a reception phenomenon. What renders diverse genres of media content and format enjoyable? Why do individuals pursue entertainment experiences in ever-increasing numbers? What is the political impact of apolitical media entertainment?.

COMM 104W. Reporting, Writing, and Understanding the News. 5 Units.

Techniques of news reporting and writing. The value and role of news in democratic societies. Gateway class to journalism. Prerequisite for all COMM 177/277 classes. Limited enrollment. Preference to COMM majors.

COMM 105S. Media Power in American Culture. 3 Units.

An exploration of media power, focused on both digital and mass media. This course aims to interrogate what it means to claim that media are powerful, with an eye toward power dynamics in an era of Edward Snowden, National Security Agency surveillance of Americans, and constant online tracking by Internet companies. The objective of this course is to develop a framework and vocabulary for critically understanding media power and its role in setting the conditions of everyday life.

COMM 106. Communication Research Methods. 4-5 Units.

(Graduate students register for COMM 206.) Conceptual and practical concerns underlying commonly used quantitative approaches, including experimental, survey, content analysis, and field research in communication. Pre- or corequisite: STATS 60 or consent of instructor. Same as: COMM 206

COMM 106S. Communication Research Methods. 3-5 Units.

An introduction to social science research methods for those who have little or no prior experience in statistics. Designed to provide students with a critical framework and a set of tools to examine social problems - especially those related to the area of communication and the media. Students will be guided through the process of formulating real-world research questions, parsing them into analyzable statements, engaging in systematic data collection and analysis, and finally, thinking about value and limits of its outcome. Hands-on research experience provided.

COMM 107S. Engendering Compassion with Interactive Digital Media. 3 Units.

This course will draw on research regarding behavioral, cognitive, and physiological indicators and predictors of compassion, as well as computer-mediated communication, intimate and ubiquitous computing, social networking, and multitasking to better understand how interactive digital media affects compassionate behaviors, including altruism and helping. For their final project, students will either (1) propose an experiment for future research investigating compassion in HCI, or (2) propose a design change for an extant technology to engender compassionate responses.

COMM 108. Media Processes and Effects. 4-5 Units.

(Graduate students register for COMM 208.) The process of communication theory construction including a survey of social science paradigms and major theories of communication. Recommended: 1 or PSYCH 1. Same as: COMM 208

COMM 109S. Psychology of Technology & Human-Technology Interaction. 3 Units.

Products of design surround us, and shape our lives. This course will explore the human relationship with technology from a psychological point of view, and probe how technology can be designed to work in concert with those who use it. To survey this vast space, the course will cover seminal readings in the areas of human factors, human-computer interaction, product design, and psychology. The course will also delve into the area of design, with a collaborative final project integrating design and psychology.

COMM 111S. Creative Industries: The Business of Popular Culture. 3 Units.

Examines the processes, institutions and cultural forces that shape production in creative industries. Examines book publishing, journalism, music, video/film, and games. Explores how these industries are organized, how work is structured and how technology and social media affect the production, distribution and discovery of products (like books, songs and videos) and experiences (like concerts). Asks how user-created content, like fan fiction and youtube videos, affect existing media institutions, and asks how digital technologies change the way culture is made.

COMM 113. Computational Methods in the Civic Sphere. 4-5 Units.

The widespread availability of public data provides a rich opportunity for those who can efficiently filter, interpret, and visualize information. Course develops necessary technical skills for data collection, analysis, and publication, including data mining and web visualization, with a focus on civic affairs and government accountability. Open to all majors and a range of technical skill levels. Involves tackling new tools and technical concepts in the pursuit of engaging, public-facing projects. (Graduate students enroll in 213). Same as: COMM 213

COMM 115S. Fun & Games: Motivational Design of User Experiences. 3-5 Units.

Various interventions are employing virtual rewards, teams, and badges to incentivize real world behavior ranging from commercial purchases to reductions in home energy use. These are examples of motivational design, in which the engaging qualities common to games and other enjoyable activities are leveraged to drive particular behaviors. Using scientific research and industry examples we will examine the key processes and concepts that make up such designs. Along the way we will compare different theoretical approaches to motivation, consider the potential application of emerging technologies for new motivational designs, and discuss the ethics of designing for behavior change.

COMM 116. Journalism Law. 4-5 Units.

(Graduate students register for 216.) Laws and regulation impacting journalists. Topics include libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, and broadcast regulation. Prerequisite: Journalism M.A. student or advanced Communication major. Same as: COMM 216

COMM 117. Digital Journalism. 4-5 Units.

(Graduate students register for COMM 217.) Seminar and practicum. The implications of new media for journalists. Professional and social issues related to the web as a case of new media deployment, as a story, as a research and reporting tool, and as a publishing channel. Prerequisite: Journalism M.A. student or consent of instructor. Same as: COMM 217

COMM 120W. Digital Media in Society. 4-5 Units.

(Graduate students register for 220.) Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to Juniors and Seniors. Same as: AMSTUD 120, COMM 220

COMM 121S. The Human Relationship with Machines. 3 Units.

This course will survey ways in which people have thought about machines, in social and moral terms, from the late 18th century to the mid-20th century. Students will read mostly primary and secondary historical sources, originally published among industrial countries including France, Holland, England, Germany, and the United States, that illustrate major points of contention between actors brought into contact with one another through machine technologies. By the end of the course, students will have a greater understanding of the particular stances taken toward machines throughout modernity, how communication between people during this period has been shaped and occasioned by machines, the variety of forms taken by that communication, and what this history could mean for the role played by machines in our own lives. Topics include the censorship of Julien Offray de la Mettrie, automata and industrialization in 18th century England, the English and French Luddite movements, the literary dystopias of Samuel Butler and Charles Dickens, the American machine breakers movement, Taylorism and technocracy, and the post-war perspectives of Norbert Wiener and Martin Heidegger.

COMM 122. Content Analysis: Studying Communication Artifacts. 4-5 Units.

An empirical and systematic investigation of documented messages in print, graphical, and audio-visual forms and observed human communication behaviors. Focuses on the design and execution of content analytic studies, including manifest vs. latent content, measurement issues, reliability and validity assessment, computer text analysis, and traditional human-coder techniques. Prerequisite: junior, senior or grad standing; COMM 106/206 or an equivalent course in basic social science research. Limited enrollment. Same as: COMM 222

COMM 123. Argumentation and Persuasion. 4-5 Units.

We all know that appeals based on logic and sound evidence often fail where less rational appeals that "shouldn't" work, succeed. This course examines persuasion, the influencing of attitudes, beliefs or behavior, and locates within that broad subject argumentation, the process of reasoning methodically from evidence. Argumentation, the socially acceptable method of persuasion, typically confines itself to the rules of logic and has as its goal the recognition of states and causal relationships held by the arguer to objectively exist. Other methods of persuasion can succeed while flouting those rules, but only within limits, as the story of the Emperor's New Clothes reminds us. This course will explore whether those limits be accounted for by the capacity limitations and heuristics and biases of human information processing. Topics to be covered include evolutionary explanations; the central and peripheral routes to persuasion; source, channel and receiver factors; attitude-behavior consistency; the roles of involvement, elaboration, affect and social influence; critical thinking skills and logical fallacies. Limited enrollment; preference to juniors, seniors and graduate students, and within these, to Communication majors. Same as: COMM 223

COMM 125. Perspectives on American Journalism. 4-5 Units.

(Graduate students register for COMM 225.) An examination of the practice of American journalism, focusing on the political, social, cultural, economic and technological forces that have shaped the U. S. press since the early 1800s. Aimed at consumers as well as producers of news, the objective of this course is to provide a framework and vocabulary for judging the value and quality of everyday journalism.

Same as: COMM 225

COMM 130N. The idea of a free press. 3-4 Units.

Preference to freshmen. An examination of the meaning of freedom of the press, tied to but not bound by various Supreme Court rulings on the scope and purpose of the First Amendment's speech and press clauses. Discussions will include a look at the recent and rapid computerization of communication and what it portends for the future of a free press.

COMM 131. Media Ethics and Responsibility. 4-5 Units.

(Graduate students register for COMM 231.) The development of professionalism among American journalists, emphasizing the emergence of objectivity as a professional and the epistemological norm. An applied ethics course where questions of power, freedom, and truth autonomy are treated normatively so as to foster critical thinking about the origins and implications of commonly accepted standards of responsible journalism.

Same as: COMM 231

COMM 133. Need to Know: The Tension between a Free Press and National Security Decision Making. 4-5 Units.

This seminar will examine the dynamic interaction at the highest levels of government and the media when news coverage of secret national security policy and operations impinges on United States defense, diplomatic and intelligence activities and decision making. A prime example: the torrent of secret NSA programs disclosed by Edward Snowden in newspapers and other media. Students will explore attitudes, practices and actions by the media and the government through a series of case studies and simulations. Former editors, reporters and government officials will appear as guest speakers. The goal of the course is to inform students about the vital but often fraught relationship between a free press and the government in a democratic society, especially in the management of national security affairs. For advanced undergraduate and graduate students. Application for enrollment required. The instructor is a former Washington bureau chief of The New York Times. Please email Anne Stickells (annees7@stanford.edu) to request an application. Completed applications are due by 6pm on March 21, 2015. (Grad students register for COMM 233).

Same as: COMM 233

COMM 134. Public Participation and Public Policy. 4-5 Units.

Examines the role of public participation in public policy making. Around the world, policymakers seek to engage their publics. But, even though public participation is important, it is also problematic. Public meetings can become dysfunctional and turn into media spectacles instead of actually gathering the opinions of the public. The question becomes, when and how should the public be consulted in order to effectively impact public policies? There are consequences of engaging the public, and this seminar explores the methods used to engage publics around the world.

Same as: COMM 234

COMM 135. Deliberative Democracy and its Critics. 3-5 Units.

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. In spring quarter 2015, this course will have a special focus on deliberative democracy in the the Greater China region. The course will discuss whether a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age. What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Case studies from the Deliberative Polling method and other deliberation methods, its applications, defenders and critics, both normative and empirical, will provide a cases studies for discussion. Some course sessions will utilize the case method to examine public consultations, the media, and civil society. Throughout the course, students will address how public participation is currently conducted around the world. As we have all seen successful, but more likely unsuccessful attempts to consult the public and this course will examine the various ways of consulting the public and how governments, media, and the public have responded and used the results.

Same as: AMSTUD 135, COMM 235, COMM 335, POLISCI 234P, POLISCI 334P

COMM 137W. The Dialogue of Democracy. 4-5 Units.

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

Same as: AMSTUD 137, COMM 237, POLISCI 232T, POLISCI 332T

COMM 140. Digital Media Entrepreneurship. 3-5 Units.

(Graduate students register for COMM 240.) Primarily for graduate journalism and computer science students. Silicon Valley's new media culture, digital storytelling skills and techniques, web-based skills, and entrepreneurial ventures. Guest speakers. Prerequisite: Instructor consent/completed application. Application can be found at: <http://dme.stanford.edu>.

Same as: COMM 240

COMM 142W. Media Economics. 4-5 Units.

Uses economics to examine the generation and consumption of information in communication markets. Covers concepts that play a large role in information economics, including public goods, economies of scale, product differentiation, and externalities. Looks at individuals' information demands as consumers, producers, audience members, and voters. Topics include economics of Internet, sustainability of accountability journalism, and marketplace of ideas.

Same as: COMM 242

COMM 143W. Communication Policy and Regulation. 4-5 Units.

Focuses on the development, implementation, and evaluation of policies affecting communication markets. Policy issues include universal service, digital divide, Internet regulation, intellectual property, privacy, television violence, content diversity, media ownership, antitrust, and impact of news on government accountability. Examines political economy of communication policy and the evolution of policies across time.

Same as: COMM 243

COMM 147. Modern History and Future of Journalism. 4-5 Units.

(Graduate students register for COMM 247.) The birth and evolution of local and national television news. The modern history of newspapers. Can they survive in the era of online journalism?.

Same as: COMM 247

COMM 151. The First Amendment: Freedom of Speech and Press. 4-5 Units.

Introduction to the constitutional protections for freedom of speech, press, and expressive association. All the major Supreme Court cases dealing with issues such as incitement, libel, hate speech, obscenity, commercial speech, and campaign finance. There are no prerequisites, but a basic understanding of American government would be useful. In addition to a final and midterm exam, students participate in a moot court on a hypothetical case. (Grad students register for COMM 251).

Same as: COMM 251, POLISCI 125P

COMM 160. The Press and the Political Process. 4-5 Units.

(Graduate students register for COMM 260.) The role of mass media and other channels of communication in political and electoral processes.

Same as: COMM 260, POLISCI 323R

COMM 161. Research Seminar on Political Campaigns. 4 Units.

This seminar will provide students with the opportunity to design and implement a research project concerning the effects of campaigns on public opinion/voting preference. The first half of the course will expose students to principles of research design (including field experiments, surveys and content analysis) and major repositories of election and campaign data including the American National Election Studies, the Wisconsin Advertising Database, and other compilations of national and statewide polls. The second half of the course will cover recent scholarship into the effects of exposure to political campaigns on vote choice, turnout, polarization, and related outcomes. Prerequisite: COMM162/Polisci 120b.

COMM 162. Campaigns, Voting, Media, and Elections. 4-5 Units.

This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players -- candidates, parties, journalists, and voters -- in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as "laboratories" for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process.

Same as: COMM 262, POLISCI 120B

COMM 163. Running Time: Running and Winning Elections. 5 Units.

This course aims to teach you the nuts-n-bolts of political campaigning. How do campaign consultants organize a campaign, draft a strategy, come up with a theme, target voters, raise money, write and produce ads and get voters to the ballot? Drawing upon academic writings in the fields of political science and communication, articles by campaign consultants, TV ads, and documentaries, you will learn all about how elections are won and lost. You will master, and yet learn to be critical of, current electoral politics with their emphasis on money, polls, and sound bites. Finally, you will harness this new knowledge to do some good, by promoting a worthy cause.

Same as: POLISCI 229R

COMM 164. The Psychology of Communication About Politics in America. 4-5 Units.

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Same as: COMM 264, POLISCI 224L, PSYCH 170

COMM 166. Virtual People. 4-5 Units.

(Graduate students register for COMM 266.) The concept of virtual people or digital human representations; methods of constructing and using virtual people; methodological approaches to interactions with and among virtual people; and current applications. Viewpoints including popular culture, literature, film, engineering, behavioral science, computer science, and communication.

Same as: COMM 266

COMM 167. Advanced Seminar in Virtual Reality Research. 1-3 Unit.

Restricted to students with previous research experience in virtual reality. Experimental methods and other issues.

COMM 168. Experimental Research in Advanced User Interfaces. 1-5 Unit.

Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

Same as: COMM 268, COMM 368, ME 468

COMM 169. Computers and Interfaces. 4-5 Units.

(Graduate students register for COMM 269.) Interdisciplinary. Interdisciplinary. User responses to interfaces and design implications of those responses. Theories from different disciplines illustrate cognitive, emotional, and social responses to textual, voice-based, pictorial, metaphoric, conversational, adaptive, agent-based, intelligent, and anthropomorphic interfaces. Group design project applying theory to the design of an interactive interface.

Same as: COMM 269

COMM 171. Moving Pictures: How the Web, Mobile and Tablets are Revolutionizing Video Journalism. 3-5 Units.

(Graduate students register for 271.) Examine the emerging role of video journalism across web, tablet and mobile platforms. What are the specific needs of these platforms? How can new reporting tools be integrated to efficiently produce video news content? We'll examine case studies and hear from guest speakers about innovations in video journalism on these platforms. Students will produce video journalism pieces using mobile tools, optimized for viewing on mobile devices. Prerequisite: Journalism MA student or instructor's consent.

Same as: COMM 271

COMM 172. Media Psychology. 4-5 Units.

(Graduate students register for COMM 272.) The literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences among reading, watching, and listening.

Same as: COMM 272

COMM 176. Advanced Digital Media Production. 4-5 Units.

In-depth reporting and production using audio, images and video. Focus on an in-depth journalism project with appropriate uses of digital media: audio, photography, graphics, and video. Topics include advanced field techniques and approaches (audio, video, still) and emphasis on creating a non-fiction narrative arc in a multimedia piece of 10-12 minutes. Prerequisite: COMM 275 or consent of instructor.

Same as: COMM 276

COMM 177A. Computational Journalism. 4 Units.

Focuses on using data and algorithms to lower the cost of discovering stories or telling stories in more engaging and personalized ways. Project based assignments based on real-world challenges faced in newsrooms. Prior experience in journalism or computational thinking helpful.

Prerequisite: Comm 273D, COMM 113/213, or the consent of instructor.

Same as: COMM 277A

COMM 177C. Specialized Writing and Reporting: Environmental Journalism. 4-5 Units.

(Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu. Same as: COMM 277C, EARTHSYS 177C, EARTHSYS 277C, ENVRES 277C

COMM 177D. Specialized Writing and Reporting: Magazine Journalism. 4-5 Units.

(Graduate students register for COMM 277D.) How to report, write, edit, and read magazine articles, emphasizing long-form narrative. Tools and templates of story telling such as scenes, characters, dialogue, and narrative arc. How the best magazine stories defy or subvert conventional wisdom and bring fresh light to the human experience through reporting, writing, and moral passion. Prerequisite: 104 or consent of instructor. Same as: COMM 277D

COMM 177G. Specialized Writing and Reporting: Covering Silicon Valley. 4-5 Units.

(Graduate students register for COMM 277G.) Business reporting basics in the context of Silicon Valley's technology scene. Prerequisite: 104 or consent of instructor. Same as: COMM 277G

COMM 177I. Becoming a Watchdog: Investigative Reporting Techniques. 4-5 Units.

Graduate students register for COMM 277I.) Learn how to apply an investigative and data mindset to journalism, from understanding how to background an individual or entity using online databases to compiling or combining disparate sets of information in ways that unveil wrongdoing or mismanagement. Focuses on mining texts, tracking associations, and using visualizations. Stories produced apply investigative techniques to beat reporting, breaking news, and long form journalism. Prerequisite: COMM 104W, or consent of instructor. Same as: COMM 277I

COMM 177S. Specialized Writing and Reporting: Sports Journalism. 4-5 Units.

(Graduate students register for COMM 277S.) Workshop. An examination of American sports writing from the 1920's Golden Age of Sports to present. Students become practitioners of the sports writing craft in an intensive laboratory. Hones journalistic skills such as specialized reporting, interviewing, deadline writing, creation of video projects, and conceptualizing and developing stories for print and online. Prerequisite: 104 or consent of instructor. Same as: COMM 277S

COMM 177Y. Specialized Writing and Reporting: Foreign Correspondence in the Middle East and Asia. 4-5 Units.

(Graduate students register for COMM 277Y.) What's involved in working as a foreign correspondent in these important and volatile parts of the world, where in many cases journalists are not respected and may face danger -- taught by a journalist who has worked extensively in both regions. (no pre-requisites). Same as: COMM 277Y

COMM 182. Social Media Issues. 4-5 Units.

(Graduate students register for COMM 282.) Students will take away from this course a set of conceptual tools, a vocabulary, and an analytical framework with which to recognize, understand, and more effectively manage new social practices online, together with a familiarity with the literature regarding social media and identity, community, collective action, public sphere, social capital, networks, and social networks. Students will also develop skills at using online forums, blogs, microblogs, wikis for research, collaboration, and communication. Limited enrollment. Prerequisite: instructor consent. Please see <http://comm.stanford.edu/faculty-rheingold/> for application instructions. Contact instructor at: howard@rheingold.com. Same as: COMM 282

COMM 183. Social Media Literacies. 4-5 Units.

Today's personal, social, political, economic worlds are all affected by digital media and networked publics: viral videos, uprisings from Tahrir to #OWS, free search engines, abundant inaccuracy and sophisticated disinformation online, indelible, and searchable digital footprints, laptops in lecture halls and BlackBerries at the dinner table, 20-something social media billionaires, massive online university courses. Introduction to the literature about and direct experience of these new literacies: research foundations and practical methods to control attention, attitudes and tools necessary for critical consumption of information, best practices of individual digital participation and collective participatory culture, the use of collaborative media and methodologies, and the application of network know-how to life online. Contrasting perspectives through readings and classroom and online discussion. Students collaborate and cooperate in their learning during and between classes through small group discussions and face to face exercises, forums, blogs, mindmaps and wikis. Prerequisite: instructor consent. See <http://comm.stanford.edu/faculty-rheingold/> for application instructions; contact instructor at howard@rheingold.com. Same as: COMM 283

COMM 195. Honors Thesis. 5 Units.

Qualifies students to conduct communication research. Student must apply for department honors thesis program during Spring Quarter of junior year.

COMM 199. Individual Work. 1-5 Unit.

For students with high academic standing. May be repeated for credit.

COMM 206. Communication Research Methods. 4-5 Units.

(Graduate students register for COMM 206.) Conceptual and practical concerns underlying commonly used quantitative approaches, including experimental, survey, content analysis, and field research in communication. Pre- or corequisite: STATS 60 or consent of instructor. Same as: COMM 106

COMM 208. Media Processes and Effects. 4-5 Units.

(Graduate students register for COMM 208.) The process of communication theory construction including a survey of social science paradigms and major theories of communication. Recommended: 1 or PSYCH 1. Same as: COMM 108

COMM 211. Mass Media, Society, and Democracy. 4-5 Units.

(Graduate students register for COMM 211.) Open to non-majors. This course examines the role of the news media in contemporary society, with particular attention to cross-national variation in the relationships between journalists, politicians, and citizens. We further consider the potentially transforming effects of technology on the media-politics nexus. Same as: COMM 1A

COMM 212. Models of Democracy. 3-5 Units.

Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments.

Same as: COMM 312

COMM 213. Computational Methods in the Civic Sphere. 4-5 Units.

The widespread availability of public data provides a rich opportunity for those who can efficiently filter, interpret, and visualize information. Course develops necessary technical skills for data collection, analysis, and publication, including data mining and web visualization, with a focus on civic affairs and government accountability. Open to all majors and a range of technical skill levels. Involves tackling new tools and technical concepts in the pursuit of engaging, public-facing projects. (Graduate students enroll in 213).

Same as: COMM 113

COMM 216. Journalism Law. 4-5 Units.

(Graduate students register for 216.) Laws and regulation impacting journalists. Topics include libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, and broadcast regulation. Prerequisite: Journalism M.A. student or advanced Communication major.

Same as: COMM 116

COMM 217. Digital Journalism. 4-5 Units.

(Graduate students register for COMM 217.) Seminar and practicum. The implications of new media for journalists. Professional and social issues related to the web as a case of new media deployment, as a story, as a research and reporting tool, and as a publishing channel. Prerequisite: Journalism M.A. student or consent of instructor.

Same as: COMM 117

COMM 220. Digital Media in Society. 4-5 Units.

(Graduate students register for 220.) Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to Juniors and Seniors.

Same as: AMSTUD 120, COMM 120W

COMM 222. Content Analysis: Studying Communication Artifacts. 4-5 Units.

An empirical and systematic investigation of documented messages in print, graphical, and audio-visual forms and observed human communication behaviors. Focuses on the design and execution of content analytic studies, including manifest vs. latent content, measurement issues, reliability and validity assessment, computer text analysis, and traditional human-coder techniques. Prerequisite: junior, senior or grad standing; COMM 106/206 or an equivalent course in basic social science research. Limited enrollment.

Same as: COMM 122

COMM 223. Argumentation and Persuasion. 4-5 Units.

We all know that appeals based on logic and sound evidence often fail where less rational appeals that "shouldn't" work, succeed. This course examines persuasion, the influencing of attitudes, beliefs or behavior, and locates within that broad subject argumentation, the process of reasoning methodically from evidence. Argumentation, the socially acceptable method of persuasion, typically confines itself to the rules of logic and has as its goal the recognition of states and causal relationships held by the arguer to objectively exist. Other methods of persuasion can succeed while flouting those rules, but only within limits, as the story of the Emperor's New Clothes reminds us. This course will explore whether those limits be accounted for by the capacity limitations and heuristics and biases of human information processing. Topics to be covered include evolutionary explanations; the central and peripheral routes to persuasion; source, channel and receiver factors; attitude-behavior consistency; the roles of involvement, elaboration, affect and social influence; critical thinking skills and logical fallacies. Limited enrollment; preference to juniors, seniors and graduate students, and within these, to Communication majors.

Same as: COMM 123

COMM 225. Perspectives on American Journalism. 4-5 Units.

(Graduate students register for COMM 225.) An examination of the practice of American journalism, focusing on the political, social, cultural, economic and technological forces that have shaped the U. S. press since the early 1800s. Aimed at consumers as well as producers of news, the objective of this course is to provide a framework and vocabulary for judging the value and quality of everyday journalism.

Same as: COMM 125

COMM 231. Media Ethics and Responsibility. 4-5 Units.

(Graduate students register for COMM 231.) The development of professionalism among American journalists, emphasizing the emergence of objectivity as a professional and the epistemological norm. An applied ethics course where questions of power, freedom, and truth autonomy are treated normatively so as to foster critical thinking about the origins and implications of commonly accepted standards of responsible journalism.

Same as: COMM 131

COMM 233. Need to Know: The Tension between a Free Press and National Security Decision Making. 4-5 Units.

This seminar will examine the dynamic interaction at the highest levels of government and the media when news coverage of secret national security policy and operations impinges on United States defense, diplomatic and intelligence activities and decision making. A prime example: the torrent of secret NSA programs disclosed by Edward Snowden in newspapers and other media. Students will explore attitudes, practices and actions by the media and the government through a series of case studies and simulations. Former editors, reporters and government officials will appear as guest speakers. The goal of the course is to inform students about the vital but often fraught relationship between a free press and the government in a democratic society, especially in the management of national security affairs. For advanced undergraduate and graduate students. Application for enrollment required. The instructor is a former Washington bureau chief of The New York Times. Please email Anne Stickells (annees7@stanford.edu) to request an application. Completed applications are due by 6pm on March 21, 2015. (Grad students register for COMM 233).

Same as: COMM 133

COMM 234. Public Participation and Public Policy. 4-5 Units.

Examines the role of public participation in public policy making. Around the world, policymakers seek to engage their publics. But, even though public participation is important, it is also problematic. Public meetings can become dysfunctional and turn into media spectacles instead of actually gathering the opinions of the public. The question becomes, when and how should the public be consulted in order to effectively impact public policies? There are consequences of engaging the public, and this seminar explores the methods used to engage publics around the world.

Same as: COMM 134

COMM 235. Deliberative Democracy and its Critics. 3-5 Units.

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. In spring quarter 2015, this course will have a special focus on deliberative democracy in the Greater China region. The course will discuss whether a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age. What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Case studies from the Deliberative Polling method and other deliberation methods, its applications, defenders and critics, both normative and empirical, will provide a cases studies for discussion. Some course sessions will utilize the case method to examine public consultations, the media, and civil society. Throughout the course, students will address how public participation is currently conducted around the world. As we have all seen successful, but more likely unsuccessful attempts to consult the public and this course will examine the various ways of consulting the public and how governments, media, and the public have responded and used the results.

Same as: AMSTUD 135, COMM 135, COMM 335, POLISCI 234P, POLISCI 334P

COMM 237. The Dialogue of Democracy. 4-5 Units.

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized. Same as: AMSTUD 137, COMM 137W, POLISCI 232T, POLISCI 332T

COMM 240. Digital Media Entrepreneurship. 3-5 Units.

(Graduate students register for COMM 240.) Primarily for graduate journalism and computer science students. Silicon Valley's new media culture, digital storytelling skills and techniques, web-based skills, and entrepreneurial ventures. Guest speakers. Prerequisite: Instructor consent/completed application. Application can be found at: <http://dme.stanford.edu>. Same as: COMM 140

COMM 242. Media Economics. 4-5 Units.

Uses economics to examine the generation and consumption of information in communication markets. Covers concepts that play a large role in information economics, including public goods, economies of scale, product differentiation, and externalities. Looks at individuals' information demands as consumers, producers, audience members, and voters. Topics include economics of Internet, sustainability of accountability journalism, and marketplace of ideas. Same as: COMM 142W

COMM 243. Communication Policy and Regulation. 4-5 Units.

Focuses on the development, implementation, and evaluation of policies affecting communication markets. Policy issues include universal service, digital divide, Internet regulation, intellectual property, privacy, television violence, content diversity, media ownership, antitrust, and impact of news on government accountability. Examines political economy of communication policy and the evolution of policies across time. Same as: COMM 143W

COMM 247. Modern History and Future of Journalism. 4-5 Units.

(Graduate students register for COMM 247.) The birth and evolution of local and national television news. The modern history of newspapers. Can they survive in the era of online journalism?. Same as: COMM 147

COMM 251. The First Amendment: Freedom of Speech and Press. 4-5 Units.

Introduction to the constitutional protections for freedom of speech, press, and expressive association. All the major Supreme Court cases dealing with issues such as incitement, libel, hate speech, obscenity, commercial speech, and campaign finance. There are no prerequisites, but a basic understanding of American government would be useful. In addition to a final and midterm exam, students participate in a moot court on a hypothetical case. (Grad students register for COMM 251).

Same as: COMM 151, POLISCI 125P

COMM 260. The Press and the Political Process. 4-5 Units.

(Graduate students register for COMM 260.) The role of mass media and other channels of communication in political and electoral processes.

Same as: COMM 160, POLISCI 323R

COMM 262. Campaigns, Voting, Media, and Elections. 4-5 Units.

This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players -- candidates, parties, journalists, and voters -- in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as "laboratories" for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process.

Same as: COMM 162, POLISCI 120B

COMM 264. The Psychology of Communication About Politics in America. 4-5 Units.

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Same as: COMM 164, POLISCI 224L, PSYCH 170

COMM 266. Virtual People. 4-5 Units.

(Graduate students register for COMM 266.) The concept of virtual people or digital human representations; methods of constructing and using virtual people; methodological approaches to interactions with and among virtual people; and current applications. Viewpoints including popular culture, literature, film, engineering, behavioral science, computer science, and communication.

Same as: COMM 166

COMM 268. Experimental Research in Advanced User Interfaces. 1-5 Unit.

Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

Same as: COMM 168, COMM 368, ME 468

COMM 269. Computers and Interfaces. 4-5 Units.

(Graduate students register for COMM 269.) Interdisciplinary. Interdisciplinary. User responses to interfaces and design implications of those responses. Theories from different disciplines illustrate cognitive, emotional, and social responses to textual, voice-based, pictorial, metaphoric, conversational, adaptive, agent-based, intelligent, and anthropomorphic interfaces. Group design project applying theory to the design of an interactive interface.
Same as: COMM 169

COMM 271. Moving Pictures: How the Web, Mobile and Tablets are Revolutionizing Video Journalism. 3-5 Units.

(Graduate students register for 271.) Examine the emerging role of video journalism across web, tablet and mobile platforms. What are the specific needs of these platforms? How can new reporting tools be integrated to efficiently produce video news content? We'll examine case studies and hear from guest speakers about innovations in video journalism on these platforms. Students will produce video journalism pieces using mobile tools, optimized for viewing on mobile devices. Prerequisite: Journalism MA student or instructor's consent.
Same as: COMM 171

COMM 272. Media Psychology. 4-5 Units.

(Graduate students register for COMM 272.) The literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences among reading, watching, and listening.
Same as: COMM 172

COMM 273. Public Issues Reporting I. 3-4 Units.

Reporting and writing on government and public policies and issues; their implications for the people and the press. Required for journalism M.A. students.

COMM 273D. Public Affairs Data Journalism I. 4 Units.

Even before the ubiquity of Internet access and high-powered computers, public accountability reporting relied on the concerted collection of observations and analytical problem-solving. We study the methods, and the data, used to discover leads and conduct in-depth reporting on public affairs, including election finance and safety regulations. Students gain practical experience with the digital tools and techniques of computer-assisted reporting. Prerequisite: Journalism M.A. student.

COMM 274. Public Issues Reporting II. 3-4 Units.

Almost everything a journalist writes about involves government, either directly or indirectly. In this course we learn about the hidden forces that control government decisions: lobbying, campaign finance, budgets and more. Students write stories and do two accompanying multimedia pieces. Prerequisites: 273, Journalism M.A. student.

COMM 274D. Public Affairs Data Journalism II. 4 Units.

Learn how to find, create and analyze data to tell news stories with public service impact. Uses relational databases, advanced queries, basic statistics, and mapping to analyze data for storytelling. Assignments may include stories, blog posts, and data visualizations, with at least one in-depth project based on data analysis. Prerequisites: COMM 273D or Journalism M.A. student.

COMM 275. Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video. 3-4 Units.

Multimedia assignments coordinated with deadline reporting efforts in COMM 273 from traditional news beats using audio, still photography, and video. Use of digital audio recorders and audio production to leverage voice-over narration, interviews, and natural sound; use of digital still cameras and audio to produce audio slideshows; and the combination of these media with video in post-production with Final Cut Pro. Prerequisite: Journalism M.A. student. Corequisite: COMM 273.

COMM 276. Advanced Digital Media Production. 4-5 Units.

In-depth reporting and production using audio, images and video. Focus on an in-depth journalism project with appropriate uses of digital media: audio, photography, graphics, and video. Topics include advanced field techniques and approaches (audio, video, still) and emphasis on creating a non-fiction narrative arc in a multimedia piece of 10-12 minutes. Prerequisite: COMM 275 or consent of instructor.
Same as: COMM 176

COMM 277A. Computational Journalism. 4 Units.

Focuses on using data and algorithms to lower the cost of discovering stories or telling stories in more engaging and personalized ways. Project based assignments based on real-world challenges faced in newsrooms. Prior experience in journalism or computational thinking helpful. Prerequisite: Comm 273D, COMM 113/213, or the consent of instructor.
Same as: COMM 177A

COMM 277C. Specialized Writing and Reporting: Environmental Journalism. 4-5 Units.

(Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu. Same as: COMM 177C, EARTHSYS 177C, EARTHSYS 277C, ENVRES 277C

COMM 277D. Specialized Writing and Reporting: Magazine Journalism. 4-5 Units.

(Graduate students register for COMM 277D.) How to report, write, edit, and read magazine articles, emphasizing long-form narrative. Tools and templates of story telling such as scenes, characters, dialogue, and narrative arc. How the best magazine stories defy or subvert conventional wisdom and bring fresh light to the human experience through reporting, writing, and moral passion. Prerequisite: 104 or consent of instructor.
Same as: COMM 177D

COMM 277G. Specialized Writing and Reporting: Covering Silicon Valley. 4-5 Units.

(Graduate students register for COMM 277G.) Business reporting basics in the context of Silicon Valley's technology scene. Prerequisite: 104 or consent of instructor.
Same as: COMM 177G

COMM 277I. Becoming a Watchdog: Investigative Reporting Techniques. 4-5 Units.

Graduate students register for COMM 277I.) Learn how to apply an investigative and data mindset to journalism, from understanding how to background an individual or entity using online databases to compiling or combining disparate sets of information in ways that unveil wrongdoing or mismanagement. Focuses on mining texts, tracking associations, and using visualizations. Stories produced apply investigative techniques to beat reporting, breaking news, and long form journalism. Prerequisite: COMM 104W, or consent of instructor.
Same as: COMM 177I

COMM 277S. Specialized Writing and Reporting: Sports Journalism. 4-5 Units.

(Graduate students register for COMM 277S.) Workshop. An examination of American sports writing from the 1920's Golden Age of Sports to present. Students become practitioners of the sports writing craft in an intensive laboratory. Hones journalistic skills such as specialized reporting, interviewing, deadline writing, creation of video projects, and conceptualizing and developing stories for print and online. Prerequisite: 104 or consent of instructor.

Same as: COMM 177S

COMM 277Y. Specialized Writing and Reporting: Foreign Correspondence in the Middle East and Asia. 4-5 Units.

(Graduate students register for COMM 277Y.) What's involved in working as a foreign correspondent in these important and volatile parts of the world, where in many cases journalists are not respected and may face danger -- taught by a journalist who has worked extensively in both regions. (no prerequisites).

Same as: COMM 177Y

COMM 278. Journalism and Imaginative Writing in America. 5 Units.

Walt Whitman spent twenty-five years as a journalist before publishing his first book of poems. Mark Twain was a journalist for twenty years before publishing his first novel. Topics include examination of how writers' quest; backgrounds in journalism shaped the poetry or fiction for which they are best known; study of recent controversies surrounding writers who blurred the line between journalism and fiction. Writers include Whitman, Fanny Fern, Twain, Pauline Hopkins, Theodore Dreiser, Charlotte Perkins Gilman, Ernest Hemingway, Meridel LeSueur.

Same as: AMSTUD 257

COMM 279. News Reporting & Writing Fundamentals. 3-4 Units.

Learn beat reporting and writing skills including source development, interviewing, and story structure for news and features. Emphasis on developing news judgment, clear writing skills, and an ability to execute stories on deadline. Exercises and assignments mimic a newsroom. Students pursue local beats with a focus on public issues and complement written pieces with relevant data analyses and multimedia components. Prerequisite: Journalism M.A. student. Corequisite: COMM 275.

COMM 282. Social Media Issues. 4-5 Units.

(Graduate students register for COMM 282.) Students will take away from this course a set of conceptual tools, a vocabulary, and an analytical framework with which to recognize, understand, and more effectively manage new social practices online, together with a familiarity with the literature regarding social media and identity, community, collective action, public sphere, social capital, networks, and social networks. Students will also develop skills at using online forums, blogs, microblogs, wikis for research, collaboration, and communication. Limited enrollment. Prerequisite: instructor consent. Please see <http://comm.stanford.edu/faculty-rheingold/> for application instructions. Contact instructor at: howard@rheingold.com.

Same as: COMM 182

COMM 283. Social Media Literacies. 4-5 Units.

Today's personal, social, political, economic worlds are all affected by digital media and networked publics: viral videos, uprisings from Tahrir to #OWS, free search engines, abundant inaccuracy and sophisticated disinformation online, indelible, and searchable digital footprints, laptops in lecture halls and BlackBerries at the dinner table, 20-something social media billionaires, massive online university courses. Introduction to the literature about and direct experience of these new literacies: research foundations and practical methods to control attention, attitudes and tools necessary for critical consumption of information, best practices of individual digital participation and collective participatory culture, the use of collaborative media and methodologies, and the application of network know-how to life online. Contrasting perspectives through readings and classroom and online discussion. Students collaborate and cooperate in their learning during and between classes through small group discussions and face to face exercises, forums, blogs, mindmaps and wikis. Prerequisite: instructor consent. See <http://comm.stanford.edu/faculty-rheingold/> for application instructions; contact instructor at howard@rheingold.com.

Same as: COMM 183

COMM 289. Journalism Master's Project. 4 Units.

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COMM 289C. Projects for Publication. 2 Units.

In-depth journalism projects are not products of happenstance. They require thorough planning and coordination at every stage of the process -- from refinement of ideas, to the creation of "back-out" schedules and precise outlines, to strategies for pitching the story and its author to skeptical editors. In this course, students will workshop and pitch MA journalism projects for placement and publication. Required for MA Journalism students; registration Comm 289 required.

COMM 289P. Journalism Thesis. 4 Units.

MA thesis course. Focuses on development of in-depth journalism project, culminating in work of publishable quality.

COMM 290. Media Studies M.A. Project. 1-2 Unit.

Individual research for coterminial Media Studies students.

COMM 291. Graduate Journalism Seminar. 1 Unit.

Required of students in the graduate program in Journalism. Forum for current issues in the practice and performance of the press. The seminar frequently features Bay Area Journalists as guest speakers. May be repeated for credit.

COMM 299. Individual Work. 1-4 Unit.

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COMM 301. Communication Research, Curriculum Development and Pedagogy. 1 Unit.

Designed to prepare students for teaching and research in the Department of Communication. Students will be trained in developing curriculum and in pedagogical practices, and will also be exposed to the research programs of various faculty members in the department. Required of all Ph.D. students.

COMM 307. Summer Institute in Political Psychology. 3 Units.

Lectures, discussion groups, and workshops addressing many applications of psychology to the analysis of political behavior. Public opinion, international relations, political decision-making, attitudes and beliefs, prejudice, social influence and persuasion, terrorism, news media influence, foreign policy, socialization, social justice.

COMM 308. Graduate Seminar in Political Psychology. 1-3 Unit.

For students interested in research in political science, psychology, or communication. Methodological techniques for studying political attitudes and behaviors. May be repeated for credit.

Same as: POLISCI 324

COMM 310. Method of Analysis Program in the Social Sciences. 1 Unit.

Colloquium series. Creation and application of new methodological techniques for social science research. Presentations on methodologies of use for social scientists across departments at Stanford by guest speakers from Stanford and elsewhere. See <http://mapss.stanford.edu>. Same as: ANTHRO 446A

COMM 311. Theory of Communication. 1-5 Unit.

Basic communication theory for first-year Ph.D. students in the Department of Communication. Introduction to basic writings and concepts in communication research. The goal is an introduction to issues in the field that are common in communication research. First half of the class will emphasize classic literature about field organization, history and theory. Second half will emphasize contemporary theory in areas that students select.

COMM 312. Models of Democracy. 3-5 Units.

Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments.

Same as: COMM 212

COMM 314. Qualitative Social Science Research Methods. 1-5 Unit.

Part of the doctoral research methods sequence. Focus is on the logic of qualitative research methods and modes of inquiry relevant to the study of communication and meaning. Prerequisite: Communication Ph.D. student, or consent of instructor.

COMM 317. The Philosophy of Social Science. 1-5 Unit.

Approaches to social science research and their theoretical presuppositions. Readings from the philosophy of the social sciences. Research design, the role of experiments, and quantitative and qualitative research. Cases from communication and related social sciences. Prerequisite: consent of instructor.

COMM 318. Quantitative Social Science Research Methods. 1-5 Unit.

An introduction to a broad range of social science research methods that are widely used in PhD work. Prerequisite: consent of instructor.

COMM 320G. Advanced Topics in New Media and American Culture. 1-5 Unit.

This course deals with advanced issues in computing and American cultural history since World War II. Primarily for Ph.D. students. Prerequisite: 220 or consent of instructor.

COMM 325G. Comparative Studies of News and Journalism. 1-5 Unit.

Focus is on topics such as the roles and responsibilities of journalists, news as a genre of popular literature, the nexus between press and state, and journalism's commitment to political participation.

COMM 326. Advanced Topics in Human Virtual Representation. 1-5 Unit.

Topics include the theoretical construct of person identity, the evolution of that construct given the advent of virtual environments, and methodological approaches to understanding virtual human representation. Prerequisite: PhD student or consent of instructor.

COMM 331G. Communication and Media Ethics. 1-5 Unit.

Limited to Ph.D. students. Advanced topics in press ethics and responsibility. Prerequisite: 231 or consent of instructor.

COMM 335. Deliberative Democracy and its Critics. 3-5 Units.

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. In spring quarter 2015, this course will have a special focus on deliberative democracy in the the Greater China region. The course will discuss whether a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age. What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Case studies from the Deliberative Polling method and other deliberation methods, its applications, defenders and critics, both normative and empirical, will provide a cases studies for discussion. Some course sessions will utilize the case method to examine public consultations, the media, and civil society. Throughout the course, students will address how public participation is currently conducted around the world. As we have all seen successful, but more likely unsuccessful attempts to consult the public and this course will examine the various ways of consulting the public and how governments, media, and the public have responded and used the results.

Same as: AMSTUD 135, COMM 135, COMM 235, POLISCI 234P, POLISCI 334P

COMM 339. Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives. 4 Units.

The social and psychological processes involved in asking and answering questions via questionnaires for the social sciences; optimizing questionnaire design; open versus closed questions; rating versus ranking; rating scale length and point labeling; acquiescence response bias; don't-know response options; response choice order effects; question order effects; social desirability response bias; attitude and behavior recall; and introspective accounts of the causes of thoughts and actions.

Same as: POLISCI 421K, PSYCH 231

COMM 360G. Political Communication. 1-5 Unit.

An overview of research in political communication with particular reference to work on the impact of the mass media on public opinion and voting behavior. Limited to Ph.D. students. Prerequisite: 260 or consent of instructor.

Same as: POLISCI 425

COMM 361. Regulation of the Political Process. 3-5 Units.

Combined with LAW 577. This course is intended to give students a basic understanding of the themes in the legal regulation of elections and politics. We will cover all the major Supreme Court cases on topics of voting rights, reapportionment/redistricting, ballot access, regulation of political parties, campaign finance, and the 2000 presidential election controversy. The course pays particular attention to competing political philosophies and empirical assumptions that underlie the Court's reasoning while still focusing on the cases as litigation tools used to serve political ends. Elements used in grading: Class participation and one day take home final exam. (POLISCI 327C; LAW 577).

Same as: POLISCI 327C

COMM 362. Topics in Political Communication: Media Bias, Selective Exposure, and Political Polarization. 1-5 Unit.

This course surveys theories of media bias, biased processing of information, and the empirical challenges facing researchers attempting to link changes in the composition of audiences to attitudinal and behavioral outcomes. (Limited to PhD students).

Same as: POLISCI 425S

COMM 368. Experimental Research in Advanced User Interfaces. 1-5 Unit.

Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

Same as: COMM 168, COMM 268, ME 468

COMM 372G. Seminar in Psychological Processing. 1-5 Unit.

Limited to Ph.D. students. Advanced topics. Prerequisite: 272 or consent of instructor.

COMM 379. History of the Study of Communication. 1-5 Unit.

The origins of communication/media theory and research emphasizing the rise of communication as a separate field of study. The influence of schools of thought concerning the scope and purpose of the study of communication. Readings include foundational essays and studies. Prerequisite: Ph.D. student or consent of instructor.

COMM 380. Curriculum Practical Training. 1-5 Unit.

Practical experience in the communication industries. Prerequisite: consent of instructor. Meets requirements for Curricular Practical Training for students on F-1 visas. (Staff).

COMM 384. Media Technology Theory. 3-5 Units.

This course surveys major theoretical approaches to the study of media technologies, including Frankfurt School critical theory, media archaeology, actor network theory, science and technology studies, platform studies and theories of critical making. By the end of the course, students should have a rich familiarity with the literature in this area, as well as with exemplary empirical studies conducted within each tradition. Preference to Ph.D. students in Communication and Art and Art History. Consent of instructor required for non-PhD students.

Same as: ARTHIST 465

COMM 397. Minor Research Project. 1-6 Unit.

Individual research for Ph.D. candidates. Course may be repeated for credit.

COMM 398. Major Research Project. 1-6 Unit.

Individual research for Ph.D. candidates.

COMM 399. Advanced Individual Work. 1-9 Unit.

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COMM 801. TGR Project. 0 Units.

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COMM 802. TGR Dissertation. 0 Units.

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Comparative Literature Courses

COMPLIT 10N. Shakespeare and Performance in a Global Context. 3 Units.

Preference to freshmen. The problem of performance including the performance of gender through the plays of Shakespeare. In-class performances by students of scenes from plays. The history of theatrical performance. Sources include filmed versions of plays, and readings on the history of gender, gender performance, and transvestite theater.

COMPLIT 10SC. The Cult of Happiness: Pursuing the Good Life in America and China. 2 Units.

The 2006 film *Pursuit of Happyness*, an unabashed celebration of the American Dream, was enthusiastically embraced by Chinese audiences. It seems that the pursuit of happiness has become truly globalized, even as the American Dream is slipping away for many. Are Americans still convinced that their conception of happiness is a self-evident truth and a universal gospel? Is there anything that Americans might learn about what it means to live a good life from not only the distant past, but also cultures in which happiness is conceptualized and sought after very differently? This course takes a multi-disciplinary approach to the question of happiness and invites undergraduate students to reflect on its relationship to virtue, wisdom, health, love, prosperity, justice, and solidarity. Giving equal weight to Chinese and Western sources, it seeks to defamiliarize some of the most deeply held ideas and values in American society through the lens of cross-cultural inquiry. During the summer, students will read a selection of novels, memoirs, and reflections by philosophers, psychologists, and sociologists. In September, we will review these texts and place them alongside movies, short fiction, news stories, and social commentary while we interrogate the chimera of happiness. In addition to daily seminars, we will experiment with meditation, short-form life writing, and service learning with participation of local elders. Furthermore, there will be at least three guest speakers, including a prominent Confucian philosopher and a Stanford alum now running a happiness-related enterprise. nSophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

Same as: CHINGEN 10SC

COMPLIT 11Q. Shakespeare, Playing, Gender. 3 Units.

Preference to sophomores. Focus is on several of the best and lesser known plays of Shakespeare, on theatrical and other kinds of playing, and on ambiguities of both gender and playing gender.

COMPLIT 11SC. Worlds (No Longer) Apart. 2 Units.

What (if anything) do supermall shoppers in the Philippines, a Filipino taxi driver in Paris, and television viewers in Nepal have to do with a legal case in Canada, two young Japanese on a pilgrimage to Graceland, and a South Asian lawyer/liquor store owner trying to reclaim his property in Uganda from where he lives, in Mississippi? This course uses literary narratives, films, and historical research to examine new textures of contemporary life, where "borders" seem hard-pressed to contain culture. Texts include Pico Iyer, *Video Night in Kathmandu*, Mira Nair's film *Mississippi Masala*, and M.G. Vassanji, *No New Land*. New forms of identity have emerged that reflect the cultural changes that have accompanied such movements. Nevertheless, we will not idealize such phenomena either; we will want also to carefully observe the binding power of nations. The result will be a finer-tuned sense of "globalization" and the "local" and the "global." The course emphasizes creative thinking and discussion. Students are expected to do the reading and be well prepared for every session with not only questions, but tentative answers. Each student will participate in one group presentation as their final project.

COMPLIT 13SC. Arabic in America: Language Immersion. 2 Units.

Do you speak Arabic at home? Are you studying Arabic at Stanford? Have you done a year of Arabic study elsewhere? If you answer yes to any one of these questions then "Arabic in America: Language Immersion" might be for you. Our intensive course is designed to improve your command of Arabic while living in an active community of Arabic speakers and learners. We will be talking about films, poetry, politics, religion, gender and much more—all the while practicing how to talk to people, read newspapers, recite poetry, write emails, all with the goal of communicating better in Arabic. Your three teachers will share their knowledge and love of Arabic literature, culture, and grammar with you while we engage with all kinds of Arabic, from the Quran and Pre-Islamic poetry to the colloquial Arabic spoken at barbecues (we will be grilling!). We will also be inviting guest speakers and taking class field trips to the Ba'th Party archives in the Hoover Library, mosques and churches in the Bay Area, Middle Eastern restaurants, and more. Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

COMPLIT 31SI. What is Neoconservatism? The Movement's History and Ideas. 2 Units.

Its thinking from its communist roots, through the changes of the 60s, the rise of conservatism in the 80s, and the invasion of Iraq. Readings include Irving Kristol, Jeane Kirkpatrick, Daniel P. Moynihan, and David Brooks. Guest lecturers from supporters and critics.

COMPLIT 37Q. Zionism and the Novel. 4 Units.

At the end of the nineteenth century, Zionism emerged as a political movement to establish a national homeland for the Jews, eventually leading to the establishment of the State of Israel in 1948. This seminar uses novels to explore the changes in Zionism, the roots of the conflict in the Middle East, and the potentials for the future. We will take a close look at novels by Israelis, both Jewish and Arab, in order to understand multiple perspectives, and we will also consider works by authors from the North America and from Europe.

Same as: JEWISHST 37Q

COMPLIT 38Q. Ethics of Jihad. 4 Units.

Why choose jihad? An introduction to Islamic ethics. Focus on ways in which people have chosen, rejected, or redefined jihad. Topics include jihad in the age of 1001 Nights, feminist jihad, jihad in Africa, al-Qaida and Hamas, and the hashtag #MyJihad. All readings and discussion in English.

COMPLIT 40Q. Aesthetics of Dissent: the Case of Islamic Iran. 2 Units.

Censorship, Borges tells us, is the mother of metaphors. The Islamic regime in Iran censors all aesthetic production in the country. But Iranian dissident artists, from film-makers and fiction writers to composers in a thriving under-ground musical scene, have cleverly found ways to fight these draconian measures. They have developed an impressive body of work that is as sophisticated in style as it is rich in its discourse of democracy and dissent. The purpose of the seminar is to understand the aesthetic tropes of dissent in Iran, and the social and theological roots of rules of censorship. Masterpieces of post-revolutionary film, fiction, and music will be discussed in the context of tumultuous history of dissent in Islamic Iran. Same as: INTNLREL 71Q

COMPLIT 41N. Borderlands of Literature and Culture. 3-4 Units.

Rather than try to examine the whole of such an extensive body of work by artists of Mexican descent living in Mexico and the United States, the focus will be on the transnational themes of border thinking, memory, and identity (both personal and collective). Looking at the foundational poetry, auto-ethnographies, and narratives by Américo Paredes and Gloria Anzaldúa and how their literary and ethnographic work laid the groundwork for subsequent imaginings in the narratives, poetry, and theory of border thinking and writing. We will explore the trans-frontier cultural conditions under which imaginative literary texts are produced, disseminated, and received. We will consider not only the historical transnational experiences that inform these borderlands texts but the potential futures of Mexico and the United States they imagine.

COMPLIT 41Q. Ethnicity and Literature. 5 Units.

Preference to sophomores. What is meant by ethnic literature? How is ethnic writing different from non-ethnic writing, or is there such a thing as either? How does ethnicity as an analytic perspective affect the way literature is read by ethnic peoples? Articles and works of fiction; films on ethnic literature and cultural politics. How ethnic literature represents the nexus of social, historical, political, and personal issues.

COMPLIT 51Q. Comparative Fictions of Ethnicity. 4 Units.

We may "know" "who" we "are," but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of "the Self"? After all, don't we tell stories in response to the question, "who are you"? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue ("who am I") become skewed differently when we add a qualifier before it, like "ethnic"?.

Same as: AMSTUD 51Q, CSRE 51Q

COMPLIT 57. Human Rights and World Literature. 5 Units.

Human rights may be universal, but each appeal comes from a specific location with its own historical, social, and cultural context. This summer we will turn to literary narratives and films from a wide number of global locations to help us understand human rights; each story taps into fundamental beliefs about justice and ethics, from an eminently human and personal point of view. What does it mean not to have access to water, education, free speech, for example? This course has two components. The first will be a set of readings on the history and ethos of modern human rights. These readings will come from philosophy, history, political theory. The second, and major component is comprised of novels and films that come from different locations in the world, each telling a compelling story. We will come away from this class with a good introduction to human rights history and philosophy and a set of insights into a variety of imaginative perspectives on human rights issues from different global locations. Readings include: Amnesty International, *Freedom: Stories Celebrating the Universal Declaration of Human Rights* Andrew Clapman, *Human Rights: A Very Short Introduction* James Dawes, *That the World May Know* Walter Echo-Hawk, *In the Light of Justice* Amitav Ghosh, *The Hungry Tiden* Bessie Head, *Marun* Ursula LeGuin, *The Word for World is Forest*.

COMPLIT 70N. Animal Planet and the Romance of the Species. 3-4 Units.

Preference to freshmen. This course considers a variety of animal characters in Chinese and Western literatures as potent symbols of cultural values and dynamic sites of ethical reasoning. What does pervasive animal imagery tell us about how we relate to the world and our neighbors? How do animals define the frontiers of humanity and mediate notions of civilization and culture? How do culture, institutions, and political economy shape concepts of human rights and animal welfare? And, above all, what does it mean to be human in the pluralistic and planetary 21st century?.

Same as: CHINGEN 70N

COMPLIT 101. What is Comparative Literature?. 5 Units.

Introduction to theories about reading and theories about thinking. How should we best read novels, plays, short stories, poetry, and a variety of other forms of literary expression? Why compare texts to other texts? What is theory and how does it work? What has literature done and what should it do? Authors will include G.W.F. Hegel, Judith Butler, Jonathan Culler, Arabic Adab, and Gustave Flaubert. Fulfills the Writing in the Major requirement. Gateway to the Comparative Literature Major.

COMPLIT 110. Introduction to Comparative Queer Literary Studies. 3-5 Units.

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 310, FEMGEN 110X, FEMGEN 310X

COMPLIT 111. German Capstone: Reading Franz Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. (Meets Writing-in-the-Major requirement).

Same as: COMPLIT 311C, GERMAN 190, GERMAN 390, JEWISHST 147, JEWISHST 349

COMPLIT 112. Oscar Wilde and the French Decadents. 3-5 Units.

Close reading of Oscar Wilde's work together with major texts and authors of 19th-century French Decadence, including Symbolism, l'art pour l'art, and early Modernism. Points of contact between Wilde and avant-garde Paris salons; provocative, creative intersections between (homo)erotic and aesthetic styles, transgression; literary and cultural developments from Baudelaire to Mallarmé; Huysmans, Flaubert, Rachilde, Lorrain, and Proust compared with Wilde; Salomé; Picture of Dorian Gray, and critical writings; relevant historical and philosophical contexts. All readings in English; all student levels welcome.

Same as: COMPLIT 312, FRENCH 112, FRENCH 312

COMPLIT 114. Masterpieces: Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. Same as: GERMAN 150, JEWISHST 145

COMPLIT 115. Nabokov in the Transnational Context. 3-5 Units.

Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel "The Gift," "Lolita" (the novel and screenplay), and "Pale Fire." Readings in English. Russian speakers will be encouraged to read Russian texts in original.

Same as: COMPLIT 315, SLAVIC 156, SLAVIC 356

COMPLIT 121. Poems, Poetry, Worlds. 5 Units.

What is poetry? How does it speak in many voices to questions of history, society, and personal experience? Why does it matter? The reading and interpretation of poetry in crosscultural comparison as experience, invention, form, sound, knowledge, and part of the world. Readings include: classical Chinese poetry, English Romantic poetry, and modern Arabic, American, Brazilian, Japanese, German, Spanish poetry, with specific attention to landscape, terrain, the environment, and the role of the poet.

COMPLIT 122. Literature as Performance: The Potentials of Theater. 5 Units.

An introduction to the "theatrical" dimensions of literature in different cultures based on a view of the staging arts as a specific segment within phenomena of "performance". Documentation and discussions of the history of western drama as a central axis within the debate about the cultural status of other forms of performance art that are normally not culturally canonized within this genre (eg. sports).

COMPLIT 123. The Novel, the Global South. 5 Units.

Literary inventiveness and social significance of novelistic forms from the Great Depression to the present.

Same as: ENGLISH 184

COMPLIT 125. Past Desire Made Present: The Traditions of Erotic Poetry in Medieval Iran and Europe. 3-5 Units.

Aims to make present and accessible, to our early 21st-century experience, convergences and differences between medieval Persian and medieval European love poetry. Poetry will be dealt with as a discursive and institutional means through which it is possible to make present and tangible that which is absent -- both in space and time. If we accept that medieval Persian and European love poetry conjured up moods of homo- and heteroerotic desire for contemporary audiences, then this desire can also become present for us today through a close reading of those same texts.

COMPLIT 125A. The Gothic Novel. 5 Units.

The Gothic novel and its relatives from its invention by Walpole in *The Castle of Otranto* of 1764. Readings include: *Northanger Abbey*, *The Italian*, *The Monk*, *Frankenstein*, *Jane Eyre*, *Great Expectations*, and *Dracula*. What defines the Gothic as it evolves from one specific novel to a mode that makes its way into a range of fictional types?.

COMPLIT 129A. Contemporary Persian Poetry: Encounter of a Thousand-Year-Old Classical Tradition with Modernity. 5 Units.

The primacy of poetic expression in Persian culture in the transition from tradition to modernity. Major 20th-century poets in relation to historical events and social change. Authors include: Nima Yushij, Ahmad Shamlou, Sohrab Sepehri, Mehdi Akhavan Sales, Forough Farokhzad, Nader Naderpour, Fereydoon Moshiri, Esma'il Kho'i, and Afghan and Tajik poets.

COMPLIT 132A. Dynasties, Dictators and Democrats: History and Politics in Germany. 3-5 Units.

Key moments in German history through documents: personal accounts, political speeches and texts, and literary works. The course begins with the Prussian monarchy and proceeds to the crisis years of the French Revolution. Documents from the 1848 revolution and the age of Bismarck and German unification follow. World War I and its impact on Germany, including the rise of Hitler, as well as the aftermath, divided Germany in the Cold War through the fall of the Berlin Wall. Taught in German.

Same as: GERMAN 132

COMPLIT 133. Gender and Modernism. 3-5 Units.

Gender and sexuality in trans-Atlantic modernist literature and culture from the 1880s-1930s. Topics include the 19th-century culture wars and the figures of the dandy and the New Woman; modernist critiques of Enlightenment rationality; impact of World War I on gender roles; gender and the rise of modern consumer culture, fashion, design; the modernist metropolis and gender/sexuality; the avant-garde and gender; literary first-wave feminism; homoerotic modernism; modernism in the context of current theories of gender and sexuality.

Same as: COMPLIT 333

COMPLIT 135. Chinese Cultural Revolution: Performance, Politics, and Aesthetics. 4 Units.

Events, arts, films, and operas of the Chinese Cultural Revolution. Analysis of political passion, aesthetics, and psychology of mass movements. Places the Cultural Revolution in the long-range context of art, social movements, and politics. Chinese language is not required.

Same as: CHINLIT 190, CHINLIT 290

COMPLIT 141A. The Meaning of Arabic Literature: a seminar investigation into the nebulous concept of adab. 3-5 Units.

An investigation into the concept of literature in mediaeval Arabic. Was there a mediaeval Arabic way of thinking? We look to develop a translation for the word "adab," a concept that dominated mediaeval Arabic intellectual culture, and is related in some ways to what we mean today when we use the word literature. Our core text is a literary anthology from the 900s in Iraq and we try, together, to work out what literature meant for the author and his contemporaries. Readings, assignments and, class discussion all in English.

COMPLIT 142. The Literature of the Americas. 5 Units.

A wide-ranging overview of the literatures of the Americas in comparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes--the Harlem Renaissance, the Beats, magic realism, Noigandres--in unaccustomed conversation with each other. Same as: AMSTUD 142, CSRE 142, ENGLISH 172E

COMPLIT 142B. Translating Japan, Translating the West. 3-4 Units.

Translation lies at the heart of all intercultural exchange. This course introduces students to the specific ways in which translation has shaped the image of Japan in the West, the image of the West in Japan, and Japan's self-image in the modern period. What texts and concepts were translated by each side, how, and to what effect? No prior knowledge of Japanese language necessary. Same as: JAPANGEN 121, JAPANGEN 221

COMPLIT 143A. Alla Turca Love: Tales of Romance in Turkish Literature. 3-5 Units.

An introduction to the theme of romantic love in Turkish literature, with particular attention to key classical and contemporary works that influenced the development of the Turkish literary tradition. Topics include close reading and discussion of folk tales, poems, short stories, and plays with particular attention to the characters of lover/beloved, the theme of romantic love, and the cultural and historical background of these elements. We will begin with essential examples of ghazels from Ottoman court poetry to explore the notion of "courtly love" and move to the most influential texts of 19th and 20th centuries. All readings and discussions will be in English; all student levels welcome. Same as: COMPLIT 342

COMPLIT 144A. Istanbul the Muse: The City in Literature and Film. 3-5 Units.

The multiple layers of culture and history in Istanbul, a city on two continents between East and West, wrapped in past and present have inspired great art and literature. The class explores how Istanbul inspired artists and writers, and focuses on the idea of "in-betweenness" through art, literature, music, and film seen chronologically. In addition to discussing literary, historical, and secondary texts we will explore visual genres such as film, painting, and photography. All readings, screenings, and discussions will be in English.

COMPLIT 145. Reflection on the Other: The Jew and the Arab in Literature. 3-5 Units.

How literary works outside the realm of Western culture struggle with questions such as identity, minority, and the issue of the Other. How the Arab is viewed in Hebrew literature, film and music and how the Jew is viewed in Palestinian works in Hebrew or Arabic (in translation to English). Historical, political, and sociological forces that have contributed to the shaping of these writers' views. Guest lectures about the Jew in Palestinian literature and music. Same as: AMELANG 126, JEWISHST 106

COMPLIT 145B. Africa in Atlantic Writing. 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Adichie, Condeacut;, Olinto), prose poetry (Ceacut;saire, Neto, Walcott), theoretical reflection (Fanon, Glissant), reportage (Gide, Gourevitch), ethnography (Leiris, Oulougum) and autobiography (Barack Obama).

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B, FRENCH 345B

COMPLIT 146. Asian American Culture and Community. 3-5 Units.

This course introduces students to the histories of Asians in America, specifically as these histories are part of a broader Asia-US-Pacific history that characterized the 20th century and now the 21st. We will combine readings in history, literature, sociology, with community-based learning. The course takes place over two quarters. The first quarter focuses on gaining knowledge of Asian America and discussion key topics that students wish to focus on collaboratively. During this first quarter we also learn about community-based learning, set up teams and projects, and develop relationships with community organizations. The second quarter students work with student liaisons (senior students who have experience in service learning) and complete their work with the community; there are no formal class meetings this second quarter. Service Learning Course (certified by Haas Center). Course can be repeated once. Same as: AMSTUD 146, ASNAMST 146S, CSRE 146S

COMPLIT 146A. The Arab Spring in Arabic Literature. 3-5 Units.

An examination of the events of 2011 in the Middle East through literature. We will read short stories, poetry, graphic novels, and blogs in order to try and work out whether the revolution could have been predicted, and how it took place. Prerequisite: two years of Arabic at Stanford, or equivalent. Same as: COMPLIT 347

COMPLIT 147A. The Hebrew Bible in Literature. 3-5 Units.

Close reading of major biblical stories and poems that influenced modern literature written in English and Hebrew. Hebrew texts will be read in translation to English. Each class will include a section from the Hebrew Bible as well as a modern text or film based on the biblical story/poem. Discussion of questions such as: the meaning and function of myths and the influence of the Hebrew Bible on the development of literary styles and genres. Same as: COMPLIT 347A, JEWISHST 147A, JEWISHST 347A

COMPLIT 148B. Indian Epics: Past and Present. 4 Units.

The Mahabharata and the Ramayana, the two great epics of India, have been crucial texts in South Asian literature and culture for millennia. In this course, we will explore the diverse forms and impacts of both epics from their Sanskrit versions, first composed more than 2,000 years ago, into retellings through newer media forms well into the twenty-first century. We begin with abridged translations of both the Mahabharata (including the Bhagavadgita) and the Ramayana. We will discuss the major literary, religious, and social themes of each text as well as subsequent retellings in Sanskrit and vernacular languages. Throughout the course we will also investigate the modern lives of the Indian epics, including their transformations into Indian television serials, film versions of both narratives (from India and America), and invocations of the epic stories in contemporary political disputes. In addition to gaining exposure to some of the foundational texts for the study of South Asia, students will cultivate the ability to fruitfully analyze texts and stories from different cultures. Same as: RELIGST 108

COMPLIT 149A. Classical Arabic Poetry: An Introduction. 3-5 Units.

The primary litmus test of proficiency in the Arabic language is, and has always been, a command of classical Arabic poetry. Study and memorize the great lines of Arabic poetry with a manual that has stood the pedagogical test of time from the eleventh century until today. Questions of literary merit, poetic technique, metaphor, and divine and human linguistic innovation are all raised by the text that we will read together. Readings in Arabic, assignments and discussion in English. Prerequisite: two years of Arabic at Stanford, or equivalent.

Same as: COMPLIT 346

COMPLIT 151A. Philosophies, Literatures, and Alternatives. 3-5 Units.

Aristotelian poetics and mediaeval Arabic literary theory. Nietzsche's irony and Philosophies and literatures, together and apart, dominate the last two millennia of human thought. How might they best be read? Are philosophy and literature two different ways of thinking, or are they just two separate institutional histories? This course starts with familiar Greeks, moves onto unfamiliar Arabs, confronts old Europe, and ends with contemporary Americans arguing.

Same as: COMPLIT 351A

COMPLIT 151B. Great Books: Dramatic Traditions. 4 Units.

The most influential and enduring texts in the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons.

Same as: COMPLIT 351B, TAPS 151T, TAPS 351

COMPLIT 154A. Film & Philosophy. 4 Units.

Issues of freedom, morality, faith, knowledge, personal identity, and the value of truth explored through film; philosophical investigation of the filmic medium itself. Screenings to include *Twelve Monkeys* (Gilliam), *Ordet* (Dreyer), *The Dark Knight* (Nolan), *Vicky Cristina Barcelona* (Allen), and *Eternal Sunshine of the Spotless Mind* (Kaufman). Taught in English.

Same as: FRENCH 154, ITALIAN 154, PHIL 193C, PHIL 293C

COMPLIT 154B. Poetic Thinking Across Media. 4 Units.

Even before Novalis claimed that the world must be romanticized, thinkers, writers, and artists wanted to perceive the human and natural world poetically. The pre- and post-romantic poetic modes of thinking they created are the subject of this course. Readings include Ecclesiastes, Zhaozhou Congshen, Montaigne, Nietzsche, Kafka, Benjamin, Arendt, and Sontag. This course will also present poetic thinking in the visual arts--from the expressionism of Ingmar Bergman to the neo-romanticism of Gerhard Richter.

Same as: COMPLIT 354B, GERMAN 154, GERMAN 354, JEWISHST 144B

COMPLIT 157. Contemporary Turkish Cinema and Society. 3-5 Units.

This course is an examination of contemporary Turkish cinema in a social and political context. The course will focus on films and directors that revived Turkish cinema starting with the mid-1990s with a focus on key issues pertaining to belonging, denied identities, masculinity, nationalism, silencing of women, and urbanization. The course aims to provide an overview of contemporary Turkish cinema and society in cultural, political, and social framework. There will be approximately two hours of film screening and two hours of classroom discussion/seminar (in English) each week. All films are in Turkish with English subtitles.

Same as: COMPLIT 357

COMPLIT 160. The Literature of Dehumanization. 3-5 Units.

An examination of a constellation in Western literature that specifically deals with a borderline state between humanity and animality, showing different approaches to the problem of humanity and non-humanity through some of the major works in the modern Western literary canon. The class explores the different ways in which dehumanization takes place in these texts, and how these texts also suggest a regaining of one's lost humanity. Readings include: Ovid, Marie de France, Shakespeare, Hobbes, Heine, Baudelaire, Tolstoy, Nietzsche, Lautreamont, Kafka, Rilke, Celan, and more.

COMPLIT 161. Co-Existence in Hebrew Literature. 4-5 Units.

Is co-existence possible? Does pluralism require co-existence? Can texts serve as forms of co-existence? The class will focus on these and other questions related to coexistence and literature. Through reading works mostly by Jewish authors writing in Europe, Israel and the US we will explore attempts for complete equality, for a variety of hierarchical systems and for different kinds of co-dependence. Guest speaker: professor Anat Weisman, Ben Gurion University of the Negev.

Same as: AMELANG 175, JEWISHST 146

COMPLIT 162. American Poetry and Secular Prayer. 3-5 Units.

This course will explore the practice of "secular prayer" in early- and mid-20th Century North American poetry. We will look at diverse poetic examples of meditation, contemplation, exegesis and revelation in order to consider how and why poetry has maintained a particular relation to the sacred, even amidst a secular cultural and intellectual context. We'll also consider how this question has played out in several key strands of 20th century literary theory, with particular emphasis on New Criticism and Eco-Criticism. Primary readings will include the poetry of T.S. Eliot, Wallace Stevens, Audre Lorde, George Oppen, Robert Bly, Mary Oliver, Charles Wright and Jan Zwicky.

COMPLIT 168. Imagining the Oceans. 5 Units.

How has Western culture constructed the world's oceans since the beginning of global ocean exploration? How have imaginative visions of the ocean been shaped by marine science, technology, exploration, commerce and leisure? Authors read might include Cook, Equiano, and Steinbeck; Defoe, Verne, Stevenson, Conrad, Woolf and Hemingway; Coleridge, Baudelaire, Moore, Bishop and Walcott. Films by Painleveacute; and Bigelow. Seminar co-ordinated with a spring 2015 Cantor Arts Center public exhibition. Visits to Cantor; other possible field trips include Hopkins Marine Station and SF Maritime Historical Park.

Same as: ENGLISH 168, FRENCH 168

COMPLIT 171. Ethics of Jihad. 5 Units.

Why choose jihad? An introduction to Islamic ethics. Focus on ways in which people have chosen, rejected, or redefined jihad. Evaluation of the norms in moments of ethical and political choice. Topics include jihad in the age of 1001 Nights, jihad in the Arab Renaissance, jihad in Bin Laden's sermons, and the hashtag #MyJihad. All readings and discussion in English.

Same as: ETHICSOC 102R

COMPLIT 181. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English.

Same as: CLASSICS 42, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

COMPLIT 190. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought. 3-5 Units.

Anna Karenina, the novel as a case study in the contest between "modernity" and "tradition," their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a "philosophical" prism and vice versa (30% each); class discussion and Forum (10%).

Same as: COMPLIT 390, SLAVIC 190, SLAVIC 390

COMPLIT 194. Independent Research. 1-5 Unit.

(Staff).

COMPLIT 197. Designing a Digital Community: Human Rights. 2 Units.

This course will focus on helping to design, conceptualize, and populate an international human rights website. No knowledge of web design or of human rights is necessary to get started on this project. We have technical assistance available, though hopefully this course will attract students with those skills as well. Similarly, we will be learning about human rights as we build the site, explore and share resources and ideas, and reflect on the content. Preliminary site viewable at teachinghumanrights.org.

Same as: DLCL 197

COMPLIT 199. Senior Seminar: The Pleasures of Reading. 5 Units.

Senior seminar for Comp Lit Senior majors only.

COMPLIT 203. The Money Philosophers: Marx, Simmel, Keynes, Hayek. 3-5 Units.

In this course we will discuss selections from writings by Marx, Simmel, Keynes, and Hayek that focuses on money, a key but neglected aspect of their work. It is money that drives today's economies, rather than "business", the "market", "capital", or the "state". It is this exclusive concern with monetary phenomena that uniquely defines these authors and characterizes their work as philosophical rather than economic, sociological or anthropological.

COMPLIT 211A. Emile Zola. 3-5 Units.

A comprehensive introduction to and historical analysis of Emile Zola's literary work as foundational for the late-nineteenth century literary movement that we call "Naturalism." The analysis of Zola's novels will be embedded in the historical situation of France in the transition from the Second Empire to the Third Republic, with special emphasis on the epistemological situation of that time. Knowledge of French desirable but participation through English translations will be possible.

Same as: FRENCH 211

COMPLIT 213A. Martin Heidegger. 3-5 Units.

Working through the most systematically important texts by Martin Heidegger and their historical moments and challenges, starting with *Being and Time* (1927), but emphasizing his philosophical production after World War II. The philological and historical understanding of the texts function as a condition for the laying open of their systematic provocations within our own (early 21st-century) situations. Satisfies the capstone seminar requirement for the major tracks in Philosophy and Literature. Taught in English.

Same as: COMPLIT 313A, GERMAN 282, GERMAN 382

COMPLIT 217. The Poetry of Friedrich Holderlin. 3-5 Units.

A working through of the complex prosodic forms, existential and political concerns, and poetological reflections of both the most past-oriented and most pathbreaking German poet of the late eighteenth and early nineteenth century. A comprehensive introduction that will attempt to develop an innovative view in which Holderlin will appear as one of the founding figures of literary Modernity. Knowledge of German desirable but participation through English translations will be possible.

Same as: GERMAN 217

COMPLIT 218. The work of Luis Martín Santos in Mid-Twentieth Century Spain. 3-5 Units.

First published in 1962, "Tiempo de Silencio" is the only book that the young psychiatrist Luis Martín Santos finished during his lifetime, and, although largely overlooked (even in Spain) until the present day, one of the great European novels of the 20th century. It brings to a complex convergence the evocation of Spain's decadent and run-down post-Civil War society with high-modernist literary procedures and (an implicit parody of) phenomenological analysis.

COMPLIT 219. Dostoevsky: Narrative Performance and Literary Theory. 3-5 Units.

In-depth engagement with a range of Dostoevsky's genres: early works (epistolary novella *Poor Folk* and experimental *Double*), major novels (*Crime and Punishment*, *The Idiot*), less-read shorter works ("A Faint Heart," "Bobok," and "The Meek One"), and genre-bending *House of the Dead* and *Diary of a Writer*. Course applies recent theory of autobiography, performance, repetition and narrative gaps, to Dostoevsky's transformations of genre, philosophical and dramatic discourse, and narrative performance. Slavic students read primary texts in Russian, other participants in translation. Course conducted in English. For graduate students; undergraduates with advanced linguistic and critical competence may enroll with consent of instructor.

Same as: SLAVIC 251

COMPLIT 221A. Courtly Love: Deceit and Desire in the Middle Ages. 3-5 Units.

A comparative seminar on medieval love books and their reception. We will examine and question the notion of "amour courtois," which arose in the lyrics and romances of medieval France and was codified in Romantic-era criticism. Primary readings will be enriched by thinking about this notion through the lens of modern theories of desire, such as those of Girard, Lacan, and Žižek. Conducted in English with readings in translation.

Same as: FRENCH 234, ITALIAN 234

COMPLIT 222A. German Literature 3: Myth and Modernity. 5-8 Units.

Masters of German 20th- and 21st-Century literature and philosophy as they present aesthetic innovation and confront the challenges of modern technology, social alienation, manmade catastrophes, and imagine the future. Readings include Nietzsche, Freud, Rilke, Musil, Brecht, Kafka, Doebelin, Benjamin, Juenger, Arendt, Musil, Mann, Adorno, Celan, Grass, Bachmann, Bernhardt, Wolf, and Kluge. Taught in English. Undergraduates enroll in 222 for 5 units, graduate students enroll in 322 for 8 units.

Same as: GERMAN 222, GERMAN 322

COMPLIT 223. Literature and Human Experimentation. 3-5 Units.

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann* and Vivien Spitz's *Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care.

Same as: AFRICAAM 223, CSRE 123B, HUMBIO 175H, MED 220

COMPLIT 224. Literature in the Age of Digital Culture. 3-5 Units.

Study literary classics about readers and reading (by Austen, Dickinson, Wilde, Benjamin, Eliot, Orwell, Borges, Calvino, Bechdel, etc.) and compare with digital reading/writing today: fan fiction and online expansions of "the book", literary collaborations online, changing notions of "author", "reader", "work", literary-social interactions. Our literary close readings will also introduce some useful new digital tools and methods for literary studies (annotation, editing, and research tools, web-based public social interactions, innovative digital humanities projects in literary studies today). No technical prerequisites.

COMPLIT 224A. Genocide and The Humanities. 3-5 Units.

We will study the history and current instances of genocide and ways in which the humanities deal with these. Mass slaughter would seem to be opposed by the supposedly humane nature of the humanities. Yet each realm of the humanities has its own constraints. We will study historiography, memoirs, novels, and films in order to recognize ideologies of representation and signifying implications of structure. By discerning implicit values, students will gain tools they can use in working to eliminate genocide.

COMPLIT 225E. Petrarch & Petrarchism: Fragments of the Self. 3-5 Units.

In this course we will examine Francis Petrarch's book of Italian lyric poems, *Rerum vulgarium fragmenta*, and its reception in early modern France, England, and Spain. Readings from Petrarch's epistolary and ethical writings will contextualize historically and intellectually the aesthetics and ethics of the fragment in his poetry. With this foundation, we will investigate the long-lasting impact of Petrarch's work on Renaissance poetry and humanism, with attention to both the literary and the material aspects of its reception. Taught in English.

Same as: COMPLIT 325E, ITALIAN 225, ITALIAN 325

COMPLIT 226A. Queer Literature and Film. 3-5 Units.

Close analysis of major works of LGBTQ literature, film, and visual art from the 1890s to today. Students will gain deeper knowledge and appreciation of historical and contemporary forms of queer representation in various national literatures, film, and visual art; understand relevant social and political debates; and gain a basic knowledge of feminist and queer theory. Course will include an optional online component to reach out to the public (class website queerlitfilm.wordpress.com, social media).

Same as: FEMGEN 226A

COMPLIT 227A. The Ballad Tradition. 3-5 Units.

This team-taught cross-disciplinary course traces the history and aesthetics of the ballad in German, English, and Scottish literature, from the 18th century to the early 20th century. No knowledge of German is required, but reading knowledge is a plus.

Same as: ENGLISH 383A, GERMAN 200

COMPLIT 228D. Introduction to Digital Humanities: Concepts, Technologies, Tools. 1-3 Unit.

In this course, we will explore the perspectives of scholars who have thought about what "digital humanities" means and the technologies and tools that are shaping new kinds of research, scholarship, and publishing. Topics will include history of the digital humanities, textual studies, electronic literature, computational and new media, and emerging work around text, image, and new media curation and visualization. This seminar is ideal for anyone interested in digital methods and digital in the humanities, teaching with new digital methods, or to learn about all the digital humanities projects at Stanford. This course is organized as a mix of seminar and workshop and will be featuring a new platform called "Lacuna Stories," designed for Stanford students, that presents multiple platforms, media, and texts to digitally engage with narratives surrounding 9/11; active engagement by all participants is expected. Students may contribute to the field with a creative final project that they develop over the course of the quarter if they select the 3-unit option.

Same as: COMPLIT 338D, DLCL 228

COMPLIT 229. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer.

Same as: AFRICAAM 229, AFRICAST 229, CSRE 129B, FRENCH 229, HUMBIO 175L, MED 234

COMPLIT 230A. The Novel in Europe: The Age of Compromise, 1800-1848. 5 Units.

The novel after the French revolution and the industrial take-off. Novelistic form and historical processes: nation-building and the marriage market, political conservatism and the advent of fashion, aristocracy and bourgeoisie and proletariat... focusing on how stylistic choices and plot structures offer imaginary resolutions to social and ideological conflicts. Authors will include Austen, Scott, Shelley, Stendhal, Puskin, Balzac, Bronte.

COMPLIT 233. Baroque and Neobaroque. 5 Units.

The literary, cultural, and political implications of the 17th-century phenomenon formed in response to the conditions of the 16th century including humanism, absolutism, and early capitalism, and dispersed through Europe, the Americas, and Asia. If the Baroque is a universal code of this period, how do its vehicles, such as tragic drama, Ciceronian prose, and metaphysical poetry, converse with one another? The neobaroque as a complex reaction to the remains of the baroque in Latin American cultures, with attention to the mode in recent Brazilian literary theory and Mexican poetry.

Same as: SPANLIT 293E

COMPLIT 236. Literature and Transgression. 3-5 Units.

Close reading and analysis of erotic-sexual and aesthetic-stylistic transgression in selected works by such authors as Baudelaire, Wilde, Flaubert, Rachilde, Schnitzler, Kafka, Joyce, Barnes, Eliot, Bataille, Burroughs, Thomas Mann, Kathy Acker, as well as in recent digital literature and online communities. Along with understanding the changing cultural, social, and political contexts of what constitutes "transgression" or censorship, students will gain knowledge of influential theories of transgression and conceptual limits by Foucault, Blanchot, and contemporary queer and feminist writers.

Same as: FEMGEN 236

COMPLIT 237C. Human Rights, Literature, Justice. 3-5 Units.

This course will have three components. The first will be a set of readings on the history and ethos of modern human rights. These readings will come from philosophy, history, political theory. The second component will consist of readings from various global locations that involve human rights in various ways, predominantly as they interface with issues of environmental justice. Finally, this course will involve students in creating and populating a website that will be not only the archive of our work in class but also build a set of resources to be shared with others (we will be adding partners from different locations to speak to us online from their locations as well as to share resources and ideas). We will come away from this class with a good introduction to human rights history and philosophy; a set of insights into a variety of imaginative workings-out of human rights and environmental justice issues from different global locations, and a rich web resource.

COMPLIT 239B. Literature and Social Online Learning. 3-5 Units.

Study, develop, and test new digital methods, games, apps, interactive social media uses to innovate how the humanities can engage and educate students and the public today. Exploring well-known literary texts, digital storytelling forms and literary communities online, students work individually and in interdisciplinary teams to develop innovative projects aimed at bringing literature to life. Tasks include literary role-plays on Twitter; researching existing digital pedagogy and literary projects, games, and apps; reading and coding challenges; collaborative social events mediated by new technology. Minimal prerequisites which vary for students in CS and the humanities; please check with instructors. Same as: CS 27, ENGLISH 239B

COMPLIT 240A. Introduction to Hebrew Literature. 3-5 Units.

The influence of biblical poetry, piyut, and medieval Hebrew poetry on the development of Modern Hebrew poetry. With focus on voice, space, lyrical Subjectivity, Intertextuality, and Poetic Forms. Guest Speakers include Tamar Zwi, Susan Einbinder, Berry Saharoff, and Raymond Scheindlin.

COMPLIT 242A. Short Stories from South Asia. 3-5 Units.

This course will explore how cultural identities of the nations in South Asia were re-defined after the Partition of India in 1947, the independence of Sri Lanka in 1948 and the formation of Bangladesh in 1971. Comparative/cross-cultural study of stories will be taken up for indepth analysis based on certain themes like partition and violence, myth and narrative, gender and narrative, music and narratology, familial patterns, etc.

COMPLIT 243B. Readings in Avicenna and al-Jurjani. 3-5 Units.

Classical Arabic reading course. Instructor approval required. Pre-requisite: minimum two years of Arabic at Stanford or equivalent.

COMPLIT 245. Introductory Ottoman Turkish. 1-3 Unit.

This course is an introduction to basic orthographic conventions and grammatical characteristics of Ottoman Turkish through readings in printed material from the 19th and 20th centuries. Selected readings will range from poetry to prose, from state documents, newspaper and journal articles to reference works. Course is open to both undergraduate and graduate students. Prior knowledge of modern Turkish is required (Completion of COMPLIT 248A, COMPLIT 248B Reading Turkish I&II and COMPLIT 248C Advanced Turkish OR AMELANG 184 & 185 First & Second Year Turkish OR a solid knowledge of Turkish grammar.) Please contact the instructor for more information.

COMPLIT 246B. Ottoman Translation Workshop. 1-2 Unit.

This course aims to provide students with training in reading printed Ottoman Turkish texts and translating them into English. Through translation we will explore not only syntactical and lexical problems, but also cultural history and politics as they relate to the texts. Open to undergraduate and graduate students. High intermediate or advanced level of modern Turkish and introductory level of Ottoman Turkish is required. Contact Burcu Karahan Richardson (bkarahan@stanford.edu) for more information.

COMPLIT 247. Bollywood and Beyond: An Introduction to Indian Film. 3-4 Units.

A broad engagement with Indian cinema: its relationship with Indian politics, history, and economics; its key thematic concerns and forms; and its adaptation of and response to global cinematic themes, genres, and audiences. Locating the films within key critical and theoretical debates and scholarship on Indian and world cinemas. Goal is to open up what is often seen as a dauntingly complex region, especially for those who are interested in but unfamiliar with its histories and cultural forms.

Same as: FILMSTUD 250B, GLOBAL 250

COMPLIT 247F. Beyond Casablanca: North African Cinema and Literature. 3-5 Units.

This course explores the emergence of Francophone cinema and literature from North Africa (Algeria, Tunisia, Morocco) in the post-independence era: aesthetics, exile, language message, race and gender relations, collective memory, parallax, nationalism, laïcité, religion, emigration and immigration, and the Arab Spring will be covered. Special attention will be given to judeo-maghrebi history, and to the notions of francophone / maghrebi / "beur" / diasporic cinema and literature. Readings from Frantz Fanon, Albert Memmi, Kateb Yacine, Albert Camus, Colette Fellous, Abdelkebir Khatibi, Leila Sebbar, Benjamin Stora, Lucette Valensi, Abdelwahab Meddeb. Movies include Viva Laldjeacutie;rie, Tenja, Le Chant des Marieacutie;es, Francedil;aise, Bled Number One, Omar Gatlato, Casanegra, La Saison des Hommes. Taught in French. Films in French and Arabic with English subtitles.

Same as: FRENCH 242, JEWISHST 242

COMPLIT 248A. Reading Turkish I. 2-4 Units.

Reading Turkish I is an introduction to the structures of the Turkish language necessary for reading. It is designed to develop reading competence in Turkish for graduate students. Undergraduates should consult the instructor before enrolling for the course. Essential grammar, syntax points, vocabulary, and reading skills will be emphasized. This is not a traditional language course that takes an integrated four-skill approach; since the goal is advanced reading level, the focus is mainly on grammar, reading comprehension, and translation. With full concentration on reading, we will be able to cover advanced material in a short amount of time. The course is conducted in English, but students will be exposed to the sounds of Turkish, and will have the opportunity to practice pronunciation in class. nnCOMPLIT 248A Reading Turkish I is followed by COMPLIT 248B Reading Turkish II in the Winter and COMPLIT 248C Advanced Turkish for Research in the Spring."

COMPLIT 248B. Reading Turkish II. 2-4 Units.

This course is the continuation of COMPLIT 248A Reading Turkish I, which served as an introduction to the structures of the Turkish language necessary for reading. It is designed to develop reading competence in Turkish for graduate students. Undergraduates should consult the instructor before enrolling for the course. Essential grammar, syntax points, vocabulary, and reading skills will be emphasized. This is not a traditional language course that takes an integrated four-skill approach; it focuses only on reading, and as a result we will be able to cover advanced material in a short amount of time. This course is conducted in English, but students will be exposed to the sounds of Turkish, and will have the opportunity to practice pronunciation in class.nnCOMPLIT 248B is followed by COMPLIT 248C Advanced Turkish for Research in the Spring.

COMPLIT 248C. Advanced Turkish-English Translation. 2-4 Units.

This course is the continuation of COMPLIT 248A Reading Turkish I and COMPLIT 248B Reading Turkish II. Refining advanced grammar, reading, and translation skills in modern Turkish through intensive reading and translation from a variety of source texts. Emphasis on Turkish cultural, historical, literary, and political texts depending on students' academic interests. Prerequisites COMPLIT 248A & B or prior knowledge of Turkish and consultation with the instructor is necessary.

COMPLIT 249A. The Iranian Cinema: Image and Meaning. 1-3 Unit.

This course will focus on the analysis of ten Iranian films with the view of conducting a discourse on the semiotics of Iranian art and culture. Each session will be designated to the viewing of a film by a prominent Iranian film-maker. Students are expected to prepare for class by having previously examined other available films by the film-maker under consideration. Same as: GLOBAL 249A

COMPLIT 249B. Iranian Cinema in Diaspora. 1-3 Unit.

Despite enormous obstacles, immigrant Iranian Filmmakers, within a few decades (after the Iranian revolution), have created a slow but steady stream of films outside Iran. They were originally started by individual spontaneous attempts from different corners of the world and by now we can identify common lines of interest amongst them. There are also major differences between them. These films have never been allowed to be screened inside Iran, and without any support from the global system of production and distribution, as independent and individual attempts, they have enjoyed little attention. Despite all this, Iranian cinema in exile is in no sense any less important than Iranian cinema inside Iran. In this course we will view one such film, made outside Iran, in each class meeting and expect to reach a common consensus in identifying the general patterns within these works and this movement. Questions such as the ones listed below will be addressed in our meetings each week: What changes in aesthetics and point of view of the filmmaker are caused by the change in his or her work environment? Though unwantedly these films are made outside Iran, how related are they to the known (recognized) cinema within Iran? And in fact, to what extent do these films express things that are left unsaid by the cinema within Iran?

Same as: GLOBAL 249B

COMPLIT 249C. Contemporary Iranian Theater. 1-3 Unit.

Today Iranian plays - both in traditional and contemporary styles - are staged in theater festivals throughout the world play their role in forming a universal language of theater which combine the heritages from countries in all five continents. Despite many obstacles, some Iranian plays have been translated into English and some prominent Iranian figures are successful stage directors outside Iran. Forty-six years ago when "Theater in Iran" (a monograph on the history of Iranian plays) by Bahram Beyzaie was first published, it put the then contemporary Iranian theater movement--which was altogether westernizing itself blindly - face to face with a new kind of self-awareness. Hence in today's generation of playwrights and stage directors in Iran, all know something of their theatrical heritage. In this course we will spend some class sessions on the history of theater in Iran and some class meetings will be concentrating on contemporary movements and present day playwrights. Given the dearth of visual documents, an attempt will be made to present a picture of Iranian theater to the student. Students are expected to read the recommended available translated plays of the contemporary Iranian playwrights and participate in classroom discussions.

Same as: GLOBAL 249C

COMPLIT 250. Literature, History and Memory. 3-5 Units.

Analysis of literary works as historical narratives. Focus on the relationship history, fiction, and memory as reflected in Francophone literary texts that envision new ways of reconstructing or representing ancient or immediate past. Among questions to be raised: individual memory and collective history, master narratives and alternatives histories, the role of reconstructing history in the shaping or consolidating national or gender identities. Readings include fiction by Glissant, Kane, Condeacutec;, Schwarz-Bart, Djébar, Perec, as well as theoretical texts by Ricoeur, de Certeau, Nora, Halbwachs, White, Echevarria. Taught in French. Same as: FRENCH 248

COMPLIT 252A. Classic Arabic Poetry. 3-5 Units.

Introduction to the canon of Classical Arabic Poetry and to the classics of Arabic poetry from the sixth to the twenty-first century. Focus on skills needed to read and understand, from syntax and morphology to dictionaries, encyclopedias, memorization, and the internet. Readings in Arabic. Two years of Arabic at Stanford or equivalent required. Counts for the Arabic Track in the MELLAC Minor.

COMPLIT 252B. Classic Arabic Prose. 3-5 Units.

Introduction to Classical Arabic Prose and to the classics of Arabic prose; from the 700s and the dawn of Islam to the 2010s and the Arab Spring. Focus on skills needed to read and understand, from syntax and morphology to dictionaries, encyclopedias, memorization, and the internet. Readings in Arabic. Two years of Arabic at Stanford or equivalent required. Counts for the Arabic Track in the MELLAC Minor.

COMPLIT 253. Honoré de Balzac. 3-5 Units.

Working through a selection of novels by the author widely considered as a founder of western (19th-century) "Literary Realism." Balzac's will be contextualized within his life and the French culture and literature of his time. We will also approach, from a philosophical point of view, the emergence and functions of "Literary Realism." Another focus will be Balzac's work as exemplary of certain traditions within Literary Criticism (particularly Marxist Literary Criticism). Taught in English. Same as: FRENCH 253

COMPLIT 254. Modern Chinese Novel: Theory, Aesthetics, History. 4 Units.

From the May Fourth movement to the 40s. Themes include enlightenment, democracy, women's liberation, revolution, war, urban culture, and love. Prerequisite: advanced Chinese.

Same as: CHINLIT 174, CHINLIT 274

COMPLIT 254A. Was Deconstruction an Illusion?. 3-5 Units.

A both systematic and historical presentation of "Deconstruction" as a philosophical and intellectual movement that dominated academic and general culture in many western societies during the final decades of the twentieth century, with special focus on the writings of Jacques Derrida and Paul de Man. Deconstruction's specific reception history obliges us to ask the question of whether the extremely high esteem that it enjoyed over two decades was intellectually justified or the result of a misunderstanding. Participation through English translations is possible. Same as: FRENCH 254

COMPLIT 262A. Explosions of Enlightenment. 3-5 Units.

Eighteenth-century culture seen as permeated by intellectual and artistic practices and plays pushing principles of reason and rationality to an extreme that becomes self-undercutting. Such obsessions and practices are becoming more visible and prominent now, as the traditional concept of "Enlightenment" (synonymous with the 18th century) is undergoing a profound transformation. Among the protagonists of this seminar will be: Diderot as a philosopher and novelist; Lichtenberg as a scientist and writer of everyday notes; Goya, accusing violence and obsessed with nightmarish visions; Mozart as the excessive master of repetition and variation. Same as: GERMAN 262A

COMPLIT 264. Walter Benjamin. 3-5 Units.

Walter Benjamin's work as cultural historian, critic, literary author and philosopher, seen from the trajectory of a German-Jewish intellectual life in the context of the first half of the 20th century. Providing such a historical perspective will be the condition for an actively critical reading of Benjamin's works; a reading that -- counter to the predominant Benjamin-reception -- will try to distinguish between works of purely biographical and historical interest and those Benjamin texts that prove to be of great and lasting intellectual value. Taught in English.

Same as: GERMAN 264A

COMPLIT 265. Histories and Futures of Humanistic Education: Culture and Crisis, Books and MOOCs. 5 Units.

Features of online education as they relate to the humanities and notions of engaged critical learning. Collaborative course, working in tandem with Professor Cathy Davidson's Duke course, The History and Future of High Education, using live chats, Google documents, and other forums to interact with students at Duke and other universities nationally. Each campus uses a syllabus linked to each instructor's angle into this general subject, but many readings and exercises in common. Seeing this as a critical moment in education, to connect this topic to its historical, cultural, political, and ethical implications. The Stanford course looks at early discussions about education and culture (Arnold's Culture and Anarchy) and then works through a key moment in the mid-20th century whose premises still have influence: the Two Cultures (humanities, sciences) debate. Radical responses to educational reform in France and the US in the late 60s, and the changing state of funding, value, and cultural critique in the late 20th and early 21st centuries. The idea of education as a personal, collective, and intellectual endeavor which is shaped by and shapes societies. Focus on the idea of the public good and the relation between education and a democratic society.

Same as: DLCL 265, EDUC 217X

COMPLIT 271A. Futurity: Why the Past Matters. 3-5 Units.

Drawing on literature, the arts, political discourse, museums, and new media, this course asks why and how we take interest in the watershed events of the modern era; how does contemporary culture engages with modern, made-made disasters such as the World Wars or 9/11? Readings and viewings include the literature of G. Grass, W. G. Sebald, Ian McEwan, Toni Morrison and Cormac McCarthy; the cinema of Kathryn Bigelow and Steven Spielberg; speeches by Barak Obama; and the theoretical writing of Walter Benjamin, Hayden White, Fredric Jameson, among others. Taught in English.

Same as: GERMAN 271

COMPLIT 275. Humanities Education in the Changing University. 3 Units.

Advanced study in the humanities faces changes within fields, the university and the wider culture. Considers the debate over the status of the humanities with regard to historical genealogies and current innovations. Particular attention on changes in doctoral education. Topics include: origins of the research university; disciplines and specialization; liberal education in conflict with professionalization; literature and literacy education; interdisciplinarity as a challenge to departments; education policy; digital humanities; accountability in education, assessment and student-centered pedagogies.

Same as: DLCL 320, GERMAN 250

COMPLIT 281. Visions of the Future in Literature. 4 Units.

Emphasis on personal and collective future as perceived and described in works translated from Hebrew or written originally in English. Focus on novels, short stories, poems and movies that deal both with the future of Israel and the Middle East and the future of individuals in the area. Guest speaker on Science Fiction and the Graphic Novel. The course is part of "The Future of Storytelling" activities organized by Taube Center for Jewish Studies.

COMPLIT 281E. Pirandello, Sartre, and Beckett. 3-5 Units.

In this course we will read the main novels and plays of Pirandello, Sartre, and Beckett, with special emphasis on the existentialist themes of their work. Readings include The Late Mattia Pascal, Six Characters in Search of an Author, Henry IV; Nausea, No Exit, "Existentialism is a Humanism"; Molloy, Endgame, Krapp's Last Tape, Waiting for Godot. Taught in English.

Same as: COMPLIT 381E, FRENCH 214, FRENCH 314, ITALIAN 214, ITALIAN 314

COMPLIT 283. Masterpieces of Hebrew Literature from the Bible to the Present. 3-5 Units.

This course presents and reflects on some of the canonical works of Hebrew literature, from biblical era to the present. Discussing works such as the Wisdom Books and selections from the Midrash; and reflecting on important periods such as the Golden Age of Jewish Culture in Spain, the Renaissance, and contemporary Israeli literature, we will highlight linguistic innovation, as well as crucial thematic and philosophical concerns. Readings include the Book of Job, Psalm, Ibn Gabirol, Mapu, Rachel, Goldbegr, Agnon, S. Yizhar, Amichai, Oz and more.

Same as: JEWISHST 243

COMPLIT 290. Ferguson in a Global Frame: Human Rights and the Arts. 3-5 Units.

This course introduces students to fundamental concepts of international human rights and uses these concepts to frame problems of inequality, marginality, exclusion and injustice that are chronic across the globe; including the United States. Focusing on Ferguson as a point of inflection, this course will consider police repression of political protest in a comparative context. The course will also use the lens of fundamental human rights to explore a state's failure to investigate and prosecute, and its failure to protect its citizens from violations committed by agents or from non-state agents. In each thematic unit, we will examine the United States in a comparative lens, and will consider how we understand, frame, mourn and contest the violations of rights in literature, the visual arts, and in social and political action. We will continuously examine the role of the arts in disseminating, shaping and deepening our understanding of multiple dimensions of human rights violations. At the same time, we will consider how these cultural products reflect on, illuminate, contest or problematize advocacy texts and sources of international law. We will examine texts from the United States, Brazil, South Africa, among other countries, as well as documents from international and regional human rights bodies.

Same as: AFRICAAM 290, CSRE 290

COMPLIT 303D. Thinking in Fiction. 5 Units.

Narrative and cognition in 18th-century fictional, philosophical, scientific, and cultural texts. Probable readings: Hobbes, Locke, Newton, Swift, Defoe, Hume, Lennox, Sterne, Adam Smith, Wollstonecraft, and Bentham.

COMPLIT 310. Introduction to Comparative Queer Literary Studies. 3-5 Units.

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 110, FEMGEN 110X, FEMGEN 310X

COMPLIT 311. Shakespeare, Islam, and Others. 5 Units.

Shakespeare and other early modern writers in relation to new work on Islam and the Ottoman Turk in early modern studies. *Othello*, *Twelfth Night*, *Titus Andronicus*, *The Merchant of Venice*, and other Shakespeare plays. Kyd's *Solyman and Perseda*, Daborne's *A Christian Turned Turk*, Massinger's *The Renegado*, Marlowe's *The Jew of Malta*, and literary and historical materials.

COMPLIT 311C. German Capstone: Reading Franz Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. (Meets Writing-in-the-Major requirement).

Same as: COMPLIT 111, GERMAN 190, GERMAN 390, JEWISHST 147, JEWISHST 349

COMPLIT 312. Oscar Wilde and the French Decadents. 3-5 Units.

Close reading of Oscar Wilde's work together with major texts and authors of 19th-century French Decadence, including Symbolism, l'art pour l'art, and early Modernism. Points of contact between Wilde and avant-garde Paris salons; provocative, creative intersections between (homo)erotic and aesthetic styles, transgression; literary and cultural developments from Baudelaire to Mallarmé; Huysmans, Flaubert, Rachilde, Lorrain, and Proust compared with Wilde; Salomé; Picture of Dorian Gray, and critical writings; relevant historical and philosophical contexts. All readings in English; all student levels welcome.

Same as: COMPLIT 112, FRENCH 112, FRENCH 312

COMPLIT 313A. Martin Heidegger. 3-5 Units.

Working through the most systematically important texts by Martin Heidegger and their historical moments and challenges, starting with *Being and Time* (1927), but emphasizing his philosophical production after World War II. The philological and historical understanding of the texts function as a condition for the laying open of their systematic provocations within our own (early 21st-century) situations. Satisfies the capstone seminar requirement for the major tracks in Philosophy and Literature. Taught in English.

Same as: COMPLIT 213A, GERMAN 282, GERMAN 382

COMPLIT 315. Nabokov in the Transnational Context. 3-5 Units.

Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel "The Gift," "Lolita" (the novel and screenplay), and "Pale Fire." Readings in English. Russian speakers will be encouraged to read Russian texts in original.

Same as: COMPLIT 115, SLAVIC 156, SLAVIC 356

COMPLIT 317. João/Joyce: Guimarães Rosa and the World Novel. 3-5 Units.

A comparative analysis of João Guimarães Rosa's (1908-1967) work, with special attention to the novel *Grande Sertão-Veredas*, translated by a Stanford professor, launched by A. Knopf in 1963. Rosa's fiction disturbs gender, racial, and literary divisions by the creation of a Babelic Brazilian Portuguese language from the sertão. Students increase their literary vocabulary with new terms, *nonada* and *conversa*, and a gallery of Indigenous, Afro-Americans, *mestizos*, and foreigners' characters. Discussions in English; readings in Portuguese and Spanish.

Same as: ILAC 367

COMPLIT 320A. Epic and Empire. 5 Units.

Focus is on Virgil's *Aeneid* and its influence, tracing the European epic tradition (Ariosto, Tasso, Camões, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

Same as: ENGLISH 314

COMPLIT 321A. German Literature 2: Selfhood and History. 3-8 Units.

How the literature of the period between 1750 and 1900 gives voice to new conceptions of selfhood and articulates the emergent self understanding of modernity. Responses to unprecedented historical experiences such as the French Revolution and the ensuing wars, changes in the understanding of nature, the crisis of foundations, and the persistence of theological motifs. Lessing, Herder, Goethe, Schiller, Holderlin, Kleist, Heine, Buchner, Keller, and Fontane. Taught in English, readings in German. (Note: Fulfills DLCL 325 for AY 1415 for the PhD Minor in the Humanities).

Same as: GERMAN 221, GERMAN 321

COMPLIT 321B. Anthropology and Literature: Problems of Representation, Power, and Textuality. 5 Units.

How are literary and social scientific forms of cultural description, evocation, and interpretation related? The seminar reads classic texts as well as recent experiments, addressing issues of genre, rhetoric, epistemology, translation, authority, and collaboration. The emphasis is on writing as a situated practice; embodied, relational, and historically circumscribed. Authors may include Malinowski, Mead, Benedict, Lévi-Strauss, Geertz, Taussig, Leiris, Conrad, Achebe, Said, Barthes, Kroeber, Le Guin, and selected contemporary ethnographies. Examples from film, visual culture, and performance art may also be included.

Same as: ANTHRO 321A

COMPLIT 324. Landscapes of the Sublime. 5 Units.

The modern notion of the sublime in philosophy, literature, and art, emphasizing its connection to space and landscape. Topics include: how global exploration contributed to the sublime in the late 17th and 18th centuries; the romantic interiorization of the sublime; and the sublime's connection to mimesis, power, work, and technology. Writers may include Milton, Burke, Kant, Deleuze and Guattari, Freud, the Shelleys, Coleridge, Hugo, Baudelaire, and Rimbaud; artists may include Géricault, Turner, Delacroix, and Friedrich.

COMPLIT 325. Rethinking Comparative Literary Study Outside of Academia. 2 Units.

This graduate seminar will serve three primary purposes: 1) we will create and inspire a dialogue to help us think through the application of comparative literary study in non-academic contexts, 2) we will refine our ideas by applying them in various exercises and settings, and, as a result, 3) we will need to investigate what is meant by the phrase "critical thinking." Broadly speaking, this seminar represents a forum for thinking creatively about the unique skills of a doctoral student as well as the specific challenges that await when pursuing career opportunities outside of academia. The goal is to come out of the seminar with a heightened appreciation of the humanities skill set in applications that may present new opportunities for the student. Texts will be highly cross-disciplinary, drawing from legal, financial, and technological traditions and mediums. No prerequisites required.

COMPLIT 325E. Petrarch & Petrarchism: Fragments of the Self. 3-5 Units.

In this course we will examine Francis Petrarch's book of Italian lyric poems, *Rerum vulgarium fragmenta*, and its reception in early modern France, England, and Spain. Readings from Petrarch's epistolary and ethical writings will contextualize historically and intellectually the aesthetics and ethics of the fragment in his poetry. With this foundation, we will investigate the long-lasting impact of Petrarch's work on Renaissance poetry and humanism, with attention to both the literary and the material aspects of its reception. Taught in English.

Same as: COMPLIT 225E, ITALIAN 225, ITALIAN 325

COMPLIT 327. Genres of the Novel. 5 Units.

Provides students with an overview of some major genres in the history of the modern novel, along with major theorists in the critical understanding of the form. Novels might include works by Cervantes, Defoe, Lafayette, Radcliffe, Goethe, Scott, Balzac, Melville, and Woolf. Theorists might include Lukács, Bakhtin, Jameson, Gallagher, Barthes, Kristeva, and Bourdieu. *PLEASE NOTE: Course for graduate students only.*

Same as: ENGLISH 327, FRENCH 327

COMPLIT 328. Literature, Narrative, and the Self. 3-5 Units.

The role of narrative in the well-lived life. Are narratives necessary? Can they, and should they, be literary? When might non-narrative approaches, whether literary or otherwise, be more relevant? Is unity of self something given, something to be achieved, or something to be overcome? Readings from Aristotle, Montaigne, Schopenhauer, Nietzsche, Camus, Sartre, MacIntyre, G. Strawson, Velleman; Ricoeur, Brooks; Shakespeare, Stendhal, Musil, Levi, Beckett, Morrison; film. Taught in English.

Same as: FRENCH 328, ITALIAN 328

COMPLIT 330. The Bourgeois. 5 Units.

Goal is to define the ruling class of modern times. Social history (Weber, Hirschmann, Marx); literary texts (Defoe, Goethe, Gaskell); and Henrik Ibsen who produced an intransigent criticism of the bourgeois ethos.

COMPLIT 332. The Transatlantic Renaissance. 5 Units.

The emergence of a transatlantic culture in the early modern period. How is the Renaissance of Europe and England fashioned in a conversation with the cultural forms and material realities of the colonial Americas? And how do colonial writings expand and complicate the available understanding of the Renaissance? Readings in Columbus, More, Hakluyt, Spenser, Shakespeare, the Inca Garcilaso de la Vega.

Same as: ENGLISH 310

COMPLIT 333. Gender and Modernism. 3-5 Units.

Gender and sexuality in trans-Atlantic modernist literature and culture from the 1880s-1930s. Topics include the 19th-century culture wars and the figures of the dandy and the New Woman; modernist critiques of Enlightenment rationality; impact of World War I on gender roles; gender and the rise of modern consumer culture, fashion, design; the modernist metropolis and gender/sexuality; the avant-garde and gender; literary first-wave feminism; homoerotic modernism; modernism in the context of current theories of gender and sexuality.

Same as: COMPLIT 133

COMPLIT 334B. Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization. 5 Units.

Emphasis on world-system theory, theories of coloniality and power, and aesthetic modernity/postmodernity in their relation to culture broadly understood.

Same as: ENGLISH 334B, MTL 334B

COMPLIT 335A. Materialism and Literature. 3-5 Units.

Exploration of vibrant materialism (Bennet, Latour) and historical materialism (critical theory) as a basis to approach Latin American commodity novels, i.e., those that revolve around bananas, coffee, etc. Literary works by J.E. Rivera, Garciaacute;a Maacute;quez, Asturias, Neruda, Magnus, and others. Taught in Spanish.

Same as: ILAC 335

COMPLIT 338. The Gothic in Literature and Culture. 5 Units.

This course examines the Gothic as a both a narrative subgenre and an aesthetic mode, since its 18th century invention. Starting with different narrative genres of Gothic expression such as the Gothic novel, the ghost tale, and the fantastic tale by writers such as Walpole, Radcliffe, Sade, Poe, and E.T.A. Hoffmann, the course goes on to ask how the Gothic sensibility permeates a wide range of 19th century cultural phenomena that explore the dark side of Enlightenment, from Romantic poetry and art to melodrama, feuilleton novels, popular spectacles like the wax museum and the morgue. If time permits, we will also ask how the Gothic is updated into our present in popular novels and cinema. Critical readings will examine both the psychology of the Gothic sensibility and its social context, and might be drawn from theorists such as Benjamin, Freud, Lacan, Kristeva, and Zizek.

Same as: ENGLISH 338, FRENCH 338

COMPLIT 338D. Introduction to Digital Humanities: Concepts, Technologies, Tools. 1-3 Unit.

In this course, we will explore the perspectives of scholars who have thought about what "digital humanities" means and the technologies and tools that are shaping new kinds of research, scholarship, and publishing. Topics will include history of the digital humanities, textual studies, electronic literature, computational and new media, and emerging work around text, image, and new media curation and visualization. This seminar is ideal for anyone interested in digital methods and digital in the humanities, teaching with new digital methods, or to learn about all the digital humanities projects at Stanford. This course is organized as a mix of seminar and workshop and will be featuring a new platform called "Lacuna Stories," designed for Stanford students, that presents multiple platforms, media, and texts to digitally engage with narratives surrounding 9/11; active engagement by all participants is expected. Students may contribute to the field with a creative final project that they develop over the course of the quarter if they select the 3-unit option.

Same as: COMPLIT 228D, DLCL 228

COMPLIT 342. Alla Turca Love: Tales of Romance in Turkish Literature. 3-5 Units.

An introduction to the theme of romantic love in Turkish literature, with particular attention to key classical and contemporary works that influenced the development of the Turkish literary tradition. Topics include close reading and discussion of folk tales, poems, short stories, and plays with particular attention to the characters of lover/beloved, the theme of romantic love, and the cultural and historical background of these elements. We will begin with essential examples of ghazels from Ottoman court poetry to explore the notion of "courtly love" and move to the most influential texts of 19th and 20th centuries. All readings and discussions will be in English; all student levels welcome.

Same as: COMPLIT 143A

COMPLIT 345B. Africa in Atlantic Writing. 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Adichie, Condeacute;, Olinto), prose poetry (Ceacute;saire, Neto, Walcott), theoretical reflection (Fanon, Glissant), reportage (Gide, Gourevitch), ethnography (Leiris, Ouologuem) and autobiography (Barack Obama).

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, CSRE 145B, FRENCH 145B, FRENCH 345B

COMPLIT 346. Classical Arabic Poetry: An Introduction. 3-5 Units.

The primary litmus test of proficiency in the Arabic language is, and has always been, a command of classical Arabic poetry. Study and memorize the great lines of Arabic poetry with a manual that has stood the pedagogical test of time from the eleventh century until today. Questions of literary merit, poetic technique, metaphor, and divine and human linguistic innovation are all raised by the text that we will read together. Readings in Arabic, assignments and discussion in English. Prerequisite: two years of Arabic at Stanford, or equivalent.

Same as: COMPLIT 149A

COMPLIT 347. The Arab Spring in Arabic Literature. 3-5 Units.

An examination of the events of 2011 in the Middle East through literature. We will read short stories, poetry, graphic novels, and blogs in order to try and work out whether the revolution could have been predicted, and how it took place. Prerequisite: two years of Arabic at Stanford, or equivalent.

Same as: COMPLIT 146A

COMPLIT 347A. The Hebrew Bible in Literature. 3-5 Units.

Close reading of major biblical stories and poems that influenced modern literature written in English and Hebrew. Hebrew texts will be read in translation to English. Each class will include a section from the Hebrew Bible as well as a modern text or film based on the biblical story/poem. Discussion of questions such as: the meaning and function of myths and the influence of the Hebrew Bible on the development of literary styles and genres.

Same as: COMPLIT 147A, JEWISHST 147A, JEWISHST 347A

COMPLIT 351A. Philosophies, Literatures, and Alternatives. 3-5 Units.

Aristotelian poetics and mediaeval Arabic literary theory. Nietzsche's irony and Philosophies and literatures, together and apart, dominate the last two millennia of human thought. How might they best be read? Are philosophy and literature two different ways of thinking, or are they just two separate institutional histories? This course starts with familiar Greeks, moves onto unfamiliar Arabs, confronts old Europe, and ends with contemporary Americans arguing.

Same as: COMPLIT 151A

COMPLIT 351B. Great Books: Dramatic Traditions. 4 Units.

The most influential and enduring texts in the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons.

Same as: COMPLIT 151B, TAPS 151T, TAPS 351

COMPLIT 353A. Experiment and the Novel. 5 Units.

A double exploration of experiment in the novel from 1719 into the 19th century. Taking off from Zola's "The Experimental Novel," consideration of the novel's aspect as scientific instrument. Taking the idea of experimental fiction in the usual sense of departures from standard practice, consideration of works that seem to break away from techniques of "realism" devised prior to 1750, with "Robinson Crusoe" as the representative of that mode.. Texts by: Defoe, Sterne, Walpole, Godwin, Lewis, Goethe, and Shelley. Same as: ENGLISH 303

COMPLIT 354B. Poetic Thinking Across Media. 4 Units.

Even before Novalis claimed that the world must be romanticized, thinkers, writers, and artists wanted to perceive the human and natural world poetically. The pre- and post-romantic poetic modes of thinking they created are the subject of this course. Readings include Ecclesiastes, Zhaozhou Congshen, Montaigne, Nietzsche, Kafka, Benjamin, Arendt, and Sontag. This course will also present poetic thinking in the visual arts--from the expressionism of Ingmar Bergman to the neo-romanticism of Gerhard Richter.

Same as: COMPLIT 154B, GERMAN 154, GERMAN 354, JEWISHST 144B

COMPLIT 357. Contemporary Turkish Cinema and Society. 3-5 Units.

This course is an examination of contemporary Turkish cinema in a social and political context. The course will focus on films and directors that revived Turkish cinema starting with the mid-1990s with a focus on key issues pertaining to belonging, denied identities, masculinity, nationalism, silencing of women, and urbanization. The course aims to provide an overview of contemporary Turkish cinema and society in cultural, political, and social framework. There will be approximately two hours of film screening and two hours of classroom discussion/seminar (in English) each week. All films are in Turkish with English subtitles.

Same as: COMPLIT 157

COMPLIT 359A. Philosophical Reading Group. 1 Unit.

Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit. Taught in English.

Same as: FRENCH 395, ITALIAN 395

COMPLIT 360B. The Theory of the Novel. 5 Units.

Topics will include: theories of the novel's origin; novelistic subjectivity; voice and text; body and text; the problem of the quotidian; democracy, revolution and novelistic form; and the peculiar dynamic of the novelistic trinity (author, character, reader).

COMPLIT 363. Ecology, History, Exchange. 4-5 Units.

Readings of novels, ecocriticism. Ghosh, Gordimer, Coetzee, Al-Koni, Ondaatje, Silko.

COMPLIT 364. Style. 5 Units.

The return of a term that was central in 20th-century criticism, and has all but disappeared in recent decades. Focus is on looking at concepts of style from various branches of linguistic and literary theory, and examination of some revealing examples in novels and films. Team taught with D.A. Miller from U.C. Berkeley.

COMPLIT 368A. Imagining the Oceans. 5 Units.

How has Western culture constructed the world's oceans since the beginning of global ocean exploration? How have imaginative visions of the ocean been shaped by marine science, technology, exploration, commerce and leisure? Primary authors read might include Cook, Banks, Equiano, Ricketts, and Steinbeck; Defoe, Cooper, Verne, Conrad, Woolf and Hemingway; Coleridge, Baudelaire, Moore, Bishop and Walcott. Critical readings include Schmitt, Rediker and Linebaugh, Baucom, Best, Corbin, Auden, Sontag and Heller-Roazen. Films by Sekula, Painleveacute; and Bigelow. Seminar coordinated with a 2015 Cantor Arts Center public exhibition. Visits to the Cantor; other possible field trips include Hopkins Marine Station and SF Maritime Historical Park. Open to graduate students only.

Same as: ENGLISH 368A, FRENCH 368A

COMPLIT 369. Introduction to Graduate Studies: Criticism as Profession. 3 Units.

A history of literary theory for entering graduate students in national literature departments and comparative literature.

Same as: DLCL 369, FRENCH 369, GERMAN 369, ITALIAN 369

COMPLIT 371. Aesthetics, Politics, Modernity and China. 2-5 Units.

The making of global heroes--and the many bodies of Chairman Mao. This course explores a number of key motifs of critical theory relevant to Chinese studies. It introduces some seminal theories of visuality and the making of (global) heroes and problematizes the writing of visual histories and the uses of Digital Humanities for this purpose. Part of an ongoing research project which focuses on two hyper-visible male protagonists of the twentieth century--Mohandas Gandhi and Mao Zedong. How have these flesh and blood men been transformed through the work of visual imagery into globally recognizable, transcultural "bio-icons"? Prerequisite: CHINLIT 127/207 or consent of instructor.

Same as: CHINLIT 371

COMPLIT 376C. Tragic Form and Political Theory. 5 Units.

Tragic form and political theory have in common a profound interest in the conflictual foundation of human society. This course will explore how the two intellectual approaches define the actors of conflict, its causes, and its possible [or impossible] resolution.

Same as: ENGLISH 376C, PHIL 376C

COMPLIT 381E. Pirandello, Sartre, and Beckett. 3-5 Units.

In this course we will read the main novels and plays of Pirandello, Sartre, and Beckett, with special emphasis on the existentialist themes of their work. Readings include The Late Mattia Pascal, Six Characters in Search of an Author, Henry IV; Nausea, No Exit, "Existentialism is a Humanism"; Molloy, Endgame, Krapp's Last Tape, Waiting for Godot. Taught in English.

Same as: COMPLIT 281E, FRENCH 214, FRENCH 314, ITALIAN 214, ITALIAN 314

COMPLIT 390. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought. 3-5 Units. Anna Karenina, the novel as a case study in the contest between "modernity" and "tradition," their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a "philosophical" prism and vice versa (30% each); class discussion and Forum (10%).
Same as: COMPLIT 190, SLAVIC 190, SLAVIC 390

COMPLIT 396L. Pedagogy Seminar I. 2 Units. Required for first-year Ph.D students in English, Modern Thought and Literature, and Comparative Literature. Preparation for surviving as teaching assistants in undergraduate literature courses. Focus is on leading discussions and grading papers.
Same as: ENGLISH 396L

COMPLIT 398L. Literary Lab. 2-5 Units. Gathering and analyzing data, constructing hypotheses and designing experiments to test them, writing programs [if needed], preparing visuals and texts for articles or conferences. Requires a year-long participation in the activities of the Lab.
Same as: ENGLISH 398L

COMPLIT 399. Individual Work. 1-15 Unit.

COMPLIT 802. TGR Dissertation. 0 Units.

Comparative Medicine Courses

COMP MED 10SC. Comparative Anatomy and Physiology of Mammals. 2 Units. This course introduces the student to common laboratory, domestic, and exotic mammals through lectures, dissection labs and student presentations. Using a comparative approach, investigates the unique adaptations of species in terms of their morphological, anatomical, and behavioral characteristics. Focus on how these species interact with their own and other species (including humans), discuss basic evolution, and the devastating impact of habitat destruction on wild animals. Class provides the student with a deeper appreciation for the diversity of the mammalian orders, along with the fundamentals of comparative anatomy, physiology, and basic dissection techniques. A large collection of skulls, bones and plastinated organs facilitate learning mammalian anatomy, and a field trip to a local zoo enables students to appreciate behavior and locomotion of assorted mammals in their iquest;nativeiquest; habitats.

COMP MED 11SC. Life in the Zoo: Behavior, Welfare and Enrichment. 2 Units. Emphasis is on how animal welfare sciences provide an evidence-based approach to optimize and balance each of these demands so that "good welfare is good business." Topics include how to apply principles of animal behavior to design environmental enrichments beneficial to both animals and complex mission of the zoo; assessing exhibits from the point of view of animal behavior and well-being, educational opportunities and guest experience; developing an enrichment plan; designing and building enrichments for animals; interacting with the public as docents; assessing overall effectiveness of new enrichment. Class includes experience at San Francisco Zoo.

COMP MED 80N. Introduction to Animal Behavior. 3 Units. Preference to freshman. Behavior is what makes animals special (thirsty plants don't walk to water), but why do animals behave the way they do? What does their behavior tell us about their inner lives, and about ourselves? What do lipstick and cuckoos and fireflies have in common? Why would nobody want to be a penguin? What do mice say to each other in their pee-mail? Learning how to think about questions like these gives us a unique perspective on the natural world. Format: Discussion and criticism of video examples, documentaries, and research papers. Topics: History and approaches to animal behavior; development of behavior, from genetics to learning; mechanisms of behavior, from neurons to motivation; function of behavior, from honest signals to selfish genes; the phylogeny of behavior, from domestication to speciation; and modern applications of behavior, from abnormal behavior, to conservation, to animal welfare, and animal consciousness.

COMP MED 81N. Comparative Anatomy and Physiology of Mammals. 3 Units. Preference to freshmen. Emphasis is on a comparative approach to anatomy and physiology of a wide range of mammals, the unique adaptations of each species in terms of its anatomical, and behavioral characteristics, and how these species interact with human beings and other animals. Dissection required. Class size is limited to 16.

COMP MED 84Q. Globally Emerging Zoonotic Diseases. 3 Units. Preference to sophomores. Infectious diseases impacting veterinary and human health around the world today. Mechanisms of disease, epidemiology, and underlying diagnostic, treatment and control principles associated with these pathogens.

COMP MED 85N. Animal Use in Biomedical Research. 3 Units. Preference to freshmen. How and why animals are used in biomedical science. Addresses human and animal disease entities and how animal research has contributed to the treatment and cure of disease. Significantnportions of this course are devoted to documenting the humane care and treatment of laboratory animals in research, including, but not limited to such topics as laws and ethics, animal behavior, animal modeling, and the animal activist movement. Course topics will also include: What advances have been made as a result of the use of animals in research? Who conducts animal research? Predominant animal species used in biomedical research, facts and myths; the regulation of biomedical research; housing and care of laboratory animals; why new drugs must be tested; animal use in stem cell research, cancer research and genetically engineered mice; career choices in biomedical research.

COMP MED 87Q. Introduction to the Mouse in Biomedical Research. 3 Units. Preference to sophomores. Focus is on the laboratory mouse, a widely used and important research model. Topics include the ethics of animal use in research; the natural history, origin and husbandry of the mouse; characteristics of key mouse strains; its anatomy and physiology; common diseases and their effects on research; coat color genetics relative to human diseases; immunodeficient mouse models; and genetic engineering of mice. The laboratory includes necropsy, handling, anesthesia, identification methods, and common research techniques using live and dead mice. Enrollment limited to 14 students.

COMP MED 88Q. Blood Cells- The Basics. 3 Units. Preference to sophomores. The essential and constant production of new blood cells by the bone marrow. Focus is on fundamentals of the three blood cell types along with white blood cell subtypes. Topics include the microscopic appearance of blood cells in mammalian and non-mammalian species, common morphologic abnormalities of blood cells, and shifts in blood cells that occur in several major diseases of humans and animals. Ideally suited for premed, prevet and Bio-X students, but no biology specialty background required.

COMP MED 89Q. Ouch it Hurts! The Comparative Neurobiology of Pain. 3 Units.

Preference to sophomores. Focus is on understanding the basic neurobiology of pain pathways. Topics include the physiology, pharmacology, and clinical aspects of effective pain management. In both humans and animals pain is part of the protective mechanisms that prevent further injury to the body. However, if the pain process continues unchecked, it can become extremely detrimental.

COMP MED 110. Pre-Vet Advisory. 1 Unit.

For students interested in a career in veterinary medicine. How to meet the academic and practical experience prerequisites for admission to veterinary school. Networking with other pre-vet students. Periodic group meetings with guest speakers presenting career options in veterinary medicine. Prerequisite: consent of instructor.

COMP MED 121. Imaging Anatomy in Animal Models. 3 Units.

(Same as RADO 121) Introduces engineering and physical science majors to the basic laboratory animal anatomy visualized and targeted with biomedical imaging. Topics include: various imaging modalities (PET, CT, Radiology, MRI, and other optical imaging) and associated depiction of normal organs and skeletal structures in pigs, dogs, rabbits and rodents. Course includes didactic lectures, discussion, imaging labs and gross cadaver examination.

COMP MED 198. Undergraduate Directed Reading in Comparative Medicine. 1-3 Unit.

May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research.

COMP MED 199. Undergraduate Research. 1-3 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

COMP MED 207. Comparative Brain Evolution. 4 Units.

Functional organization and evolution of the vertebrate nervous system. Topics include paleoneurology, cladistic analysis, allometry, mosaic versus concerted evolution, and evolution of brain region structure, connectivity, and neurons. Comparisons between structure and function of vertebrate forebrains including hippocampi. Evolution of the primate visual and sensorimotor central nervous system as related to vocalization, socialization, and intelligence.

COMP MED 215. Synaptic Properties and Neuronal Circuits. 2-3 Units.

Focus is on synapses and circuits in the central nervous system. Objective is to demonstrate how the specific properties of different synapses play a role in the function of neuronal circuits. The main types of synapses are covered, including both ionotropic and metabotropic-receptor-dependent synapses and their related circuits in the CNS. Lectures and student presentations. If taken for 3 units qualifies as a Core Course satisfying requirements in Cellular, Molecular & Developmental Neuroscience in the Neurosciences Graduate Program. Students enrolling for 3 units write an NIH-style proposal on a selected synapse, proposing a study of its properties and related function and presenting the proposal to the class for critique and discussion.

COMP MED 299. Directed Reading in Comparative Medicine. 1-18 Unit.

Prerequisite: consent of instructor. (Staff).

COMP MED 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

COMP MED 399. Graduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Opportunities are available in comparative medicine and pathology, immuno-histochemistry, electron microscopy, molecular genetics, quantitative morphometry, neuroanatomy and neurophysiology of the hippocampus, pathogenesis of intestinal infections, immunopathology, biology of laboratory rodents, anesthesiology of laboratory animals, gene therapy of animal models of neurodegenerative diseases, and development and characterization of transgenic animal models. Prerequisite: consent of instructor.

Comparative Studies in Race Ethnicity Courses

CSRE 1A. Meet the Profs: Conversations on Race and Ethnicity. 1-2 Unit.

This course meets once a week for one hour, over lunch (provided). Students will meet with CSRE faculty who will share their work, their life stories, their reasons for believing that race and ethnicity are of central concern to all members of our society. Diverse fields will be represented: sociology, history, literature, psychology and others. The course may be taken for either one or two units. Open to freshmen and sophomores only.

CSRE 11W. Service-Learning Workshop on Issues of Education Equity. 1 Unit.

Introduces students to a variety of issues at stake in the public education of at-risk high school youth in California. Participants will hear from some of the leading faculty in the School of Education as well as the Departments of Psychology, Sociology, and others, who will share perspectives on the problems and challenges of educating a diverse student body in the state's public school system. The service-learning component of the workshop is a mentoring project (Stanford Students for Educational Equity) with junior class history students from East Palo Alto Academy High School, a Stanford charter school.

Same as: HISTORY 11W

CSRE 14N. Growing Up Bilingual. 3 Units.

This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

Same as: CHILATST 14N, EDUC 114N

CSRE 16N. African Americans and Social Movements. 3 Units.

Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's rights, LGBT rights, environmental movement, and contemporary political conservatism.

Same as: AFRICAAM 16N, SOC 16N

CSRE 19N. "Land of Milk and Honey": Food, Justice, and Ethnic Identity in Jewish Culture. 3 Units.

Food is an essential aspect of the human experience. The decisions and choices we make about food define who we have been, who we are now, and who we want to become. This seminar examines Jewish culture and the food practices and traditions that have shaped and continue to shape it. Why has Jewish culture been centered around food practices? How have religious laws and rituals about food and food production shaped Jewish culture and vice versa? Dietary laws prescribe which animals are and are not "kosher" and what can be eaten with them, holidays are celebrated with traditional foods, and regional foods contribute to the formation of distinct Jewish ethnic identities. More recently, American Jews have begun to organize around issues of food justice, and joined the sustainability movement, adapting Jewish traditions about food production into their cause. What is the significance of animal welfare, environmental issues, and labor practices in Jewish culture? This multi-disciplinary seminar explores the connection between food practices and ethnic and religious identity(ies), the history of the dietary laws and their multiple interpretations, the cultural significance of the phenomenal success of kosher certification in the U.S. food market, and the rise of the Jewish food justice movement. These issues raise a multitude of comparative questions, and you are encouraged to engage in research into other religious and ethnic food cultures. Course materials include: biblical and later religious, legal, and philosophical texts; cook-books (as cultural and historical sources); literature (both fiction and academic); films; news media, and food experts. We will visit an urban farming community (Urban Adamah) to learn from those involved in the Jewish sustainability movement.

Same as: JEWISHST 19N, RELIGST 19N

CSRE 24D. Introduction to Dance in the African Diaspora. 4 Units.

This course introduces students to dance as an important cultural force in the African Diaspora. From capoeira in Brazil to dance hall in Jamaica to hip hop in the United States and Ghana, we will analyze dance as a form of resistance to slavery, colonialism, and oppression; as an integral component of community formation; and as a practice that shapes racial, gendered, and national identity. We will explore these topics through readings, film viewings, and movement workshops (no previous dance experience required). Students will have the option to do a creative performance as part of their final project.

Same as: AFRICAAM 24, DANCE 24, TAPS 152D

CSRE 28SI. What is Whiteness? Historical and Contemporary Definitions of White Racial Identity in the U.S.. 1-2 Unit.

This course will explore one central question: What does it mean to be White, and how has that changed over time and place? From Abigail Fisher to Kreyshawn to the Tsarnaev brothers, we will use narratives and experiences of Whiteness to illuminate historical and contemporary understandings of what it means to be White in 2013. Through this class, students will share their own encounters with Whiteness, and will develop tools and strategies for navigating privileged identities and engaging within Stanford's diverse student community.

CSRE 32. Theories in Race and Ethnicity: A Comparative Perspective. 5 Units.

This undergraduate course employs an anthropological and historical perspective to introduce students to ideas and concepts of race and ethnicity that emerged primarily in Europe and the United States in the eighteenth and nineteenth centuries and that continue to shape contemporary racial attitudes, interactions, and inequalities. Ideas about race and ethnicity forged outside the U.S. and case studies from other nations are presented to broaden students' understanding and to overcome the limitations of an exclusive focus on the U.S. This course is geared to sophomores and juniors who have already taken at least one course on race and ethnicity, anthropology, African American Studies, Asian American Studies, Chicana/o Studies, Jewish Studies or Native American Studies.

Same as: ANTHRO 32

CSRE 32A. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations. Same as: AFRICAAM 32, AMSTUD 32, EDUC 32X, EDUC 432X, TAPS 32

CSRE 34. Race, Policing, and Mass Incarceration. 1 Unit.

This course is a critical examination of the relationship between race, policing, and mass incarceration. Students will be reading the most important contemporary texts to discuss and deconstruct this relationship, as well as attending lectures and workshops by leading scholars and activists. The course will approach this critical nexus of concerns--race, policing, and mass incarceration--from social scientific, legal, theoretical and activist viewpoints.

Same as: AFRICAAM 34

CSRE 36. REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.. 5 Units.

Probably since the first audience formed for the first chalk scrawls in a cave, there have been storytellers to narrate that caveperson's art and life, and critics to troll that caveperson's choice and usage of color. And so it goes. This course is an exploration into how to cover race, culture, and identity in the arts in journalism, such as print, web, video, radio, and podcasting. It is also an arts journalism practicum. During the quarter, we will be working toward creating work that is publishable in various venues and outlets. In this course, we will be discussing exemplary arts writers and their works and interrogating critical questions around race, identity, representation, and ethics. Experienced journalists, editors, and experts from different platforms and backgrounds will also be imparting important skills and training that will help you to navigate today's working media and transmedia environments. Those who enroll in the class will be expected to produce quality content (e.g. articles, blog posts, video reports, podcasts) for media outlets. Some travel outside of class may be required for additional reporting and training. This seminar class will be By Instructor Approval Only. Please submit an application by February 22 at 11:59pm. Starred items are required. The app is available at: <http://bit.ly/RepresentClass36> Those selected for this class will be informed by March 2nd so that they may enroll in the course. Please do not apply for the course if you are unsure about completing it. If you have any questions, you may email the instructor at: jeffc410@stanford.edu.

Same as: AFRICAAM 36

CSRE 41A. Genes and Identity. 3 Units.

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and anthropological works (ethnographies). We will explore several case studies where the use of DNA markers (as proof of heritage, disease risk, or legal standing) has spawned cultural movements that are biosocial in nature. Throughout we will look at how new social movements are organized around gene-based definitions of personhood, health, and legal truth. Several examples include political analyses of citizenship and belonging. On this count we will discuss issues of African ancestry testing as evidence in slavery reparations cases, revisit debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, and hear arguments on whether people with genetic links to Jewish groups should have a right of return to Israel. We will also examine the ways genetic knowledge may shape different health politics at the individual and societal level. On this count we will do close readings of how personal genomics testing companies operate, we will investigate how health disparities funding as well as orphan disease research take on new valences when re-framed in genetic terms, and we will see how new articulations of global health priorities are emerging through genetic research in places like Africa. Finally we will explore social implications of forensic uses of DNA. Here we will examine civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects, and inquire into the use of DNA to generate digital mugshots of suspects that re-introduce genetic concepts of race.

Same as: AFRICAAM 41, ANTHRO 41

CSRE 45Q. Understanding Race and Ethnicity in American Society. 4 Units.

Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16.

Same as: SOC 45Q

CSRE 51Q. Comparative Fictions of Ethnicity. 4 Units.

We may "know" "who" we "are," but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of "the Self"? After all, don't we tell stories in response to the question, "who are you"? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue ("who am I") become skewed differently when we add a qualifier before it, like "ethnic"?.

Same as: AMSTUD 51Q, COMPLIT 51Q

CSRE 52D. Asian American Human Development: Cultural Perspectives on Psychology, Education and Critical Issues. 3 Units.

In this course, we will examine the critical issues in Asian American growth and development with particular attention given to current theoretical and research perspectives within a diverse society. We will consider topics related to their cultural identity, cognitive, and socio-emotional development, engaging in the ethnic discourse on Confucian history and culture, Eastern and Western thought and learning, tiger parenting, gender roles, the model minority stereotype, acculturation and bicultural identity, and mental health. This course uniquely integrates the fields of history, education, psychology, human biology, and ethnic studies as we seek to understand the underlying processes of the Asian American person as an individual and as an effective member of the larger society.

Same as: ASNAMST 52D

CSRE 53J. Love Notes: Queers of Color on Politics of the Heart. 3 Units.

This course unfolds in three ways. First, we will begin by examining theories of love by women of color feminists and queer theorists. Secondly, we will position these theories alongside art, literature, photography, comics, and film by and about queers of color who partake in the cultural representation of the love story. Finally, we will interrogate the aesthetic politics of each work in order engage with the ways that the writers, artists, and filmmakers contribute to the theorization of love.

Same as: CHILATST 53J

CSRE 54N. African American Women's Lives. 3-4 Units.

Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality.

Same as: AFRICAAM 54N, AMSTUD 54N, FEMGEN 54N, HISTORY 54N

CSRE 55M. MMUF Seminar. 1 Unit.

This seminar is designed to help MMUF honor students in the following ways: (1) developing and refining research paper topics, (2) learning about the various approaches to research and writing, and (3) connecting to Stanford University resources such as the library and faculty.

CSRE 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.

This course explores the emergence of concepts of gender equality in world history. It asks how gender inequality relates to racial, ethnicity, and sexual identities, how men engage with feminism, whether gender equality is purely a western cultural tradition, and much more. We approach the long history of ideas about gender and equality by reading primary historical documents from around the world, moving from the 15th century to the present. Topics include education, the body, sexuality, violence, labor, and politics.

Same as: AMSTUD 63N, FEMGEN 63N, HISTORY 63N

CSRE 64. Racial and Ethnic Diversity in Modern America. 4-5 Units.

How ethnicity influenced the American experience and how prevailing attitudes about racial and ethnic groups over time have affected the historical and contemporary reality of the nation's major minority populations. Focus is on the past two centuries.

Same as: HISTORY 64

CSRE 65. Nation in Motion: Film, Race and Immigration in Contemporary French Cinema. 3-5 Units.

An examination of the current debates in France regarding national identity, secularism, and the integration of immigrants, notably from the former colonies. Confronts films' and other media's visual and discursive rhetorical strategies used to represent ethnic or religious minorities, discrimination, citizens' resistance to government policies, inter-racial marriages, or women's rights within immigrant communities. By embodying such themes in stories of love, hardships, or solidarity, the motion pictures make the movements and emotions inherent to immigration tangible: to what effect? Taught in French. Films in French with English subtitles. Additional paper for students enrolled in 235.

Same as: FRENCH 122

CSRE 65M. Intimate Frontiers: Race, Gender, and Colonialism in the American West. 5 Units.

Historians have increasingly recognized the American West as a place of empire and settler colonialism. This course will explore the colonial dimensions of the 19th century American West through a variety of sources produced in the most "intimate" spaces on North America's multicultural frontier: in homes, missions, boardinghouses, schools, mining camps, courtrooms, and more. By examining how the intimate shaped everyday lives, we will pay special attention to how ambiguous concepts like race, gender, class, sexuality, and national identity coalesced. The course fulfills the departmental Sources and Methods requirement.

Same as: FEMGEN 65S, HISTORY 65S

CSRE 66S. The Americans are Coming!: The Cold War at Home and Abroad. 5 Units.

This course explores the relationship between U.S. foreign and domestic policy from 1945 to 1975. How did fighting the "Communist menace" shape notions of race, gender, and national identity within the United States? In what ways did nation-building abroad trigger clashes over the meaning of democracy at home? Using textual sources, photographs, films, and cartoons, students will examine notions of what it meant to be "American," both inside and outside the nation's borders, in a Cold War climate. The course fulfills the departmental Sources and Methods requirement.

Same as: HISTORY 66S

CSRE 84. Zionism. 3 Units.

(Same as HISTORY 184. History majors and others taking 5 units, register for 184.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.

Same as: HISTORY 84, JEWISHST 84, REES 84

CSRE 102. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3-5 Units.

This interdisciplinary seminar explores challenges and avenues for furthering protection of the cultural heritage rights enshrined in the UN Declaration on the Rights of Indigenous Peoples. Using an innovative combination of online lectures by Stanford faculty and students, and recorded interviews with Indigenous leaders, artists, performers, scholars and museum professionals, the seminar will explore and problematize: historic and contemporary understandings of "Indigenous cultural heritage" and the impact of colonialism, urbanization and other forces on Indigenous identity and cultural heritage; current and potential domestic and international legal and non-legal frameworks for Indigenous cultural heritage protection and repatriation; past and present museum approaches to Indigenous peoples and their cultural material; and optimal methods of resolving repatriation disputes. While the seminar will cover primarily the situation of Indigenous peoples in North America, comparisons will be drawn with other regions of the globe. The on-campus component of the seminar will involve directed discussions of the online content, the online forum, assigned readings and short writing assignments. Students can choose between a final exam, paper or video project. Lunch is provided.

Same as: ANTHRO 102C, ARCHLGY 101, ARCHLGY 202, NATIVEAM 102

CSRE 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.

Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

Same as: AFRICAAM 106, EDUC 103B, EDUC 337

CSRE 103S. Native American Women, Gender Roles, and Status. 5 Units.

Historical and cultural forces at work in traditional and contemporary Native American women's lives through life stories and literature. How women are fashioning gendered indigenous selves. Focus is on the diversity of Native American communities and cultures.

Same as: FEMGEN 103S, NATIVEAM 103S

CSRE 106A. Gang Colors: The Racialization of Violence and the American City. 5 Units.

Street gangs (e.g. Bloods, Crips, Mara Salvatrucha, M-18, etc.) serve as a window onto the experience of racial, ethnic and economic marginalization under late capitalism. This class explores the context that gives rise to gang violence through a combination of anthropological, sociological, and historical approaches. Students will be familiarized with the macro-social factors that shape both gangs and the politics of violence in the Americas, North and South.

Same as: ANTHRO 106A

CSRE 107. The Black Mediterranean: Greece, Rome and Antiquity. 4-5 Units.

Explore problems of race and ethnicity as viable criteria in studying ancient societies and consider the question, What is the Mediterranean?, in relation to premodern evidence. Investigate the role of blackness as a marker of ethnicity; the demography of slavery and its roles in forming social identities; and environmental determinism as a factor in ethnic and racial thinking. Consider Greek and Roman perspectives and behavior, and their impact on later theories of race and ethnicity as well as the Mediterranean as a whole.

Same as: AFRICAAM 107C

CSRE 108. Introduction to Feminist Studies. 4-5 Units.

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives.

Same as: AMSTUD 107, FEMGEN 101, TAPS 108

CSRE 108S. American Indian Religious Freedom. 5 Units.

The persistence of tribal spiritual beliefs and practices in light of legal challenges (sacred geography and the 1st Amendment), treatment of the dead and sacred objects (repatriation), consumerism (New Age commodification), and cultural intellectual property protection (trademark, copyright, patent law). Focus is on contemporary issues and cases, analyzed through interdisciplinary scholarship and practical strategies to protect the fundamental liberty of American Indian religious freedom.

Same as: NATIVEAM 108S

CSRE 109A. Federal Indian Law. 5 Units.

Cases, legislation, comparative justice models, and historical and cultural material. The interlocking relationships of tribal, federal, and state governments. Emphasis is on economic development, religious freedom, and environmental justice issues in Indian country.

Same as: NATIVEAM 109A

CSRE 112X. Urban Education. 3-4 Units.

(Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, EDUC 112X, EDUC 212X, SOC 129X, SOC 229X

CSRE 117S. History of California Indians. 5 Units.

Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system.

Same as: HISTORY 250A

CSRE 118A. Digital Heritage: Bringing the Past Online with the Chinese American Historical Museum. 5 Units.

Interpreting the past is no longer just for people like historians and archaeologists, and it is no longer confined to the pages of books. More and more, community-based organizations are gathering stories and perspectives from everyday people, and they are putting them out for the world to see online. With these big changes, what will be the future of thinking about the past? In this course, students will work through the dynamics of digital heritage through readings, discussion, and original research. The course centers around artifacts unearthed at the Market Street Chinatown in San Jose. Each student will analyze and gather stories relating to a single artifact in order to contribute to a multimedia exhibit for the Chinese American Historical Museum in San Jose. Class time will be devoted both to discussion and to work on artifact-based projects, and will also include a fieldtrip to the museum and collaboration time with members of the Chinese Historical and Cultural Project.

Same as: ANTHRO 118A, ASNAMST 118A

CSRE 121. Discourse of the Colonized: Native American and Indigenous Voices. 5 Units.

Using the assigned texts covering the protest movements in the 20th century to the texts written from the perspective of the colonized at the end of the 20th century, students will engage in discussions on decolonization. Students will be encouraged to critically explore issues of interest through two short papers and a 15-20 minute presentation on the topic of interest relating to decolonization for Native Americans in one longer paper. Approaching research from an Indigenous perspective will be encouraged throughout.

Same as: NATIVEAM 121

CSRE 121L. Racial-Ethnic Politics in US. 5 Units.

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. Stats 60 or Econ 1 is strongly recommended.

Same as: AMSTUD 121L, POLISCI 121L, PUBLPOL 121L

CSRE 121X. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, EDUC 121X, LINGUIST 155

CSRE 122E. Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces. 4 Units.

This class will introduce students to both historical and contemporary public art practices and the expression of race and identity through murals, graffiti, site-specific works and performative interventions in public spaces. Involving lectures, guest speakers, field trips, and hands-on art practice, students will be expected to produce both an individual and group piece as a final project.

Same as: AFRICAAM 122E

CSRE 123A. American Indians and the Cinema. 5 Units.

Hollywood and the film industry have had a major influence on American society for nearly a century. Initially designed to provide entertainment, the cinema broadened its impact by creating images perceived as real and essentialist. Hollywood's Indians have been the main source of information about who American Indians are and Hollywood has helped shape inaccurate and stereotypical perceptions that continue to exist today.

This course looks chronologically at cinematic interpretations and critically examines accurate portrayals of American Indians and of American history.

Same as: NATIVEAM 123A

CSRE 123B. Literature and Human Experimentation. 3-5 Units.

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann and Vivien Spitz's Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care.

Same as: AFRICAAM 223, COMPLIT 223, HUMBIO 175H, MED 220

CSRE 125V. The Voting Rights Act. 5 Units.

Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena.

Same as: AFRICAAM 125V, POLISCI 125V

CSRE 126B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: AFRICAAM 126B, EDUC 136B, EDUC 236B, PUBLPOL 126B

CSRE 127A. Can't Stop Won't Stop: A History Of The Hip-Hop Arts. 4 Units.

This course explores the history and development of the hip-hop arts movement, from its precursor movements in music, dance, visual arts, literature, and folk and street cultures to its rise as a neighborhood subculture in the Bronx in the early 1970s through its local, regional and global expansion and development. Hip-hop aesthetics, structures, and politics will be explored within the context of the movement; its rise as a post-multicultural form in an era of neoliberal globalization.

Same as: AFRICAAM 127A

CSRE 128. WHAT WE WANT IS WE: Identity in Visual Arts, Social Engagement, and Civic Propositions. 4 Units.

This studio practicum examines contemporary culture through case studies on visual art, race theory, urban studies, and resistance legacies. This class looks at strategies of socially engaged art practices, community building endeavors, and the complications peculiar to these projects. From these case studies, students will make public art/text/performance experiments and learn research and grant writing approaches for designing long-term political projects. Students will translate their research into grant proposals that will be judged by a professional panel during the final week. Course guests include granting agencies/arts foundations and international artists, curators, city planners, and activists (live/video conferences).

CSRE 129B. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer.

Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, FRENCH 229, HUMBIO 175L, MED 234

CSRE 130. Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms. 3-5 Units.

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Prerequisite: graduate status or consent of instructor.

Same as: AFRICAAM 130, EDUC 123X, EDUC 322

CSRE 131. Genes and Identity. 5 Units.

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and ethnographies. We will explore several case studies where the use of DNA markers (either as proof of heritage or disease risk) has spawned cultural movements that are biosocial in nature. Examples include legal and political analyses of African ancestry testing as evidence; in slavery reparations cases, debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, considerations on whether people with genetic links to Jewish groups should have a right of return to Israel, close readings of The U.S. Food and Drug Administration's crackdown on personal genomics testing companies (such as 23andMe), examinations of genetic identity politics in health disparities funding and orphan disease research, inquiries into new social movements organized around gene-based definitions of personhood, and civil liberties concerns about genetic searching; in forensic databases that disproportionately target specific minority groups as criminal suspects. Students will engage in a short observational; pilot; ethnographic project that allows them to further explore issues from the course for their final paper.

Same as: AFRICAAM 131, ANTHRO 131

CSRE 131C. Trauma, healing, and empowerment in Asian America. 3-5 Units.

This course will look at the ways in which Asian Americans are affected by the legacy of war, occupation and colonialism through themes of home, displacement, community, roots, identity, and inter-generational trauma. The approach is integrative, including scholarly investigation, embodied practice, and creative approach. This self-reflective process uses narrative, oral and written, as a means of becoming whole and healing personal, historical, and collective wounds.

Same as: ASNAMST 131

CSRE 132J. Sociology of Jewishness. 3-5 Units.

Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

Same as: JEWISHST 132D, SOC 132J

CSRE 133A. Anthropology of the Middle East. 3-5 Units.

This course examines social, political, and religious dimensions of various Middle Eastern societies. Key topics include the development of the modern nation-state, the Islamic revival, human rights, and discourses of democracy. Course materials include ethnographic studies, novels, and films, which provide a rich contextualization of social life and cultural politics in the region.

Same as: ANTHRO 133A

CSRE 133B. Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims. 3-5 Units.

In this course, students will think critically about how knowledge about Islam, Muslims, and Muslim Societies is produced and circulated. As a class, we will consider why and how certain kinds of ideas about Islam and Muslims become representative (i.e., authoritative discourse) while others ideas do not. This is an interdisciplinary class; course material will draw on readings from anthropology, literary criticism, history, sociology and media and cultural studies. We will also be engaging with other kinds of material, including news articles, editorials, documentaries, and films.

Same as: AFRICAST 133B, ANTHRO 133B

CSRE 134. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the iquest;black boxquest; of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores iquest;museum culturesquest;: representations of iquest;selfquest; and iquest;otherquest; within museums and institutional cultures of the museum world itself.

Same as: AMSTUD 134, ARCHLGY 134, ARCHLGY 234, ARTHIST 284B, EDUC 214, NATIVEAM 134

CSRE 135H. Conversations in CSRE: Case Studies in the Stanford Community. 1-2 Unit.

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: ANTHRO 135H

CSRE 135I. CSRE House Seminar: Race and Ethnicity at Stanford. 1-2 Unit.

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: ANTHRO 135I

CSRE 138. Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise. 5 Units.

This course will explore historical as well as current market transformations of medical ethics in different global contexts. We will examine various aspects of the research enterprise, its knowledge-generating and life-saving goals, as well as the societal, cultural, and political influences that make medical research a site of brokering in need of oversight and emergent ethics. This seminar will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state, the media, and certain publics in shaping scientific research agendas. We will also examine how structural violence, poverty, global standing, and issues of citizenship also influence issues of consent and just science and medicine.

Same as: ANTHRO 138, ANTHRO 238

CSRE 140C. Stand Up Comedy and the "Great American Joke" Since 1945. 5 Units.

Development of American Stand Up Comedy in the context of social and cultural eruptions after 1945, including the Borscht Belt, the Chitlinquest; Circuit, the Cold War, censorship battles, Civil Rights and other social movements of the 60s and beyond. The artistry of stories, monologues, jokes, impersonations, persona, social satire, scatology, obscenity, riffs, rants, shtick, and more by such artists as Lenny Bruce, Dick Gregory, Richard Pryor, George Carlin, Margaret Cho, Sarah Silverman, Jon Stewart, Stephen Colbert, as well as precursors such as Mark Twain, minstrelsy and vaudeville and related films, TV shows, poems and other manifestations of similar sensibilities and techniques.

Same as: AMSTUD 140

CSRE 142. The Literature of the Americas. 5 Units.

A wide-ranging overview of the literatures of the Americas inncomparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes--the Harlem Renaissance, the Beats, magic realism, Noigandres--in unaccustomed conversation with each other.

Same as: AMSTUD 142, COMPLIT 142, ENGLISH 172E

CSRE 142A. What is Hemispheric Studies?. 5 Units.

Will attempt to open up "America," beyond the United States. Have we reached the end of an era in our national literary imaginations? What is the utility and durability of the idea of the nation in a global era? New developments in hemispheric, Black Atlantic, and trans-american studies have raised questions about the very viability of US literary studies. Should we, as Franco Moretti suggests, map, count, and graph the relationships in our close (rhetorical) and "distant" readings of texts in the Americas? Topics include the definitions of concepts such as coloniality, modernity, time and the colonial difference, the encounters between world views of Europeans and indigenous Native American peoples, and the inventions of America, Latinamericanism, and Americanity.

CSRE 144. Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class. 5 Units.

Exploration of crossing borders within ourselves, and between us and them, based on a belief that understanding the self leads to understanding others. How personal identity struggles have meaning beyond the individual, how self healing can lead to community healing, how the personal is political, and how artistic self expression based in self understanding can address social issues. The tensions of victimization and agency, contemplation and action, humanities and science, embracing knowledge that comes from the heart as well as the mind. Studies are founded in synergistic consciousness as movement toward meaning, balance, connectedness, and wholeness. Engaging these questions through group process, journaling, reading, drama, creative writing, and storytelling. Study is academic and self-reflective, with an emphasis on developing and presenting creative works in various media that express identity development across borders. Same as: ASNAMST 144, FEMGEN 144X

CSRE 145. Race and Ethnic Relations in the USA. 4 Units.

(Graduate students register for 245.) Race and ethnic relations in the U.S. and elsewhere. The processes that render ethnic and racial boundary markers, such as skin color, language, and culture, salient in interaction situations. Why only some groups become targets of ethnic attacks. The social dynamics of ethnic hostility and ethnic/racial protest movements. Same as: SOC 145, SOC 245

CSRE 145B. Africa in Atlantic Writing. 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Adichie, Condeacute;, Olinto), prose poetry (Ceacute;saire, Neto, Walcott), theoretical reflection (Fanon, Glissant), reportage (Gide, Gourevitch), ethnography (Leiris, Ouloguem) and autobiography (Barack Obama).

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, FRENCH 145B, FRENCH 345B

CSRE 145F. Race and Power. 5 Units.

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the construction of race as a literally made phenomenon, where historical, colonial, bodily, market, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race and capital.

Same as: ANTHRO 145, ANTHRO 245

CSRE 146. Community Matters: Research and Service with Community Organizations. 2-4 Units.

(Taught in conjunction with URBANST 123B. Students participating in CRSI must enroll in CSRE 146. All others can enroll in either course.) This course focuses on issues of research design and how to select specific methodological strategies to assure ethical and effective partnership-based research. In this course, students will plan for their own participation in a CB(P)R project. Topical themes will include best practice strategies for (a) defining and selecting community problems or issues to be addressed, (b) generating relevant and useful research questions, (c) choosing specific means and methods for data collection [e.g., surveys, interviews, focus groups, etc.], (d) storing, organizing and analyzing data, (e) reflecting on and critiquing research findings, and (f) carrying out dissemination in ways that can be expected to enhance community power and advance community development. Students will be provided with opportunities to workshop their respective projects-in-development, (e.g., developing and sharing research questions, data collection instruments, strategies for engaging community constituents as co-researchers, etc.). Students will leave the course with a plan for participating in a CBPR project.

CSRE 146S. Asian American Culture and Community. 3-5 Units.

This course introduces students to the histories of Asians in America, specifically as these histories are part of a broader Asia-US-Pacific history that characterized the 20th century and now the 21st. We will combine readings in history, literature, sociology, with community-based learning. The course takes place over two quarters. The first quarter focuses on gaining knowledge of Asian America and discussion key topics that students wish to focus on collaboratively. During this first quarter we also learn about community-based learning, set up teams and projects, and develop relationships with community organizations. The second quarter students work with student liaisons (senior students who have experience in service learning) and complete their work with the community; there are no formal class meetings this second quarter. Service Learning Course (certified by Haas Center). Course can be repeated once.

Same as: AMSTUD 146, ASNAMST 146S, COMPLIT 146

CSRE 147J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: AFRICAAM 19, AMSTUD 147J, MUSIC 147J, MUSIC 247J

CSRE 148. Comparative Ethnic Conflict. 4 Units.

Causes and consequences of racial and ethnic conflict, including nationalist movements, ethnic genocide, civil war, ethnic separatism, politics, indigenous peoples' movements, and minority rights movements around the world.

Same as: SOC 148, SOC 248

CSRE 150. Race and Political Sociology. 3 Units.

How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena.

Same as: SOC 150, SOC 250

CSRE 151H. ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities. 4-5 Units.

A quarter-long exploration of improvisation in relationship to identity and race in the 21st century in which students investigate new dynamics of doing and thinking identities through the arts. Panel discussions, performances, and talks that engage critically with the theme, concept, and practice of improvising identity across a variety of contexts and genres such as jazz music, modern dance, contemporary art, race comedy, food, and hip-hop poetry/freestyle. Strategies that artists/scholars have used to overturn essentializing notions of identity in theory and practice.

Same as: AMSTUD 151H, DANCE 151H, DANCE 251H, TAPS 151H, TAPS 351H

CSRE 152K. Mixed-Race Politics and Culture. 5 Units.

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? This course approaches issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st-century U.S. Issues surrounding the role of multiculturalism, immigration, acculturation, racial representation, and racial prejudice in American society. Topics include the political and social formation of race; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of census categories and the rise of the multiracial movement.

Same as: AFRICAAM 226, AMSTUD 152K, ENGLISH 152K

CSRE 154. Anthropology of Drugs: Experience, Capitalism, Modernity. 5 Units.

This course examines the significant role of drugs; play in shaping expressions of the self and social life; in the management populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

Same as: ANTHRO 154, ANTHRO 254B

CSRE 154D. Law, Slavery, and Race. 5 Units.

(Same as LAW 747.) This course will explore the interaction of law, slavery and race in the United States, as well as from a comparative perspective. We will read original documents, including excerpts of trial transcripts, appellate opinions, treatises, codes, and first-person narratives. We will study the way law, politics and culture interacted to shape the institution of slavery and the development of modern conceptions of race. Course lectures and discussions will focus on questions such as: Did different legal regimes (Spanish, French, British) foster different systems of race and slavery in the Americas? How did/does law work "on the ground" to shape the production of racial hierarchy and creation of racial identities? In what ways did slavery influence the U.S. Constitution? How has race shaped citizenship in the U.S., and how can we compare it to other constitutional regimes? The course will begin with the origins of New World slavery, race and racism, and move chronologically to the present day.

Same as: AFRICAAM 254D, HISTORY 254D, HISTORY 354

CSRE 156J. Environment, Nature and Race. 3-5 Units.

Environment, nature and race: Politics of belonging, exclusion, and embodiment. Scientific and popular understandings of race and ethnicity remain deeply entangled with ideas about "nature" and the "environment". This course will introduce students to some of the many ways that nature, environment, and race have been and remain intertwined, for better or for worse. What does it mean to claim race is "natural"? To what extent is race shaped by environment and vice versa? How are the politics of race linked to the politics of environmentalism? The class will begin with a brief treatment of current critical consensus on the biology of race and the cultural politics of race and nature, and move on to a theoretical discussion of how humans and "nature" interact. From there, the course moves into historical and ethnographic examples of the politics of race and the environment: the racialized and racializing character of particular environments; the ways that racial politics shape natural environments; and the politics of exclusion and belonging in environmental movements. Case studies will be both rural and urban and draw from anthropology, geography, history, and biology. The course will end by considering the recent resurgence of the race concept in biology.

Same as: ANTHRO 156B

CSRE 157P. Allyship: Challenging Privilege and Doing Solidarity in Movements for Collective Liberation. 2-4 Units.

Many activists in the racial justice, immigrant, indigenous, feminist, and LGBTQ movements, are committed to principles of leadership by frontline communities - their goal is to build power in communities that are disempowered by dominant institutions and practices. This makes for complicated relationships with those that are not part of those frontline communities but recognize that their own silence makes them complicit in systems of oppression. In this course, we will examine how power and privilege can undermine attempts to collaborate in social justice work, and then explore principles and practices of solidarity and allyship that attempt to overcome these challenges. We will discuss texts on white privilege and anti-racism as our primary point of reference, but will connect to other kinds of ally work and movements for collective liberation. As a community-engaged learning course, students will work with community partners to establish long-term relationships based in solidarity. Students are encouraged to work with movements and organizations with whom they already have relationships (e.g., through student-activism). Throughout the quarter, we will have guest lectures and workshops with community partners and movement strategy organizations.

Same as: AFRICAAM 157P, AMSTUD 157P, FEMGEN 157P

CSRE 159M. Movement and Meaning: Dance Studies in Global Comparative Context. 4 Units.

This course introduces students to various approaches to studying dance in a humanities context. We will explore how people create meaning through dance and how dance, in turn, shapes social norms, political institutions, and cultural practices across time and space. The course's structure challenges the Western/non-Western binary that still pervades many academic disciplines by comparing dance forms across the globe on the basis of functional similarities. At the same time, we will keep in mind the unequal power hierarchies shaping our modern world, and therefore we will examine how and why certain forms have become delineated as 'Western' and others as 'world' or 'ethnic,' despite similarities in movement, meaning, or purpose.

Same as: DANCE 23, TAPS 159M, TAPS 259M

CSRE 162. Women in Modern America. 4-5 Units.

This course explores the transition from Victorian to modern womanhood in the U.S. from the 1890s to the end of the 20th century, including the experiences of Native, European, African, Mexican, and Asian American women. It asks how, when, and why the majority of American women become wage earners, gained full citizenship, and enacted political opportunities; how race- and class-specific ideals of womanhood changed in popular culture; and how women have redefined their reproductive and sexual relations.

Same as: AMSTUD 161, FEMGEN 161, HISTORY 161

CSRE 162A. Spirituality and Nonviolent Urban and Social Transformation. 3 Units.

A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, Cesar Chavez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center).

Same as: RELIGST 162, URBANST 126

CSRE 163. Mindful Intelligence: Making Peace in Ourselves and in the World. 3-5 Units.

Our study explores the development of mindfulness and related abilities that lead to making peace in ourselves and in the world. We examine the intersection of race and ethnicity with the emerging field of contemplative studies through the teachings of leaders whose lives were dedicated to both contemplation and social action. Through self reflection, experiential learning, and creative expression we explore the personal as political. We aim to develop the capacity to move among worldviews, transcending particular identities while simultaneously honoring each of them, finding peace among the component parts of our own psyche, and possessing the inner resources to make peace in a multicultural society.

CSRE 164. Immigration and the Changing United States. 4 Units.

The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration.

Same as: CHILATST 164, SOC 164, SOC 264

CSRE 165. Race, Athletics and College Achievement. 3 Units.

How does racial group membership affect academic experiences, and how do race and athletic participation intersect with collegiate life? In this class, we will explore the relationships among race, athletic status, and academic experiences, with a focus on social science data and the specific experiences of Stanford students. Readings will draw from psychology, sociology, education, and popular press. This class is a seminar format with no prerequisites.

Same as: AFRICAAM 165, CTL 165

CSRE 166B. Immigration Debates in America, Past and Present. 3-5 Units.

Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. Part Two considers new immigration patterns after 1965, including those of refugees, and investigates the contemporary debate over immigration and immigration policy in the post 9/11 era as well as inequalities within the system and the impact of foreign policy on exclusions and inclusions.

Same as: HISTORY 166B, HISTORY 366B

CSRE 168. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: ANTHRO 169A, CHILATST 168, FEMGEN 140H

CSRE 171H. Mexicans in the United States. 5 Units.

This course explores the lives and experiences of Mexicans living in the United States, from 1848 to the present. Themes and topics include: the legacies of colonialism, the Mexican-American War, transnational migration, the effects of economic stratification, race and racialization, and the impact of sexual and gender ideologies on the lives of Mexicans residing north of the border.

Same as: AMSTUD 271, CHILATST 171, HISTORY 271

CSRE 172. Out of Place: (W)riting Home. 4 Units.

A creative writing workshop; all genres. This course will introduce students to the fundamentals of a productive creative writing practice, including iquest;the beginner iquest;s mind iquest; (as founded in Eastern spiritual practices); and, an indigenous approach to iquest;authenticity iquest; in one iquest;s work and one iquest;s words. Through w(riting), one returns to the body of home-knowledges, languages, and geographies to uncover what is profoundly original in us as artists, writers and thinkers. iquest;

Same as: TAPS 172, TAPS 272

CSRE 172H. Theories of Citizenship and Sovereignty in a Transnational Context. 4-5 Units.

This course explores the multiple meanings of citizenship and the ways in which they change when examined using different geographic scales (from the local to the transnational). The course will pair theoretical readings on citizenship with case studies that focus on North America. Topics include: definitions of citizenship; the interrelation of ideas of citizenship with those of race, ethnicity, gender, and sexuality; the relationship between sovereignty and territoriality; human and civil rights; and immigration. Same as: AMSTUD 272E, CHILATST 172, FEMGEN 272E, HISTORY 272E, HISTORY 372E

CSRE 174S. When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness. 5 Units.

This is an exploration of the ways in which individuals construct whole selves in societies that fragment, label, and bind us in categories and boxes. We examine identities that overcome the destructive dichotomies of iquest;us iquest; and iquest;them, iquest; crossing borders of race, ethnicity, culture, nation, sex, and gender. Our focus is on the development of hybrid and synergistic forms of identity and mestiza consciousness in which the whole is greater than the sum of its parts.

CSRE 176S. Finding Meaning in Life's Struggles: Narrative Ways of Healing. 5 Units.

We can find meaning in life's struggles through narrative ways of healing. The self-reflective, dynamic process of finding, telling, and living our stories connects us with our whole selves as well as with others. We find our stories through vulnerability and courage; tell them with humility and honesty; and live them authentically and responsibly. Our shared stories will focus on gratitude, acceptance, reconciliation, forgiveness and compassion, empowering us to overcome personal, community, and historical traumas and wounds. In a respectful, caring community we will discover our hidden wholeness by improvising with various experiential and embodied means of finding our stories; telling our stories in diverse ways, including writing, storytelling, music, and art; and living our stories by putting values into action.

Same as: TAPS 176S

CSRE 177. Writing for Performance: The Fundamentals. 5 Units.

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: FEMGEN 177, TAPS 177, TAPS 277

CSRE 177B. Introduction to Dance on the Global Stage. 4 Units.

The course will examine and engage with dance cultures from around the world. Through historical and theoretical readings, film screenings, and viewing performances, this course aims to introduce students to a number of theoretical issues central to the study of dance across various disciplines. As a class we set out to explore how dance is more than a set of organized bodily movements, pleasurable to both do and watch. We will consider what cultural work dance performance accomplishes in the world.

Same as: DANCE 177

CSRE 177E. Well-Being in Immigrant Children & Youth: A Service Learning Course. 3 Units.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177A, EDUC 177A, HUMBIO 29A

CSRE 177F. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177B, EDUC 177B

CSRE 177G. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177C, EDUC 177C

CSRE 178. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.]

Same as: ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

CSRE 178B. Intensive Playwriting. 5 Units.

Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

Same as: TAPS 178B, TAPS 278

CSRE 179C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what is; the facts; can offer.

Same as: CSRE 279C, FEMGEN 179C, TAPS 179C, TAPS 279C

CSRE 179F. Flor y Canto: Poetry Workshop. 3-5 Units.

Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as *flor y canto*, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlacut;n. Required 20-page poetry manuscript.

Same as: CHILATST 179F, TAPS 179F, TAPS 279F

CSRE 179G. Indigenous Identity in Diaspora: People of Color Art Practice in North America. 3-5 Units.

This "gateway" core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

Same as: CSRE 279G, FEMGEN 179G, TAPS 279G

CSRE 183. Re-Imagining American Borders. 5 Units.

How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual preference, and class borders in the context of a national discussion about the place of Americans in the world. How Anna Deavere Smith, Sherman Alexie, or Michael Moore consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzalduacut;e;a's conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these American narratives? Course includes examining one's own identity.

Same as: AMSTUD 183, FEMGEN 183

CSRE 184C. Zionism. 5 Units.

(Same as History 84.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.

Same as: HISTORY 184, JEWISHST 184, REES 184

CSRE 187A. The Anthropology of Race, Nature, and Animality. 5 Units.

As recently as the 40s, the S. Africa government labeled indigenous San people part of the animal landscape. Using the San example as a starting point, course examines socially, culturally, and politically constructed ideas about race, animality, and nature in the cultural and geographic settings of N. America, Australia, and Africa. How connections between race and nature have served as terrains of power through which people and governments have claimed territories and justified violence. Classic texts by nature writers and philosophers and current social science works that focus on race and ethnicity. Concepts such as gender, sex, and nature; environmental tourism; natural resource development; and indigeneity and animality. How ideas about race and nature have come together around concepts such as the myth of wilderness and the violence of considering certain people to be less-than-human. Issues of environmental politics and activism.

Same as: ANTHRO 187A

CSRE 188Q. Imagining Women: Writers in Print and in Person. 4-5 Units.

Gender roles, gender relations and sexual identity explored in contemporary literature and conversation with guest authors. Weekly meetings designated for book discussion and meeting with authors. Interest in writing and a curiosity about diverse women's lives would be helpful to students. Students will use such tools as close reading, research, analysis and imagination. Seminar requires strong voice of all participants. Oral presentations, discussion papers, final projects.

Same as: FEMGEN 188Q

CSRE 189W. Language and Minority Rights. 3 Units.

Language as it is implicated in migration and globalization. The effects of globalization processes on languages, the complexity of language use in migrant and indigenous minority contexts, the connectedness of today's societies brought about by the development of communication technologies. Individual and societal multilingualism; preservation and revival of endangered languages.

Same as: CHILATST 189W, EDUC 189X

CSRE 192E. Topics in the History of Sexuality: Sexual Violence in America. 4-5 Units.

This undergraduate/graduate colloquium explores recent historical interpretations of the history of sexuality, with a focus on sexual violence. The readings cover changing definitions and laws, cultural representations, and the role of gender, race, and age in the construction of rape and other forms of sexual violence. Topics include slavery; incest, seduction, and statutory rape reform; the racialization of rape and the anti-lynching movement; street harassment; men and boys as victims; war and conquest; and feminist responses to rape.

Same as: AMSTUD 258, FEMGEN 258, FEMGEN 358, HISTORY 258, HISTORY 358

CSRE 196C. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: ENGLISH 172D, PSYCH 155, SOC 146, TAPS 165

CSRE 198. Internship for Public Service. 1-5 Unit.

Students should consult with CCSRE Director of Service-Learning (nadiad@stanford.edu) to develop or sign-up for a community service internship. Group meetings may be required. May be repeated for credit. Service Learning Course (certified by Haas Center).

Same as: CHILATST 198

CSRE 200. Latin@ Literature. 3-5 Units.

Examines a diverse set of narratives by U.S. Latin@s of Mexican, Puerto Rican, Cuban, Guatemalan, and Dominican heritage through the lens of latinidad. All share the historical experience of Spanish colonization and U.S. imperialism, yet their im/migration patterns differ, affecting social, cultural, and political trajectories in the US and relationships to "home" and "homeland," nation, diaspora, history, and memory. Explores how racialization informs genders as well as sexualities. Emphasis on textual analysis. Taught in English.

Same as: CHILATST 200, ILAC 280, ILAC 382

CSRE 200R. Directed Research. 1-5 Unit.

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CSRE 200W. Directed Reading. 1-5 Unit.

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CSRE 200X. CSRE Senior Seminar. 5 Units.

Required for CSRE-related students, including those who opt to write honors theses in other departments and programs. Research and the writing of the senior honors thesis or senior paper under the supervision of a faculty project adviser. The process of research including conceptualization, development of prospectus, development of theses, research, analysis, and writing.

CSRE 200Y. CSRE Senior Honors Research. 1-10 Unit.

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CSRE 200Z. CSRE Senior Honors Research. 1-10 Unit.

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CSRE 201. Introduction to Public History and Public Service. 4-5 Units.

Gateway course for the History and Public Service interdisciplinary track. Topics include the production, presentation, and practice of public history through narratives, exhibits, web sites, and events in museums, historical sites, parks, and public service settings in nonprofit organizations, government agencies, and educational institutions. Service Learning Course (certified by Haas Center).

Same as: AFRICAAM 102, HISTORY 201, HISTORY 301

CSRE 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era. 5 Units.

How creative projects build and strengthen communities of common concern. Projects focus on cultural reclamation, multiculturalism, cultural equity and contemporary cultural wars, media literacy, independent film, and community-based art. Guest artists and organizers, films, and case studies.

Same as: CHILATST 201B

CSRE 201C. Critical Concepts in Chican@ Literature. 3-5 Units.

Combines primary texts of Chican@ literature with a metacritical interrogation of key concepts informing Chican@ literary criticism, the construction of Chican@ literary history, and a Chican@ literary canon. Interrogates the resistance paradigm and the "proper" subject of this literature, and critiques established genealogies and foundational authors and texts, as well as issues of periodization, including the notion of "emergence" (e.g. of feminist voices or dissident sexualities). Considers texts, authors and subjects that present alternatives to the resistance paradigm.

Same as: CHILATST 201C, ILAC 380E

CSRE 203A. The Changing Face of America: Building Leaders for Civil Rights and Education. 5 Units.

For students with leadership potential who have studied these topics in lecture format. Race discrimination strategies, their relation to education reform initiatives, and the role of media in shaping racial attitudes in the U.S. A service-learning component will be offered as an option in this course in partnership with East Palo Alto organizations. Application Required! Please apply here: http://bit.ly/CSRE_203A before 5pm on Friday, March 21st.

CSRE 216X. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: AFRICAAM 116, EDUC 216, HISTORY 255E

CSRE 220. Public Policy Institute. 3-5 Units.

Public Policy Institute serves to: provide students with information and perspectives on important public policy issues that have particular relevancy to matters of race and ethnicity in American society, past and present; expose students to faculty and other professionals working on public policy-related issues; and provide insight into the legislative process of public policy making at the state and local levels. Students are expected to conduct research necessary to write a policy brief on a particular issue, and make a presentation based on the policy brief. A field trip to Sacramento introduces students to policymakers and current policy matters of importance to marginalized communities in California.

CSRE 226. Race and Racism in American Politics. 5 Units.

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

Same as: AMSTUD 226, POLISCI 226, POLISCI 326

CSRE 226X. Curating Experience: Representation in and beyond Museums. 2-4 Units.

In an age when some 50% of museum visitors only "visit" museums online and when digital technologies have broken open archival access, anyone can be a curator, a critic, an historian, an archivist. In this context, how do museums create experiences that teach visitors about who they are and about the world around them? What are the politics of representation that shape learning in these environments? Using an experimental instructional approach, students will reconsider and redefine what it means to curate experience.

Same as: AMSTUD 226X, EDUC 226X

CSRE 233A. Counseling Theories and Interventions from a Multicultural Perspective. 3-5 Units.

In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

Same as: AFRICAAM 233A, EDUC 233A

CSRE 243. Writing Across Languages and Cultures: Research in Writing and Writing Instruction. 3-5 Units.

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area.

Same as: EDUC 145, EDUC 243

CSRE 245. Understanding Racial and Ethnic Identity Development. 3-5 Units.

African American, Native American, Mexican American, and Asian American racial and ethnic identity development; the influence of social, political and psychological forces in shaping the experience of people of color in the U.S. The importance of race in relationship to social identity variables including gender, class, and occupational, generational, and regional identifications. Bi- and multiracial identity status, and types of white racial consciousness.

Same as: AFRICAAM 245, EDUC 245

CSRE 246. Constructing Race and Religion in America. 4-5 Units.

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: HISTORY 256G, HISTORY 356G, RELIGST 246, RELIGST 346

CSRE 260. California's Minority-Majority Cities. 4-5 Units.

Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center).

Same as: HISTORY 260

CSRE 279C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what is requested; can offer.

Same as: CSRE 179C, FEMGEN 179C, TAPS 179C, TAPS 279C

CSRE 279G. Indigenous Identity in Diaspora: People of Color Art Practice in North America. 3-5 Units.

This "gateway" core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

Same as: CSRE 179G, FEMGEN 179G, TAPS 279G

CSRE 289E. Queer of Color Critique: Race, Sex, Gender in Cultural Representations. 3-5 Units.

Examines major questions and issues that arise in considering race, sex, and gender together. Focus on critical and theoretical texts queering ethnic and diaspora studies and bringing race and ethnicity into queer studies. Close reading of texts in a variety of media negotiating racialized sexualities and sexualized identities. How is desire racialized? How is racial difference produced through sex acts? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and structures of power?.

Same as: FEMGEN 389E, ILAC 389E

CSRE 290. Ferguson in a Global Frame: Human Rights and the Arts. 3-5 Units.

This course introduces students to fundamental concepts of international human rights and uses these concepts to frame problems of inequality, marginality, exclusion and injustice that are chronic across the globe; including the United States. Focusing on Ferguson as a point of inflection, this course will consider police repression of political protest in a comparative context. The course will also use the lens of fundamental human rights to explore a state's failure to investigate and prosecute, and its failure to protect its citizens from violations committed by agents or from non-state agents. In each thematic unit, we will examine the United States in a comparative lens, and will consider how we understand, frame, mourn and contest the violations of rights in literature, the visual arts, and in social and political action. We will continuously examine the role of the arts in disseminating, shaping and deepening our understanding of multiple dimensions of human rights violations. At the same time, we will consider how these cultural products reflect on, illuminate, contest or problematize advocacy texts and sources of international law. We will examine texts from the United States, Brazil, South Africa, among other countries, as well as documents from international and regional human rights bodies. Same as: AFRICAAM 290, COMPLIT 290

Computational Mathematical Engineering Courses

CME 20Q. Computational Modeling for Future Leaders. 3 Units.

Preference to sophomores. How can we harness and exploit the power of computational modeling? What responsibilities are there in developing and using computer models? In this course we will analyze fundamental issues inherent to computational modeling such as uncertainty, predictability, error, and resolution. We will furthermore examine the social context of computational modeling including the public perception of computational models, how computer modeling impacts politics and policy, and how politics and policy, in turn, influence computer modeling.

CME 100. Vector Calculus for Engineers. 5 Units.

Computation and visualization using MATLAB. Differential vector calculus: analytic geometry in space, functions of several variables, partial derivatives, gradient, unconstrained maxima and minima, Lagrange multipliers. Introduction to linear algebra: matrix operations, systems of algebraic equations, methods of solution and applications. Integral vector calculus: multiple integrals in Cartesian, cylindrical, and spherical coordinates, line integrals, scalar potential, surface integrals, Green's theorem, divergence, and Stokes' theorem. Examples and applications drawn from various engineering fields. Prerequisites: MATH 41 and 42, or 10 units AP credit. Note: Students enrolled in section 100-02 and 100A-02 are required to attend the discussion sections on Thursdays 5:15-6:45. Same as: ENGR 154

CME 100A. Vector Calculus for Engineers, ACE. 6 Units.

Students attend CME100/ENGR154 lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Enrollment by department permission only. Prerequisite: application at: http://soe.stanford.edu/current_students/edp/programs/ace.html.

CME 102. Ordinary Differential Equations for Engineers. 5 Units.

Analytical and numerical methods for solving ordinary differential equations arising in engineering applications: Solution of initial and boundary value problems, series solutions, Laplace transforms, and nonlinear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, finite differences. Introduction to MATLAB programming as a basic tool kit for computations. Problems from various engineering fields. Prerequisite: CME 100/ENGR 154 or MATH 51.

Same as: ENGR 155A

CME 102A. Ordinary Differential Equations for Engineers, ACE. 6 Units.

Students attend CME102/ENGR155A lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: application at: http://soe.stanford.edu/current_students/edp/programs/ace.html.

CME 103. Introduction to Matrix Methods. 4-5 Units.

Introduction to applied linear algebra with emphasis on applications. Vectors, norm, and angle; linear independence and orthonormal sets. Matrices, left and right inverses, QR factorization. Least-squares and model fitting, regularization and cross-validation, time-series prediction, and other examples. Constrained least-squares; applications to least-norm reconstruction, optimal control, and portfolio optimization. Newton methods and nonlinear least-squares. Prerequisites: MATH 51 or CME 100. Same as: EE 103

CME 104. Linear Algebra and Partial Differential Equations for Engineers. 5 Units.

Linear algebra: matrix operations, systems of algebraic equations, Gaussian elimination, undetermined and overdetermined systems, coupled systems of ordinary differential equations, eigensystem analysis, normal modes. Fourier series with applications, partial differential equations arising in science and engineering, analytical solutions of partial differential equations. Numerical methods for solution of partial differential equations: iterative techniques, stability and convergence, time advancement, implicit methods, von Neumann stability analysis. Examples and applications from various engineering fields. Prerequisite: CME 102/ENGR 155A. Same as: ENGR 155B

CME 104A. Linear Algebra and Partial Differential Equations for Engineers, ACE. 6 Units.

Students attend CME104/ENGR155B lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: application at: http://soe.stanford.edu/current_students/edp/programs/ace.html.

CME 106. Introduction to Probability and Statistics for Engineers. 3-4 Units.

Probability: random variables, independence, and conditional probability; discrete and continuous distributions, moments, distributions of several random variables. Topics in mathematical statistics: random sampling, point estimation, confidence intervals, hypothesis testing, non-parametric tests, regression and correlation analyses; applications in engineering, industrial manufacturing, medicine, biology, and other fields. Prerequisite: CME 100/ENGR154 or MATH 51. Same as: ENGR 155C

CME 108. Introduction to Scientific Computing. 3-4 Units.

Introduction to Scientific Computing Numerical computation for mathematical, computational, physical sciences and engineering: error analysis, floating-point arithmetic, nonlinear equations, numerical solution of systems of algebraic equations, banded matrices, least squares, unconstrained optimization, polynomial interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, truncation error, numerical stability for time dependent problems and stiffness. Implementation of numerical methods in MATLAB programming assignments. Prerequisites: MATH 51, 52, 53; prior programming experience (MATLAB or other language at level of CS 106A or higher). Graduate students should take it for 3 units and undergraduate students should take it for 4 units. Same as: MATH 114

CME 151. Introduction to Data Visualization. 1 Unit.

Bring your data to life with beautiful and interactive visualizations. This course is designed to provide practical experience on combining data science and graphic design to effectively communicate knowledge buried inside complex data. Each lecture will explore a different set of free industry-standard tools, for example d3.js, three.js, ggplots2, and processing; enabling students to think critically about how to architect their own interactive visualization for data exploration, web, presentations, and publications. Geared towards scientists and engineers, and with a particular emphasis on web, this course assumes an advanced background in programming methodology in multiple languages (particularly R and Javascript). Assignments are short and focus on visual experimentation with interesting data sets or the students' own data. Topics: data, visualization, web. Prerequisites: some experience with general programming is required to understand the lectures and assignments.

CME 181. Projects in Applied and Computational Mathematics. 3 Units.

Teams of students use techniques in applied and computational mathematics to tackle problems of their choosing. Students will have the opportunity to pursue open-ended projects in a variety of areas: economics, physics, political science, operations research, etc. Projects can cover (but are not limited to!) topics such as mathematical modeling of real-world phenomena (population dynamics), data-driven applications (movie recommendations) or complex systems in engineering (optimal control). Each team will be paired with a graduate student mentor working in applied and computational mathematics. Limited enrollment. Prerequisites: CME 100/102/104 or equivalents, or instructor consent. Recommended: CME 106/108 and familiarity with programming at the level of CME 192/193.

CME 184. Startup Engineering. 3 Units.

Spiritual sequel to Peter Thiel's CS 183 course on startups. A new course that bridges the gap between academic computer science and production software engineering. Fast-paced introduction to key tools and techniques (command line, dotfiles, text editor, distributed version control, debugging, testing, documentation, reading code, deployments), featuring guest appearances by senior engineers from successful startups and large-scale academic projects including Uber, Square, Stripe, AirBnB, Twilio, Taskrabbit, Judicata, Counsyl, Asana, Heroku, and Twitter. Over the course of the class, students will build a command line application, expose it as a web service, and then link other students' applications and services together to build an HTML5 mobile app. General principles are illustrated through modern Javascript and the latest web technologies, including Node, Backbone, Coffeescript, Bootstrap, Git, and Github. Prerequisites: Basic computer science as per CS 106B. Recommended: some familiarity with HTML, CSS, and Javascript.

CME 192. Introduction to MATLAB. 1 Unit.

This short course runs for the first eight weeks of the quarter and is offered each quarter during the academic year. It is highly recommended for students with no prior programming experience who are expected to use MATLAB in math, science, or engineering courses. It will consist of interactive lectures and application-based assignments. The goal of the short course is to make students fluent in MATLAB and to provide familiarity with its wide array of features. The course covers an introduction of basic programming concepts, data structures, and control/flow; and an introduction to scientific computing in MATLAB, scripts, functions, visualization, simulation, efficient algorithm implementation, toolboxes, and more.

CME 193. Introduction to Scientific Python. 1 Unit.

This short course runs for the first eight weeks of the quarter and is offered each quarter during the academic year. It is recommended for students who want to use Python in math, science, or engineering courses and for students who want to learn the basics of Python programming. The goal of the short course is to familiarize students with Pythonic tools for scientific computing. Lectures will be interactive with a focus on learning by example, and assignments will be application-driven. Some prior programming experience is highly recommended. Topics covered include control flow, basic data structures, File I/O, and an introduction to NumPy/SciPy.

CME 194. Introduction to MPI. 1 Unit.

This short course runs for the first four weeks of the quarter. Recommended for students interested in writing parallel programs. Focus is on distributed memory programming via the Message Passing Interface (MPI). Topics include: parallel decomposition, basic communication primitives, collective operations, and debugging. Interactive lectures and homework assignments require writing software. Students should be comfortable and interested in writing software in C/C++ but no prior parallel programming experience is required.

CME 195. Introduction to R. 1 Unit.

This short course runs for the first four weeks of the quarter and is offered in fall and spring. It is recommended for students who want to use R in statistics, science, or engineering courses and for students who want to learn the basics of R programming. The goal of the short course is to familiarize students with R's tools for scientific computing. Lectures will be interactive with a focus on learning by example, and assignments will be application-driven. No prior programming experience is needed. Topics covered include basic data structures, File I/O, graphs, control structures, etc, and some useful packages in R.

Same as: STATS 195

CME 196. Practical Fortran. 1 Unit.

A five-week short course presenting the use of the Fortran programming language in science and engineering. Topics covered: basic language elements; good programming practices; testing and debugging; verification and validation; differences between Fortran-77 and Fortran-90 (95, 03, 08); calling numerical software libraries such as LAPACK; calling Fortran routines from C or C++; performance considerations. The course will be centered around solving iquest;realquest; computational problems, emphasizing practice over theory. Programming proficiency in C/C++, or other modern compiled language, is required. Familiarity with the GNU development tools (compilers, debuggers, makefiles, etc.) is assumed. Prerequisites: CME 211 or equivalent.

CME 200. Linear Algebra with Application to Engineering Computations. 3 Units.

Computer based solution of systems of algebraic equations obtained from engineering problems and eigen-system analysis, Gaussian elimination, effect of round-off error, operation counts, banded matrices arising from discretization of differential equations, ill-conditioned matrices, matrix theory, least square solution of unsolvable systems, solution of non-linear algebraic equations, eigenvalues and eigenvectors, similar matrices, unitary and Hermitian matrices, positive definiteness, Cayley-Hamilton theory and function of a matrix and iterative methods. Prerequisite: familiarity with computer programming, and MATH51.

Same as: ME 300A

CME 204. Partial Differential Equations in Engineering. 3 Units.

Geometric interpretation of partial differential equation (PDE) characteristics; solution of first order PDEs and classification of second-order PDEs; self-similarity; separation of variables as applied to parabolic, hyperbolic, and elliptic PDEs; special functions; eigenfunction expansions; the method of characteristics. If time permits, Fourier integrals and transforms, Laplace transforms. Prerequisite: CME 200/ME 300A, equivalent, or consent of instructor.

Same as: ME 300B

CME 206. Introduction to Numerical Methods for Engineering. 3 Units.

Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B.
Same as: AA 214A, ME 300C

CME 211. Introduction to Programming for Scientists and Engineers. 3 Units.

Basic usage of the Python and C/C++ programming languages are introduced and used to solve representative computational problems from various science and engineering disciplines. Software design principles including time and space complexity analysis, data structures, object-oriented design, decomposition, encapsulation, and modularity are emphasized. Usage of campus wide Linux compute resources: login, file system navigation, editing files, compiling and linking, file transfer, etc. Versioning and revision control, software build utilities, and the LaTeX typesetting software are introduced and used to help complete individual programming assignments and a final project. Prerequisite: Some previous experience with programming (does not need to be a formal course in programming).
Same as: EARTHSCI 211

CME 212. Advanced Programming for Scientists and Engineers. 3 Units.

Advanced topics in software programming, debugging, and performance optimization are covered. The capabilities and usage of common libraries and frameworks such as BLAS, LAPACK, FFT, PETSc, and MKL/ACML are reviewed. Computer representation of integer and floating point numbers, and interoperability between C/C++ and Fortran is described. More advanced software engineering topics including: representing data in files, application checkpoint/restart, signals, unit and regression testing, and build automation. The use of debugging tools including static analysis, gdb, and Valgrind are introduced. An introduction to computer architecture covering processors, memory hierarchy, storage, and networking provides a foundation for understanding software performance. Profiles generated using gprof and perf are used to help guide the performance optimization process. Computational problems from various science and engineering disciplines will be used in individual and group assignments. Prerequisites: CME 200/ME 300A and CME 211 or equivalent level of programming proficiency in Python and C/C++.
Same as: ENERGY 212

CME 213. Introduction to parallel computing using MPI, openMP, and CUDA. 3 Units.

This class will give hands on experience with programming multicore processors, graphics processing units (GPU), and parallel computers. Focus will be on the message passing interface (MPI, parallel clusters) and the compute unified device architecture (CUDA, GPU). Topics will include: network topologies, modeling communication times, collective communication operations, parallel efficiency, MPI, dense linear algebra using MPI. Symmetric multiprocessing (SMP), pthreads, openMP. CUDA, combining MPI and CUDA, dense linear algebra using CUDA, sort, reduce and scan using CUDA. Pre-requisites include: C programming language and numerical algorithms (solution of differential equations, linear algebra, Fourier transforms).
Same as: ME 339

CME 213B. Parallel Computing Projects. 3 Units.

Students will discuss, devise and implement parallel applications for a discipline of mutual interest. The parallel implementation will focus on the use of MPI for clusters, OpenMP for multicore processors, and/or CUDA for GPU processors. Instructors will help guide students to relevant literature and resources. A short introduction to MPI, OpenMP, and CUDA will be given at the beginning of the quarter. Hardware will be available for the duration of the quarter including NVIDIA Jetson TK1 development kits, and the ICME GPU cluster. Prerequisites: CME 211/212 or equivalent.

CME 214. Software Design in Modern Fortran for Scientists and Engineers. 3 Units.

This course introduces software design and development in modern Fortran. Course covers the functional, object-oriented-, and parallel programming features introduced in the Fortran 95, 2003, and 2008 standards, respectively, in the context of numerical approximations to ordinary and partial differential equations; introduces object-oriented design and design schematics based on the Unified Modeling Language (UML) structure, behavior, and interaction diagrams; cover the basic use of several open-source tools for software building, testing, documentation generation, and revision control. Recommended: Familiarity with programming in Fortran 90, basic numerical analysis and linear algebra, or instructor approval.
Same as: EARTHSCI 214

CME 215A. Advanced Computational Fluid Dynamics. 3 Units.

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.
Same as: AA 215A

CME 215B. Advanced Computational Fluid Dynamics. 3 Units.

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.
Same as: AA 215B

CME 232. Introduction to Computational Mechanics. 3 Units.

Provides an introductory overview of modern computational methods for problems arising primarily in mechanics of solids and is intended for students from various engineering disciplines. The course reviews the basic theory of linear solid mechanics and introduces students to the important concept of variational forms, including the principle of minimum potential energy and the principles of virtual work. Specific model problems that will be considered include deformation of bars, beams and membranes, plates, and problems in plane elasticity (plane stress, plane strain, axisymmetric elasticity). The variational forms of these problems are used as the starting point for developing the finite element method (FEM) and boundary element method (BEM) approaches; providing an important connection between mechanics and computational methods.
Same as: ME 332

CME 239B. Workshop in Quantitative Finance. 1 Unit.

Topics of current interest. May be repeated for credit.
Same as: STATS 239B

CME 242. Mathematical and Computational Finance Seminar. 1 Unit.

Same as: STATS 239

CME 243. Financial Models and Statistical Methods in Active Risk Management. 2-4 Units.

(SCPD students register for 243P.) Market risk and credit risk, credit markets. Back testing, stress testing and Monte Carlo methods. Logistic regression, generalized linear models and generalized mixed models. Loan prepayment and default as competing risks. Survival and hazard functions, correlated default intensities, frailty and contagion. Risk surveillance, early warning and adaptive control methodologies. Banking and bank regulation, asset and liability management. Prerequisite: STATS 240 or equivalent. Same as: STATS 243

CME 244. Project Course in Mathematical and Computational Finance. 1-6 Unit.

For graduate students in the MCF track; students will work individually or in groups on research projects.

CME 245. Topics in Mathematical and Computational Finance. 1 Unit.

Current topics for enrolled students in the MCF program; can be repeated up to three times.

CME 250. Introduction to Machine Learning. 1 Unit.

A short course presenting the principles behind when, why, and how to apply modern machine learning algorithms. We will discuss a framework for reasoning about when to apply various machine learning techniques, emphasizing questions of over-fitting/under-fitting, regularization, interpretability, supervised/unsupervised methods, and handling of missing data. The principles behind various algorithms--the why and how of using them--will be discussed, while some mathematical detail underlying the algorithms--including proofs--will not be discussed. Unsupervised machine learning algorithms presented will include k-means clustering, principal component analysis (PCA), and independent component analysis (ICA). Supervised machine learning algorithms presented will include support vector machines (SVM), classification and regression trees (CART), boosting, bagging, and random forests. Imputation, the lasso, and cross-validation concepts will also be covered. The R programming language will be used for examples, though students need not have prior exposure to R. Prerequisite: undergraduate-level linear algebra and statistics; basic programming experience (R/Matlab/Python).

CME 263. Introduction to Linear Dynamical Systems. 3 Units.

Applied linear algebra and linear dynamical systems with application to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-input/multi-output systems, impulse and step matrices; convolution and transfer matrix descriptions. Control, reachability, and state transfer; observability and least-squares state estimation. Prerequisites: linear algebra and matrices as in MATH 103; differential equations and Laplace transforms as in EE 102A. Same as: EE 263

CME 291. Master's Research. 1-6 Unit.

Students require faculty sponsor. (Staff).

CME 292. Advanced MATLAB for Scientific Computing. 1 Unit.

Short course running first four weeks of the quarter (8 lectures) with interactive lectures and application based assignment. Students will be introduced to advanced MATLAB features, syntaxes, and toolboxes not traditionally found in introductory courses. Material will be reinforced with in-class examples, demos, and homework assignment involving topics from scientific computing. MATLAB topics will be drawn from: advanced graphics (2D/3D plotting, graphics handles, publication quality graphics, animation), MATLAB tools (debugger, profiler), code optimization (vectorization, memory management), object-oriented programming, compiled MATLAB (MEX files and MATLAB coder), interfacing with external programs, toolboxes (optimization, parallel computing, symbolic math, PDEs). Scientific computing topics will include: numerical linear algebra, numerical optimization, ODEs, and PDEs.

CME 300. First Year Seminar Series. 1 Unit.

Required for first-year ICME Ph.D. students; recommended for first-year ICME M.S. students. Presentations about research at Stanford by faculty and researchers from Engineering, H&S, and organizations external to Stanford. May be repeated for credit.

CME 302. Numerical Linear Algebra. 3 Units.

First in a three quarter graduate sequence. Solution of systems of linear equations: direct methods, error analysis, structured matrices; iterative methods and least squares. Parallel techniques. Prerequisites: CME 108, MATH 103 or 113.

CME 303. Partial Differential Equations of Applied Mathematics. 3 Units.

First-order partial differential equations; method of characteristics; weak solutions; elliptic, parabolic, and hyperbolic equations; Fourier transform; Fourier series; and eigenvalue problems. Prerequisite: foundation in multivariable calculus and ordinary differential equations. Same as: MATH 220

CME 304. Numerical Optimization. 3 Units.

Solution of nonlinear equations; unconstrained optimization; linear programming; quadratic programming; global optimization; general linearly and nonlinearly constrained optimization. Theory and algorithms to solve these problems. Prerequisite: background in analysis and numerical linear algebra. Same as: MSE 315

CME 305. Discrete Mathematics and Algorithms. 3 Units.

Topics: Basic Algebraic Graph Theory, Matroids and Minimum Spanning Trees, Submodularity and Maximum Flow, NP-Hardness, Approximation Algorithms, Randomized Algorithms, The Probabilistic Method, and Spectral Sparsification using Effective Resistances. Topics will be illustrated with applications from Distributed Computing, Machine Learning, and large-scale Optimization. Prerequisites: CS 261 is highly recommended, although not required. Same as: MSE 316

CME 306. Numerical Solution of Partial Differential Equations. 3 Units.

Hyperbolic partial differential equations: stability, convergence and qualitative properties; nonlinear hyperbolic equations and systems; combined solution methods from elliptic, parabolic, and hyperbolic problems. Examples include: Burger's equation, Euler equations for compressible flow, Navier-Stokes equations for incompressible flow. Prerequisites: MATH 220A or CME 302. Same as: MATH 226

CME 308. Stochastic Methods in Engineering. 3 Units.

Review of basic probability; Monte Carlo simulation; state space models and time series; parameter estimation, prediction, and filtering; Markov chains and processes; stochastic control; and stochastic differential equations. Examples from various engineering disciplines. Prerequisites: exposure to probability; background in real variables and analysis. Same as: MATH 228

CME 309. Randomized Algorithms and Probabilistic Analysis. 3 Units. Randomness pervades the natural processes around us, from the formation of networks, to genetic recombination, to quantum physics. Randomness is also a powerful tool that can be leveraged to create algorithms and data structures which, in many cases, are more efficient and simpler than their deterministic counterparts. This course covers the key tools of probabilistic analysis, and application of these tools to understand the behaviors of random processes and algorithms. Emphasis is on theoretical foundations, though we will apply this theory broadly, discussing applications in machine learning and data analysis, networking, and systems. Topics include tail bounds, the probabilistic method, Markov chains, and martingales, with applications to analyzing random graphs, metric embeddings, random walks, and a host of powerful and elegant randomized algorithms. Prerequisites: CS 161 and STAT 116, or equivalents and instructor consent.
Same as: CS 265

CME 321A. Mathematical Methods of Imaging. 3 Units. Image denoising and deblurring with optimization and partial differential equations methods. Imaging functionals based on total variation and l-1 minimization. Fast algorithms and their implementation.
Same as: MATH 221A

CME 321B. Mathematical Methods of Imaging. 3 Units. Array imaging using Kirchhoff migration and beamforming, resolution theory for broad and narrow band array imaging in homogeneous media, topics in high-frequency, variable background imaging with velocity estimation, interferometric imaging methods, the role of noise and inhomogeneities, and variational problems that arise in optimizing the performance of array imaging algorithms.
Same as: MATH 221B

CME 322. Spectral Methods in Computational Physics. 3 Units. Data analysis, spectra and correlations, sampling theorem, nonperiodic data, and windowing; spectral methods for numerical solution of partial differential equations; accuracy and computational cost; fast Fourier transform, Galerkin, collocation, and Tau methods; spectral and pseudospectral methods based on Fourier series and eigenfunctions of singular Sturm-Liouville problems; Chebyshev, Legendre, and Laguerre representations; convergence of eigenfunction expansions; discontinuities and Gibbs phenomenon; aliasing errors and control; efficient implementation of spectral methods; spectral methods for complicated domains; time differencing and numerical stability.
Same as: ME 408

CME 323. Distributed Algorithms and Optimization. 3 Units. The emergence of large distributed clusters of commodity machines has brought with it a slew of new algorithms and tools. Many fields such as Machine Learning and Optimization have adapted their algorithms to handle such clusters. Topics include distributed algorithms for: Optimization, Numerical Linear Algebra, Machine Learning, Graph analysis, Streaming and online algorithms, and other problems that are challenging to scale on a commodity cluster. Throughout the class, topics will be illustrated with hands-on exercises using the high-speed cluster programming framework, Spark, with computing resources provided by the instructor.

CME 325. Numerical Approximations of Partial Differential Equations in Theory and Practice. 1-2 Unit. Finite volume and finite difference methods for initial boundary value problems in multiple space dimensions. Emphasis is on formulation of boundary conditions for the continuous and the discrete problems. Analysis of numerical methods with respect to stability, accuracy, and error behavior. Techniques of treating non-rectangular domains, and effects of non-regular grids.

CME 326. Numerical Methods for Initial Boundary Value Problems. 3 Units.

Initial boundary value problems model many phenomena in engineering and science such as, fluid flow problems, wave propagation, fluid-structure interaction, conjugate heat transfer and financial mathematics. We discuss numerical techniques for such simulations and focus on the underlying principles and theoretical understanding. Emphasis is on stability, convergence and efficiency for methods applied to hyperbolic and parabolic initial boundary value problems.

CME 327. Numerical Methods for Stiff Problems. 3 Units. Focus is on analysis of numerical techniques for stiff ordinary differential equations, including those resulting from spatial discretization of partial differential equations. Topics include stiffness, convergence, stability, adaptive time stepping, implicit time-stepping methods (SDIRK, Rosenbrock), linear and nonlinear system solvers (Fixed Point, Newton, Multigrid, Krylov subspace methods) and preconditioning. Pre-requisites: CME200/ME300A or equivalent; or consent of instructor.

CME 328. Advanced Topics in Partial Differential Equations. 3 Units. Contents change each time and is taught as a topics course, most likely by a faculty member visiting from another institution. May be repeated for credit. Topic in 2012-13: numerical solution of time-dependent partial differential equations is a fundamental tool for modeling and prediction in many areas of science and engineering. In this course we explore the stability, accuracy, efficiency, and appropriateness of specialized temporal integration strategies for different classes of partial differential equations including stiff problems and fully implicit methods, operator splitting and semi-implicit methods, extrapolation methods, multirate time integration, multi-physics problems, symplectic integration, and temporal parallelism. Prerequisites: recommended CME303 and 306 or with instructor's consent.

CME 329. Top Ten Algorithms of the 20th Century. 3 Units. A high-level survey course covering one algorithm per week: metropolis, simplex method, conjugate gradient, QR, quicksort, fast fourier transform, maxcut, fast multipole method, integer relation detection, and convex/semi-definite programming.
Same as: MATH 310

CME 330. Applied Mathematics in the Chemical and Biological Sciences. 3 Units. Mathematical solution methods via applied problems including chemical reaction sequences, mass and heat transfer in chemical reactors, quantum mechanics, fluid mechanics of reacting systems, and chromatography. Topics include generalized vector space theory, linear operator theory with eigenvalue methods, phase plane methods, perturbation theory (regular and singular), solution of parabolic and elliptic partial differential equations, and transform methods (Laplace and Fourier). Prerequisites: CME 102/ENGR 155A and CME 104/ENGR 155B, or equivalents.
Same as: CHEMENG 300

CME 334. Advanced Methods in Numerical Optimization. 3 Units. Topics include interior-point methods, relaxation methods for nonlinear discrete optimization, sequential quadratic programming methods, optimal control and decomposition methods. Topic chosen in first class; different topics for individuals or groups possible. Individual or team projects. May be repeated for credit.
Same as: MSE 312

CME 335. Advanced Topics in Numerical Linear Algebra. 3 Units. Possible topics: Approximate invariant subspaces and Krylov decompositions, modern interpretations of the Hessenberg QR algorithm, accurate symmetric factorizations (e.g., Bunch-Kaufman), low-rank modifications of factorizations, sparse-direct factorizations, and, if time permits, a small selection of topics chosen by the students. Prerequisite - CME 302: Numerical Linear Algebra.

CME 336. Linear and Conic Optimization with Applications. 3 Units.

Linear, semidefinite, conic, and convex nonlinear optimization problems as generalizations of classical linear programming. Algorithms include the interior-point, barrier function, and cutting plane methods. Related convex analysis, including the separating hyperplane theorem, Farkas lemma, dual cones, optimality conditions, and conic inequalities. Complexity and/or computation efficiency analysis. Applications to combinatorial optimization, sensor network localization, support vector machine, and graph realization. Prerequisite: MS&E 211 or equivalent.

Same as: MSE 314

CME 337. Spectral Graph Theory and Algorithmic Applications. 3 Units.

Brings students to the forefront of a very active area of research. Reviews classic results relating graph expansion and spectra, random walks, random spanning trees, and their electrical network representation. Covers recent progress on graph sparsification, Kadison-Singer problem and approximation algorithms for traveling salesman problems.

Same as: MSE 337

CME 338. Large-Scale Numerical Optimization. 3 Units.

The main algorithms and software for constrained optimization emphasizing the sparse-matrix methods needed for their implementation. Iterative methods for linear equations and least squares. The simplex method. Basis factorization and updates. Interior methods. The reduced-gradient method, augmented Lagrangian methods, and SQP methods. Prerequisites: Basic numerical linear algebra, including LU, QR, and SVD factorizations, and an interest in MATLAB, sparse-matrix methods, and gradient-based algorithms for constrained optimization. Recommended: MS&E 310, 311, 312, 314, or 315; CME 108, 200, 302, 304, 334, or 335. Same as: MSE 318

CME 342. Parallel Methods in Numerical Analysis. 3 Units.

Emphasis is on techniques for obtaining maximum parallelism in numerical algorithms, especially those occurring when solving matrix problems, partial differential equations, and the subsequent mapping onto the computer. Implementation issues on parallel computers. Topics: parallel architecture, programming models (MPI, GPU Computing with CUDA iquest; quick review), matrix computations, FFT, fast multiple methods, domain decomposition, graph partitioning, discrete algorithms. Prerequisites: 302 or 200 (ME 300A), 213 or equivalent, or consent of instructor. Recommended: differential equations and knowledge of a high-level programming language such as C or C++ (F90/95 also allowable).

CME 345. Model Reduction. 3 Units.

Model reduction is an indispensable tool for computational-based design and optimization, statistical analysis, embedded computing, and real-time optimal control. This course presents the basic mathematical theory for projection-based model reduction. Topics include: notions of linear dynamical systems and projection; projection-based model reduction; error analysis; proper orthogonal decomposition; Hankel operator and balancing of a linear dynamical system; balanced truncation method: modal truncation and other reduction methods for linear oscillators; model reduction via moment matching methods based on Krylov subspaces; introduction to model reduction of parametric systems and notions of nonlinear model reduction. Course material is complemented by a balanced set of theoretical, algorithmic and Matlab computer programming assignments. Prerequisites: CME 200 or equivalent, CME 263 or equivalent and basic numerical methods for ODEs.

CME 356. Engineering Functional Analysis and Finite Elements. 3 Units.

Concepts in functional analysis to understand models and methods used in simulation and design. Topology, measure, and integration theory to introduce Sobolev spaces. Convergence analysis of finite elements for the generalized Poisson problem. Extensions to convection-diffusion-reaction equations and elasticity. Upwinding. Mixed methods and LBB conditions. Analysis of nonlinear and evolution problems. Prerequisites: 335A,B, CME 200, CME 204, or consent of instructor. Recommended: 333, MATH 171. Same as: ME 412

CME 358. Finite Element Method for Fluid Mechanics. 3 Units.

Mathematical theory of the finite element method for incompressible flows; related computational algorithms and implementation details. Poisson equation; finite element method for simple elliptic problems; notions of mathematical analysis of non-coercive partial differential equations; the inf-sup or Babushka-Brezzi condition and its applications to the Stokes and Darcy problems; presentation of stable mixed finite element methods and corresponding algebraic solvers; stabilization approaches in the context of advection-diffusion equation; numerical solution of the incompressible Navier-Stokes equations by finite element method. Theoretical, computational, and MATLAB computer programming assignments. Prerequisites: foundation in multivariate calculus and ME 335A or equivalent.

CME 362. An Introduction to Compressed Sensing. 3 Units.

Compressed sensing is a new data acquisition theory asserting that one can design nonadaptive sampling techniques that condense the information in a compressible signal into a small amount of data. This revelation may change the way engineers think about signal acquisition. Course covers fundamental theoretical ideas, numerical methods in large-scale convex optimization, hardware implementations, connections with statistical estimation in high dimensions, and extensions such as recovery of data matrices from few entries (famous Netflix Prize).

Same as: STATS 330

CME 364A. Convex Optimization I. 3 Units.

Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, basic probability.

Same as: CS 334A, EE 364A

CME 364B. Convex Optimization II. 3 Units.

Continuation of 364A. Subgradient, cutting-plane, and ellipsoid methods. Decentralized convex optimization via primal and dual decomposition. Monotone operators and proximal methods; alternating direction method of multipliers. Exploiting problem structure in implementation. Convex relaxations of hard problems. Global optimization via branch and bound. Robust and stochastic optimization. Applications in areas such as control, circuit design, signal processing, and communications. Course requirements include project. Prerequisite: 364A.

Same as: EE 364B

CME 371. Computational Biology in Four Dimensions. 3 Units.

Computational approaches to understanding the three-dimensional spatial organization of biological systems and how that organization evolves over time. The course will cover cutting-edge research in both physics-based simulation and computational analysis of experimental data, at scales ranging from individual molecules to entire cells. Prerequisite: CS 106A or equivalent, and an introductory course in biology or biochemistry. Recommended: some experience in mathematical modeling (does not need to be a formal course).

Same as: CS 371

CME 372. Applied Fourier Analysis and Elements of Modern Signal Processing. 3 Units.

Introduction to the mathematics of the Fourier transform and how it arises in a number of imaging problems. Mathematical topics include the Fourier transform, the Plancherel theorem, Fourier series, the Shannon sampling theorem, the discrete Fourier transform, and the spectral representation of stationary stochastic processes. Computational topics include fast Fourier transforms (FFT) and nonuniform FFTs. Applications include Fourier imaging (the theory of diffraction, computed tomography, and magnetic resonance imaging) and the theory of compressive sensing.

Same as: MATH 262

CME 375. Advanced Topics in Convex Optimization. 3 Units.

Modern developments in convex optimization: semidefinite programming; novel and efficient first-order algorithms for smooth and nonsmooth convex optimization. Emphasis on numerical methods suitable for large scale problems arising in science and engineering. Prerequisites: convex optimization (EE 364), linear algebra (Math 104), numerical linear algebra (CME 302); background in probability, statistics, real analysis and numerical optimization.

Same as: MATH 301

CME 390. Curricular Practical Training. 1 Unit.

May be repeated three times for credit.

CME 399. Special Research Topics in Computational and Mathematical Engineering. 1-15 Unit.

Graduate-level research work not related to report, thesis, or dissertation. May be repeated for credit.

CME 400. Ph.D. Research. 1-15 Unit.

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CME 444. Computational Consulting. 1-3 Unit.

Advice by graduate students under supervision of ICME faculty. Weekly briefings with faculty adviser and associated faculty to discuss ongoing consultancy projects and evaluate solutions. May be repeated for credit.

CME 500. Departmental Seminar. 1 Unit.

Weekly research lectures by experts from academia, national laboratories, industry, and doctoral students. May be repeated for credit. In autumn and winter 2014-15, this seminar will predominantly feature current graduate students talking about their research.

CME 510. Linear Algebra and Optimization Seminar. 1 Unit.

Recent developments in numerical linear algebra and numerical optimization. Guest speakers from other institutions and local industry. Goal is to bring together scientists from different theoretical and application fields to solve complex scientific computing problems. May be repeated for credit.

CME 520. Topics in Simulation of Human Physiology & Anatomical Systems. 1 Unit.

Biweekly interdisciplinary lecture series on the development of computational tools for modeling and simulation of human physiological and anatomical systems. Lectures by instructors and guest speakers on topics such as surgical simulation, anatomical & surgical Modeling, neurological Systems, and biomedical models of human movement. Group discussions, team based assignments, and project work. Prerequisite: Medical students, residents or fellows from school of medicine, and computationally oriented students with a strong interest to explore computational and mathematical methods related to the health sciences. Same as: SURG 253

CME 801. TGR Project. 0 Units.

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CME 802. TGR Dissertation. 0 Units.

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Computer Science Courses

CS 1C. Introduction to Computing at Stanford. 1 Unit.

For those with limited experience with computers or who want to learn more about Stanford's computing environment. Topics include: computer maintenance and security, computing resources, Internet privacy, and copyright law. One-hour lecture/demonstration in dormitory clusters prepared and administered weekly by the Resident Computer Consultant (RCC). Final project. Not a programming course.

CS 1U. Practical Unix. 1 Unit.

A practical introduction to using the Unix operating system with a focus on Linux command line skills. Class will consist of video tutorials and weekly hands-on lab sections. The time listed on AXESS is for the first week's logistical meeting only. Topics include: grep and regular expressions, ZSH, Vim and Emacs, basic and advanced GDB features, permissions, working with the file system, revision control, Unix utilities, environment customization, and using Python for shell scripts. Topics may be added, given sufficient interest. Course website: <http://cs1u.stanford.edu>.

CS 2C. Introduction to Media Production. 1-2 Unit.

Sound, image and video editing techniques and applications, including understanding file formats and publishing multimedia online. Topics include GarageBand, Photoshop, iMovie, and production best practices. Weekly lecture followed by lab section. Second unit for additional creative production assignments completed outside of class time and Final Project with group. Not a programming course, but will use computer multimedia applications heavily for editing.

CS 9. Problem-Solving for the CS Technical Interview. 1 Unit.

This course will prepare students to interview for software engineering and related internships and full-time positions in industry. Drawing on multiple sources of actual interview questions, students will learn key problem-solving strategies specific to the technical/coding interview. Students will be encouraged to synthesize information they have learned across different courses in the major. Emphasis will be on the oral and combination written-oral modes of communication common in coding interviews, but which are unfamiliar settings for problem solving for many students. Prerequisites: CS 106B or X.

CS 10SC. Great Ideas in Computer Science. 2 Units.

Computers have come to permeate many aspects of our lives, from how we communicate with each other to how we produce and consume information. And while it is all too easy to think of computing in terms of the products and applications we see emerging from technology companies, the intellectual foundations of computer science go much deeper. Indeed, beneath the surface of the tools we use, the social networks we engage in, and the web of information we search, lays a field rich with fascinating, intellectually exciting, and sometimes unexpectedly surprising ideas. In this seminar, we will explore several of the great ideas in computer science, looking at both challenging problems and their impact on real applications. From understanding how search engines on the Web work to looking at mathematical theories underlying social networks, from questioning whether a computer can be intelligent to analyzing the notion of what is even possible to compute, this seminar will take us on a series of intellectual excursions that will change the way you look at computers. No prior experience with computer science or programming is required, but a high school mathematics background, an interest in problem-solving, and a healthy curiosity will go a long way toward ensuring an enjoyable and enlightening experience. Students will work in small groups to research topics in computer science they find most intriguing. The course will also take advantage of Stanford's location in the heart of Silicon Valley by conducting field trips to a local company and the Computer History Museum. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

CS 12SC. Computational Decision Making. 2 Units.

Although we make decisions every day, many people base their decisions on initial reactions or gut feelings. There are, however, powerful frameworks for making decisions more effectively based on computationally analyzing the choices available and their possible outcomes. In this course we give an introduction to some of these frameworks, including utility theory, decision analysis, game theory, and Markov decision processes. We also discuss why people sometimes make seemingly reasonable, yet irrational, decisions. We begin the class by presenting some of the basics of probability theory, which serves as the main mathematical foundation for the decision making frameworks we will subsequently present. Although we provide a mathematical/computational basis for the decision making frameworks we examine, we also seek to give intuitive (and sometime counterintuitive) explanations for actual decision making behavior through in-class demonstrations. No prior experience with probability theory is needed (we'll cover what you need to know in class), but students should be comfortable with mathematical manipulation at the level of Math 41. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

CS 27. Literature and Social Online Learning. 3-5 Units.

Study, develop, and test new digital methods, games, apps, interactive social media uses to innovate how the humanities can engage and educate students and the public today. Exploring well-known literary texts, digital storytelling forms and literary communities online, students work individually and in interdisciplinary teams to develop innovative projects aimed at bringing literature to life. Tasks include literary role-plays on Twitter; researching existing digital pedagogy and literary projects, games, and apps; reading and coding challenges; collaborative social events mediated by new technology. Minimal prerequisites which vary for students in CS and the humanities; please check with instructors. Same as: COMPLIT 239B, ENGLISH 239B

CS 42. Callback Me Maybe: Contemporary Javascript. 2 Units.

Introduction to the JavaScript programming language with a focus on building contemporary applications. Course consists of in-class activities and programming assignments that challenge students to create functional web apps (e.g. Yelp, Piazza, Instagram). Topics include syntax/semantics, event-based programming, document object model (DOM), application programming interfaces (APIs), asynchronous JavaScript and XML (AJAX), jQuery, Node.js, and MongoDB. Prerequisite: CS 107.

CS 45N. Computers and Photography: From Capture to Sharing. 3-4 Units.

Preference to freshmen with experience in photography and use of computers. Elements of photography, such as lighting, focus, depth of field, aperture, and composition. How a photographer makes photos available for computer viewing, reliably stores them, organizes them, tags them, searches them, and distributes them online. No programming experience required. Digital SLRs and editing software will be provided to those students who do not wish to use their own.

CS 54N. Great Ideas in Computer Science. 3 Units.

Stanford Introductory Seminar. Preference to freshmen. Covers the intellectual tradition of computer science emphasizing ideas that reflect the most important milestones in the history of the discipline. No prior experience with programming is assumed. Topics include programming and problem solving; implementing computation in hardware; algorithmic efficiency; the theoretical limits of computation; cryptography and security; and the philosophy behind artificial intelligence.

CS 55N. Computer and Information Security. 3 Units.

Preference to freshmen. Why computer systems are vulnerable to attack. Common software bugs, how to exploit technology for blocking common attacks, cryptography, and legal issues.

CS 74N. Digital Dilemmas. 3 Units.

Preference to freshmen. Issues where policy decision making requires understanding computer and communications technology. Technology basics taught in non-technology terms. Topics include consumer privacy, government surveillance, file sharing and intellectual property, and electronic voting.

CS 75N. Cell Phones, Sensors, and You. 3 Units.

Focuses on the role of cell phones as the first prevalent wearable sensors that gather information about you that can be both useful and potentially harmful. Topics include the state of technology, sociological and privacy implications, potential governmental regulation, etc. Addresses omniscient "big brother" technology including radar guns and the recording devices that led to the Watergate scandal. Students will gather and compile information on topics and come to class ready to discuss and debate with formulated opinions.

CS 76N. Elections and Technology. 3 Units.

Freshmen Seminar. Since the disastrous Presidential election in Florida in 2000, problems with and worries about technology in elections have gained increasing attention. Are electronic voting machines secure? Are paper ballots secure? Why can't we just vote over our cell phones or the internet? Should voters have to show identification? How do legislators decide these things? How can technologists be heard? We'll look into these questions as we watch others struggle with them in the 2012 Presidential election.

CS 81N. Hackers and Heroes. 3 Units.

This course is about dreamers, role models, and the spirit of adventure. Hackers are said to be the soul of computing: playful programmers who think progress is best made by trial and error, guided by the "hacker ethic." Another view has hackers as nettlesome troublemakers -- "computer bums" at best, or maybe just plain criminals. In this class, you'll decide, by interviewing real hackers about their exploits and learning how to do your own hacks. We'll study major moments in the fifty-year history of hacking and read from texts including Steven Levy's "Hackers," John Markoff's "What the Dormouse Said," Andy Hertzfeld's "Revolution in The Valley," and Peter Seibel's "Coders at Work."

CS 91SI. Digital Canvas: Intro to Visual Design on the Web. 2 Units.

Introduction to visual design concepts with a focus on modern interfaces like web, mobile and app. Topics include visual design elements and principles such as color theory, layout and composition, typography, and aspects of communication. Students will analyze existing designs, and use various technical tools to implement their own designs. This course consists of a series of in-class activities, design projects, peer critique sessions, and guest speakers. Recommended prerequisites: some web programming experience. Application required.

CS 99SI. Callback Me Maybe: Contemporary JavaScript. 2 Units.

Introduction to the JavaScript programming language with a focus on building contemporary applications. Course consists of in-class activities and programming assignments that challenge students to create functional web apps (e.g. Yelp, Piazza, Instagram). Topics include syntax/semantics, event-based programming, document object model (DOM), application programming interfaces (APIs), asynchronous JavaScript and XML (AJAX), jQuery, Node.js, and Redis. Prerequisite: CS 107.

CS 101. Introduction to Computing Principles. 3-5 Units.

Introduces the essential ideas of computing: data representation, algorithms, programming "code", computer hardware, networking, security, and social issues. Students learn how computers work and what they can do through hands-on exercises. In particular, students will see the capabilities and weaknesses of computer systems so they are not mysterious or intimidating. Course features many small programming exercises, although no prior programming experience is assumed or required. CS101 is not a complete programming course such as CS106A. CS101 is effectively an alternative to CS105. A laptop computer is recommended for the in-class exercises.

CS 103. Mathematical Foundations of Computing. 3-5 Units.

Mathematical foundations required for computer science, including propositional predicate logic, induction, sets, functions, and relations. Formal language theory, including regular expressions, grammars, finite automata, Turing machines, and NP-completeness. Mathematical rigor, proof techniques, and applications. Prerequisite: 106A or equivalent.

CS 103A. Mathematical Problem-solving Strategies. 1 Unit.

Problem solving strategies and techniques in discrete mathematics and computer science. Additional problem solving practice for CS103. In-class participation required. Prerequisite: consent of instructor. Co-requisite: CS103.

CS 105. Introduction to Computers. 3-5 Units.

For non-technical majors. What computers are and how they work. Practical experience in programming. Construction of computer programs and basic design techniques. A survey of Internet technology and the basics of computer hardware. Students in technical fields and students looking to acquire programming skills should take 106A or 106X. Students with prior computer science experience at the level of 106 or above require consent of instructor. Prerequisite: minimal math skills.

CS 106A. Programming Methodology. 3-5 Units.

Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Uses the Java programming language. Emphasis is on good programming style and the built-in facilities of the Java language. No prior programming experience required. Summer quarter enrollment is limited. Priority given to Stanford students.

Same as: ENGR 70A

CS 106B. Programming Abstractions. 3-5 Units.

Abstraction and its relation to programming. Software engineering principles of data abstraction and modularity. Object-oriented programming, fundamental data structures (such as stacks, queues, sets) and data-directed design. Recursion and recursive data structures (linked lists, trees, graphs). Introduction to time and space complexity analysis. Uses the programming language C++ covering its basic facilities. Prerequisite: 106A or equivalent. Summer quarter enrollment is limited. Priority given to Stanford students.

Same as: ENGR 70B

CS 106L. Standard C++ Programming Laboratory. 1 Unit.

Supplemental lab to 106B and 106X. Additional features of standard C++ programming practice. Possible topics include advanced C++ language features, standard libraries, STL containers and algorithms, object memory management, operator overloading, and inheritance. Prerequisite: consent of instructor. Corequisite: 106B or 106X.

CS 106X. Programming Abstractions (Accelerated). 3-5 Units.

Intensive version of 106B for students with a strong programming background interested in a rigorous treatment of the topics at an accelerated pace. Additional advanced material and more challenging projects. Prerequisite: excellence in 106A or equivalent, or consent of instructor. Same as: ENGR 70X

CS 107. Computer Organization and Systems. 3-5 Units.

Introduction to the fundamental concepts of computer systems. Explores how computer systems execute programs and manipulate data, working from the C programming language down to the microprocessor. Topics covered include: the C programming language, data representation, machine-level code, computer arithmetic, elements of code compilation, memory organization and management, and performance evaluation and optimization. Prerequisites: 106B or X, or consent of instructor.

CS 107E. Computer Systems from the Ground Up. 3-5 Units.

Introduction to the fundamental concepts of computer systems through bare metal programming on the Raspberry Pi. Explores how five concepts come together in computer systems: hardware, architecture, assembly code, the C language, and software development tools. Students do all programming with a Raspberry Pi kit and several add-ons (LEDs, buttons). Topics covered include: the C programming language, data representation, machine-level code, computer arithmetic, compilation, memory organization and management, debugging, hardware, and I/O. Prerequisite: 106B or X, and consent of instructor.

CS 108. Object-Oriented Systems Design. 3-4 Units.

Software design and construction in the context of large OOP libraries. Taught in Java. Topics: OOP design, design patterns, testing, graphical user interface (GUI) OOP libraries, software engineering strategies, approaches to programming in teams. Prerequisite: 107.

CS 109. Introduction to Probability for Computer Scientists. 3-5 Units.

Topics include: counting and combinatorics, random variables, conditional probability, independence, distributions, expectation, point estimation, and limit theorems. Applications of probability in computer science including machine learning and the use of probability in the analysis of algorithms. Prerequisites: 103, 106B or X, multivariate calculus at the level of MATH 51 or CME 100 or equivalent.

CS 109L. Statistical Computing with R Laboratory. 1 Unit.

Supplemental lab to CS109. Introduces the R programming language for statistical computing. Topics include basic facilities of R including mathematical, graphical, and probability functions, building simulations, introductory data fitting and machine learning. Provides exposure to the functional programming paradigm. Corequisite: CS109.

CS 110. Principles of Computer Systems. 3-5 Units.

Principles and practice of engineering of computer software and hardware systems. Topics include: techniques for controlling complexity; strong modularity using client-server design, virtual memory, and threads; networks; atomicity and coordination of parallel activities; security, and encryption; and performance optimizations. Prerequisite: 107.

CS 122. Artificial Intelligence: Philosophy, Ethics, & Impact. 3-4 Units.

Recent advances in computing may place us at the threshold of a unique turning point in human history. Soon we are likely to entrust management of our environment, economy, security, infrastructure, food production, healthcare, and to a large degree even our personal activities, to artificially intelligent computer systems. The prospect of "turning over the keys" to increasingly autonomous systems raises many complex and troubling questions. How will society respond as versatile robots and machine-learning systems displace an ever-expanding spectrum of blue- and white-collar workers? Will the benefits of this technological revolution be broadly distributed or accrue to a lucky few? How can we ensure that these systems respect our ethical principles when they make decisions at speeds and for rationales that exceed our ability to comprehend? What, if any, legal rights and responsibilities should we grant them? And should we regard them merely as sophisticated tools or as a newly emerging form of life? The goal of this course is to equip students with the intellectual tools, ethical foundation, and psychological framework to successfully navigate the coming age of intelligent machines. Same as: SYMSYS 122

CS 124. From Languages to Information. 3-4 Units.

Extracting meaning, information, and structure from human language text, speech, web pages, genome sequences, social networks, or any less structured information. Methods include: string algorithms, edit distance, language modeling, naive Bayes, inverted indices, vector semantics. Applications such as question answering, sentiment analysis, information retrieval, text classification, social network models, machine translation, genomic sequence alignment, spell checking, speech processing. Prerequisite: CS103, CS107, CS109.

Same as: LINGUIST 180, LINGUIST 280

CS 131. Computer Vision: Foundations and Applications. 3-4 Units.

Robots that can navigate space and perform duties, search engines that can index billions of images and videos, algorithms that can diagnose medical images for diseases, or smart cars that can see and drive safely: Lying in the heart of these modern AI applications are computer vision technologies that can perceive, understand and reconstruct the complex visual world. This course is designed for students who are interested in learning about the fundamental principles and important applications of computer vision. Course will introduce a number of fundamental concepts in computer vision and expose students to a number of real-world applications, plus guide students through a series of well designed projects such that they will get to implement cutting-edge computer vision algorithms. Prerequisites: Students should be familiar with Matlab (i.e. have programmed in Matlab before) and Linux; plus Calculus & Linear Algebra.

CS 140. Operating Systems and Systems Programming. 3-4 Units.

Operating systems design and implementation. Basic structure; synchronization and communication mechanisms; implementation of processes, process management, scheduling, and protection; memory organization and management, including virtual memory; I/O device management, secondary storage, and file systems. Prerequisite: CS 110.

CS 142. Web Applications. 3 Units.

Concepts and techniques used in constructing interactive web applications. Browser-side web facilities such as HTML, cascading stylesheets, javascript, and the document object model. Server-side technologies such as sessions, templates, relational databases, and object-relational mapping. Issues in web security and application scalability. New models of web application deployment. Prerequisites: CS 107 and CS 108.

CS 143. Compilers. 3-4 Units.

Principles and practices for design and implementation of compilers and interpreters. Topics: lexical analysis; parsing theory; symbol tables; type systems; scope; semantic analysis; intermediate representations; runtime environments; code generation; and basic program analysis and optimization. Students construct a compiler for a simple object-oriented language during course programming projects. Prerequisites: 103 or 103B, and 107.

CS 144. Introduction to Computer Networking. 3-4 Units.

Principles and practice. Structure and components of computer networks, packet switching, layered architectures. Applications: web/http, voice-over-IP, p2p file sharing and socket programming. Reliable transport: TCP/IP, reliable transfer, flow control, and congestion control. The network layer: names and addresses, routing. Local area networks: ethernet and switches. Wireless networks and network security. Prerequisite: CS 110.

CS 145. Introduction to Databases. 3-4 Units.

The course covers database design and the use of database management systems for applications. It includes extensive coverage of the relational model, relational algebra, and SQL. It also covers XML data including DTDs and XML Schema for validation, and the query and transformation languages XPath, XQuery, and XSLT. The course includes database design in UML, and relational design principles based on dependencies and normal forms. Many additional key database topics from the design and application-building perspective are also covered: indexes, views, transactions, authorization, integrity constraints, triggers, on-line analytical processing (OLAP), JSON, and emerging NoSQL systems. Class time will include guest speakers from industry and additional advanced topics as time and class interest permits. Prerequisites: 103 and 107 (or equivalent).

CS 147. Introduction to Human-Computer Interaction Design. 3-4 Units.

Introduces fundamental methods and principles for designing, implementing, and evaluating user interfaces. Topics: user-centered design, rapid prototyping, experimentation, direct manipulation, cognitive principles, visual design, social software, software tools. Learn by doing: work with a team on a quarter-long design project, supported by lectures, readings, and studios. Prerequisite: 106B or X or equivalent programming experience.

CS 148. Introduction to Computer Graphics and Imaging. 3-4 Units.

Introductory prerequisite course in the computer graphics sequence introducing students to the technical concepts behind creating synthetic computer generated images. Focuses on using OpenGL to create visual imagery, as well as an understanding of the underlying mathematical concepts including triangles, normals, interpolation, texture mapping, bump mapping, etc. Course will cover fundamental understanding of light and color, as well as how it impacts computer displays and printers. Class will discuss more thoroughly how light interacts with the environment, constructing engineering models such as the BRDF, plus various simplifications into more basic lighting and shading models. Also covers ray tracing technology for creating virtual images, while drawing parallels between ray tracers and real world cameras to illustrate various concepts. Anti-aliasing and acceleration structures are also discussed. The final class mini-project consists of building out a ray tracer to create visually compelling images. Starter codes and code bits will be provided to aid in development, but this class focuses on what you can do with the code as opposed to what the code itself looks like. Therefore grading is weighted toward in person "demos" of the code in action - creativity and the production of impressive visual imagery are highly encouraged. Prerequisites: CS 107, MATH 51.

CS 149. Parallel Computing. 3-4 Units.

This course is an introduction to parallelism and parallel programming. Most new computer architectures are parallel; programming these machines requires knowledge of the basic issues of and techniques for writing parallel software. Topics: varieties of parallelism in current hardware (e.g., fast networks, multicore, accelerators such as GPUs, vector instruction sets), importance of locality, implicit vs. explicit parallelism, shared vs. non-shared memory, synchronization mechanisms (locking, atomicity, transactions, barriers), and parallel programming models (threads, data parallel/streaming, futures, SPMD, message passing, SIMT, transactions, and nested parallelism). Significant parallel programming assignments will be given as homework. The course is open to students who have completed the introductory CS course sequence through 110 and have taken CS 143.

CS 154. Introduction to Automata and Complexity Theory. 3-4 Units.

This course provides a mathematical introduction to the following questions: What is computation? Given a computational model, what problems can we hope to solve in principle with this model? Besides those solvable in principle, what problems can we hope to efficiently solve? In many cases we can give completely rigorous answers; in other cases, these questions have become major open problems in computer science and mathematics. By the end of this course, students will be able to classify computational problems in terms of their computational complexity (Is the problem regular? Not regular? Decidable? Recognizable? Neither? Solvable in P? NP-complete? PSPACE-complete?, etc.). Students will gain a deeper appreciation for some of the fundamental issues in computing that are independent of trends of technology, such as the Church-Turing Thesis and the P versus NP problem. Prerequisites: CS 103 or 103B.

CS 155. Computer and Network Security. 3 Units.

For seniors and first-year graduate students. Principles of computer systems security. Attack techniques and how to defend against them. Topics include: network attacks and defenses, operating system security, application security (web, apps, databases), malware, privacy, and security for mobile devices. Course projects focus on building reliable code. Prerequisite: 110. Recommended: basic Unix. Same as: EE 287A

CS 157. Logic and Automated Reasoning. 3 Units.

An elementary exposition from a computational point of view of propositional and predicate logic, axiomatic theories, and theories with equality and induction. Interpretations, models, validity, proof, strategies, and applications. Automated deduction: polarity, skolemization, unification, resolution, equality. Prerequisite: 103 or 103B.

CS 161. Design and Analysis of Algorithms. 3-5 Units.

Worst and average case analysis. Recurrences and asymptotics. Efficient algorithms for sorting, searching, and selection. Data structures: binary search trees, heaps, hash tables. Algorithm design techniques: divide-and-conquer, dynamic programming, greedy algorithms, amortized analysis, randomization. Algorithms for fundamental graph problems: minimum-cost spanning tree, connected components, topological sort, and shortest paths. Possible additional topics: network flow, string searching. Prerequisite: 103 or 103B; 109 or STATS 116.

CS 164. Computing with Physical Objects: Algorithms for Shape and Motion. 3 Units.

Algorithms and data structures dealing with the representation and manipulation of physical objects and entities in the computer. Computational structures for shape and motion, shape fitting and matching, triangulations and other spatial subdivisions, and low-dimensional search and optimization. Examples relevant to computer graphics, computer vision, robotics and geometric computation emphasizing algorithmic paradigms applicable to multidimensional data. Prerequisites: CS 103 or 103B, and CS 109 or STATS 116, and CS 106B/X or consent of instructor.

CS 168. The Modern Algorithmic Toolbox. 3-4 Units.

This course will provide a rigorous and hands-on introduction to the central ideas and algorithms that constitute the core of the modern algorithms toolkit. Emphasis will be on understanding the high-level theoretical intuitions and principles underlying the algorithms we discuss, as well as developing a concrete understanding of when and how to implement and apply the algorithms. The course will be structured as a sequence of one-week investigations; each week will introduce one algorithmic idea, and discuss the motivation, theoretical underpinning, and practical applications of that algorithmic idea. Each topic will be accompanied by a mini-project in which students will be guided through a practical application of the ideas of the week. Topics include hashing, dimension reduction and LSH, boosting, linear programming, gradient descent, sampling, and basic data representation and coding. Prerequisites: CS107 and CS161, or permission from the instructor.

CS 170. Stanford Laptop Orchestra: Composition, Coding, and Performance. 1-5 Unit.

Classroom instantiation of the Stanford Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit.

Same as: MUSIC 128

CS 173. A Computational Tour of the Human Genome. 3 Units.

(Only one of 173 or 273A counts toward any CS degree program.)

Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing; functional landscape of the human genome (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures on current genomic research topics. Class will be similar in spirit to CS273A, which will not be offered this year. Prerequisites: CS107 or equivalent background in programming.

CS 178. Digital Photography. 3-5 Units.

Scientific, artistic, and computing aspects of digital photography. Topics: lenses and optics, light and sensors, optical effects in nature, perspective and depth of field, sampling and noise, the camera as a computing platform, image processing and editing, history of photography, computational photography. Counts as a CS elective in the Graphics track. Prerequisites: introductory calculus; students must have a digital camera with manual control over shutter speed and aperture. Loaner cameras may be available. No programming experience required. GER:DB-EngrAppSci.

CS 181. Computers, Ethics, and Public Policy. 4 Units.

(Formerly 201.) Primarily for majors entering computer-related fields. Ethical and social issues related to the development and use of computer technology. Ethical theory, and social, political, and legal considerations. Scenarios in problem areas: privacy, reliability and risks of complex systems, and responsibility of professionals for applications and consequences of their work. Prerequisite: 106B or X.

CS 181W. Computers, Ethics, and Public Policy. 4 Units.

Writing-intensive version of CS181. Satisfies the WIM requirement for Computer Science and Computer Systems Engineering undergraduates. Same as: WIM

CS 183B. How to Start a Startup. 2 Units.

The course is designed to be a one-class practical MBA equivalent for engineers that want to start startups. We'll try to cover everything you need to know other than how to build a product. Topics include: having ideas, getting users, company culture, fundraising, hiring, operations, managements, and more. The format of the class will be guest lectures from experts in each subject. The class will focus more on practical advice than theory, although many speakers will also tell personal stories.

CS 190. Software Design Studio. 3 Units.

This course will teach the art of software design: how to decompose large complex systems into classes that can be implemented and maintained easily. Topics include information hiding, thick classes, API design, managing complexity, and how to write in-code documentation. The class will involve significant system software implementation and will use an iterative approach consisting of implementation, review, and revision. The course will be taught in a studio format with in-class discussions and code reviews in addition to lectures. Prerequisites: CS 140.

CS 191. Senior Project. 1-6 Unit.

Restricted to Computer Science and Computer Systems Engineering students. Group or individual projects under faculty direction. Register using instructor's section number. A project can be either a significant software application or publishable research. Software application projects include substantial programming and modern user-interface technologies and are comparable in scale to shareware programs or commercial applications. Research projects may result in a paper publishable in an academic journal or presentable at a conference. Required public presentation of final application or research results.

CS 191W. Writing Intensive Senior Project. 3-6 Units.

Restricted to Computer Science and Computer Systems Engineering students. Writing-intensive version of CS191. Register using the section number of an Academic Council member.

Same as: WIM

CS 192. Programming Service Project. 1-4 Unit.

Restricted to Computer Science students. Appropriate academic credit (without financial support) is given for volunteer computer programming work of public benefit and educational value.

CS 193A. Android Programming. 1 Unit.

Introduction to building applications for Android platform. Examines key concepts of Android programming: tool chain, application life-cycle, views, controls, intents, designing mobile UIs, networking, threading, and more. Features ten weekly lectures and a series of small programming projects. Phone not required, but a phone makes the projects more engaging. Prerequisites: 106B or Java experience at 106B level.

CS 193C. Client-Side Internet Technologies. 3 Units.

Client-side technologies used to create web sites such as sophisticated Web 2.0 interfaces similar to Google maps. XHTML, CSS, JavaScript, document object model (DOM), AJAX, and Flash. Prerequisite: programming experience at the level of 106A.

CS 193P. iPhone and iPad Application Programming. 3 Units.

Tools and APIs required to build applications for the iPhone and iPad platforms using the iOS SDK. User interface design for mobile devices and unique user interactions using multi-touch technologies. Object-oriented design using model-view-controller paradigm, memory management, Objective-C programming language. Other topics include: object-oriented database API, animation, mobile device power management, multi-threading, networking and performance considerations. Prerequisites: C language and object-oriented programming experience exceeding 106B or X level. Previous completion of any one of the following is required: CS 107, 108 (preferred) or 110. Recommended: UNIX, graphics, databases.

CS 193W. Apple Watch Programming. 2 Units.

The technologies behind building Apple Watch applications. Student teams will build an Apple Watch application and containing iPhone application with supervision of the instructor. Students must have access to a Macintosh computer. iPhone and Apple Watch are not required, but recommended. Prerequisite: CS193P.

CS 194. Software Project. 3 Units.

Design, specification, coding, and testing of a significant team programming project under faculty supervision. Documentation includes a detailed proposal. Public demonstration of the project at the end of the quarter. Prerequisites: CS 110 and CS 161.

CS 194H. User Interface Design Project. 3-4 Units.

Advanced methods for designing, prototyping, and evaluating user interfaces to computing applications. Novel interface technology, advanced interface design methods, and prototyping tools. Substantial, quarter-long course project that will be presented in a public presentation. Prerequisites: CS 147, or permission of instructor.

CS 194W. Software Project. 3 Units.

Restricted to Computer Science, Computer Systems Engineering, and Electrical Engineering undergraduates. Writing-intensive version of CS194. Same as: WIM

CS 196. Computer Consulting. 2 Units.

Focus is on Macintosh and Windows operating system maintenance and troubleshooting through hardware and software foundation and concepts. Topics include operating systems, networking, security, troubleshooting methodology with emphasis on Stanford's computing environment. Not a programming course. Prerequisite: 1C or equivalent.

CS 198. Teaching Computer Science. 3-4 Units.

Students lead a discussion section of 106A while learning how to teach a programming language at the introductory level. Focus is on teaching skills, techniques, and course specifics. Application and interview required; see <http://cs198.stanford.edu>.

CS 199. Independent Work. 1-6 Unit.

Special study under faculty direction, usually leading to a written report. Letter grade; if not appropriate, enroll in 199P.

CS 199P. Independent Work. 1-6 Unit.

(Staff).

CS 200. Care and Feeding of Large-Scale Web Services. 1 Unit.

Advances in cloud technologies are making it easier than ever to build web services. Today, one can choose from a number of cloud providers to build web sites, mobile and web apps. Successful scaling of such services, however, is far from trivial. This course discusses technologies that are critical to successful operation of large-scale web services: Global load balancing via DNS, and Comparison of CDNs; Understanding TCP's impact on global client-side latency; Effect of tags and local storage on client-side latency; Backend servers: RPCs, server threading architecture and cluster management; Data storage alternatives: SQL and NoSQL; Faster access to data: Memcached and 20 years of RDMA; Flash's Role in Large Scale Distributed Systems; Cloud: Public, Private and Hybrid; Log processing: Hive and Dremel. The goal is to equip students with a good understanding of challenges and current solutions for service scaling. There is no homework. Instead, students are expected to read background materials and attend class discussions.

CS 202. Law for Computer Science Professionals. 1 Unit.

Intellectual property law as it relates to computer science including copyright registration, patents, and trade secrets; contract issues such as non-disclosure/non-compete agreements, license agreements, and works-made-for-hire; dispute resolution; and principles of business formation and ownership. Emphasis is on topics of current interest such as open source and the free software movement, peer-to-peer sharing, encryption, data mining, and spam.

CS 204. Legal Informatics. 3 Units.

Legal informatics based on representation of regulations in computable form. Encoding regulations facilitate creation of legal information systems with significant practical value. Convergence of technological trends, growth of the Internet, advent of semantic web technology, and progress in computational logic make computational law prospects better. Topics: current state of computational law, prospects and problems, philosophical and legal implications. This course is *Cross* listed with LAW 729. Prerequisite: basic concepts of programming.

CS 205A. Mathematical Methods for Robotics, Vision, and Graphics. 3 Units.

Continuous mathematics background necessary for research in robotics, vision, and graphics. Possible topics: linear algebra; the conjugate gradient method; ordinary and partial differential equations; vector and tensor calculus. Prerequisites: 106B or X; MATH 51; or equivalents.

CS 205B. Mathematical Methods for Fluids, Solids, and Interfaces. 3 Units.

Numerical methods for simulation of problems involving solid mechanics and fluid dynamics. Focus is on practical tools needed for simulation, and continuous mathematics involving nonlinear hyperbolic partial differential equations. Possible topics: finite element method, highly deformable elastic bodies, plasticity, fracture, level set method, Burgers' equation, compressible and incompressible Navier-Stokes equations, smoke, water, fire, and solid-fluid coupling. Prerequisite: 205A or equivalent.

CS 207. The Economics of Software. 2 Units.

How businesses move software products into the marketplace and how the associated intellectual capital is exploited. The value of creators and managers. Concepts that are outside of the common knowledge of computer scientists such as business terms and spreadsheet computations to quantitatively compare alternatives. Goal is to contribute to informed decision making in high-tech product design, acquisition, production, marketing, selection of business structures, outsourcing, and impact of taxation policies. No specific background required. External experts complement class presentations.

CS 210A. Software Project Experience with Corporate Partners. 3-4 Units.

Two-quarter project course. Focus is on real-world software development. Corporate partners seed projects with loosely defined challenges from their R&D labs; students innovate to build their own compelling software solutions. Student teams are treated as start-up companies with a budget and a technical advisory board comprised of instructional staff and corporate liaisons. Teams will typically travel to the corporate headquarters of their collaborating partner, meaning some teams will travel internationally. Open loft classroom format such as found in Silicon Valley software companies. Exposure to: current practices in software engineering; techniques for stimulating innovation; significant development experience with creative freedoms; working in groups; real-world software engineering challenges; public presentation of technical work; creating written descriptions of technical work. Prerequisites: CS 109 and 110.

CS 210B. Software Project Experience with Corporate Partners. 3-4 Units.

Continuation of CS210A. Focus is on real-world software development. Corporate partners seed projects with loosely defined challenges from their R&D labs; students innovate to build their own compelling software solutions. Student teams are treated as start-up companies with a budget and a technical advisory board comprised of the instructional staff and corporate liaisons. Teams will typically travel to the corporate headquarters of their collaborating partner, meaning some teams will travel internationally. Open loft classroom format such as found in Silicon Valley software companies. Exposure to: current practices in software engineering; techniques for stimulating innovation; significant development experience with creative freedoms; working in groups; real world software engineering challenges; public presentation of technical work; creating written descriptions of technical work. Prerequisites: CS 210A.

CS 210L. Introducing Software through Video Stories. 1 Unit.

In this one-unit lab where coding meets film, software development teams from CS210 are paired with film students. This resulting cross-disciplinary group will create a short video that tells an engaging and creative story about the software developed by the team in CS210. The class will introduce students to principles of short form narrative storytelling and the visual language of film, as well as cover the technical principles of DSLR cinematography and non-linear editing. This course will offer students the experience of creating a film in partnership with a producing team.

CS 211. Content Creation in Virtual Reality. 3-4 Units.

Students are immersed in a cutting edge virtual reality development environment consisting of both hardware and software elements. Students will progress from configuring a comprehensive development environment to designing and implementing networked content in VR. The deep development focus is overlaid with a discussion series with leaders in the VR space to provide both breadth and depth to a student's quest; understanding of the VR space. Prerequisites: CS 107 or equivalent. A strong software development background is required that includes comfort with C++. Design experience a plus.

CS 221. Artificial Intelligence: Principles and Techniques. 3-4 Units.

Artificial intelligence (AI) has had a huge impact in many areas, including medical diagnosis, speech recognition, robotics, web search, advertising, and scheduling. This course focuses on the foundational concepts that drive these applications. In short, AI is the mathematics of making good decisions given incomplete information (hence the need for probability) and limited computation (hence the need for algorithms). Specific topics include search, constraint satisfaction, game playing, Markov decision processes, graphical models, machine learning, and logic. Prerequisites: CS 103 or CS 103B/X, CS 106B or CS 106X, CS 107, and CS 109 (algorithms, probability, and programming experience).

CS 222. Rational Agency and Intelligent Interaction. 3 Units.

For advanced undergraduates, and M.S. and beginning Ph.D. students. Logic-based methods for knowledge representation, information change, and games in artificial intelligence and philosophy. Topics: knowledge, certainty, and belief; time and action; belief dynamics; preference and social choice; games; and desire and intention. Prerequisite: propositional and first-order logic.

Same as: PHIL 358

CS 223A. Introduction to Robotics. 3 Units.

Robotics foundations in modeling, design, planning, and control. Class covers relevant results from geometry, kinematics, statics, dynamics, motion planning, and control, providing the basic methodologies and tools in robotics research and applications. Concepts and models are illustrated through physical robot platforms, interactive robot simulations, and video segments relevant to historical research developments or to emerging application areas in the field. Recommended: matrix algebra.

Same as: ME 320

CS 224D. Deep Learning for Natural Language Processing. 3-4 Units.

Deep learning approaches have obtained very high performance across many different natural language processing tasks. In this class, students will learn to understand, implement, train, debug, visualize and potentially invent their own neural network models for a variety of language understanding tasks. The course provides a deep excursion from early models to cutting-edge research. Applications will range across a broad spectrum: from simple tasks like part of speech tagging, over sentiment analysis to question answering and machine translation. The final project will involve implementing a complex neural network model and applying it to a large scale NLP problem. Prerequisites: programming abilities (python), linear algebra, Math 21 or equivalent, machine learning background (CS 229 or similar) Recommended: machine learning (CS 229, CS 228), CS 224N, EE364a (convex optimization), CS 231N.

CS 224M. Multi-Agent Systems. 3 Units.

For advanced undergraduates, and M.S. and beginning Ph.D. students. The course serves primarily as an introduction to game theory, including computational aspects. Topics: basic game representations and solution concepts, social choice and mechanism design, multi-agent learning, communication. Applications discussed as appropriate; emphasis is on conceptual matters and theoretical foundations. Prerequisites: very basic probability theory and optimization.

CS 224N. Natural Language Processing. 3-4 Units.

Methods for processing human language information and the underlying computational properties of natural languages. Syntactic and semantic processing from linguistic and algorithmic perspectives. Focus is on modern quantitative techniques in NLP: using large corpora, statistical models for acquisition, translation, and interpretation; and representative systems. Prerequisites: CS124 or CS121/221.

Same as: LINGUIST 284

CS 224S. Spoken Language Processing. 2-4 Units.

Introduction to spoken language technology with an emphasis on dialogue and conversational systems. Automatic speech recognition, extraction of affect and social meaning from speech, speech synthesis, dialogue management, and applications to digital assistants, search, and recommender systems. Prerequisites: CS 124, 221, 224N, or 229.

CS 224U. Natural Language Understanding. 3-4 Units.

Project-oriented class focused on developing systems and algorithms for robust machine understanding of human language. Draws on theoretical concepts from linguistics, natural language processing, and machine learning. Topics include lexical semantics, distributed representations of meaning, relation extraction, semantic parsing, sentiment analysis, and dialogue agents, with special lectures on developing projects, presenting research results, and making connections with industry. Prerequisites: one of LINGUIST 180, CS 124, CS 224N, CS224S, or CS221; and logical/ semantics such as LINGUIST 130A or B, CS 157, or PHIL 150.

Same as: LINGUIST 188, LINGUIST 288

CS 224W. Social and Information Networks. 3-4 Units.

(Formerly 322) How do diseases spread? Who are the influencers? How can we predict friends and enemies in a social network? How information flows and mutates as it is passed through networks? Behind each of these questions there is an intricate wiring diagram, a network, that defines the interactions between the components. And we will never understand these questions unless we understand the networks behind them. The course will cover recent research on the structure and analysis of such large social and information networks and on models and algorithms that abstract their basic properties. Class will explore how to practically analyze large-scale network data and how to reason about it through models for network structure and evolution. Topics include methods for link analysis and network community detection, diffusion and information propagation on the web, virus outbreak detection in networks, and connections with work in the social sciences and economics.

CS 225A. Experimental Robotics. 3 Units.

Hands-on laboratory course experience in robotic manipulation. Topics include robot kinematics, dynamics, control, compliance, sensor-based collision avoidance, and human-robot interfaces. Second half of class is devoted to final projects using various robotic platforms to build and demonstrate new robot task capabilities. Previous projects include the development of autonomous robot behaviors of drawing, painting, playing air hockey, yoyo, basketball, ping-pong or xylophone. Prerequisites: 223A or equivalent.

CS 225B. Robot Programming Laboratory. 3-4 Units.

For robotics and non-robotics students. Students program mobile robots to exhibit increasingly complex behavior (simple dead reckoning and reactivity, goal-directed motion, localization, complex tasks). Topics: motor control and sensor characteristics; sensor fusion, model construction, and robust estimation; control regimes (subsumption, potential fields); probabilistic methods, including Markov localization and particle filters. Student programmed robot contest. Programming is in C++ on Unix machines, done in teams. Prerequisite: programming at the level of 106B, 106X, 205, or equivalent.

CS 226. Statistical Techniques in Robotics. 3 Units.

Theory and practice of statistical techniques used in robotics and large-scale sensor-based systems. Probabilistic state estimation, Bayes, Kalman, information and particle filters. Simultaneous localization and mapping techniques, and multi-robot sensor fusion. Markov techniques for making decisions under uncertainty, and probabilistic control algorithms and exploration.

CS 227B. General Game Playing. 3 Units.

A general game playing system accepts a formal description of a game to play it without human intervention or algorithms designed for specific games. Hands-on introduction to these systems and artificial intelligence techniques such as knowledge representation, reasoning, learning, and rational behavior. Students create GGP systems to compete with each other and in external competitions. Prerequisite: programming experience. Recommended: 103 or equivalent.

CS 228. Probabilistic Graphical Models: Principles and Techniques. 3-4 Units.

Probabilistic graphical modeling languages for representing complex domains, algorithms for reasoning using these representations, and learning these representations from data. Topics include: Bayesian and Markov networks, extensions to temporal modeling such as hidden Markov models and dynamic Bayesian networks, exact and approximate probabilistic inference algorithms, and methods for learning models from data. Also included are sample applications to various domains including speech recognition, biological modeling and discovery, medical diagnosis, message encoding, vision, and robot motion planning. Prerequisites: basic probability theory and algorithm design and analysis.

CS 229. Machine Learning. 3-4 Units.

Topics: statistical pattern recognition, linear and non-linear regression, non-parametric methods, exponential family, GLMs, support vector machines, kernel methods, model/feature selection, learning theory, VC dimension, clustering, density estimation, EM, dimensionality reduction, ICA, PCA, reinforcement learning and adaptive control, Markov decision processes, approximate dynamic programming, and policy search. Prerequisites: linear algebra, and basic probability and statistics.

CS 229T. Statistical Learning Theory. 3 Units.

(Same as STATS 231) How do we formalize what it means for an algorithm to learn from data? This course focuses on developing mathematical tools for answering this question. We will present various common learning algorithms and prove theoretical guarantees about them. Topics include online learning, kernel methods, generalization bounds (uniform convergence), and spectral methods. Prerequisites: A solid background in linear algebra and probability theory, statistics and machine learning (STATS 315A or CS 229). Convex optimization (EE 364a) is helpful but not required.

Same as: STATS 231

CS 231A. Computer Vision: From 3D Reconstruction to Recognition. 3-4 Units.

(Formerly 223B) An introduction to the concepts and applications in computer vision. Topics include: cameras and projection models, low-level image processing methods such as filtering and edge detection; mid-level vision topics such as segmentation and clustering; shape reconstruction from stereo, as well as high-level vision tasks such as object recognition, scene recognition, face detection and human motion categorization. Prerequisites: linear algebra, basic probability and statistics.

CS 231B. The Cutting Edge of Computer Vision. 3 Units.

(Formerly 223C) More than one-third of the brain is engaged in visual processing, the most sophisticated human sensory system. Yet visual recognition technology has fundamentally influenced our lives on the same scale and scope as text-based technology has, thanks to Google, Twitter, Facebook, etc. This course is designed for those students who are interested in cutting edge computer vision research, and/or are aspiring to be an entrepreneur using vision technology. Course will guide students through the design and implementation of three core vision technologies: segmentation, detection and classification on three highly practical, real-world problems. Course will focus on teaching the fundamental theory, detailed algorithms, practical engineering insights, and guide them to develop state-of-the-art systems evaluated based on the most modern and standard benchmark datasets. Prerequisites: CS2223B or equivalent and a good machine learning background (i.e. CS221, CS228, CS229). Fluency in Matlab and C/C++.

CS 231M. Mobile Computer Vision. 3-4 Units.

The course surveys recent developments in computer vision, graphics and image processing for mobile application. Topics of interest include: feature extraction, image enhancement and digital photography, 3D scene understanding and modeling, virtual augmentation, object recognition and categorization, human activity recognition. As part of this course, students will familiarize with a state-of-the-art mobile hardware and software development platform: an NVIDIA Tegra-based Android tablet, with relevant libraries such as OpenCV and FCam. Tablets will be available for each student team. Prerequisites: Knowledge of linear algebra, probability, as well as concepts introduced in either CS131A or CS231A and CS232 (or equivalent) are necessary for understanding the material covered in this class. C++ (or Java) programming experience is expected.

CS 231N. Convolutional Neural Networks for Visual Recognition. 3-4 Units.

Computer Vision has become ubiquitous in our society, with applications in search, image understanding, apps, mapping, medicine, drones, and self-driving cars. Core to many of these applications are the tasks of image classification, localization and detection. This course is a deep dive into details of neural network architectures with a focus on learning end-to-end models for these tasks, particularly image classification. During the 10-week course, students will learn to implement, train and debug their own neural networks and gain a detailed understanding of cutting-edge research in computer vision. The final assignment will involve training a multi-million parameter convolutional neural network and applying it on the largest image classification dataset (ImageNet). We will focus on teaching how to set up the problem of image recognition, the learning algorithms (e.g. backpropagation), practical engineering tricks for training and fine-tuning the networks and guide the students through hands-on assignments and a final course project. Much of the background and materials of this course will be drawn from the ImageNet Challenge: <http://image-net.org/challenges/LSVRC/2014/index>. Prerequisites: Proficiency in Python; familiarity with C/C++; CS 131 and CS 229 or equivalents; Math 21 or equivalent, linear algebra.

CS 232. Digital Image Processing. 3 Units.

Image sampling and quantization color, point operations, segmentation, morphological image processing, linear image filtering and correlation, image transforms, eigenimages, multiresolution image processing, noise reduction and restoration, feature extraction and recognition tasks, image registration. Emphasis is on the general principles of image processing. Students learn to apply material by implementing and investigating image processing algorithms in Matlab and optionally on Android mobile devices. Term project. Recommended: EE261, EE278. Same as: EE 368

CS 238. Decision Making under Uncertainty. 3-4 Units.

This course is designed to increase awareness and appreciation for why uncertainty matters, particularly for aerospace applications. Introduces decision making under uncertainty from a computational perspective and provides an overview of the necessary tools for building autonomous and decision-support systems. Following an introduction to probabilistic models and decision theory, the course will cover computational methods for solving decision problems with stochastic dynamics, model uncertainty, and imperfect state information. Topics include: Bayesian networks, influence diagrams, dynamic programming, reinforcement learning, and partially observable Markov decision processes. Applications cover: air traffic control, aviation surveillance systems, autonomous vehicles, and robotic planetary exploration. Prerequisites: basic probability and fluency in a high-level programming language. Same as: AA 228

CS 239. Advanced Topics in Sequential Decision Making. 3-4 Units.

Survey of recent research advances in intelligent decision making for dynamic environments from a computational perspective. Efficient algorithms for single and multiagent planning in situations where a model of the environment may or may not be known. Partially observable Markov decision processes, approximate dynamic programming, and reinforcement learning. New approaches for overcoming challenges in generalization from experience, exploration of the environment, and model representation so that these methods can scale to real problems in a variety of domains including aerospace, air traffic control, and robotics. Students are expected to produce an original research paper on a relevant topic. Prerequisites: AA 228/CS 238 or CS 221. Same as: AA 229

CS 240. Advanced Topics in Operating Systems. 3 Units.

Recent research. Classic and new papers. Topics: virtual memory management, synchronization and communication, file systems, protection and security, operating system extension techniques, fault tolerance, and the history and experience of systems programming. Prerequisite: 140 or equivalent.

CS 242. Programming Languages. 3 Units.

Central concepts in modern programming languages, impact on software development, language design trade-offs, and implementation considerations. Functional, imperative, and object-oriented paradigms. Formal semantic methods and program analysis. Modern type systems, higher order functions and closures, exceptions and continuations. Modularity, object-oriented languages, and concurrency. Runtime support for language features, interoperability, and security issues. Prerequisite: 107, or experience with Lisp, C, and an object-oriented language.

CS 243. Program Analysis and Optimizations. 3-4 Units.

Program analysis techniques used in compilers and software development tools to improve productivity, reliability, and security. The methodology of applying mathematical abstractions such as graphs, fixpoint computations, binary decision diagrams in writing complex software, using compilers as an example. Topics include data flow analysis, instruction scheduling, register allocation, parallelism, data locality, interprocedural analysis, and garbage collection. Prerequisites: 103 or 103B, and 107.

CS 244. Advanced Topics in Networking. 3-4 Units.

Classic papers, new ideas, and research papers in networking. Architectural principles: naming, addressing, routing; congestion control, traffic management, QoS; wireless and mobility; overlay networks and virtualization; network security; switching and routing; content distribution; and proposals for future Internet structures. Prerequisite: 144 or equivalent. Same as: EE 284B

CS 244B. Distributed Systems. 3 Units.

Distributed operating systems and applications issues, emphasizing high-level protocols and distributed state sharing as the key technologies. Topics: distributed shared memory, object-oriented distributed system design, distributed directory services, atomic transactions and time synchronization, application-sufficient consistency, file access, process scheduling, process migration, and storage/communication abstractions on distribution, scale, robustness in the face of failure, and security. Prerequisites: CS 144 and CS 249A.

CS 244C. Readings and Projects in Distributed Systems. 3-6 Units.

Companion project option for 244B. Corequisite: 244B.

CS 244E. Networked Wireless Systems. 3 Units.

Design and implementation of wireless networks and mobile systems. The course will commence with a short retrospective of wireless communication and initially touch on some of the fundamental physical layer properties of various wireless communication technologies. The focus will then shift to design of media access control and routing layers for various wireless systems. The course will also examine adaptations necessary at transport and higher layers to cope with node mobility and error-prone nature of the wireless medium. Finally, it will conclude with a brief overview of other related issues including emerging wireless/mobile applications. Prerequisites: EE 284. Same as: EE 384E

CS 245. Database Systems Principles. 3 Units.

File organization and access, buffer management, performance analysis, and storage management. Database system architecture, query optimization, transaction management, recovery, concurrency control. Reliability, protection, and integrity. Design and management issues. Prerequisites: 145, 161.

CS 246. Mining Massive Data Sets. 3-4 Units.

The course will discuss data mining and machine learning algorithms for analyzing very large amounts of data. The emphasis will be on Map Reduce as a tool for creating parallel algorithms that can process very large amounts of data. Topics include: Frequent itemsets and Association rules, Near Neighbor Search in High Dimensional Data, Locality Sensitive Hashing (LSH), Dimensionality reduction, Recommender Systems, Clustering, Link Analysis, Large-scale machine learning, Data streams, Analysis of Social-network Graphs, and Web Advertising. Prerequisites: At least one of CS107 or CS145; At least one of CS109 or STAT116, or equivalent.

CS 246H. Mining Massive Data Sets Hadoop Lab. 1 Unit.

Supplement to CS 246 providing additional material on Hadoop. Students will learn how to implement data mining algorithms using Hadoop, how to implement and debug complex MapReduce jobs in Hadoop, and how to use some of the tools in the Hadoop ecosystem for data mining and machine learning. Topics: Hadoop, MapReduce, HDFS, combiners, secondary sort, distributed cache, SQL on Hadoop, Hive, Cloudera ML/Oryx, Mahout, Hadoop streaming, implementing Hadoop jobs, debugging Hadoop jobs, TF-IDF, Pig, Sqoop, Oozie, HBase, Impala. Prerequisite: CS 107 or equivalent.

CS 247. Human-Computer Interaction Design Studio. 3-4 Units.

Project-based focus on interaction design process, especially early-stage design and rapid prototyping. Methods used in interaction design including needs analysis, user observation, sketching, concept generation, scenario building, and evaluation. Prerequisites: 147 or equivalent background in design thinking; 106B or equivalent background in programming.

CS 247L. Human Computer Interaction Technology Laboratory. 1 Unit.

Hands-on introduction to contemporary HCI technologies. Interaction design with Adobe Flash, mobile development, physical computing, and web applications. Corequisite: 247.

CS 248. Interactive Computer Graphics. 3-4 Units.

This is the second course in the computer graphics sequence, and as such it assumes a strong familiarity with rendering and image creation. The course has a strong focus on computational geometry, animation, and simulation. Topics include splines, implicit surfaces, geometric modeling, collision detection, animation curves, particle systems and crowds, character animation, articulation, skinning, motion capture and editing, rigid and deformable bodies, and fluid simulation. As a final project, students implement an interactive video game utilizing various concepts covered in the class. Games may be designed on mobile devices, in a client/server/ browser environment, or on a standard personal computer. Prerequisite: CS148.

CS 249A. Object-Oriented Programming from a Modeling and Simulation Perspective. 3 Units.

Topics: large-scale software development approaches for complex applications, class libraries and frameworks; encapsulation, use of inheritance and dynamic dispatch, design of interfaces and interface/ implementation separation, exception handling, smart pointers and reference management, minimalizing dependencies and value-oriented programming. Inheritance: when and why multiple inheritance naming, directories, manager, and disciplined use of design patterns including functors, event notification and iterators. Prerequisites: C, C++, and programming methodology as developed in 106B or X, and 107 (107 may be taken concurrently). Recommended: 193D.

CS 249B. Large-scale Software Development. 3 Units.

Software engineering of high quality large-scale complex software with a focus on evolvability, performance and cost. Software development processes, people and practice; audit: integrating invariant checks with production software; concurrency with modular object-oriented programming; collection implementation; generic programming and templates; design of value types; named descriptions for large value types; memory management; controlling placement, locality and consumption; run-time vs. static type checking and identification.

CS 254. Computational Complexity. 3 Units.

An introduction to computational complexity theory. Topics include the P versus NP problem; diagonalization; space complexity: PSPACE, Savitch's theorem, and NL=coNL; counting problems and #P-completeness; circuit complexity; pseudorandomness and derandomization; complexity of approximation; quantum computing; complexity barriers. Prerequisites: 154 or equivalent; mathematical maturity.

CS 255. Introduction to Cryptography. 3 Units.

For advanced undergraduates and graduate students. Theory and practice of cryptographic techniques used in computer security. Topics: encryption (symmetric and public key), digital signatures, data integrity, authentication, key management, PKI, zero-knowledge protocols, and real-world applications. Prerequisite: basic probability theory.

CS 259D. Data Mining for Cyber Security. 3-4 Units.

The massive increase in the rate of novel cyber attacks has made data-mining-based techniques a critical component in detecting security threats. The course covers various applications of data mining in computer and network security. Topics include: Overview of the state of information security; malware detection; network and host intrusion detection; web, email, and social network security; authentication and authorization anomaly detection; alert correlation; and potential issues such as privacy issues and adversarial machine learning. Prerequisites: Data mining / machine learning at the level of CS 246 or CS 229; familiarity with computer systems and networks at least at the level of CS 110; CS 140 and CS 144 strongly recommended; CS 155 recommended but not required.

CS 261. Optimization and Algorithmic Paradigms. 3 Units.

Algorithms for network optimization: max-flow, min-cost flow, matching, assignment, and min-cut problems. Introduction to linear programming. Use of LP duality for design and analysis of algorithms. Approximation algorithms for NP-complete problems such as Steiner Trees, Traveling Salesman, and scheduling problems. Randomized algorithms. Introduction to online algorithms. Prerequisite: 161 or equivalent.

CS 262. Computational Genomics. 3 Units.

Applications of computer science to genomics, and concepts in genomics from a computer science point of view. Topics: dynamic programming, sequence alignments, hidden Markov models, Gibbs sampling, and probabilistic context-free grammars. Applications of these tools to sequence analysis: comparative genomics, DNA sequencing and assembly, genomic annotation of repeats, genes, and regulatory sequences, microarrays and gene expression, phylogeny and molecular evolution, and RNA structure. Prerequisites: 161 or familiarity with basic algorithmic concepts. Recommended: basic knowledge of genetics. Same as: BIOMEDIN 262

CS 263. Algorithms for Modern Data Models. 3 Units.

We traditionally think of algorithms as running on data available in a single location, typically main memory. In many modern applications including web analytics, search and data mining, computational biology, finance, and scientific computing, the data is often too large to reside in a single location, is arriving incrementally over time, is noisy/uncertain, or all of the above. Paradigms such as map-reduce, streaming, sketching, Distributed Hash Tables, Bulk Synchronous Processing, and random walks have proved useful for these applications. This course will provide an introduction to the design and analysis of algorithms for these modern data models. Prerequisite: Algorithms at the level of CS 261. Same as: MSE 317

CS 264. Beyond Worst-Case Analysis. 3 Units.

This course is motivated by problems for which the traditional worst-case analysis of algorithms fails to differentiate meaningfully between different solutions, or recommends an intuitively "wrong" solution over the "right" one. This course studies systematically alternatives to traditional worst-case analysis that nevertheless enable rigorous and robust guarantees on the performance of an algorithm. Topics include: instance optimality; smoothed analysis; parameterized analysis and condition numbers; models of data (pseudorandomness, locality, diffuse adversaries, etc.); average-case analysis; robust distributional analysis; resource augmentation; planted and semi-random graph models. Motivating problems will be drawn from online algorithms, online learning, constraint satisfaction problems, graph partitioning, scheduling, linear programming, hashing, machine learning, and auction theory. Prerequisites: CS161 (required). CS261 is recommended but not required.

CS 265. Randomized Algorithms and Probabilistic Analysis. 3 Units. Randomness pervades the natural processes around us, from the formation of networks, to genetic recombination, to quantum physics. Randomness is also a powerful tool that can be leveraged to create algorithms and data structures which, in many cases, are more efficient and simpler than their deterministic counterparts. This course covers the key tools of probabilistic analysis, and application of these tools to understand the behaviors of random processes and algorithms. Emphasis is on theoretical foundations, though we will apply this theory broadly, discussing applications in machine learning and data analysis, networking, and systems. Topics include tail bounds, the probabilistic method, Markov chains, and martingales, with applications to analyzing random graphs, metric embeddings, random walks, and a host of powerful and elegant randomized algorithms. Prerequisites: CS 161 and STAT 116, or equivalents and instructor consent. Same as: CME 309

CS 266. Parameterized Algorithms and Complexity. 3 Units. An introduction to the area of parameterized algorithms and complexity, which explores multidimensional methods for measuring the difficulty and feasibility of solving computational problems. Topics include: fixed-parameter tractability (FPT) and its characterizations, FPT algorithms for hard problems, the W-hierarchy (W[1], W[2], W[P], and complete problems for these classes), and the relationships between parameterized questions and classical theory questions. Prerequisites: CS 154 and 161 or the equivalent mathematical maturity.

CS 267. Graph Algorithms. 3 Units. An introduction to advanced topics in graph algorithms. Focusing on a variety of graph problems, the course will explore topics such as small space graph data structures, approximation algorithms, dynamic algorithms, and algorithms for special graph classes. Topics include: approximation algorithms for shortest paths and graph matching, distance oracles, graph spanners, cliques and graph patterns, dynamic algorithms, graph coloring, algorithms for planar graphs. Prerequisites: 161 or the equivalent mathematical maturity.

CS 268. Geometric Algorithms. 3 Units. Techniques for design and analysis of efficient geometric algorithms for objects in 2-, 3-, and higher dimensions. Topics: convexity, triangulations and simplicial complexes, sweeping, partitioning, and point location. Voronoi/Delaunay diagrams and their properties. Arrangements of curves and surfaces. Intersection and visibility problems. Geometric searching and optimization. Random sampling methods. Impact of numerical issues in geometric computation. Example applications to robotic motion planning, visibility preprocessing and rendering in graphics, model-based recognition in computer vision, and structural molecular biology. Prerequisite: discrete algorithms at the level of 161. Recommended: 164.

CS 270. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving. 3 Units. Methods for modeling biomedical systems and for making those models explicit in the context of building software systems. Emphasis is on intelligent systems for decision support and Semantic Web applications. Topics: knowledge representation, controlled terminologies, ontologies, reusable problem solvers, and knowledge acquisition. Recommended: exposure to object-oriented systems, basic biology. Same as: BIOMEDIN 210

CS 272. Introduction to Biomedical Informatics Research Methodology. 3 Units. Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Because the team projects start in the first week of class, attendance that week is strongly recommended. Prerequisites: BIOMEDIN 210 or 211 or 214 or 217 or consent of instructor. Same as: BIOE 212, BIOMEDIN 212, GENE 212

CS 273A. A Computational Tour of the Human Genome. 3 Units. Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing (technologies, assembly, personalized sequencing); functional landscape (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures from genomic researchers. No prerequisites. See <http://cs273a.stanford.edu/>. Same as: BIOMEDIN 273A, DBIO 273A

CS 274. Representations and Algorithms for Computational Molecular Biology. 3-4 Units. Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units. Same as: BIOE 214, BIOMEDIN 214, GENE 214

CS 275. Translational Bioinformatics. 4 Units. Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine using bioinformatics. Case studies. Prerequisites: programming ability at the level of CS 106A and familiarity with statistics and biology. Same as: BIOMEDIN 217

CS 275A. Symbolic Musical Information. 2-4 Units. Focus on symbolic data for music applications including advanced notation systems, optical music recognition, musical data conversion, and internal structure of MIDI files. Same as: MUSIC 253

CS 275B. Music Query, Analysis, and Style Simulation. 2-4 Units. Leveraging off three synchronized sets of symbolic data resources for notation and analysis, the lab portion introduces students to the open-source Humdrum Toolkit for music representation and analysis. Issues of data content and quality as well as methods of information retrieval, visualization, and summarization are considered in class. Grading based primarily on student projects. Prerequisite: 253 or consent of instructor. Same as: MUSIC 254

CS 276. Information Retrieval and Web Search. 3 Units.

Text information retrieval systems; efficient text indexing; Boolean, vector space, and probabilistic retrieval models; ranking and rank aggregation; evaluating IR systems. Text clustering and classification: classification algorithms, latent semantic indexing, taxonomy induction; Web search engines including crawling and indexing, link-based algorithms, and web metadata. Prerequisites: CS 107, CS 109, CS 161.

Same as: LINGUIST 286

CS 277. Experimental Haptics. 3 Units.

Computer haptics is the discipline of synthesizing touch feedback in simulated or virtual environments. Course objective is to study and develop computational methods for generating force feedback through haptic interfaces. Theoretical topics: haptic rendering in 3-D virtual environments, simulation of haptic interaction with rigid and deformable objects, haptic interfaces, psychophysics of touch. Applied topics: CHAI3D haptic library, implementation of algorithms for haptic rendering, collision detection, and deformable body simulation. Guest speakers; Lab/programming exercises; open-ended final project. Enrollment limited to 20. Prerequisite: experience with C++. Recommended: 148 or 248, 223A.

CS 279. Computational Biology: Structure and Organization of Biomolecules and Cells. 3 Units.

Computational approaches to understanding the three-dimensional spatial organization of biological systems and how that organization evolves over time. The course will cover cutting-edge research in both physics-based simulations and computational analysis of experimental data, at scales ranging from individual molecules to multiple cells. Prerequisites: elementary programming background (106A or equivalent) and an introductory course in biology or biochemistry.

CS 294A. Research Project in Artificial Intelligence. 3 Units.

Student teams under faculty supervision work on research and implementation of a large project in AI. State-of-the-art methods related to the problem domain. Prerequisites: AI course from 220 series, and consent of instructor.

CS 294H. Research Project in Human-Computer Interaction. 3 Units.

Student teams under faculty supervision work on research and implementation of a large project in HCI. State-of-the-art methods related to the problem domain. Prerequisites CS 377, 147, 247, or permission from instructor.

CS 294S. Research Project in Software Systems and Security. 3 Units.

Topics vary. Focus is on emerging research themes such as programmable open mobile Internet that spans multiple system topics such as human-computer interaction, programming systems, operating systems, networking, and security. May be repeated for credit. Prerequisites: CS 103 and 107.

CS 294W. Writing Intensive Research Project in Computer Science. 3 Units.

Restricted to Computer Science and Computer Systems Engineering undergraduates. Students enroll in the CS 294W section attached to the CS 294 project they have chosen.

CS 295. Software Engineering. 2-3 Units.

Software specification, testing, and verification. Emphasis is on current best practices and technology for developing reliable software at reasonable cost. Assignments focus on applying these techniques to realistic software systems. Prerequisites: 108. Recommended a project course such as 140, 143, or 145.

CS 298. Seminar on Teaching Introductory Computer Science. 1 Unit.

Faculty, undergraduates, and graduate students interested in teaching discuss topics raised by teaching computer science at the introductory level. Prerequisite: consent of instructor.

Same as: EDUC 298

CS 300. Departmental Lecture Series. 1 Unit.

Priority given to first-year Computer Science Ph.D. students. CS Masters students admitted if space is available. Presentations by members of the department faculty, each describing informally his or her current research interests and views of computer science as a whole.

CS 309. Industrial Lectureships in Computer Science. 1 Unit.

Guest computer scientist. By arrangement. May be repeated for credit.

CS 309A. Cloud Computing. 1 Unit.

For science, engineering, business, medicine, and law students. Cloud computing is bringing information systems out of the back office and making it core to the entire economy. This class is intended for all students who want to begin to understand the implications of this shift in technology. Guest industry experts are public company CEOs who are delivering application, software development, operations management, compute, storage & data center, and network cloud services.

CS 315A. Parallel Computer Architecture and Programming. 3 Units.

The principles and tradeoffs in the design of parallel architectures. Emphasis is on naming, latency, bandwidth, and synchronization in parallel machines. Case studies on shared memory, message passing, data flow, and data parallel machines illustrate techniques. Architectural studies and lectures on techniques for programming parallel computers. Programming assignments on one or more commercial multiprocessors. Prerequisites: EE 282, and reasonable programming experience.

CS 316. Advanced Multi-Core Systems. 3 Units.

In-depth coverage of the architectural techniques used in modern, multi-core chips for mobile and server systems. Advanced processor design techniques (superscalar cores, VLIW cores, multi-threaded cores, energy-efficient cores), cache coherence, memory consistency, vector processors, graphics processors, heterogeneous processors, and hardware support for security and parallel programming. Students will become familiar with complex trade-offs between performance-power-complexity and hardware-software interactions. A central part of CS316 is a project on an open research question on multi-core technologies. Prerequisites: EE 108B. Recommended: CS 149, EE 282.

Same as: EE 382E

CS 319. Topics in Digital Systems. 3 Units.

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

CS 323. Automated Reasoning: Theory and Applications. 3-4 Units.

Intelligent computer agents must reason about complex, uncertain, and dynamic environments. This course is a graduate level introduction to automated reasoning techniques and their applications, covering logical and probabilistic approaches. Topics include: logical and probabilistic foundations, backtracking strategies and algorithms behind modern SAT solvers, stochastic local search and Markov Chain Monte Carlo algorithms, variational techniques, classes of reasoning tasks and reductions, and applications.

CS 327A. Advanced Robotic Manipulation. 3 Units.

Advanced control methodologies and novel design techniques for complex human-like robotic and bio mechanical systems. Class covers the fundamentals in operational space dynamics and control, elastic planning, human motion synthesis. Topics include redundancy, inertial properties, haptics, simulation, robot cooperation, mobile manipulation, human-friendly robot design, humanoids and whole-body control. Additional topics in emerging areas are presented by groups of students at the end-of-quarter mini-symposium. Prerequisites: 223A or equivalent.

CS 328. Topics in Computer Vision. 3 Units.

Fundamental issues of, and mathematical models for, computer vision. Sample topics: camera calibration, texture, stereo, motion, shape representation, image retrieval, experimental techniques. May be repeated for credit. Prerequisites: 205, 223B, or equivalents.

CS 329. Topics in Artificial Intelligence. 3 Units.

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

CS 331A. Advanced Reading in Computer Vision. 3 Units.

(Formerly CS323) The field of computer vision has seen an explosive growth in past decade. Much of recent effort in vision research is towards developing algorithms that can perform high-level visual recognition tasks on real-world images and videos. With development of Internet, this task becomes particularly challenging and interesting given the heterogeneous data on the web. Course will focus on reading recent research papers that are focused on solving high-level visual recognition problems, such as object recognition and categorization, scene understanding, human motion understanding, etc. Project required. Prerequisite: some experience in research with one of the following fields: computer vision, image processing, computer graphics, machine learning.

CS 331B. 3D Representation and Recognition. 3 Units.

The course surveys recent developments in high level and 3D computer vision and will focus on reading recent research papers on topics related to 3D object recognition and representation, spatial inference, activity understanding, human vision and 3D perception. The course is inspired by a famous series of workshops (called 3d-RR) which have been offered during the International Conference in Computer Vision (ICCV) since 2007. Prerequisites - Some experience in research with one of the following fields: computer vision, image processing, computer graphics, machine learning.

CS 334A. Convex Optimization I. 3 Units.

Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, basic probability. Same as: CME 364A, EE 364A

CS 340. Topics in Computer Systems. 3-4 Units.

Topics vary every quarter, and may include advanced material being taught for the first time. May be repeated for credit.

CS 341. Project in Mining Massive Data Sets. 3 Units.

Team project in data-mining of very large-scale data, including the problem statement and implementation and evaluation of a solution; some lectures on relevant materials will be given: Hadoop, Hive, Amazon EC2; other topics of possible relevance to some projects: computational advertising and the adwords problem; graph partitioning and community detection; extracting relations from the Web; stream data processing.

CS 344. Topics in Computer Networks. 3 Units.

High-performance embedded system design. Student teams of two software engineers (C experience required) and one hardware engineer (Verilog experience required) build a fully functioning Internet router. Work in teams of three. How router interoperates with others in class. Open-ended design challenge judged by panel of industry experts. Prerequisites: CS 144, 244, or network programming experience.

CS 344E. Advanced Wireless Networks. 3 Units.

Networking research in wireless systems. Topics include: multi-channel/multi-radio systems, routing, coding, physical layer hints, low power, mesh networking, interference cancellation, technological trends, and protocol design. Students implement and test research ideas on SWAN, a WiFi testbed.

CS 344G. (Your) Great Ideas for Networked Applications. 3 Units.

Graduate project class on computer networking, emphasizing end-to-end applications and protocols. Students will propose and execute an original project in teams of 2-3, culminating in a final writeup and presentation/demonstration. Each week, students will read, present, and lead a discussion about a seminal paper or system. Prerequisites: programming experience; CS 244 recommended but not required.

CS 346. Database System Implementation. 3-5 Units.

A major database system implementation project realizes the principles and techniques covered in earlier courses. Students independently build a complete database management system, from file structures through query processing, with a personally designed feature or extension. Lectures on project details and advanced techniques in database system implementation, focusing on query processing and optimization. Guest speakers from industry on commercial DBMS implementation techniques. Prerequisites: 145, 245, programming experience in C++.

CS 347. Parallel and Distributed Data Management. 3 Units.

The principles and system organization of distributed and parallel databases. Data fragmentation and distribution, distributed database design, query processing and optimization, distributed concurrency control, reliability and commit protocols, and replicated data management. Data management in peer-to-peer systems. Data management in the "cloud" using map-reduce and other massive parallelism techniques.

CS 348B. Computer Graphics: Image Synthesis Techniques. 3-4 Units.

Intermediate level, emphasizing high-quality image synthesis algorithms and systems issues in rendering. Topics include: Reyes and advanced rasterization, including motion blur and depth of field; ray tracing and physically based rendering; Monte Carlo algorithms for rendering, including direct illumination and global illumination; path tracing and photon mapping; surface reflection and light source models; volume rendering and subsurface scattering; SIMD and multi-core parallelism for rendering. Written assignments and programming projects. Prerequisite: 248 or equivalent. Recommended: Fourier analysis or digital signal processing.

CS 349. Topics in Programming Systems. 3 Units.

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

CS 349C. Topics in Programming Systems: Readings in Distributed Systems. 1-3 Unit.

Discussion of research publications that are of current interest in distributed systems. Students are expected to read all papers, and sign up for presentation of one paper. The course itself is 1 unit. Those interested in working on a project along with the readings should enroll for 3 units.

CS 358. Topics in Programming Language Theory. 3 Units.

Topics of current research interest in the mathematical analysis of programming languages, structured operational semantics, domain theory, semantics of concurrency, rich type disciplines, problems of representation independence, and full abstraction. See Time Schedule or Axxess for current topics. May be repeated for credit. Prerequisites: 154, 157, 258, or equivalents. (Staff).

CS 359. Topics in the Theory of Computation. 3 Units.

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

CS 361A. Advanced Algorithms. 3 Units.

Advanced data structures: union-find, self-adjusting data structures and amortized analysis, dynamic trees, Fibonacci heaps, universal hash function and sparse hash tables, persistent data structures. Advanced combinatorial algorithms: algebraic (matrix and polynomial) algorithms, number theoretic algorithms, group theoretic algorithms and graph isomorphism, online algorithms and competitive analysis, strings and pattern matching, heuristic and probabilistic analysis (TSP, satisfiability, cliques, colorings), local search algorithms. May be repeated for credit. Prerequisite: 161 or 261, or equivalent.

CS 361B. Advanced Algorithms. 3 Units.

Topics: fundamental techniques used in the development of exact and approximate algorithms for combinatorial optimization problems such as generalized flow, multicommodity flow, sparsest cuts, generalized Steiner trees, load balancing, and scheduling. Using linear programming, emphasis is on LP duality for design and analysis of approximation algorithms; interior point methods for LP. Techniques for development of strongly polynomial algorithms. Prerequisites: 161 or 261, or equivalent.

CS 364A. Algorithmic Game Theory. 3 Units.

Topics at the interface of computer science and game theory such as: algorithmic mechanism design; combinatorial auctions; computation of Nash equilibria and relevant complexity theory; congestion and potential games; cost sharing; game theory and the Internet; matching markets; network formation; online learning algorithms; price of anarchy; prior-free auctions; selfish routing; sponsored search. Prerequisites: 154N and 161, or equivalents.

CS 369. Topics in Analysis of Algorithms. 3 Units.

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

CS 369E. Topics in Analysis of Algorithms: Communication Complexity. 3 Units.

Fundamentals of communication complexity, with a strong emphasis on applications to proving lower bounds in important computational models. Application areas include data stream algorithms, data structures, extended formulations of linear programs, and combinatorial auctions. Same as: for Algorithm Designers

CS 371. Computational Biology in Four Dimensions. 3 Units.

Computational approaches to understanding the three-dimensional spatial organization of biological systems and how that organization evolves over time. The course will cover cutting-edge research in both physics-based simulation and computational analysis of experimental data, at scales ranging from individual molecules to entire cells. Prerequisite: CS 106A or equivalent, and an introductory course in biology or biochemistry. Recommended: some experience in mathematical modeling (does not need to be a formal course). Same as: CME 371

CS 373. Statistical and Machine Learning Methods for Genomics. 3 Units.

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets. Same as: BIO 268, BIOMEDIN 245, GENE 245, STATS 345

CS 374. Algorithms in Biology. 2-3 Units.

Algorithms and computational models applied to molecular biology and genetics. Topics vary annually. Possible topics include biological sequence comparison, annotation of genes and other functional elements, molecular evolution, genome rearrangements, microarrays and gene regulation, protein folding and classification, molecular docking, RNA secondary structure, DNA computing, and self-assembly. May be repeated for credit. Prerequisites: 161, 262 or 274, or BIOCHEM 218, or equivalents. Same as: BIOMEDIN 374

CS 376. Human-Computer Interaction Research. 3-4 Units.

Prepares students to conduct original HCI research by reading and discussing seminal and cutting-edge research papers. Main topics are ubiquitous computing, social computing, and design and creation; breadth topics include HCI methods, programming, visualization, and user modeling. Student pairs perform a quarter-long research project. Prerequisites: For CS and Symbolic Systems undergraduates/masters students, CS 147 or CS 247. No prerequisite for PhD students or students outside of CS and Symbolic Systems.

CS 377. Topics in Human-Computer Interaction. 2-3 Units.

Contents change each quarter. May be repeated for credit. See <http://hci.stanford.edu/academics> for offerings.

CS 377D. Topics in Learning and Technology: d.compress - Designing Calm. 3 Units.

Contents of the course change each year. The course can be repeated. Stress silently but steadily damages physical and emotional well-being, relationships, productivity, and our ability to learn and remember. This highly experiential and project-oriented class will focus on designing interactive technologies to enable calm states of cognition, emotion, and physiology for better human health, learning, creativity and productivity. Same as: EDUC 328A

CS 377E. Designing Solutions to Global Grand Challenges. 3-4 Units.

In this course we will creatively apply information technologies to collectively attack Global Grand Challenges (e.g., global warming, rising healthcare costs and declining access, and ensuring quality education for all). Interdisciplinary student teams will carry out needfinding within a target domain, followed by brainstorming to propose a quarter long project. Teams will spend the rest of the quarter applying user-centered design methods to rapidly iterate through design, prototyping, and testing of their solutions. This course will interleave a weekly lecture with a weekly studio session where students apply the techniques hands-on in a small-scale, supportive environment.

CS 377W. HCI Issues in Wearable Computing. 3 Units.

With devices like Pebble and Google Glass moving from labs to consumer use, Wearable Computing represents the forefront of HCI innovation. In this course, students will engage with a broad range of issues around the design and development of wearable devices and systems and develop their own wearable interaction. The course begins with use, analysis, and redesign of an existing wearable, followed by a larger group project integrating concepts from the course to prototype a novel wearable interaction. Students work in project teams, prototyping their wearable concept and communicating their progress through demonstration, final report, and presentation. Google Glass will be available for students interested in experimenting with this platform. Prerequisites: One of the following: CS 147 or CS 247.

CS 379. Interdisciplinary Topics. 3 Units.

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

CS 379C. Computational Models of the Neocortex. 3 Units.

Repraisal of course offered spring 2012 of the same name ; see <http://www.stanford.edu/class/cs379c/> for more detail ; which emphasized scaling the technologies of systems neuroscience to take advantage of the exponential trend in computational power known as Moore's Law. Course covers many of the same topics but will focus on the near-term prospects for practical advances in health care, prosthetic augmentation, and artificial intelligence inspired by biological systems. Graded pass / no credit on the basis of class participation, a midterm white paper or business prospectus and a final technical report evaluating an appropriate technology selected in collaboration with the instructor. Focus will be on examining the assumptions underlying current claims for realizing the potential benefits of research in neuroscience and identifying real business opportunities, disruptive new technologies and advances in medicine that could substantially benefit patients within the next decade. Technology-minded critical thinkers seriously interested in placing their bets and picking careers in related areas of business, technology and science are welcome. Prerequisites: basic probability theory, algorithms, and statistics.

CS 379L. Designing Liberation Technology. 3-4 Units.

Small project teams work with NGOs to design new technologies for promoting development and democracy. Students conduct observations to identify needs, generate concepts, create prototypes, and test their appropriateness. Some projects may continue past the quarter toward full-scale implementation. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s). Design Institute class; see <http://dschool.stanford.edu>. Same as: POLISCI 337T

CS 390A. Curricular Practical Training. 1 Unit.

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390 A, B, and C may each be taken once.

CS 390B. Curricular Practical Training. 1 Unit.

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390A,B,C may each be taken once.

CS 390C. Curricular Practical Training. 1 Unit.

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390A,B,C may each be taken once.

CS 390P. Part-time Curricular Practical Training. 1 Unit.

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

CS 390Q. Part-Time Curricular Practical Training. 1 Unit.

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

CS 393. Computer Laboratory. 1-9 Unit.

For CS graduate students. A substantial computer program is designed and implemented; written report required. Recommended as a preparation for dissertation research. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

CS 395. Independent Database Project. 1-6 Unit.

For graduate students in Computer Science. Use of database management or file systems for a substantial application or implementation of components of database management system. Written analysis and evaluation required. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

CS 399. Independent Project. 1-9 Unit.

Letter grade only.

CS 399P. Independent Project. 1-9 Unit.

Graded satisfactory/no credit.

CS 402. Beyond Bits and Atoms: Designing Technological Tools. 3-4 Units.

Practicum in designing and building technology-enabled curricula and hands-on learning environments. Students use software toolkits and state-of-the-art fabrication machines to design educational software, educational toolkits, and tangible user interfaces. The course will focus on designing low-cost technologies, particularly for urban school in the US and abroad. We will explore theoretical and design frameworks from the constructionist learning perspective, critical pedagogy, interaction design for children. Same as: EDUC 236X

CS 402L. Beyond Bits and Atoms - Lab. 1-3 Unit.

This course is a hands-on lab in the prototyping and fabrication of tangible technologies, with a special focus in learning and education. We will learn how to use state-of-the-art fabrication machines (3D printers, 3D scanners, laser cutters, routers) to design educational toolkits, educational toys, science kits, and tangible user interfaces. A special focus of the course will be to design low-cost technologies, particularly for urban school in the US and abroad.

Same as: EDUC 211X

CS 424M. Learning Analytics and Computational Modeling in Social Science. 3-4 Units.

Computational modeling and data-mining are dramatically changing the physical sciences, and more recently also the social and behavioral sciences. Traditional analysis techniques are insufficient to investigate complex dynamic social phenomena as social networks, online gaming, diffusion of innovation, opinion dynamics, classroom behavior, and other complex adaptive systems. In this course, we will learn about how modeling, network theory, and basic data-mining can support research in cognitive, and social sciences, in particular around issues of learning, cognitive development, and educational policy. Same as: EDUC 390X

CS 427. Hero's Journey: AI and Game Theory in 3D Real-time Storytelling. 3-4 Units.

In the Heroquest's Journey course, the students create a third person game by focusing on creating stories from interactions between the 3D characters and their environment. Each story is auto-generated depending on the narrative framework implemented, and the actions each of the characters decide to take. The focus is creating heroquest's that act and react in a believable manner in a dynamic environment.

CS 431. High-Level Vision: Object Representation. 3 Units.

(Formerly CS423 High-Level Vision: Behaviors, Neurons, and Computational Models) Interdisciplinary seminar focusing on understanding how computations in the brain enable rapid and efficient object perception. Covers topics from multiple perspectives drawing on recent research in Psychology, Neuroscience, Computer Science and Applied Statistics. Emphasis on discussing recent empirical findings, methods and theoretical debates in the field. Topics include: theories of object perception, neural computations underlying invariant object perception, how visual exemplars and categories are represented in the brain, what information is present in distributed activations across neural populations and how it relates to object perception, what modern statistical and analytical tools there are for multi-variate analysis of brain activations. Same as: PSYCH 250

CS 442. High Productivity and Performance with Domain-specific Languages in Scala. 3 Units.

Introduction to developing domain specific languages (DSLs) for productivity and performance using the Scala programming language. Goal is to equip students with the knowledge and tools to develop DSLs that can dramatically improve the experience of using high performance computation in important scientific and engineering domains. Aimed at two sorts of students: domain experts who can define key domain specific language elements that capture domain knowledge, and computer scientists who can implement these DSLs using a new DSL framework in Scala. First half of the course will focus on understanding the infrastructure for implementing DSLs in Scala and developing techniques for defining good DSLs. Second half of the course will focus on example DSLs that provide both high-productivity and performance. During the second half of the course groups of students will develop and implement their own DSLs using the Delite DSL process of implementing DSLs for parallel computation. Prerequisites: Systems course such as CS140, CS143 or CS149, and expertise in a particular domain and desire to improve productivity and performance of computation.

CS 448. Topics in Computer Graphics. 3-4 Units.

Topic changes each quarter. Recent topics: computational photography, datanvisualization, character animation, virtual worlds, graphics architectures, advanced rendering. See <http://graphics.stanford.edu/courses> for offererings and prerequisites. May be repeated for credit.

CS 448B. Data Visualization. 3 Units.

Techniques and algorithms for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology, and cognitive science. Topics: graphical perception, data and image models, visual encoding, graph and tree layout, color, animation, interaction techniques, automated design. Lectures, reading, and project. Prerequisite: one of 147, 148, or equivalent.

CS 448I. Computational Imaging and Display. 3 Units.

Spawned by rapid advances in optical fabrication and digital processing power, a new generation of imaging technology is emerging: computational cameras at the convergence of applied mathematics, optics, and high-performance computing. Similar trends are observed for modern displays pushing the boundaries of resolution, contrast, 3D capabilities, and immersive experiences through the co-design of optics, electronics, and computation. This course serves as an introduction to the emerging field of computational imaging and displays. Students will learn to master bits and photons.

Same as: EE 367

CS 448X. Math and Computer Science behind Special Effects. 3 Units.

Course will focus on a number of case studies of special effects work in feature films, with the aim of elucidating the underlying technical challenges from the standpoint of mathematics and computer science. As a project based class, individuals may more deeply focus on the individual aspects of most interest to them be it rendering, computational geometry, computer vision, physical simulation, or character animation. Guests from industry will speak about effects work they and their colleagues have been involved in as well as discuss some current challenges in the industry. Students will be asked to submit some current challenges either alone or in an appropriate group. Since course may be taken multiple times for credit, and will be open to both undergraduate and graduate students with varied backgrounds and interests, grading will be based on individual effort relative to preparation. As such currently there are no prerequisites enforced.

CS 476A. Music, Computing, and Design I: Software Paradigms for Computer Music. 1-4 Unit.

Software design and implementation for computer audio. Strategies, best practices, and tradeoffs in building audio software systems of various sizes (S, M, L, XL), with a focus on interactive (real-time) systems. Lectures examine high-level designs as well as dissect code in a hands-on manner. Course work includes small programming assignments and a final software project. This course is the prerequisite for MUSIC 256B. Prerequisite: experience in C/C++ and/or Java.

Same as: MUSIC 256A

CS 476B. Music, Computing, Design II: Mobile Music. 1-4 Unit.

Aesthetic, design, and implementation of mobile music, centered around the modern super smartphones such as the iPhone). Similarities and intrinsic differences between mobile and traditional computing and design for music. Topics include mobile software design, social and cloud computing, mobile interface design, and programming phones, in the service of music. Prerequisite: MUSIC 256A.

Same as: MUSIC 256B

CS 499. Advanced Reading and Research. 1-15 Unit.

Letter grade only. Advanced reading and research for CS graduate students. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

CS 499P. Advanced Reading and Research. 1-15 Unit.

Graded satisfactory/no credit. Advanced reading and research for CS graduate students. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

CS 545. Information and Data Analytics Seminar. 1 Unit.

Seminar features leading industrial and academic experts on big data analytics, information management, data mining, machine learning, and large-scale data processing.

CS 546. Seminar on Liberation Technologies. 1 Unit.

This one-unit seminar will present speakers relevant in a variety of ways to how various forms of information technology are being used to defend human rights, improve governance, deepen democracy, empower the poor, promote economic development, protect the environment, enhance public health, and pursue a variety of other social goods.

Same as: POLISCI 337S

CS 547. Human-Computer Interaction Seminar. 1 Unit.

Weekly speakers on human-computer interaction topics. May be repeated for credit.

CS 548. Internet and Distributed Systems Seminar. 1 Unit.

Guest speakers from academia and industry. May be repeated for credit.

CS 571. Surgical Robotics Seminar. 1 Unit.

Surgical robots developed and implemented clinically on varying scales. Seminar goal is to expose students from engineering, medicine, and business to guest lecturers from academia and industry. engineering and clinical aspects connected to design and use of surgical robots, varying in degree of complexity and procedural role. May be repeated for credit. Same as: ME 571

CS 801. TGR Project. 0 Units.**CS 802. TGR Dissertation. 0 Units.**

Dance Courses

DANCE 13AX. Ballet Intensive. 2 Units.

Rigorous daily practice that will challenge and expand students' understanding of and perspective on the art form. Focus on strengthening technique, exploring ballet as an expressive form and performing art, and developing an artistic voice.

DANCE 14AX. Modern Dance: Traditions of Creation. 2 Units.

Interested in putting your hands in the clay? In this hands-on course, dancers will investigate and re-choreograph some of Robert Moses' signature works. Robert and long-term dancers in his company, Robert Moses' Kin, will collaboratively guide students in intensive studio sessions as they revisit the significant issues, techniques, and directions in such seminal works as *Word of Mouth*, *The Soft Sweet Smell of Firm Warm Things*, and *Helen*. Elements used to create the works will be re-investigated and re-framed through the lens of the students' experience and perspective. Students will coordinate a showcase of excerpts of their remolded choreography. This class will utilize the language of Robert Moses' repertory to train dancers in the basics of Moses' movement vocabulary. Students will improve and reinforce technical proficiency, artistic range, and performance skills. In addition, students will expand their movement range and vocabulary in a manner that demonstrates an increase in strength, agility, flexibility, and endurance through classical ballet and contemporary modern dance techniques.

DANCE 23. Movement and Meaning: Dance Studies in Global Comparative Context. 4 Units.

This course introduces students to various approaches to studying dance in a humanities context. We will explore how people create meaning through dance and how dance, in turn, shapes social norms, political institutions, and cultural practices across time and space. The course's structure challenges the Western/non-Western binary that still pervades many academic disciplines by comparing dance forms across the globe on the basis of functional similarities. At the same time, we will keep in mind the unequal power hierarchies shaping our modern world, and therefore we will examine how and why certain forms have become delineated as 'Western' and others as 'world' or 'ethnic,' despite similarities in movement, meaning, or purpose.

Same as: CSRE 159M, TAPS 159M, TAPS 259M

DANCE 24. Introduction to Dance in the African Diaspora. 4 Units.

This course introduces students to dance as an important cultural force in the African Diaspora. From capoeira in Brazil to dance hall in Jamaica to hip hop in the United States and Ghana, we will analyze dance as a form of resistance to slavery, colonialism, and oppression; as an integral component of community formation; and as a practice that shapes racial, gendered, and national identity. We will explore these topics through readings, film viewings, and movement workshops (no previous dance experience required). Students will have the option to do a creative performance as part of their final project.

Same as: AFRICAAM 24, CSRE 24D, TAPS 152D

DANCE 25. Studio to Stage. 1 Unit.**DANCE 26. Dance and at the African Diaspora. 4 Units.**

Same as: TAPS 155M

DANCE 27. Choreographic Film. 1 Unit.

Stanford Lecturer and Choreographer Alex Ketley will work with the students on the creation of a new dance for film. The class will consist of a number of rehearsals in the studio where the students will explore Ketley's movement vocabulary. When this movement material is built, the dancers will then take the material throughout the Stanford campus to be filmed with a curiosity about how different contexts and environments effect the quality and presentation of the movement. After the film is shot, Ketley will create the film, but also give all the participating students access to the raw footage in the event that they are interested in making personal edits of the material. Students with a background in ballet, modern, or hip-hop are encouraged to participate. Students with limited dance training are welcome and are encouraged to email the choreographer so that they can have a dialog about what the class will entail. Any questions can be directed to Lecturer Alex Ketley at aketley@stanford.edu.

DANCE 28. Integrated Dance: Dance and Disability Class. 1 Unit.

Stanford Lecturer and Choreographer Alex Ketley has had a long history working on dance pieces integrating dance for people with and without disability. The politics involved in working with dance and performance as it functions in the realm of disability are very potent. Society has inherent prejudices and fears when it comes to disability, and engaging this directly through the creation of dance pieces is a way to challenge assumptions of who can dance, and what a dancing body can look like. The class will function as a studio class, where dancers with and without disability will learn choreography as well as different improvisational and collaborative strategies towards the goal of the creation of a new dance work. Discussions and reading will also be involved around the topic of how the body, in all its different configurations, lends itself and informs artistic exploration and creation. Any questions can be directed to Lecturer Alex Ketley at aketley@stanford.edu.

DANCE 30. Chocolate Heads Movement Band Performance Workshop. 2 Units.

Students from diverse dance styles (ballet to hip-hop to contemporary) participate in the dance-making/remix process and collaborate with musicians, visual artists, designers and spoken word artists, to co-create multidisciplinary fully produced production and installation. Open to student artists of different genres, styles, disciplines and levels. By audition and/or discussion with the instructor.

DANCE 31. Chocolate Head-Space: Crowd-Sourced Performance Experience. 2 Units.

Students who participate in the Chocolate Head-Space will engage in a dance and music activities and collaborative crowd-sourced performance on the Stanford campus. A mobile app using GPS data would be implemented to fellow Chocolate Heads students-- prompting them to engage, perform and collaborate with others in that space. Students (and audiences) would be encouraged to learn a piece (or multiple pieces with friends) and record themselves performing in a different places on campus. No prior experience is required.

DANCE 32. Choreography for Evita. 1-3 Unit.

In this course, students will be given the opportunity to be part of the development of choreography for the Stanford TAPS Spring production of *Evita*. They will learn about tango, salsa, musical theater dance and waltz as we construct combinations and pieces that will ultimately go into the show. Auditions for *Evita* will take place in week 1 of winter, but students enrolled in the course need not be in the cast to participate. On the flipside, students hoping to be cast are strongly encouraged to consider enrolling in the course. No previous dance experience is required.

DANCE 33. The Critic as Artist. 3 Units.

Criticism is art. It therefore must aspire to reach the heights, depths and strange in-betweens it grapples with in the art of others. Yet criticism owes a singular responsibility to these others, and to the wider culture it seeks to interrogate. Our interrogation will be generated by dance and performance criticism, with possible forays into live visual art, theater, hybrid forms and whatever else we think might suit our purposes. Various methodologies will be debated and employed throughout the semester, as students are encouraged to begin (or continue) developing personal philosophies and voices through their writing. Our meetings will be hands-on affairs, guided by student experiments. This class will function like a laboratory, an introduction to an unruly literary art form that is open to all individuals with an interest in better understanding themselves and their world through words and art.

Same as: TAPS 151D

DANCE 34. GAGA. 1 Unit.

Gaga is a movement language created by the Israeli choreographer Ohad Naharin. It is the main mode of training for the Batsheva Dance Company in Tel Aviv, Israel, which is directed by Naharin. Gaga provides the person with an experience of freedom and pleasure while emphasizing sensation through a wide variety of multi-textured movements. The Gaga language is dynamic, fluid, and continually evolving. It connects you to your groove, passion, and physicality. Guest instructor Bobbi Jene Smith is a former dancer with the internationally acclaimed Batsheva Dance Company, and a principal collaborator in the works of choreographer Ohad Naharin, as well as one of the world's most recognized teachers of GaGa and Naharin repertory.

DANCE 35. Choreography and Textures. 1 Unit.

An introductory class in exploring the different ways of approaching choreography. Bobbi will create an original work on the students throughout the term that will focus on the cognitive and emotional experience of movement. Guest instructor Bobbi Jene Smith is a former dancer with the internationally acclaimed Batsheva Dance Company, and a principal collaborator in the works of choreographer Ohad Naharin, as well as one of the world's most recognized teachers of GaGa and Naharin repertory.

DANCE 36. Scene in Action Performance Workshop. 1 Unit.

This singular performance opportunity and workshop is inspired by the stunning abstract expressionist art found in the Anderson Collection at Stanford opening in fall 2014 that includes Robert Frank's photography at the Cantor, and the special Anderson Collection of abstract expressionist paintings shown in the brand new Anderson building at Stanford. The period between the 1950s and early 1960's was a rich time for painting, dance, music, conceptual and interdisciplinary art movements. Through this course we will consider how contemporary dancers/musicians/models/performers might express these ideas as a direct response to the impulses seen and felt in the art of this period. The objective is to consider and integrate historical and contemporary ideas into the choreography, music and fashion performance. Culminating performance installation will be presented during the fall quarter 2 nights -- October 29th and October 30th, 2014 at the Cantor Arts Center and at the Anderson Collection -- in celebration and commemoration of the openings of the Robert Frank exhibition and the Abstract Expressionists art collection.

DANCE 37. Beginning Lyric Contemporary. 1 Unit.

Lyric Contemporary appeals to the creative mover with little or no experience in dance and will focus on developing a fluid coordinated dancer. The work in this course does not assume a technical or conceptual proficiency in any dance form. It does presume you have some interest in dance forms including Jazz, Hip Hop, Ballet, and Modern or at least have a strong interest in one or more of the arts. This class deals with the notion of movement as a mode of expression. We will try to find ways through movement to render as clearly as possible concepts central to the human experience.

DANCE 39. Intro/Beginning Contemporary Modern. 1 Unit.

Beginning Modern Dance appeals to the beginning mover with little or no experience in dance and will focus on developing a coordinated and technical dancer. We will use exercises from Limon, Cunningham, and Ballet techniques in training, but will not focus on any one-dance form. This class deals with the notion of movement as a mode of expression. We will try to find ways through movement to render as clearly as possible concepts central to the human experience.

DANCE 43. Liquid Flow: Introduction to Contemporary Dance and Dance-making. 1 Unit.

This introductory dance course combines the fundamentals of contemporary dance technique and exercises from various movement practices, such as yoga and Tai chi. Liquid Flow implies the continuum from the dance of the everyday to the studio to the stage. Students will develop articulation, flexibility and "grace", learn contemporary, popular and classic dance vocabulary, and gain freedom dancing with others. Designed for beginners, we welcome student movers from diverse dance traditions, non-dancers, athletes, and more advanced dancers, who desire fluidity in their daily life, from thought to action.

DANCE 45. Dance Improvisation Techniques and Strategies Lab: From Hip Hop to Contact. 2 Units.

By learning various dance improvisation forms across cultures, students will develop techniques to gain a deep understanding of generating movement from the inside-out, inspired by conceptual strategies from master improvisors while harnessing that potential for creating dances. Guest dancer/choreographer workshops and Dance Jams enhance the learning experience. All Levels welcome.

Same as: AFRICAAM 45

DANCE 46. Social Dance I. 1 Unit.

Introduction to non-competitive social ballroom dance. The partner dances found in today's popular culture include 3 kinds of swing, 3 forms of waltz, tango, salsa, cha-cha and nightclub two-step. The course also includes tips for great partnering, enhancing creativity, developing personal style, stress reduction, musicality, and the ability to adapt to changing situations. The emphasis on comfort, partnering and flexibility enables students to dance with partners whose experience comes from any dance tradition.

DANCE 48. Beginning Ballet. 1 Unit.

Fundamentals of ballet technique including posture, placement, the foundation steps, and ballet terms; emphasis on the development of coordination, balance, flexibility, sense of lines, and sensitivity to rhythm and music. May be repeated for credit.

DANCE 56. Ballet Repertory: Swan Lake Recalibrated. 1 Unit.

Series of directed studio practices focusing on the creation of a formal choreography to be integrated in the Dance Division repertory and performed during the Division Winter Concert. The course is designed to engage students in acquiring interpretive and expressive skills working one on one with a choreographer, increase adaptability of artistic technique and style, develop knowledge of movement possibilities and artistic voices, and cultivate presence and authority as performers. The new work, Swan Lake Recalibrated, will be a contemporary reinterpretation of the traditional ballet, created by choreographer Alex Ketley. Students recruited via audition. Contact: aketley@stanford.edu.

DANCE 57. Dance Repertory: Hope Mohr/Denae Hannah. 1 Unit.

Choreographer Hope Mohr/Denae Hannah will set contemporary work from her company repertory as part of an alumni commission initiative. Rehearsal Autumn Quarter. Culminate in performance on Winter Quarter concert. Participation by audition and/or invitation (Rehearsal Director: Diane Frank).

DANCE 58. Beginning Hip Hop. 1 Unit.

Steps and styling in one of America's 21st-century vernacular dance forms. May be repeated for credit.

DANCE 59. Intermediate-Advanced Hip-Hop. 1 Unit.

Steps and styling in one of America's 21st-century vernacular dance forms. May be repeated for credit.

DANCE 60. The Evolution of Hip Hop and the Dance Stage: From Broadway to Hollywood and MTV. 1 Unit.

The repertory of Hip Hop history through steps and choreography. May be repeated for credit.

DANCE 63. Beginning Dance and Dance Making. 1 Unit.

This Choreography course is designed to expose students to fundamental techniques and approaches used in the creation of dance. All of the basic elements of dance composition will be creatively touched upon including: style, form, theme and variation, narrative versus abstract methods of expression, elements of time, quality and use of space, motif and repetition. These different tools will be illustrated and the options and restrictions of each will be explored. Practical assignments will culminate in a performance of work generated and arranged by the instructor and students. The course is recommended for all students interested in the artistic process in a creative situation.

DANCE 65. Construction Site. 2 Units.

This movement-based introductory course to site-specific dance/performance art investigates one of humanity's basic drives: to build and express relationship to the external environment. Using their bodies as sensory information-gathering tools, student will examine the qualitative aspects of various sites, indoor and outdoor. Using skills/knowledge acquired through studio work supplemented by readings/ concerts/videos & films of site specific works, students will create short culminating projects/works in physical conversation with campus sites, building upon both the concrete and imaginative dimensions of place.

DANCE 67. Being S(c)ene: Dance, Fashion and Art as Exhibition. 2 Units.

In everyday life we are constantly moving from the subjects of the public, to its objects--from seeing to being seen. This performance- creation, interactive seminar explores everyday/pedestrian movement as articulated through the language of dance. Looking through the interpretive lenses of fashion, dance and visual representation, we critically consider how we observe others and ourselves in the world, and how we respond performatively or unconsciously. In addition to seminars and rehearsals, we will host guest lectures by curators, artists and professors: incorporate fieldwork research in museums as sites of display, and discuss scholarly texts and films. A performance installation with dance, fashion and visual display will ensue in the galleries at the Cantor Arts Center at Stanford, in conjunction with the Fall 2013 exhibition, Carrie Mae Weems: Three Decades of Photography and Video.

DANCE 69. The Athletic Body in Dance: Conditioning to Aesthetics. 1 Unit.

This course provides instruction in the fundamentals of the goal-oriented body in the artistic practice. Emphasis will be placed on using sports movement as a base for training in dance.

DANCE 100. Student Choreography: Studio to Stage. 1 Unit.

Students develop their own choreographic projects--from initial concept, through rehearsal phase, to culminating performance - under close faculty guidance. The course focuses on choreographic process, with no restrictions on movement vocabulary or movement style. Dancer/choreographers of all forms and genres are strongly encouraged to participate. This course is required for students working towards performance on Divisional concerts. Work includes individual mentoring within rehearsal setting as well as outside of rehearsal. May be repeated for credit.

DANCE 103. Dance, Text, Gesture: Performance and Composition. 1 Unit.

Students practice, compose and combine the languages of dance, gestural movement, music and text, to render complete expression in performance. Suitable for dancers, actors, spoken word artists and triple threat performers to devise original performance, dance and theater, culminating in an end of quarter showing.

Same as: AFRICAAM 103

DANCE 108. Hip Hop Meets Broadway. 1 Unit.

What happens when Hip Hop meets "Fosse", "Aida", "Dream Girls" and "In the Heights"? The most amazing collaboration of Hip Hop styles adapted to some of the most memorable Broadway Productions. This class will explore the realm between Hip Hop Dance and the Broadway Stage. Infusing Acting thru dance movement and exploring the Art of Lip Sync thru Hip Hop Dance styles.

DANCE 118. Developing Creativity In Dance. 2 Units.

Developing Creativity In Dance Robert Moses Course description: This introductory course explores the creative process in dance. There are many effective ways to approach creative expression, and this course will utilize multiple approaches, both in series and in parallel. Parallel processing and multitasking will become the dominant mode as rational, intuitive and physical skills merge. Processes will include changing perception, design by analogy, quick adaptation to changing situations, musicality, overcoming creative blocks, and stress reduction to relax into a more creative state of mind. Class sessions will be primarily practice, with two-thirds of the class time spent in the dance studio, creating ways of moving, to embody the concepts that will be detailed in the discussion sessions. Previous dance experience will not be required to take this course. Rationale: Dance in the University plays a vital role in the experience of self-definition. The opportunity to create dance offers students the means to experience the body in new ways through diverse forms of movement. Students come to understand dance as a conduit for impression and expression in society. It becomes a means of giving physical voice to the most private and powerful aspects of an individual's understanding of himself in relation to the world.

DANCE 133. History of the Waltz. 1 Unit.

Two hundred years of waltzing: Regency era waltz (1816), Vienna in the 1830s, redowa and mazurka waltz variations, waltz in 5/4 time, the Russian Mazurka Quadrille, pivots, 20th-century hesitation waltz, tango waltz, Parisian valse musette, 1930s Boston, 1950s Bandstand-style waltz, swing waltz. Each form is explored for possible adaptation to today's non-competitive social dancing. May be repeated for credit two times.

DANCE 140. Intermediate Contemporary Modern Technique. 1 Unit.

This intermediate studio dance practice class is primarily grounded in training practices of Merce Cunningham, with additional technical work drawn from other major modern dance training techniques. Participation in this class will increase strength, speed, line, amplitude and rhythmic acuity/musicality. Dance technique will be supplemented by other studio experiences that will increase awareness of dance as an art form. Studio work will be supplemented by readings, video viewings, concert attendance, and lively participation in classes with guest artists. Students must be ready to work at an intermediate level.

DANCE 141. Advanced Contemporary Modern Technique. 2 Units.

This advanced dance technique class is grounded in the technical training, aesthetic sensibilities, and choreographic processes of Merce Cunningham, American dancer/master choreographer. This studio work at an advanced level will build technical strength, speed, line, and rhythmic acuity/musicality and amplitude in dancing. The class will provides solid technical training useful and applicable to other forms of dancing. Dancers must be ready to work at an high intermediate/advanced level to enroll. Studio practice will be supplemented by readings, video viewing, concert attendance, and participation in special workshops with guest artists. Cunningham-based technique is particularly well-suited to dancers with prior training in ballet technique; dancers with prior training in any form are welcome. May be repeated for credit.

DANCE 146. Social Dance II. 1 Unit.

Intermediate non-competitive social ballroom dance. The partner dances found in today's popular culture include Lindy hop, Viennese waltz, hustle, traveling foxtrot, plus intermediate/advanced levels of cross-step waltz and nightclub two-step. The course continues further tips for great partnering, enhancing creativity, developing personal style, stress reduction, musicality, and the ability to adapt to changing situations. Prerequisite: Dance 46.

DANCE 147. Living Traditions of Swing. 1 Unit.

Swing dancing: the early Lindy of the 1920s; 6- and 8-count Lindy hop, Shag, Big Apple, 1950s Rock 'n' Roll swing, disco Hustle and West Coast Swing. Partnering and improvisation. Swing's crosscultural influences and personal creativity. May be repeated for credit.

DANCE 148. Intermediate Ballet. 1 Unit.

Intermediate Ballet at Stanford is designed for students who have done ballet in their past, but maybe have stepped away from the form for awhile. The class focuses on technique, musicality, vocabulary, coordination and artistic choice. The class looks at ballet as an enduring and vibrant movement system that can be used for classical purposes or as a way to strengthen and diversify the movement vocabulary inherent in other dance forms like modern, hip-hop, or social dancing. Any questions can be directed to Lecturer Alex Ketley at aketley@stanford.edu.

DANCE 149. Advanced Ballet. 2 Units.

Advanced Ballet at Stanford is offered for students who are interested in rigorous, complex, and artistically compelling ballet training. The class focuses on technique, but in the broad sense of how ballet as a movement system can be used for a wide range of dance disciplines. The class honors the historical training legacy that defines classical ballet, but is in no way shackled to that history in an antiquated fashion. The students are encouraged to explore the form as artists, to question its foundations, and find their own sense of agency within classical dance. Students with a strong background in ballet are encouraged to come, but also students with less ballet training are welcome as long as they have an email dialog with the lecturer beforehand. Any questions can be directed to Lecturer Alex Ketley at aketley@stanford.edu.

DANCE 151H. ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities. 4-5 Units.

A quarter-long exploration of improvisation in relationship to identity and race in the 21st century in which students investigate new dynamics of doing and thinking identities through the arts. Panel discussions, performances, and talks that engage critically with the theme, concept, and practice of improvising identity across a variety of contexts and genres such as jazz music, modern dance, contemporary art, race comedy, food, and hip-hop poetry/freestyle. Strategies that artists/scholars have used to overturn essentializing notions of identity in theory and practice.

Same as: AMSTUD 151H, CSRE 151H, DANCE 251H, TAPS 151H, TAPS 351H

DANCE 156. Social Dance III. 1 Unit.

Intermediate non-competitive social ballroom dance: intermediate/advanced waltz, redowa, Bohemian National Polka, intermediate/advanced tango, cha-cha, and salsa. The course continues further tips for great partnering, enhancing creativity, developing personal style, stress reduction, musicality, and the ability to adapt to changing situations. Prerequisite: Dance 46. Dance 156 may immediately follow Dance 46.

DANCE 156T. Movement and Digital Culture. 4 Units.

What is physical intelligence? How could we cultivate it? What technologies can extend sensory awareness, and which can suppress it? How can better understanding of human movement impact a creative/design process? The term 'hybrid actionquest'; introduces the notion of movement, expressed in both the physical and virtual worlds. Through interactive technologies, such as the Kinect and camera tracking, and literature from multiple fields, this class takes human movement as a practice-based, creative, theoretical, historical, and philosophical realm of study. The course introduces basic principles and practices of body awareness as a way to extend onequest;s physical intelligencequest; and asks how studying movement can inform creative practices from computer programming to engineering to choreography, as well as applications in health and rehabilitation, cognitive and neuroscience, philosophy and literature. The class emphasizes hands-on, individual and collaborative projects through research and prototyping.

Same as: TAPS 156T

DANCE 160. Rethinking the Ballerina. 4 Units.

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries.

Same as: FEMGEN 160, TAPS 160, TAPS 260

DANCE 161H. Dance, History and Conflict. 4 Units.

This seminar investigates how moving bodies are compelling agents of social, cultural, and political change. Through readings, videos, discussions and viewings of live performances this class questions the impact of social conflict and war on selected 20th and 21st century dances and dance practices. This class asks to what extent dance, in its history as well as contemporary development, is linked to concepts of the political and conflict.

Same as: TAPS 161H

DANCE 162H. Baroque Modernities: Dance, Theater, Film, Political Theory. 4 Units.

What do seventeenth-century choreography and dramaturgy contribute to (mean to) choreographic and theatrical modernity? How can we explain the recurrent baroque phenomenon across the twentieth century -- becoming particularly prominent in the 1980s -- beyond the historicist accounts of theatrical reconstruction? How does the baroque locate itself within cultural modernity? This seminar asks this question of choreography at several junctures: The analysis of seventeenth century baroque spectacle that fashioned dance and theatre into political tools of monarchical sovereignty; Twentieth-century literature on the Baroque that destabilizes received notions of subjectivity and political sovereignty; Twentieth-century choreography and film that deploys baroque figures and techniques. Thus, our material shall range from seventeenth-century dance and theater to contemporary dance, film and literature.

Same as: TAPS 162H

DANCE 167. Performing Indigeneity on Global Stage. 4 Units.

Explores how indigeneity is expressed and embodied through performance on the global stage.

Same as: NATIVEAM 167

DANCE 177. Introduction to Dance on the Global Stage. 4 Units.

The course will examine and engage with dance cultures from around the world. Through historical and theoretical readings, film screenings, and viewing performances, this course aims to introduce students to a number of theoretical issues central to the study of dance across various disciplines. As a class we set out to explore how dance is more than a set of organized bodily movements, pleasurable to both do and watch. We will consider what cultural work dance performance accomplishes in the world.
Same as: CSRE 177B

DANCE 190. Special Research. 1-5 Unit.

Topics related to the discipline of dance. May be repeated for credit.

DANCE 191. Independent Research. 1-18 Unit.

Individual supervision of off-campus internship. Prerequisite: consent of instructor.

DANCE 197. Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America. 4 Units.

This class works collaboratively with a local juvenile hall to use civic engagement and performance to explore the aesthetic, cultural and legal issues in the lives of incarcerated youth. In the process students gain an understanding of incarceration on an immediate and personal scale. Taught jointly by a Dance Studies scholar and a lawyer specializing in Juvenile Justice, we will consider what unique understandings are possible if we position the arts as central to an exploration of punishment, rehabilitation and recidivism in America. The course will examine case studies, historical and contemporary narratives about the social, imaginative and behavioral change possible through arts programs in prison. Half of the class meetings will be in Hillcrest Juvenile Hall in San Mateo, where our class will join with a group of 13-18 year old youths currently detained there. Dance will be used to help shape their individual expressive voices, and ours, through collaborative hip hop dance classes. Books to be read are *Just Mercy: A Story of Justice and Redemption* by Bryan Stevenson, and *Last Chance in Texas* by John Hubner.

Same as: TAPS 197

DANCE 251H. ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities. 4-5 Units.

A quarter-long exploration of improvisation in relationship to identity and race in the 21st century in which students investigate new dynamics of doing and thinking identities through the arts. Panel discussions, performances, and talks that engage critically with the theme, concept, and practice of improvising identity across a variety of contexts and genres such as jazz music, modern dance, contemporary art, race comedy, food, and hip-hop poetry/freestyle. Strategies that artists/scholars have used to overturn essentializing notions of identity in theory and practice.

Same as: AMSTUD 151H, CSRE 151H, DANCE 151H, TAPS 151H, TAPS 351H

DANCE 290. Special Research. 1-18 Unit.

Individual project on the work of any choreographer, period, genre, or dance-related topic. May be repeated for credit.

Dermatology Courses

DERM 199. Undergraduate Research. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

DERM 309A. Pediatric Dermatology. 3-6 Units.

2-4 week clerkship based at Pediatric Dermatology Clinic at 770 Welch Road, Suite 261 at LPCH Palo Alto location. Designed to give students a broad clinical exposure to pediatric skin diseases. Emphasis on the outpatient diagnosis and treatment of common skin problems and the cutaneous manifestations of systemic disease. Students are expected to attend the Tuesday morning didactic teaching sessions as well as the dermatology grand rounds every Thursday morning. Students are expected to learn how to describe and recognize morphology, to perform a thorough skin examination, and to perform basic diagnostic and therapeutic procedures. Basic conversational Spanish is recommended but not required as we have a translation service accessible in every exam room in the clinic. Prerequisites: nMed 208 or IND 206, DERM 300A preferred.

DERM 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

DERM 399. Graduate Research. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members. Opportunities are available in dermatopathology, histochemistry, electron microscopy, biochemistry, tissue culture, quantitative and qualitative evaluation of peripheral vascular disease and sweating, immunofluorescent microscopy, connective tissue molecular biology, and wound healing. Prerequisite: consent of instructor.

Developmental Biology Courses

DBIO 12Q. The Evolution and Development of the Human Hand. 3-4 Units.

Evolution of the human hand in the context of primate evolution; roles of the human hand in tool use, manufacture, art, music, and communication. Development of the hand: embryonic axes, appearance of the digit program, roles of cell death, molecular bases of normal and abnormal hand patterns. Prerequisite: advanced placement biology.

DBIO 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

DBIO 200. Genetics and Developmental Biology Training Camp. 1 Unit.

Open to first year Department of Genetics and Developmental Biology students, to others with consent of instructors. Introduction to basic manipulations, both experimental and conceptual, in genetics and developmental biology.

Same as: GENE 200

DBIO 201. Development and Disease Mechanisms. 4 Units.

Mechanisms that direct human development from conception to birth. Conserved molecular and cellular pathways regulate tissue and organ development; errors in these pathways result in congenital anomalies and human diseases. Topics: molecules regulating development, cell induction, developmental gene regulation, cell migration, programmed cell death, pattern formation, stem cells, cell lineage, and development of major organ systems. Emphasis on links between development and clinically significant topics including infertility, assisted reproductive technologies, contraception, prenatal diagnosis, teratogenesis, inherited birth defects, fetal therapy, adolescence, cancer, and aging.

DBIO 210. Developmental Biology. 4 Units.

Current areas of research in developmental biology. How organismic complexity is generated during embryonic and post-embryonic development. The roles of genetic networks, induction events, cell lineage, maternal inheritance, cell-cell communication, and hormonal control in developmental processes in well-studied organisms such as vertebrates, insects, and nematodes. Team-taught. Students meet with faculty to discuss current papers from the literature. Prerequisite: graduate standing, consent of instructor. Recommended: familiarity with basic techniques and experimental rationales of molecular biology, biochemistry, and genetics.

DBIO 211. Biophysics of Multi-cellular Systems and Amorphous Computing. 2-3 Units.

Provides an interdisciplinary perspective on the design, emergent behavior, and functionality of multi-cellular biological systems such as embryos, biofilms, and artificial tissues and their conceptual relationship to amorphous computers. Students discuss relevant literature and introduced to and apply pertinent mathematical and biophysical modeling approaches to various aspect multi-cellular systems, furthermore carry out real biology experiments over the web. Specific topics include: (Morphogen) gradients; reaction-diffusion systems (Turing patterns); visco-elastic aspects and forces in tissues; morphogenesis; coordinated gene expression, genetic oscillators and synchrony; genetic networks; self-organization, noise, robustness, and evolvability; game theory; emergent behavior; criticality; symmetries; scaling; fractals; agent based modeling. The course is geared towards a broadly interested graduate and advanced undergraduates audience such as from bio / applied physics, computer science, developmental and systems biology, and bio / tissue / mechanical / electrical engineering. Prerequisites: Previous knowledge in one programming language - ideally Matlab - is recommended; undergraduate students benefit from BIOE 41, BIOE 42, or equivalent. Same as: BIOE 211, BIOE 311, BIOPHYS 311

DBIO 215. Frontiers in Biological Research. 1 Unit.

Literature discussion in conjunction with the Frontiers in Biological Research seminar series in which investigators present current work. Students and faculty meet beforehand to discuss papers from the speaker's primary research literature. Students meet with the speaker after the seminar to discuss their research and future directions, commonly used techniques to study problems in biology, and comparison between the genetic and biochemical approaches in biological research. Same as: BIOC 215, GENE 215

DBIO 220. Genomics and Personalized Medicine. 3 Units.

Principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Topics include: genetic and environmental risk factors for complex genetic disorders; design and interpretation of genome-wide association studies; pharmacogenetics; full genome sequencing for disease gene discovery; population structure and genetic ancestry; use of personal genetic information in clinical medicine; ethical, legal, and social issues with personal genetic testing. Hands-on workshop making use of personal or publicly available genetic data. Prerequisite: GENE 202, Gene 205 or BIOS 200. Same as: GENE 210

DBIO 257. The Biology of Stem Cells. 3 Units.

The role of stem cells in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites: HumBio 2A and 3A, or the equivalent in the BioCore in Biological Sciences. Same as: HUMBIO 157

DBIO 273A. A Computational Tour of the Human Genome. 3 Units.

Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing (technologies, assembly, personalized sequencing); functional landscape (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures from genomic researchers. No prerequisites. See <http://cs273a.stanford.edu/>. Same as: BIOMEDIN 273A, CS 273A

DBIO 299. Directed Reading in Developmental Biology. 1-18 Unit.

Prerequisite: consent of instructor.

DBIO 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

DBIO 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

DBIO 802. TGR Dissertation. 0 Units.

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Division of Literatures, Cultures, Languages Courses

DLCL 1. History and Theory of Novel Group. 1 Unit.

This reading group, organized by the Undergraduate Initiative of the Center for the Study of the Novel (CSN), is intended for undergraduates interested in the study of the novel. The group will meet four times in the Spring Quarter, to discuss works by major theorists of the novel, including Lukagrove;cs, Watt, Bakhtin, Barthes, Foucault, Moretti, Sedgwick, and others. Discussions will be led by CSN's graduate coordinators, Elena Dancu (DLCL) and Mark Taylor (English). All readings will be available on CourseWork.

Same as: ENGLISH 1

DLCL 101. Translation Matters: Applications in the 21st Century. 1 Unit.

For students interested in translation, interpreting, and translation studies. The course will highlight guest speakers who apply translation in a variety of professional contexts (e.g. medical, legal, literary, nreligious contexts, localization, machine-translation).

DLCL 105. Going Medieval: Introduction to Freiburg, Germany, and its Surrounding Region. 1 Unit.

This course offers an introduction to materials that are pertinent to the BOSP summer seminar "Going Medieval" offered in summer 2015. It is a required course for participants of the seminar.

Same as: GERMAN 105

DLCL 111Q. Spanish-English Literary Translation Workshop. 3 Units.

This course introduces students to the theoretical knowledge and practical skills necessary to translate literary texts from Spanish to English and English to Spanish. Topics may include comparative syntaxes, morphologies, and semantic systems; register and tone; audience; the role of translation in the development of languages and cultures; and the ideological and socio-cultural forces that shape translations. Students will workshop and revise an original translation project throughout the quarter. Same as: ILAC 111Q

DLCL 121. Performing the Middle Ages. 3-5 Units.

Through an analysis of medieval love, satirical and Crusade lyrics in the Old Occitan, Old French, and Galician-Portuguese traditions, we will study deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Special attention will be given to the transmission of vernacular song from live performance to manuscripts. Authors include Ovid, Bernart de Ventadorn, Bertran de Born, La Comtessa de Dia, Thibaut de Champagne, Dante, and Pound. Taught in English. Same as: FRENCH 151

DLCL 122. The Digital Middle Ages. 3-5 Units.

How can we make historical materials, social and cultural practices and extant sites accessible in the present day? In this course, students will have the opportunity to design and create an innovative digital project based on a medieval primary source. In the first part of the course, we will familiarize ourselves with medieval European cultural history, focusing on different kinds of sources, including historical and religious texts, narrative and music, architecture, images, objects, and textiles. Then we will examine and evaluate digital resources and approaches to medieval sources, including digital facsimiles, experiments with virtual spaces, and informational sites. In order to contemporize and vivify the medieval, an integral component of this course will be the California Missions, since they so dramatically represent a medieval *modus operandi* in a modern, and, for Stanford, local, world.

DLCL 123. Medieval Journeys: Introduction through the Art and Architecture. 3-5 Units.

The course explores the experience and imagination of medieval journeys through an interdisciplinary, cross-cultural, and skills-based approaches. As a foundations class, this survey of medieval culture engages in particular the art and architecture of the period. The Middle Ages is presented as a network of global economies, fueled by a desire for natural resources, access to luxury goods and holy sites. We will study a large geographical area encompassing the British Isles, Europe, the Mediterranean, Central Asia, India, and East Africa and trace the connectivity of these lands in economic, political, religious, and artistic terms from the fourth to the fourteenth century C.E. The students will have two lectures and one discussion session per week. Depending on the size of the class, it is possible that a graduate student TA will run the discussion session. Our goal is to give a skills-oriented approach to the Middle Ages and to engage students in creative projects that will satisfy 1. Ways-Creative Expression requirement as well as one of the following two: Ways-Analytical Interpretive or Ways-Engaging Difference. Same as: ARTHIST 105B

DLCL 152A. DLCL Film Series: Bitter Laughter. 1 Unit.

The DLCL Film Series presents films around a new topic each quarter. Screenings include an introduction and discussion. Please check the DLCL website for the current schedule of films. Undergraduates and graduate students may enroll in one unit for credit. May be repeated for credit. Same as: DLCL 354A

DLCL 189A. Honors Thesis Seminar. 4 Units.

For undergraduate majors in DLCL departments; required for honors students. Planning, researching, and writing an honors thesis. Oral presentations and peer workshops. Research and writing methodologies, and larger critical issues in literary studies.

DLCL 189B. Honors Thesis Seminar. 2-4 Units.

For undergraduate majors in DLCL departments; required for honors students. Planning, researching, and writing an honors thesis. Oral presentations and peer workshops. Research and writing methodologies, and larger critical issues in literary studies.

DLCL 189C. Honors Thesis Seminar. 2-4 Units.

For undergraduate majors in DLCL departments; required for honors students. Planning, researching, and writing an honors thesis. Oral presentations and peer workshops. Research and writing methodologies, and larger critical issues in literary studies.

DLCL 197. Designing a Digital Community: Human Rights. 2 Units.

This course will focus on helping to design, conceptualize, and populate an international human rights website. No knowledge of web design or of human rights is necessary to get started on this project. We have technical assistance available, though hopefully this course will attract students with those skills as well. Similarly, we will be learning about human rights as we build the site, explore and share resources and ideas, and reflect on the content. Preliminary site viewable at teachinghumanrights.org. Same as: COMPLIT 197

DLCL 199. Honors Thesis Oral Presentation. 1 Unit.

For undergraduate majors in DLCL departments; required for honors students. Oral presentations and peer workshops. Regular advisory meetings required.

DLCL 202. Humanities+Design. 2 Units.

How might visualization tools effect the way Humanities scholars work in the digital age? Humanities research relies increasingly on digitized source material and, consequently, on data visualization as an interface for organizing and assessing as well as analyzing information. We will explore different ways of thinking about data visually, using visualization software under development to discover themes, questions and relationships. In an age where visual forms hold the force of persuasion, data visualization skills not only shape arguments but also help researchers engage critically with the information behind their analyses. Humanities+Design investigates the role of the humanities in the challenges of interpreting data - especially 'big data'. Each student will participate in the design of visualization tools for humanities research, learning about the design process and design theory as it applies to digital humanities research. The course is targeted to students interested in using visualization in their own work, as well as students new to data-driven research. All of our course meetings will take place in the at CESTA (Center for Spatial and Textual Analysis) on the 4th floor of Wallenberg Hall. There are no prerequisites for the class and the class is open to graduate students as well as advanced undergraduates.

DLCL 209. Paleography of Medieval and Early Modern Manuscripts. 3-5 Units.

Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures. Same as: CLASSICS 215, HISTORY 309G, RELIGST 204

DLCL 220. Humanities Education. 1 Unit.

Humanities Education explores issues concerning teaching and learning in the humanities, including research on student learning, innovation in pedagogy, the role of new technologies in humanities instruction, and professional issues for humanities teachers at all educational levels.

DLCL 222. Philosophy and Literature. 1 Unit.

The Focal Group in Philosophy and Literature brings together scholars and students from eight departments to investigate questions in aesthetics and literary theory, philosophically-inflected literary texts, and the form of philosophical writings. Fields of interest include both continental and analytic philosophy, as well as cognitive science, political philosophy, rational choice theory, and related fields.

DLCL 223. Renaissances. 1 Unit.

The Renaissances Group brings together faculty members and students from over a dozen departments at Stanford to consider the present and future of early modern literary studies (a period spanning the fourteenth through the seventeenth centuries). Taking seriously the plural form of the group's name, we seek to explore the early modern period from a wide range of disciplinary, cultural, linguistic, and geographical perspectives. Topic for 2012-14: "Nodes, Networks, Names."

DLCL 224. Workshop in Poetics. 1 Unit.

The Workshop in Poetics is concerned with the theoretical and practical dimensions of the reading and criticism of poetry. During the three years of its existence, the Workshop has become a central venue at Stanford enabling participants to share their individual projects in a general conversation outside of disciplinary and national confinements. The two dimensions that the workshop sees as urgent are: poetics in its specificity as an arena for theory and interpretive practice, and historical poetics as a particular set of challenges for the reader and scholar.

DLCL 225. Digital Humanities. 1 Unit.

The Digital Humanities Focal Group (DHFG) will promote faculty and graduate research in the digital humanities through lectures series, praxis workshops, curriculum, and the identification and development of digital humanities research projects, especially those eligible for grant-funding opportunities. DHFG sponsors a lecture series and convenes regular workshops alternating between praxis and theory. These activities provide fora in which faculty and graduate students can share work in progress, discuss the state of the field, and identify important research that should be shared with the DLCL and broader academic communities. Crucially, the DHFG will promote digital research on underrepresented literatures and cultures to counteract the English-language dominance of much work in the field.

DLCL 228. Introduction to Digital Humanities: Concepts, Technologies, Tools. 1-3 Unit.

In this course, we will explore the perspectives of scholars who have thought about what "digital humanities" means and the technologies and tools that are shaping new kinds of research, scholarship, and publishing. Topics will include history of the digital humanities, textual studies, electronic literature, computational and new media, and emerging work around text, image, and new media curation and visualization. This seminar is ideal for anyone interested in digital methods and digital in the humanities, teaching with new digital methods, or to learn about all the digital humanities projects at Stanford. This course is organized as a mix of seminar and workshop and will be featuring a new platform called "Lacuna Stories," designed for Stanford students, that presents multiple platforms, media, and texts to digitally engage with narratives surrounding 9/11; active engagement by all participants is expected. Students may contribute to the field with a creative final project that they develop over the course of the quarter if they select the 3-unit option.

Same as: COMPLIT 228D, COMPLIT 338D

DLCL 265. Histories and Futures of Humanistic Education: Culture and Crisis, Books and MOOCs. 5 Units.

Features of online education as they relate to the humanities and notions of engaged critical learning. Collaborative course, working in tandem with Professor Cathy Davidson's Duke course, *The History and Future of High Education*, using live chats, Google documents, and other forums to interact with students at Duke and other universities nationally. Each campus uses a syllabus linked to each instructor's angle into this general subject, but many readings and exercises in common. Seeing this as a critical moment in education, to connect this topic to its historical, cultural, political, and ethical implications. The Stanford course looks at early discussions about education and culture (Arnold's *Culture and Anarchy*) and then works through a key moment in the mid-20th century whose premises still have influence: the Two Cultures (humanities, sciences) debate. Radical responses to educational reform in France and the US in the late 60s, and the changing state of funding, value, and cultural critique in the late 20th and early 21st centuries. The idea of education as a personal, collective, and intellectual endeavor which is shaped by and shapes societies. Focus on the idea of the public good and the relation between education and a democratic society.

Same as: COMPLIT 265, EDUC 217X

DLCL 293. Literary Translation. 3-5 Units.

An overview of translation theories and practices over time. The aesthetic, ethical, and political questions raised by the act and art of translation and how these pertain to the translator's tasks. Discussion of particular translation challenges and the decision processes taken to address these issues. Coursework includes assigned theoretical readings, comparative translations, and the undertaking of an individual translation project.

DLCL 299. DLCL CS+ CAPSTONE. 2 Units.

Only DLCL/CS+ joint majors may enroll in this course.

DLCL 300. Medieval Methodologies. 3 Units.

An introduction to the essential tool-kit for medievalists, this course will give all medievalists a great head start in knowing how to access and interpret major works and topics in the field. Stanford's medieval faculty will explain the key sources and methods in the major disciplines from History to Religion, French to Arabic, English to Chinese, and Art History to German and Music. In so doing, students will be introduced to the breadth and interdisciplinary potential of Medieval Studies. A workshop devoted to Digital Technologies and Codicology/Palaeography will offer elementary training in these fundamental skills.

Same as: MUSIC 300C

DLCL 301. The Learning and Teaching of Second Languages. 3 Units.

Prepares DLCL graduate students to teach first- and second-year foreign languages. Participants learn about second-language acquisition research and participate in the initial stages of Oral Proficiency Interview (OPI) training.

DLCL 302. The Learning and Teaching of Second-Language Literatures. 1-3 Unit.

Focuses on the research on advanced level reading and writing in second language contexts with a special focus on upper-level cultural texts. Discussion of second language writing and reading assessment including a writing familiarization workshop. Participants will focus on their cognizant language and literature for the completion of their assignments. Prerequisite: DLCL 301.

DLCL 303. Language Program Management. 1-3 Unit.

Administrative Internship in Language Program Management. Experiences can include, but are not limited to, the following: Shadow faculty and staff in select areas of administration and supervision within the Language Center and DLCL; Placement testing and student advisement; Technology in teaching and learning; Processes for teacher observation and feedback; Procedures in staff supervision and Human Resources; Course scheduling, budgeting, staffing, and searches; Interface with external programs (e.g. BOSP, Bechtel, CTL).

DLCL 311. Professional Workshop. 1-2 Unit.

Meets regularly throughout the year to discuss issues in the professional study of literature. Topics include the academic job market and the challenges of research and teaching at different types of institutions. Supervised by the graduate affairs committee of the DLCL. May be repeated for credit.

DLCL 320. Humanities Education in the Changing University. 3 Units.

Advanced study in the humanities faces changes within fields, the university and the wider culture. Considers the debate over the status of the humanities with regard to historical genealogies and current innovations. Particular attention on changes in doctoral education. Topics include: origins of the research university; disciplines and specialization; liberal education in conflict with professionalization; literature and literacy education; interdisciplinarity as a challenge to departments; education policy; digital humanities; accountability in education, assessment and student-centered pedagogies.

Same as: COMPLIT 275, GERMAN 250

DLCL 321. Classical Seminar: Rethinking Classics. 4-5 Units.

Literary and philosophical texts from Antiquity (including Homer, the Greek tragedians, Plato, Aristotle, Virgil, and Augustine). In each case, we will examine the cultural contexts in which each text was composed (e.g. political regimes and ideologies; attitudes towards gender and sexuality; hierarchies of class and status; discourses on "barbarians" and resident aliens). We will study various theoretical approaches to these books in an effort to "rethink" these texts in the 21st century.

Same as: CLASSICS 244

DLCL 322. Medieval Seminar. 3-5 Units.

The cultural, literary, and artistic evolution of the Middle Ages. The barbarian invasions and the Germanic ethos, the Celtic heritage, and the monastic tradition. Romanesque art and architecture, pilgrimages, and the Crusades. Gothic aesthetics, chivalry and courtly love, scholasticism, and the rise of universities. The late Middle Ages, humanism, and the threshold of the Renaissance. Texts include: Beowulf, Mabinogion, Song of Roland, Chretien de Troyes' Lancelot and Yvain, Dante's Divine Comedy, Boccaccio's Decameron, and Chaucer's Canterbury Tales. 3-5 units.

DLCL 323. Early Modern Seminar. 3-5 Units.

Explores some of the key texts of European early modernity and the critical paradigms according to which the idea of the "Renaissance" has been formed, analyzed, and questioned since the 19th century. Will aim to provide a broad introduction to Early Modern studies from the point of view of the Italian Renaissance and its reception in different European contexts. Taught in English.

Same as: ITALIAN 220

DLCL 324. The Enlightenment. 3-5 Units.

The Enlightenment as a philosophical, literary, and political movement. Themes include the nature and limits of philosophy, the grounds for critical intellectual engagement, the institution of society and the public, and freedom, equality and human progress. Authors include Voltaire, Montesquieu, Rousseau, Hume, Diderot, and Condorcet.

Same as: HISTORY 234, HISTORY 334, HISTORY 432A, HUMNTIES 324

DLCL 325. Modern Seminar. 3-5 Units.

The postmodern condition as post-WWII rupture in Western tradition; moral, political, cultural, and aesthetic dimensions. Sources include literature, philosophy, essays, films, and painting. Authors and artists include: Primo Levi, Hannah Arendt, Alain Resnais, Samuel Beckett, Georges Bataille, Michel Foucault, Theodor Adorno, David Riesman, Georges Perec, Juliet Mitchell, and Francis Bacon.

DLCL 354A. DLCL Film Series: Bitter Laughter. 1 Unit.

The DLCL Film Series presents films around a new topic each quarter. Screenings include an introduction and discussion. Please check the DLCL website for the current schedule of films. Undergraduates and graduate students may enroll in one unit for credit. May be repeated for credit.

Same as: DLCL 152A

DLCL 369. Introduction to Graduate Studies: Criticism as Profession. 3 Units.

A history of literary theory for entering graduate students in national literature departments and comparative literature.

Same as: COMPLIT 369, FRENCH 369, GERMAN 369, ITALIAN 369

DLCL 396. Humanities+Design: Visualizing the Grand Tour. 4-5 Units.

Study of the eighteenth-century Grand Tour of Italy through visualization tools of the digital age. Critical readings in both visual epistemology and current Grand Tour studies; interrogating the relationship between quantitative and qualitative approaches in digital humanities; what new insights in eighteenth-century British travel to Italy does data visualization offer us? Students will transform traditional texts and documents into digital datasets, developing individual data analysis projects using text mining, data capture and visualization techniques.

Same as: CLASSICS 396, HISTORY 336E

Drama Courses

Earth Systems Courses

EARTHSYS 4. Evolution and Extinction: Introduction to Historical Geology. 4 Units.

Introduction to the history of the Earth, with a focus on processes that maintain or threaten habitability. Principles of stratigraphy, correlation, the geological timescale, the history of biodiversity, and the interpretation of fossils. The use of data from sedimentary geology, geochemistry, and paleontology to test theories for critical events in Earth history such as mass extinctions. One half-day field trip.

Same as: GES 4

EARTHSYS 8. The Oceans: An Introduction to the Marine Environment. 3 Units.

For non-majors and majors in earth science or environmental science. The major ocean ecosystems and how they function both naturally and under the influence of human activities. Emphasis is on the dominant organisms of each ecosystem and how they interact with each other and their physical and chemical environment. The types of ecosystems discussed include coral reefs, deep-sea hydrothermal vents, coastal upwelling systems, blue-water oceans, estuaries, and near-shore dead zones. Lectures, multimedia presentations, and group activities.

EARTHSYS 9. Community-Based Internship Preparation Seminar. 1 Unit.

Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do all assignments for 1 unit of credit. Students planning to take a community-based internship in future years are welcome to enroll.

Same as: URBANST 101

EARTHSYS 10. Introduction to Earth Systems. 4 Units.

For non-majors and prospective Earth Systems majors. Multidisciplinary approach using the principles of geology, biology, engineering, and economics to describe how the Earth operates as an interconnected, integrated system. Goal is to understand global change on all time scales. Focus is on sciences, technological principles, and sociopolitical approaches applied to solid earth, oceans, water, energy, and food and population. Case studies: environmental degradation, loss of biodiversity, and resource sustainability.

EARTHSYS 12SC. Environmental and Geological Field Studies in the Rocky Mountains. 2 Units.

The Rocky Mountain area, ecologically and geologically diverse, is being strongly impacted by changing land-use patterns, global and regional environmental change, and societal demands for energy and natural resources. This three-week field program emphasizes coupled environmental and geological problems in the Rocky Mountains and will cover a broad range of topics including the geologic origin of the American West from three billion years ago to the recent; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West that are related to changing land-use patterns and increased demand for its abundant natural resources. These broad topics are integrated into a coherent field study by examining earth/environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin that host abundant gas and oil reserves and also contain the long-term climate history of this region; and 3) the volcanic center of Yellowstone National Park and mountainous region of Teton National Park, and the economic and environmental problems associated with gold mining and extraction of oil and gas in areas adjoining these national parks. Students will complete six assignments based upon field exercises, working in small groups to analyze data and prepare reports and maps. Lectures will be held in the field prior to and after fieldwork. Note: This course involves one week of backpacking in the Wind Rivers and hiking while staying in cabins near Jackson Hole, Wyoming, and horseback riding in the Dubois area of Wyoming. Students must arrive in Salt Lake City on Monday, Sept. 1. (Hotel lodging will be provided for the night of Sept. 1, and thereafter students will travel as a Sophomore College group.) We will return to campus on Sunday, Sept. 21. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

Same as: EESS 12SC, GES 12SC

EARTHSYS 13SC. People, Land, and Water in the Heart of the West. 2 Units.

Salmon River. Sun Valley. Pioneer Mountains. The names speak of powerful forces and ideas in the American West. Central Idaho - a landscape embracing snow-capped mountains, raging rivers, sagebrush deserts, farms, ranches, and resort communities - is our classroom for this field-based seminar led by David Freyberg, professor of Civil and Environmental Engineering, and David Kennedy, professor emeritus of History. This course focuses on the history and future of a broad range of natural resource management issues in the western United States. We will spend a week on campus preparing for a two-week field course in Idaho exploring working landscapes, private and public lands, water and fisheries, conservation, and the history and literature of the relationship between people and the land in the American West. After the first week spent on campus, we will drive to Idaho to begin the field portion of our seminar. In Idaho, we will spend time near Twin Falls, at Lava Lake Ranch near Craters of the Moon National Monument, in Custer County at the Upper Salmon River, and near Stanley in the Sawtooth National Forest. No prior camping experience is required, but students should be comfortable living outdoors in mobile base camps for periods of several days. Students will investigate specific issues in-depth and present their findings at the end of the course. Same as: CEE 11SC

EARTHSYS 14SI. Human and Environmental Rights from Farm to Fork. 1 Unit.

This course aims to understand the environmental and human rights implications of our modern globalized food system-from farm, to factory, to international commerce, and finally, to fork. Focus will be on the labor and environmental conditions of industrial agriculture, working conditions and environmental consequences of processing factories, the implications of international food commerce, the modern obesity crisis, and emerging solutions that aim to correct these problems.

EARTHSYS 18. Promoting Sustainability Behavior Change at Stanford. 2 Units.

Stanford Green Living Council training course. Strategies for designing and implementing effective behavior change programs for environmental sustainability on campus. Includes methods from community-based social marketing, psychology, behavioral economics, education, public health, social movements, and design. Students design a behavior change intervention project targeting a specific environmental sustainability-related behavior. Lectures online and weekly sections/workshops.

EARTHSYS 30. Ecology for Everyone. 4 Units.

Everything is connected, but how? Ecology is the science of interactions and the changes they generate. This project-based course links individual behavior, population growth, species interactions, and ecosystem function. Introduction to measurement, observation, experimental design and hypothesis testing in field projects, mostly done in groups. The goal is to learn to think analytically about everyday ecological processes involving bacteria, fungi, plants, animals and humans. The course uses basic statistics to analyze data; there are no math prerequisites except arithmetic. Open to everyone, including those who may be headed for more advanced courses in ecology and environmental science.

Same as: BIO 30

EARTHSYS 37N. Climate Change: Science & Society. 3 Units.

Preference to freshmen. How and why do greenhouse gases cause climate to change? How will a changing climate affect humans and natural ecosystems? What can be done to prevent climate change and better adapt to the climate change that does occur? Focus is on developing quantitative understanding of these issues rooted in both the physical and social sciences. Exercises based on simple quantitative observations and calculations; algebra only, no calculus.

EARTHSYS 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration. 3 Units.

This course examines the motivations and experiences of polar explorers under the harshest conditions on Earth, as well as the chronicles of their explorations and hardships, dating to the 1500s for the Arctic and the 1700s for the Antarctic. Materials include *The Worst Journey in the World* by Aspley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Optional field trip into the high Sierra in March.

Same as: EESS 38N, GES 38N

EARTHSYS 39N. The Carbon Cycle: Reducing Your Impact. 3 Units.

Preference to freshmen. Changes in the long- and short-term carbon cycle and global climate through the burning of fossil fuels since the Industrial Revolution. How people can shrink their carbon footprints. Long-term sources and sinks of carbon and how they are controlled by tectonics and short-term sources and sinks and the interaction between the biosphere and ocean. How people can shrink their carbon footprints. Held at the Stanford Community Farm.

EARTHSYS 41N. The Global Warming Paradox. 3 Units.

Preference to freshman. Focus is on the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Topics include: Earthquest; energy balance; detection and attribution of climate change; the climate response to enhanced greenhouse forcing; impacts of climate change on natural and human systems; and proposed methods for curbing further climate change. Sources include peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks.

EARTHSYS 42. The Global Warming Paradox II. 1 Unit.

Further discussion of the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Discussions of topics of student interest, including peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks. Focus is on student engagement in on-campus and off-campus activities. Prerequisite: EESS 41N or EARTHSYS 41N or consent of instructor.

Same as: EESS 42

EARTHSYS 46N. Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough. 3 Units.

Preference to freshmen. Field trips to sites in the Elkhorn Slough, a small agriculturally impacted estuary that opens into Monterey Bay, a model ecosystem for understanding the complexity of estuaries, and one of California's last remaining coastal wetlands. Readings include Jane Caffrey's *Changes in a California Estuary: A Profile of Elkhorn Slough*. Basics of biogeochemistry, microbiology, oceanography, ecology, pollution, and environmental management.

Same as: EESS 46N

EARTHSYS 46Q. Environmental Impact of Energy Systems: What are the Risks?. 3 Units.

In order to reduce CO₂ emissions and meet growing energy demands during the 21st Century, the world can expect to experience major shifts in the types and proportions of energy-producing systems. These decisions will depend on considerations of cost per energy unit, resource availability, and unique national policy needs. Less often considered is the environmental impact of the different energy producing systems: fossil fuels, nuclear, wind, solar, and other alternatives. One of the challenges has been not only to evaluate the environmental impact but also to develop a systematic basis for comparison of environmental impact among the energy sources. The course will consider fossil fuels (natural gas, petroleum and coal), nuclear power, wind and solar and consider the impact of resource extraction, refining and production, transmission and utilization for each energy source.

Same as: GES 46Q

EARTHSYS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay. 3 Units.

This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

Same as: CEE 50N, EESS 49N

EARTHSYS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays. 3 Units.

Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay.

Same as: EESS 56Q

EARTHSYS 57Q. Climate Change from the Past to the Future. 3 Units.

Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

Same as: EESS 57Q

EARTHSYS 61Q. Food and security. 3 Units.

The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

Same as: EESS 61Q, INTNLREL 61Q

EARTHSYS 100. Environmental and Geological Field Studies in the Rocky Mountains. 3 Units.

Three-week, field-based program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such as acid mine drainage and changing land-use patterns.

Same as: EESS 101, GES 101

EARTHSYS 101. Energy and the Environment. 3 Units.

Energy use in modern society and the consequences of current and future energy use patterns. Case studies illustrate resource estimation, engineering analysis of energy systems, and options for managing carbon emissions. Focus is on energy definitions, use patterns, resource estimation, pollution.

Recommended: MATH 21 or 42.

Same as: ENERGY 101

EARTHSYS 102. Renewable Energy Sources and Greener Energy Processes. 3 Units.

The energy sources that power society are rooted in fossil energy although energy from the core of the Earth and the sun is almost inexhaustible; but the rate at which energy can be drawn from them with today's technology is limited. The renewable energy resource base, its conversion to useful forms, and practical methods of energy storage. Geothermal, wind, solar, biomass, and tidal energies; resource extraction and its consequences.

Recommended: MATH 21 or 42.

Same as: ENERGY 102

EARTHSYS 103. Energy Resources. 3-5 Units.

Comprehensive overview of fossil and renewable energy resources and energy efficiency. Topics covered for each resource: resource abundance, location, recovery, conversion, consumption, end-uses, environmental impacts, economics, policy, and technology. Applied lectures in specific energy sectors: buildings, transportation, the electricity industry, and energy in the developing world. Required field trips to local energy facilities.

Optional discussion section for extra unit. CEE 173 is offered for 4-5 units; ES 103 is offered for 4-5 units; CEE 207A is offered for 3-5 units; instructor approval required for 3-unit option.

Same as: CEE 173A, CEE 207A

EARTHSYS 104. The Water Course. 3 Units.

The pathway that water takes from rainfall to the tap using student home towns as an example. How the geological environment controls the quantity and quality of water; taste tests of water from around the world. Current U.S. and world water supply issues.

Same as: GEOPHYS 104

EARTHSYS 105. Food and Community: New Visions for a Sustainable Future. 3 Units.

Through this course students will learn about the community and outreach component of the urban gardening movement. Over the quarter students will learn about urban farming, about projects that work to increase access of the most underserved to fresh and local food, and about the challenges surrounding these efforts. The theme of the course will be stories- stories of food and community, of innovation, and of service. Students will learn through engaging in conversation with different leaders in the local food movement. Additionally, through hands-on learning and participation, students will become familiar with different types of community food projects in the Bay Area, including urban farms, free food giveaways, food banks, and gleaning projects. Service Learning Course (certified by Haas Center). Limited enrollment. May be repeated for credit.
Same as: EESS 105

EARTHSYS 105A. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.

Formerly 96A - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

Same as: BIO 105A

EARTHSYS 105B. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.

Formerly 96B - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

Same as: BIO 105B

EARTHSYS 106. World Food Economy. 5 Units.

The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on public sector decision making as it relates to food policy.
Same as: ECON 106, EESS 106

EARTHSYS 107. Control of Nature. 3 Units.

Think controlling the earth's climate is science fiction? It is when you watch *Snowpiercer* or *Dune*, but scientists are already devising geoengineering schemes to slow climate change. Will we ever resurrect the woolly mammoth or even a T. Rex (think *Jurassic Park*)? Based on current research, that day will come in your lifetime. Who gets to decide what species to save? And more generally, what scientific and ethical principles should guide our decisions to control nature? In this course, we will examine the science behind ways that people alter and engineer the earth, critically examining the positive and negative consequences. We'll explore these issues first through popular movies and books and then, more substantively, in scientific research.
Same as: EESS 107

EARTHSYS 109. Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision. 2 Units.

Examination of program-based local actions that promote resource conservation and an educational environment for sustainability. Examination of building-level actions that contribute to conservation, lower utility costs, and generate understanding of sustainability consistent with Stanford's commitment to sustainability as a core value. Overview of operational sustainability including energy, water, buildings, waste, and food systems. Practical training to enable students to become sustainability coordinators for their dorms or academic units.
Same as: CEE 109, ENVRINST 109

EARTHSYS 111. Biology and Global Change. 4 Units.

The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing.
Same as: BIO 117, EESS 111

EARTHSYS 112. Human Society and Environmental Change. 4 Units.

Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1.
Same as: EESS 112, HISTORY 103D

EARTHSYS 113. Earthquakes and Volcanoes. 3 Units.

Is the "Big One" overdue in California? What kind of damage would that cause? What can we do to reduce the impact of such hazards in urban environments? Does "fracking" cause earthquakes and are we at risk? Is the United States vulnerable to a giant tsunami? The geologic record contains evidence of volcanic super eruptions throughout Earth's history. What causes these gigantic explosive eruptions, and can they be predicted in the future? This course will address these and related issues. For non-majors and potential Earth scientists. No prerequisites. More information at https://pangea.stanford.edu/research/CDFM/CourseDescriptions/GP_113_announcement.pdf.
Same as: GEOPHYS 90

EARTHSYS 115. Wetlands Ecology of the Pantanal Prefield Seminar. 2-3 Units.

This seminar will prepare students for their overseas field experience in the Pantanal, Brazil, the largest wetland in the world, studying wetlands ecology and conservation in situ. Students will give presentations on specific aspects of the Pantanal and lay the groundwork for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be quite limited. Additional topics include: logistics, health and safety, cultural sensitivity, geography and politics, and basic language skills; also, post-field issues such as reverse culture shock, and ways in which participants can consolidate and build up their abroad experiences after they return to campus. Students will have the opportunity to participate in a pilot study aimed at developing a series of innovative online curriculum based upon their field experience.

EARTHSYS 115T. Island Biogeography of Tasmania Prefield Seminar. 3 Units.

Islands are natural laboratories for studying a wide variety of subjects including biological diversity, cultural diversity, epidemiology, geology, climate change, conservation, and evolution. This field seminar focuses on Island Biogeography in one of the most extraordinary and well-preserved ecosystems in the world: Tasmania. Tasmanian dshy;shy;evils, wombats, and wallabies iquest; the names conjure up images of an exotic faraway place, a place to appreciate the incredibly diversity of life and how such striking forms of life came to be. This course will prepare students for their overseas seminar in Tasmania. Students will give presentations on specific aspects of the Tasmania and will lay the groundwork for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be quite limited. Additional topics to be addressed include: logistics, health and safety, group dynamics, cultural sensitivity, history, and politics. We will also address post-field issues such as reverse culture shock, and ways to consolidate and build up abroad experiences after students return to campus.

EARTHSYS 116. Ecology of the Hawaiian Islands. 4 Units.

Terrestrial and marine ecology and conservation biology of the Hawaiian Archipelago. Taught in the field in Hawaii as part of quarter-long sequence of courses including Earth Sciences and Anthropology. Topics include ecological succession, plant-soil interactions, conservation biology, biological invasions and ecosystem consequences, and coral reef ecology. Restricted to students accepted into the Earth Systems of Hawaii Program. Same as: BIO 116

EARTHSYS 117. Earth Sciences of the Hawaiian Islands. 4 Units.

Progression from volcanic processes through rock weathering and soil-ecosystem development to landscape evolution. The course starts with an investigation of volcanic processes, including the volcano structure, origin of magmas, physical-chemical factors of eruptions. Factors controlling rock weathering and soil development, including depth and nutrient levels impacting plant ecosystems, are explored next. Geomorphic processes of landscape evolution including erosion rates, tectonic/volcanic activity, and hillslope stability conclude the course. Methods for monitoring and predicting eruptions, defining spatial changes in landform, landform stability, soil production rates, and measuring biogeochemical processes are covered throughout the course. This course is restricted to students accepted into the Earth Systems of Hawaii Program. Same as: EARTHSCI 117, EESS 117

EARTHSYS 118. Heritage, Environment, and Sovereignty in Hawaii. 4 Units.

This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity been shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life. Same as: ANTHRO 118

EARTHSYS 119. Will Work for Food. 1 Unit.

This is a speaker series class featuring highly successful innovators in the food system. Featured speakers will talk in an intimate, conversational manner about their current work, as well as about their successes, failures, and learnings along the way. Additional information can be found here: <http://feedcollaborative.org/speaker-series/>. Same as: EARTHSYS 219

EARTHSYS 121. Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities. 3 Units.

"Building a Sustainable Society: New approaches to integrating human and environmental priorities" draws on economics, natural resources management, sociology and leadership science to examine theoretical frameworks and diverse case studies that illustrate the main drivers, core features and challenges of building a sustainable society where human beings and the natural environment thrive. Themes include collaborative consumption, the sharing economy, worker-owned cooperatives, community-corporate partnerships, cradle to cradle design, social entrepreneurship, impact investing, "beyond GDP" measures, and 21st century leadership. Critical perspectives, lectures and student-led discussions guide analysis of innovations within public, private and civic sectors globally, with emphasis on Latin America.

EARTHSYS 122. Paleobiology. 4 Units.

Introduction to the fossil record with emphasis on marine invertebrates. Major debates in paleontological research. The history of animal life in the oceans. Topics include the nature of the fossil record, evolutionary radiations, mass extinctions, and the relationship between biological evolution and environmental change. Fossil taxa through time. Exercises in phylogenetics, paleoecology, biostratigraphy, and statistical methods. Same as: GES 123

EARTHSYS 127. GIS for good: Applications of GIS for International Development and Humanitarian Assistance. 3-4 Units.

This service-learning course exposes students to geographic information systems (GIS) as a tool for exploring alternative solutions to complex environmental and humanitarian issues in the international arena. The project-based, interdisciplinary structure of this class gives primary emphasis to the use of GIS for field data collection, mapping, analysis and visualization that allows for multi-criteria assessment of community development. Those with no prior GIS experience will be required to take an introductory GIS workshop hosted by the Geospatial Center in Branner Library during the first two weeks of class. Same as: EESS 122, EESS 222

EARTHSYS 128. Evolutionary History of Terrestrial Ecosystems. 4 Units.

The what, when, and how do we know it regarding life on land iquest; including plants, fungi, invertebrates, and vertebrates (yes, dinosaurs) iquest; and how all of those components interact with each other and with changing climates, continental drift, atmospheric composition, and environmental perturbations like glaciation and mass extinction. Same as: GES 128, GES 228

EARTHSYS 129. Geographic Impacts of Global Change: Mapping the Stories. 4 Units.

Forces of global change (eg., climate disruption, biodiversity loss, disease) impart wide-ranging political, socioeconomic, and ecological impacts, creating an urgent need for science communication. Students will collect data for a region of the US using sources ranging from academic journals to popular media and create an interactive Story Map (<http://stanford.maps.arcgis.com/apps/StorytellingTextLegend/index.html?appid=dafe2393fd2e4acc8b0a4e6e71d0b6d5>) that merges the scientific and human dimensions of global change. Students will interview stakeholders as part of a community-engaged learning experience and present the Map to national policy-makers. Our 2014 Map is being used by the CA Office of Planning & Research. Same as: BIO 128

EARTHSYS 135. Podcasting the Anthropocene. 2 Units.

Identification and interview of Stanford researchers to be featured in an audio podcast. Exploration of interviewing techniques, audio storytelling, audio editing, and podcasting as a newly emerging media platform. Individual and group projects. Group workshops focused on preparation, review, and critiques of podcasts. Same as: EARTHSYS 235

EARTHSYS 138. International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development. 4-5 Units.

Comparative approach to sustainable cities, with focus on international practices and applicability to China. Tradeoffs regarding land use, infrastructure, energy and water, and the need to balance economic vitality, environmental quality, cultural heritage, and social equity. Student teams collaborate with Chinese faculty and students partners to support urban sustainability projects. Limited enrollment via application; see internationalurbanization.org for details. Prerequisites: consent of the instructor(s).

Same as: IPS 274, URBANST 145

EARTHSYS 140. The Energy-Water Nexus. 3 Units.

Energy, water, and food are our most vital resources constituting a tightly intertwined network: energy production requires water, transporting and treating water needs energy, producing food requires both energy and water. The course is an introduction to learn specifically about the links between energy and water. Students will look first at the use of water for energy production, then at the role of energy in water projects, and finally at the challenge in figuring out how to keep this relationship as sustainable as possible. Students will explore case examples and are encouraged to contribute examples of concerns for discussion as well as suggest a portfolio of sustainable energy options.

Same as: GEOPHYS 80

EARTHSYS 141. Remote Sensing of the Oceans. 3-4 Units.

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

Same as: EARTHSYS 241, EESS 141, EESS 241, GEOPHYS 141

EARTHSYS 142. Remote Sensing of Land. 4 Units.

The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

Same as: EARTHSYS 242, EESS 162, EESS 262

EARTHSYS 142A. Negotiating Sustainable Development. 3 Units.

How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

Same as: CEE 142A, CEE 242A, EARTHSYS 242A

EARTHSYS 144. Fundamentals of Geographic Information Science (GIS). 3-4 Units.

Survey of geographic information including maps, satellite imagery, and census data, approaches to spatial data, and tools for integrating and examining spatially-explicit data. Emphasis is on fundamental concepts of geographic information science and associated technologies. Topics include geographic data structure, cartography, remotely sensed data, statistical analysis of geographic data, spatial analysis, map design, and geographic information system software. Computer lab assignments.

Same as: EESS 164

EARTHSYS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: EARTHSYS 246A, EESS 146A, EESS 246A, GEOPHYS 146A, GEOPHYS 246A

EARTHSYS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A or EESS 246A, or CEE 164 or CEE 262D, or consent of instructor.

Same as: EARTHSYS 246B, EESS 146B, EESS 246B, GEOPHYS 146B, GEOPHYS 246B

EARTHSYS 151. Biological Oceanography. 3-4 Units.

Required for Earth Systems students in the oceans track. Interdisciplinary look at how oceanic environments control the form and function of marine life. Topics include distributions of planktonic production and abundance, nutrient cycling, the role of ocean biology in the climate system, expected effects of climate changes on ocean biology. Local weekend field trips. Designed to be taken concurrently with Marine Chemistry (EESS/EARTHSYS 152/252). Prerequisites: BIO 43 and EESS 8 or equivalent.

Same as: EARTHSYS 251, EESS 151, EESS 251

EARTHSYS 152. Marine Chemistry. 3-4 Units.

Introduction to the interdisciplinary knowledge and skills required to critically evaluate problems in marine chemistry and related disciplines. Physical, chemical, and biological processes that determine the chemical composition of seawater. Air-sea gas exchange, carbonate chemistry, and chemical equilibria, nutrient and trace element cycling, particle reactivity, sediment chemistry, and diagenesis. Examination of chemical tracers of mixing and circulation and feedbacks of ocean processes on atmospheric chemistry and climate. Designed to be taken concurrently with Biological Oceanography (EESS/EARTHSYS 151/251).

Same as: EARTHSYS 252, EESS 152, EESS 252

EARTHSYS 155. Science of Soils. 3-4 Units.

Physical, chemical, and biological processes within soil systems. Emphasis is on factors governing nutrient availability, plant growth and production, land-resource management, and pollution within soils. How to classify soils and assess nutrient cycling and contaminant fate. Recommended: introductory chemistry and biology.

Same as: EESS 155

EARTHSYS 156. Soil and Water Chemistry. 1-4 Unit.

(Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

Same as: EARTHSYS 256, EESS 156, EESS 256

EARTHSYS 156M. Marine Resource Economics and Conservation. 5 Units.

Economic and ecological frameworks to understand the causes of and potential solutions to marine resource degradation. Focus on conservation of marine biodiversity and ecosystem-based management. Applications include: commercial and recreational fisheries, marine reserves, and offshore energy production.

Same as: ECON 156, HUMBIO 111M

EARTHSYS 158. Geomicrobiology. 3 Units.

How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

Same as: EARTHSYS 258, EESS 158, EESS 258

EARTHSYS 160. Sustainable Cities. 4-5 Units.

Service-learning course that exposes students to sustainability concepts and urban planning as a tool for determining sustainable outcomes in the Bay Area. Focus will be on the relationship of land use and transportation planning to housing and employment patterns, mobility, public health, and social equity. Topics will include government initiatives to counteract urban sprawl and promote smart growth and livability, political realities of organizing and building coalitions around sustainability goals, and increasing opportunities for low-income and communities of color to achieve sustainability outcomes. Students will participate in team-based projects in collaboration with local community partners and take part in significant off-site fieldwork. Prerequisites: consent of the instructor.

Same as: URBANST 164

EARTHSYS 164. Introduction to Physical Oceanography. 4 Units.

The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

Same as: CEE 164, CEE 262D, EESS 148

EARTHSYS 168. The Evolving Sphere of Food Security. 2 Units.

This seminar delves into a comprehensive new volume on food security written by an all-Stanford team of nineteen faculty and researchers. It explores the interconnections of food security with energy, water, climate, health, and national security, and examines the role of food and agricultural policies and their consequences in countries at different stages of development. Led by the editor of the book, with participation of several of the authors from across many disciplines. Prerequisite: ECON 106.

Admission is by application.

Same as: EARTHSYS 268

EARTHSYS 170. Environmental Geochemistry. 4 Units.

Solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and chemical interactions. Contrast between natural sources of hazardous elements and compounds and types and sources of anthropogenic contaminants and pollutants. Chemical and physical processes of weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. The release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The impact of contaminants and design of remediation strategies. Case studies. Prerequisite: 90 or consent of instructor.

Same as: GES 170, GES 270

EARTHSYS 172. Australian Ecosystems: Human Dimensions and Environmental Dynamics. 3 Units.

This cross-disciplinary course surveys the history and prehistory of human ecological dynamics in Australia, drawing on geology, climatology, archaeology, geography, ecology and anthropology to understand the mutual dynamic relationships between the continent and its inhabitants. Topics include anthropogenic fire and fire ecology, animal extinctions, aridity and climate variability, colonization and spread of *Homo sapiens*, invasive species interactions, changes in human subsistence and mobility throughout the Pleistocene and Holocene as read through the archaeological record, the totemic geography and social organization of Aboriginal people at the time of European contact, the ecological and geographical aspects of the "Dreamtime", and contemporary issues of policy relative to Aboriginal land tenure and management.

Same as: ANTHRO 170, ANTHRO 270

EARTHSYS 173. Aquaculture and the Environment: Science, History, and Policy. 3 Units.

Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures. By application only - instructor consent required. Contact gerhart@stanford.edu or dhklinger@stanford.edu prior to first day of class.

Same as: EARTHSYS 273, EESS 173, EESS 273

EARTHSYS 174. Marine Biodiversity: Law, Science, and Policy. 3 Units.

Examination of the mechanisms that create marine biodiversity and the ways in which biodiversity and natural resources are linked. Introduction to the federal laws and policies that impact marine biodiversity and natural resources. Interactions between biological and political systems.

Same as: EARTHSYS 274

EARTHSYS 175. California Coast: Science, Policy, and Law. 3-4 Units.

Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

Same as: CEE 175A, CEE 275A, EARTHSYS 275

EARTHSYS 176. Peninsula Open Space Trust Practicum: Community-Based Research for Open Space Management. 3 Units.

In this course, students will work directly on real-world open space management projects in partnership with the Peninsula Open Space Trust (POST), a non-profit organization dedicated to the conservation and preservation of open space, farmland and parkland in and around Silicon Valley. The unique patchwork of urban-to-rural land uses, property ownership, and ecosystems in our region poses numerous challenges and opportunities for regional conservation and environmental stewardship. Students will address a particular challenge through a faculty-mentored research project that will help achieve POST's property management and planning objectives. By focusing on a project driven by POSTiquest;s needs and carried out through engagement with the community, and with thorough reflection, study, and discussion about the roles of scientific, economic, and policy research in local-scale environmental decision-making, students will explore the underlying challenges and complexities of what it means to actually do community-engaged research for conservation and open space preservation in the real world. As such, this course will provide students with skills and experience in research design in conservation biology and ecology, community and stakeholder engagement, land use policy and planning, and the practical aspects of land and environmental management. The POST Practicum is a collaboration between the Woods Institute for the Environment and the Haas Center for Public Service.

EARTHSYS 176A. Open Space Practicum Independent Study. 1-2 Unit.

Additional practicum units for students intent on continuing their projects from EARTHSYS 176. Students who enroll in 176A must have completed EARTHSYS 176: The Peninsula Open Space Practicum: Community-Based Environmental Research for Open Space Management, or have consent of the instructors.

EARTHSYS 177. Interdisciplinary Research Survival Skills. 2 Units.

Learning in interdisciplinary situations. Framing research questions. Developing research methods that benefit from interdisciplinary understanding. Writing for multiple audiences and effectively making interdisciplinary presentations. Discussions with interdisciplinary experts from across campus regarding interdisciplinary research projects. Same as: EARTHSYS 277, ENVRINST 177, ENVRINST 277

EARTHSYS 177C. Specialized Writing and Reporting: Environmental Journalism. 4-5 Units.

(Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu. Same as: COMM 177C, COMM 277C, EARTHSYS 277C, ENVRES 277C

EARTHSYS 179S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings. Same as: CEE 179S, CEE 279S, EESS 179S

EARTHSYS 180B. Principles and Practices of Sustainable Agriculture. 3-4 Units.

Field-based training in ecologically sound agricultural practices at the Stanford Community Farm. Weekly lessons, field work, and group projects. Field trips to educational farms in the area. Topics include: soils, composting, irrigation techniques, IPM, basic plant anatomy and physiology, weeds, greenhouse management, and marketing. Same as: EESS 280B

EARTHSYS 181. Urban Agriculture in the Developing World. 3-4 Units.

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application. Same as: EARTHSYS 281, EESS 181, EESS 281, URBANST 181

EARTHSYS 182. Ecological Farm Management. 1 Unit.

A project-based course emphasizing ways of doing it; in sustainable agricultural systems based at the new Stanford Educational Farm. Students will work individually and in small groups on farm projects of their choice facilitated and guided by the Educational Farm Director. Potential projects include: orchards, compost systems, pastured poultry, beekeeping, medicinal herbs, mushroom cultivation, native plants, etc. Same as: EESS 282

EARTHSYS 183. Food Matters: Agriculture in Film. 1 Unit.

Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit. Same as: EARTHSYS 283, EESS 183, EESS 283

EARTHSYS 184. Climate and Agriculture. 3-4 Units.

The effects of climate change on global agriculture and food security, and the effects of agriculture on climate change. An overview of different lines of evidence used to measure impacts and adaptations, and to quantify future impacts, risks, and adaptation needs for agro-ecosystems and society. Enrollment limited to 25; priority to juniors, seniors, and graduate students. Prerequisites: ECON 106/206 or permission of instructor. Same as: EARTHSYS 284, EESS 184, EESS 284

EARTHSYS 185. Feeding Nine Billion. 4-5 Units.

Feeding a growing and wealthier population is a huge task, and one with implications for many aspects of society and the environment. There are many tough choices to be made- on fertilizers, groundwater pumping, pesticide use, organics, genetic modification, etc. Unfortunately, many people form strong opinions about these issues before understanding some of the basics of how food is grown, such as how most farmers currently manage their fields, and their reasons for doing so. The goal of this class is to present an overview of global agriculture, and the tradeoffs involved with different practices. Students will develop two key knowledge bases: basic principles of crop ecology and agronomy, and familiarity with the scale of the global food system. The last few weeks of the course will be devoted to building on this knowledge base to evaluate different future directions for agriculture.

EARTHSYS 187. FEED the Change: Redesigning Food Systems. 2-3 Units.

Introductory course in design thinking and food system analysis offered through the FEED Collaborative. Targeted at upper-class undergraduates, this course provides a series of diverse, primarily hands-on experiences (design projects, field work, and storytelling) in which students both learn and apply the process of human-centered design to projects of real consequence in the food system. Students will also develop knowledge and basic tools for working effectively in teams and for analyzing complex systems. The goal of this course is to develop the creative confidence of students and, in turn, to work collaboratively with thought leaders in the local food system to design innovative solutions to the challenges they face. Admission is by application: <http://feedcollaborative.org/classes/>.

EARTHSYS 188. Social and Environmental Tradeoffs in Climate Decision-Making. 1-2 Unit.

How can we ensure that measures taken to mitigate global climate change don't create larger social and environmental problems? What metrics should be used to compare potential climate solutions beyond cost and technical feasibility, and how should these metrics be weighed against each other? How can modeling efforts and stakeholder engagement be best integrated into climate decision making? What information are we still missing to make fully informed decisions between technologies and policies? Exploration of these questions, alongside other issues related to potential negative externalities of emerging climate solutions. Evaluation of energy, land use, and geoengineering approaches in an integrated context, culminating in a climate stabilization group project.

Same as: EARTHSYS 288

EARTHSYS 195. Natural Hazards and Risk Communication. 3 Units.

Introduction to the science behind natural hazards, the risks associated with these hazards, and effective methods of communicating them to a variety of audiences. Examination of methods of translation and communication. Investigation of the relative effectiveness of these methods for increasing preparedness and resiliency to natural hazards. Satisfies the Earth Systems WIM requirement.

EARTHSYS 197. Directed Individual Study in Earth Systems. 1-9 Unit.

Under supervision of an Earth Systems faculty member on a subject of mutual interest.

EARTHSYS 199. Honors Program in Earth Systems. 1-9 Unit.**EARTHSYS 200. Sustaining Action: Research, Analysis and Writing for the Public. 3 Units.**

Preference to graduate students and senior undergraduates in environmental, natural and social sciences, engineering, journalism. Students help produce and publish SAGE, an eco advice column, by choosing, researching, and answering questions about sustainable living submitted by Stanford alumni and the general public. Prerequisite: admission by application, available from instructor, thayden@stanford.edu. (Meets Earth Systems WIM requirement).

Same as: ENVRES 200

EARTHSYS 205. Navigating Wicked Marine Problems. 3 Units.

Commercial shipping is essential to international trade, consumer goods and the global economy, but can impact the marine environment. Vessel traffic schemes often overlap with important marine areas, creating unintended pressures and impacts to marine ecosystems, including whales. Ship strikes are a threat to endangered whales, and ship noise can affect important mating and feeding behavior. In this course, the issue of whale and vessel interactions will be used as a case study to help students identify threats, pressures, and policy responses of a complex, or "wicked," ocean-based problem. In project teams, students will complete a Pressure State Response analysis of the problem, with the goal of developing practical and professional skills necessary to participate in complex marine planning and decision-making in their post-graduate careers. Students will gain an opportunity to network with experts, scientists and professionals who have experience on the primary themes of the course. The deadline for enrollment for this course is Feb. 23. Contact lhgood@stanford.edu with interest.

EARTHSYS 207. Spanish in Science/Science in Spanish. 2 Units.

For graduate and undergraduate students interested in the natural sciences and the Spanish language. Students will acquire the ability to communicate in Spanish using scientific language and will enhance their ability to read scientific literature written in Spanish. Emphasis on the development of science in Spanish-speaking countries or regions. Course is conducted in Spanish and intended for students pursuing degrees in the sciences, particularly disciplines such as ecology, environmental science, sustainability, resource management, anthropology, and archeology.

Same as: BIO 208, LATINAM 207

EARTHSYS 210A. Senior Seminar. 3 Units.

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

EARTHSYS 210B. Senior Seminar. 3 Units.

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

EARTHSYS 210C. Senior Seminar. 3 Units.

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

EARTHSYS 211. Fundamentals of Modeling. 3-5 Units.

Simulation models are a powerful tool for environmental research, if used properly. The major concepts and techniques for building and evaluating models. Topics include model calibration, model selection, uncertainty and sensitivity analysis, and Monte Carlo and bootstrap methods. Emphasis is on gaining hands-on experience using the R programming language. Prerequisite: Basic knowledge of statistics.

Same as: EESS 211

EARTHSYS 219. Will Work for Food. 1 Unit.

This is a speaker series class featuring highly successful innovators in the food system. Featured speakers will talk in an intimate, conversational manner about their current work, as well as about their successes, failures, and learnings along the way. Additional information can be found here: <http://feedcollaborative.org/speaker-series/>.

Same as: EARTHSYS 119

EARTHSYS 235. Podcasting the Anthropocene. 2 Units.

Identification and interview of Stanford researchers to be featured in an audio podcast. Exploration of interviewing techniques, audio storytelling, audio editing, and podcasting as a newly emerging media platform. Individual and group projects. Group workshops focused on preparation, review, and critiques of podcasts.

Same as: EARTHSYS 135

EARTHSYS 238. Land Use. 3 Units.

(Same as LAW 338.) This course focuses on the pragmatic (rather than theoretical) aspects of contemporary land use law and policy, including: nuisance as a land use tool and foundation for modern land use law; use and abuse of the "police power" (the legal basis for land use control); zoning flexibility; vested property rights, development agreements, and takings; redevelopment; growth control; and direct democracy. We explore how land use decisions affect environmental quality and how land use decision-making addresses environmental impacts. Special Instructions: All graduate students from other departments are encouraged to enroll, and no pre-requisites apply. Student participation is essential. Roughly two-thirds of the class time will involve a combination of lecture and classroom discussion. The remaining time will engage students in case studies based on actual land use issues and disputes. Elements used in grading: Attendance, class participation, writing assignments, and final exam.

EARTHSYS 241. Remote Sensing of the Oceans. 3-4 Units.

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

Same as: EARTHSYS 141, EESS 141, EESS 241, GEOPHYS 141

EARTHSYS 242. Remote Sensing of Land. 4 Units.

The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

Same as: EARTHSYS 142, EESS 162, EESS 262

EARTHSYS 242A. Negotiating Sustainable Development. 3 Units.

How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

Same as: CEE 142A, CEE 242A, EARTHSYS 142A

EARTHSYS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: EARTHSYS 146A, EESS 146A, EESS 246A, GEOPHYS 146A, GEOPHYS 246A

EARTHSYS 246B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A or EESS 246A, or CEE 164 or CEE 262D, or consent of instructor.

Same as: EARTHSYS 146B, EESS 146B, EESS 246B, GEOPHYS 146B, GEOPHYS 246B

EARTHSYS 250. Directed Research. 1-9 Unit.

Independent research related to student's primary track, carried out after the junior year, during the summer, and/or during the senior year. Student develops own project with faculty supervision. 10-15 page thesis. May be repeated for credit.

EARTHSYS 251. Biological Oceanography. 3-4 Units.

Required for Earth Systems students in the oceans track. Interdisciplinary look at how oceanic environments control the form and function of marine life. Topics include distributions of planktonic production and abundance, nutrient cycling, the role of ocean biology in the climate system, expected effects of climate changes on ocean biology. Local weekend field trips. Designed to be taken concurrently with Marine Chemistry (EESS/EARTHSYS 152/252). Prerequisites: BIO 43 and EESS 8 or equivalent.

Same as: EARTHSYS 151, EESS 151, EESS 251

EARTHSYS 252. Marine Chemistry. 3-4 Units.

Introduction to the interdisciplinary knowledge and skills required to critically evaluate problems in marine chemistry and related disciplines. Physical, chemical, and biological processes that determine the chemical composition of seawater. Air-sea gas exchange, carbonate chemistry, and chemical equilibria, nutrient and trace element cycling, particle reactivity, sediment chemistry, and diagenesis. Examination of chemical tracers of mixing and circulation and feedbacks of ocean processes on atmospheric chemistry and climate. Designed to be taken concurrently with Biological Oceanography (EESS/EARTHSYS 151/251).

Same as: EARTHSYS 152, EESS 152, EESS 252

EARTHSYS 256. Soil and Water Chemistry. 1-4 Unit.

(Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

Same as: EARTHSYS 156, EESS 156, EESS 256

EARTHSYS 258. Geomicrobiology. 3 Units.

How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

Same as: EARTHSYS 158, EESS 158, EESS 258

EARTHSYS 260. Internship. 1-9 Unit.

Supervised field, lab, or private sector project. May consist of directed research under the supervision of a Stanford faculty member, participation in one of several off campus Stanford programs, or an approved non-Stanford program relevant to the student's Earth Systems studies. Required of and restricted to declared Earth Systems majors. Includes 15-page technical summary research paper that is subject to iterative revision. (WIM).

EARTHSYS 268. The Evolving Sphere of Food Security. 2 Units.

This seminar delves into a comprehensive new volume on food security written by an all-Stanford team of nineteen faculty and researchers. It explores the interconnections of food security with energy, water, climate, health, and national security, and examines the role of food and agricultural policies and their consequences in countries at different stages of development. Led by the editor of the book, with participation of several of the authors from across many disciplines. Prerequisite: ECON 106. Admission is by application.

Same as: EARTHSYS 168

EARTHSYS 272. Antarctic Marine Geology. 3 Units.

For upper-division undergraduates and graduate students. Intermediate and advanced topics in marine geology and geophysics, focusing on examples from the Antarctic continental margin and adjacent Southern Ocean. Topics: glaciers, icebergs, and sea ice as geologic agents (glacial and glacial marine sedimentology, Southern Ocean current systems and deep ocean sedimentation), Antarctic biostratigraphy and chronostratigraphy (continental margin evolution). Students interpret seismic lines and sediment core/well log data. Examples from a recent scientific drilling expedition to Prydz Bay, Antarctica. Up to two students may have an opportunity to study at sea in Antarctica during Winter Quarter.

Same as: EESS 242

EARTHSYS 273. Aquaculture and the Environment: Science, History, and Policy. 3 Units.

Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures. By application only - instructor consent required. Contact gerhart@stanford.edu or dhklinger@stanford.edu prior to first day of class.
Same as: EARTHSYS 173, EESS 173, EESS 273

EARTHSYS 274. Marine Biodiversity: Law, Science, and Policy. 3 Units.

Examination of the mechanisms that create marine biodiversity and the ways in which biodiversity and natural resources are linked. Introduction to the federal laws and policies that impact marine biodiversity and natural resources. Interactions between biological and political systems.
Same as: EARTHSYS 174

EARTHSYS 275. California Coast: Science, Policy, and Law. 3-4 Units.

Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.
Same as: CEE 175A, CEE 275A, EARTHSYS 175

EARTHSYS 277. Interdisciplinary Research Survival Skills. 2 Units.

Learning in interdisciplinary situations. Framing research questions. Developing research methods that benefit from interdisciplinary understanding. Writing for multiple audiences and effectively making interdisciplinary presentations. Discussions with interdisciplinary experts from across campus regarding interdisciplinary research projects.
Same as: EARTHSYS 177, ENVRINST 177, ENVRINST 277

EARTHSYS 277C. Specialized Writing and Reporting: Environmental Journalism. 4-5 Units.

(Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu.
Same as: COMM 177C, COMM 277C, EARTHSYS 177C, ENVRES 277C

EARTHSYS 281. Urban Agriculture in the Developing World. 3-4 Units.

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application.
Same as: EARTHSYS 181, EESS 181, EESS 281, URBANST 181

EARTHSYS 283. Food Matters: Agriculture in Film. 1 Unit.

Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.
Same as: EARTHSYS 183, EESS 183, EESS 283

EARTHSYS 284. Climate and Agriculture. 3-4 Units.

The effects of climate change on global agriculture and food security, and the effects of agriculture on climate change. An overview of different lines of evidence used to measure impacts and adaptations, and to quantify future impacts, risks, and adaptation needs for agro-ecosystems and society. Enrollment limited to 25; priority to juniors, seniors, and graduate students. Prerequisites: ECON 106/206 or permission of instructor.
Same as: EARTHSYS 184, EESS 184, EESS 284

EARTHSYS 288. Social and Environmental Tradeoffs in Climate Decision-Making. 1-2 Unit.

How can we ensure that measures taken to mitigate global climate change don't create larger social and environmental problems? What metrics should be used to compare potential climate solutions beyond cost and technical feasibility, and how should these metrics be weighed against each other? How can modeling efforts and stakeholder engagement be best integrated into climate decision making? What information are we still missing to make fully informed decisions between technologies and policies? Exploration of these questions, alongside other issues related to potential negative externalities of emerging climate solutions. Evaluation of energy, land use, and geoenvironmental approaches in an integrated context, culminating in a climate stabilization group project.
Same as: EARTHSYS 188

EARTHSYS 289A. FEED Lab: Innovating in the Local Food System. 3-4 Units.

Offered through the FEED Collaborative, this graduate-level course combines experiential learning in human-centered design, systems thinking and social entrepreneurship. Students will learn and apply these skills to projects that may include: sustainable food and farming technology, disruptive models of production and distribution, food justice, and/or the behavioral economics of eating. Students will benefit from close interaction with the teaching team, working on a multidisciplinary team of their peers, support from industry-leading project sponsors, and the varied perspectives of guest speakers. The goal of this course is to develop the creative confidence of students and, in turn, to work collaboratively with thought leaders in the local food system to design innovative solutions to the challenges they face. Admission is by application: <http://feedcollaborative.org/classes/>.

EARTHSYS 289B. FEED Lab: Innovating in the Local Food System. 3-4 Units.

Primarily a follow-on course to EARTHSYS 289A, this course is an experiential education platform that enables students already experienced in design thinking to collaborate with faculty and industry thought-leaders on projects of real consequence in the local food system. A select cohort of students will work in small, diverse teams and will interact closely with the teaching team in an intentionally creative and informal classroom setting. Students will deepen their skills in design thinking and social entrepreneurship by working on projects sponsored by leading innovators in the FEED Collaborative's network. Some projects may turn into summer internships or research projects for students interested in continuing their work. Admission is by application: <http://feedcollaborative.org/classes/>.

EARTHSYS 290. Master's Seminar. 2 Units.

Required of and open only to Earth Systems master's students. Reflection on the Earth Systems cotermin experience and development of skills to clearly articulate interdisciplinary expertise to potential employers, graduate or professional schools, colleagues, business partners, etc. Hands-on projects to take students through a series of guided reflection activities. Individual and small group exercises. Required, self-chosen final project encapsulates each student's MS expertise in a form relevant to his or her future goals (ie. a personal statement, research poster, portfolio, etc.).

EARTHSYS 292. Multimedia Environmental Communication. 3 Units.

Theory and practice of effective, accurate and engaging use of photography and audio and web video production in environmental communication. Emphasis on group project work and peer critiquing in each modality, including some out-of-class work time. Limited class size, preference to Earth Systems Master's students.

EARTHSYS 297. Directed Individual Study in Earth Systems. 1-9 Unit.

Under supervision of an Earth Systems faculty member on a subject of mutual interest.

EARTHSYS 298. Earth Systems Book Review. 2 Units.

For Earth Systems master's students and advanced undergraduates only. Analysis and discussion of selected literary nonfiction books relevant to Earth systems topics. Examples of previous topics include political presentations of environmental change in the popular press, review of the collected works of Aldo Leopold, disaster literature, and global warming.

EARTHSYS 299. M.S. Thesis. 1-9 Unit.**EARTHSYS 323. Stanford at Sea. 16 Units.**

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

Same as: BIOHOPK 182H, BIOHOPK 323H, EESS 323

Earth, Energy and Environmental Sciences Courses

EARTHSCI 1. Current Research in the Earth and Environmental Sciences. 1 Unit.

Primarily for freshmen and sophomores. An introduction to faculty and research areas in the School of Earth Sciences, including biogeochemistry, oceanography, paleobiology, geophysics, tectonics, geostatistics, soil science, hydrogeology, energy resources, earth surface processes, geochronology, volcanoes and earthquakes, and remote sensing. May be repeated for credit.

EARTHSCI 5. Geokids: Earth Sciences Education. 1 Unit.

Service learning through the Geokids program. Eight weeks of supervised teaching to early elementary students about Earth sciences. Hands-on teaching strategies for science standards-based instruction.

EARTHSCI 100. Research Preparation for Undergraduates. 1 Unit.

For undergraduates planning to conduct research during the summer with faculty in the School of Earth Sciences. Readings, oral presentations, proposal development. May be repeated for credit.

EARTHSCI 117. Earth Sciences of the Hawaiian Islands. 4 Units.

Progression from volcanic processes through rock weathering and soil-ecosystem development to landscape evolution. The course starts with an investigation of volcanic processes, including the volcano structure, origin of magmas, physical-chemical factors of eruptions. Factors controlling rock weathering and soil development, including depth and nutrient levels impacting plant ecosystems, are explored next. Geomorphic processes of landscape evolution including erosion rates, tectonic/volcanic activity, and hillslope stability conclude the course. Methods for monitoring and predicting eruptions, defining spatial changes in landform, landform stability, soil production rates, and measuring biogeochemical processes are covered throughout the course. This course is restricted to students accepted into the Earth Systems of Hawaii Program.

Same as: EARTHSYS 117, EESS 117

EARTHSCI 191. GES Field Trips. 1 Unit.

Four- to seven-day field trips to locations of geologic and environmental interest. Includes trips offered during Thanksgiving and Spring breaks. May be repeated for credit. See <http://pangea.stanford.edu/GES/undergraduates/courses/>.

Same as: GES 191

EARTHSCI 193. Natural Perspectives: Geology, Environment, and Art. 1 Unit.

Multi-day field trip that combines exploration of regional geology, ecology, and environmental history with guided drawing exercises. Weiqest;ll visit several sites of geologic and environmental interest, discuss their formation and significance, and use drawing as tool for close observation. Students will gain an understanding of the natural processes shaping California, acquire new skills and techniques for artistic expression, and gain an appreciation for how scientific and aesthetic perspectives complement and enhance one another in the study of nature. No previous scientific or artistic experience is required.

EARTHSCI 200. Professional Development in Earth Science Education. 1 Unit.

For graduate students who wish to gain experience for careers in teaching and mentoring. May be repeated for credit.

EARTHSCI 201. Earth Science Course Enhancement. 3 Units.

For graduate students working in collaboration with a faculty member to develop and improve activities for courses within the School of Earth Sciences. Weekly meetings to discuss pedagogical strategies and give feedback on activities. May be repeated for credit.

EARTHSCI 202. PhD Students on the PhD. 1 Unit.

This seminar is designed for coterms and upperclassmen who are considering pursuing a PhD in earth science fields but want to know what that path really entails. Consisting of small-group discussions with current PhD students, this course will feature conversations on a range of PhD research topics and will also delve into the substance of the PhD experience itself. We will explore PhD students' programs and career paths: the milestones, processes, and issues that guide their decisions and shape their PhD experiences. Discussion themes will be determined partly in advance and partly based on the interests of participants and could include topics such as choosing a PhD program or research question, interdisciplinarity, community engagement, or work/life balance.

EARTHSCI 211. Introduction to Programming for Scientists and Engineers. 3 Units.

Basic usage of the Python and C/C++ programming languages are introduced and used to solve representative computational problems from various science and engineering disciplines. Software design principles including time and space complexity analysis, data structures, object-oriented design, decomposition, encapsulation, and modularity are emphasized. Usage of campus wide Linux compute resources: login, file system navigation, editing files, compiling and linking, file transfer, etc. Versioning and revision control, software build utilities, and the LaTeX typesetting software are introduced and used to help complete individual programming assignments and a final project. Prerequisite: Some previous experience with programming (does not need to be a formal course in programming).

Same as: CME 211

EARTHSCI 214. Software Design in Modern Fortran for Scientists and Engineers. 3 Units.

This course introduces software design and development in modern Fortran. Course covers the functional, object-oriented-, and parallel programming features introduced in the Fortran 95, 2003, and 2008 standards, respectively, in the context of numerical approximations to ordinary and partial differential equations; introduces object-oriented design and design schematics based on the Unified Modeling Language (UML) structure, behavior, and interaction diagrams; cover the basic use of several open-source tools for software building, testing, documentation generation, and revision control. Recommended: Familiarity with programming in Fortran 90, basic numerical analysis and linear algebra, or instructor approval.

Same as: CME 214

EARTHSCI 218. Communicating Science. 3 Units.

For undergraduates and graduate students interested in teaching science in local schools. Inquiry-based science teaching methods. How to communicate scientific knowledge and improve presentations. Six weeks of supervised teaching in a local school classroom. Prerequisite: course in introductory biology, geology, chemistry, or marine sciences.

EARTHSCI 219. OPINION WRITING IN THE SCIENCES. 1 Unit.

Part exposition, part reflection, part synthesis, research-driven opinion writing can be found everywhere from the op-ed pages of daily newspapers, to the commentary sections of journals such as *Nature* and *Science*, to the sort of wide-ranging reviews found in the *New York Review of Books*. In this course, advanced doctoral students will study the form, and work with the instructors to develop a publication-quality opinion essay on an aspect of their own field. Admission is limited and by application only. Contact thayden@stanford.edu.

EARTHSCI 251. Negotiation. 3 Units.

Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; see Coursework.

Same as: CEE 151, CEE 251

EARTHSCI 300. Earth Sciences Seminar. 1 Unit.

Required for incoming graduate students except coterm. Research questions, tools, and approaches of faculty members from all departments in the School of Earth Sciences. Goals are: to inform new graduate students about the school's range of scientific interests and expertise; and introduce them to each other across departments and research groups. Panel discussions or faculty member presentations at each meeting. May be repeated for credit.

EARTHSCI 310. Computational Geosciences Seminar. 1 Unit.

Weekly lectures focusing on high-performance computing in geoscientific research by experts from academia, national laboratories, industry, and doctoral students. May be repeated for credit.

EARTHSCI 320. Methods of High-Performance Computing in GeoSciences. 1 Unit.

Workshop consisting of 8 lectures addressing topics necessary for high-performance computing research on the CEES cluster in the School of Earth Sciences. In addition to attending lectures students will be required to complete a short project related to high-performance computing.

EARTHSCI 400. Directed Research. 3 Units.

Independent research for graduate student projects.

EARTHSCI 401. Curricular Practical Training. 1 Unit.

Curricular Practical Training.

Earth, Energy, Environmental Sciences Courses

EEES 302. Challenges and Practices in Crossdisciplinary Research and Teaching. 1 Unit.

Required EEES core course. Presentations by Earth Sciences faculty. Pedagogical tools to present interdisciplinary concepts to a non-specialist audience.

EEES 400. Research in Earth, Energy, and Environmental Sciences. 1-15 Unit.

May be repeated for credit.

EEES 802. TGR Dissertation. 0 Units.

East Asian Studies Courses

EASTASN 94. The Rise of China in World Affairs. 3-5 Units.

This course examines the impact and implications of the rise of China in contemporary world politics from a historical and international relations perspective. It reviews China's halting progress into the international system, sketches the evolution of PRC foreign policy since 1949, and analyzes China's developmental priorities and domestic political context as they figure into Beijing's interactions with the world. It sketches American policy toward the PRC, and it assesses alternative approaches to dealing with China on such issues as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions.

Same as: EASTASN 294

EASTASN 97. The International Relations of Asia since World War II. 3-5 Units.

Asian international relations since World War II were dominated by the efforts of the newly independent nation-states of Asia, almost all of which had been colonies before the war, to establish and maintain sovereignty in a context of American and Soviet competition for influence in the region. This course traces the major developments of the period, including the Chinese civil war, the U.S. occupation of Japan, the division of Korea and the Korean War, the South and Southeast Asian independence struggles, the American and Soviet alliance systems, the Vietnam War, the strategic realignments that led to the end of the Cold War in Asia, the emergence of Central Asia, and the legacy of issues that the period has posed for the region today.

Same as: EASTASN 297

EASTASN 117. Health and Healthcare Systems in East Asia. 3-5 Units.

China, Japan, and both Koreas. Healthcare economics as applied to East Asian health policy, including economic development, population aging, infectious disease outbreaks (SARS, avian flu), social health insurance, health service delivery, payment incentives, competition, workforce policy, pharmaceutical industry, and regulation. No prior knowledge of economics or healthcare required.

Same as: EASTASN 217

EASTASN 120E. East Asian Internets. 4 Units.

This course examines the social, cultural, aesthetic, and political dimensions of internet culture in China, Japan, and the two Koreas. Working with web texts, social media, streaming music and video, and film and fiction engaging with online culture, we will trace the social impact of networked life in East Asia over the last three decades.

Same as: EASTASN 220E

EASTASN 151. Innovation-Based Economic Growth: Silicon Valley and Japan. 4 Units.

Innovation is essential for the growth of a matured economy. An important reason for Japan's economic stagnation over the past two decades was its failure to transform its economic system from one suited for catch-up growth to one that supports innovation-based economic growth. This course examines the institutional factors that support innovation-based economic growth and explores policies that may encourage innovation-based growth in Japan. The course is a part of a bigger policy implementation project that aims to examine the institutional foundations of innovation-based economic growth, to suggest government policies that encourage innovation-based growth in Japan, and to help implement such policies. The central part of the course will be several group research projects conducted by the students. Each student research project evaluates a concrete innovation policy idea. Each student research group is to report the findings to the class and prepare the final paper.

Same as: EASTASN 251, IPS 225

EASTASN 162. Seminar on the Evolution of the Modern Chinese State, 1550-Present. 3-5 Units.

This seminar will assess the evolving response of the late imperial, early Republican, Nanjing Republic, and the PRC regimes in response to China's changing international setting, to successive revolutions in warfare, and to fundamental economic, social and demographic trends domestically from the 16th century to present. It will assess the capacities of each successive Chinese state to extract resources from society and economy and to mobilize people behind national purposes, to elaborate centralized institutions to pursue national priorities, to marshal military forces for national defense and police forces to sustain domestic order, and to generate popular identities loyal to national authority.

Same as: EASTASN 262

EASTASN 189K. The Political Transition for Economic Development in East Asian: Government or Market?. 3 Units.

This course aims to understand the role of government and market in the process of economic development in East Asia and change in the role depending upon development stages, political ideology, and cultural traditions. The course will examine a couple of leading forces, market and government, in encouraging each national economy, and how the dynamic combination has been changed, is being changed, and will be changed. For this purpose, we will explore a political economic framework for analyzing the economic development stages; then concentrate on comparative and case studies; and try to seek informative hypotheses and propositions for East Asian experiences, and reach persuasive lessons which can be applied to other developing countries.

Same as: EASTASN 289K

EASTASN 191. Journal of East Asian Studies. 1 Unit. (Staff).

EASTASN 217. Health and Healthcare Systems in East Asia. 3-5 Units. China, Japan, and both Koreas. Healthcare economics as applied to East Asian health policy, including economic development, population aging, infectious disease outbreaks (SARS, avian flu), social health insurance, health service delivery, payment incentives, competition, workforce policy, pharmaceutical industry, and regulation. No prior knowledge of economics or healthcare required.

Same as: EASTASN 117

EASTASN 220E. East Asian Internets. 4 Units.

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EASTASN 262. Seminar on the Evolution of the Modern Chinese State, 1550-Present. 3-5 Units.

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Same as: EASTASN 94

EASTASN 297. The International Relations of Asia since World War II. 3-5 Units.

Asian international relations since World War II were dominated by the efforts of the newly independent nation-states of Asia, almost all of which had been colonies before the war, to establish and maintain sovereignty in a context of American and Soviet competition for influence in the region. This course traces the major developments of the period, including the Chinese civil war, the U.S. occupation of Japan, the division of Korea and the Korean War, the South and Southeast Asian independence struggles, the American and Soviet alliance systems, the Vietnam War, the strategic realignments that led to the end of the Cold War in Asia, the emergence of Central Asia, and the legacy of issues that the period has posed for the region today.

Same as: EASTASN 97

EASTASN 300. Graduate Directed Reading. 1-7 Unit.

Independent studies under the direction of a faculty member for which academic credit may properly be allowed. For East Asian Studies M.A. students only.

EASTASN 330. Core Seminar: Issues and Approaches in East Asian Studies. 1 Unit.

For East Asian Studies M.A. students only.

EASTASN 390. Practicum Internship. 1 Unit.

On-the-job training under the guidance of experienced, on-site supervisors. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of adviser.

EASTASN 801. TGR Project. 0 Units.

Economic Analysis Policy Courses

MGTECON 200. Managerial Economics. 4 Units.

This course covers microeconomic concepts relevant to managerial decision making. Topics include: demand and supply analysis; consumer demand theory; production theory; price discrimination; perfect competition; partial equilibrium welfare analysis; externalities and public goods; risk aversion and risk sharing; hidden information and signaling; moral hazard and incentives; game theory; oligopoly; and transaction cost economics.

MGTECON 203. Managerial Economics - Accelerated. 4 Units.

MGTECON 203 is the accelerated option in microeconomics for 1st year MBA students. It will cover the usual array of topics, with an emphasis on topics more useful for students of management (although the order in which the topics are covered will be different from that in 200). No previous background in economics is required or expected, but in comparison with MGTECON 200, less time will be spent in class on basic problems. Therefore, students choosing this option should be completely comfortable with calculus and linear algebra. A good diagnostic is to read Sections 3.5 and 3.6 (pp. 57-67) in Kreps, *Microeconomics for Managers*. If you find this easy, 203 is a good choice. If not, 200 is the right course for you. Students with extensive background in microeconomics should take one of the Advanced Applications options; in particular, MGTECON 203 is NOT a good fit for students who have an undergraduate major in economics.

MGTECON 209. MSx: Economics. 3 Units.

This course is an introduction to Microeconomics, focusing on microeconomic concepts relevant to managerial decision making. Topics include demand and supply, cost structure, price discrimination, perfect competition, externalities, and the basics of game theory. No prior Economics background is required but students who have not had courses in this area (or not had one in a very long time) may want to brush up on math prior to the start of classes.

MGTECON 249. Smart Pricing and Market Design. 2 Units.

This is the Advanced Applications option in the menu of courses that satisfy the Management Perspectives requirement in Optimization and Simulation Modeling (OSM). The course is tailored to students who already have command of basic optimization and simulation techniques, or have an advanced mathematical background that will allow them to catch up quickly. The focus of the course is on applying these techniques to a particular business domain: pricing mechanisms and market design. The pricing component of the course will handle both traditional topics, such as price differentiation, and more modern ones, such as dynamic pricing. In the market design component of the course, we will apply optimization and simulation techniques to such topics as auctions (e.g., designing auctions for selling online advertising slots) and matching (e.g., designing mechanisms for matching students to schools). No background in economics or in the pricing and market design topics mentioned above is required or expected.

MGTECON 300. Growth and Stabilization in the Global Economy. 4 Units.

This course gives students the background they need to understand the broad movements in the global economy. Key topics include long-run economic growth, technological change, wage inequality, international trade, interest rates, inflation, exchange rates, and monetary policy. By the end of the course, students should be able to read and understand the discussions of economic issues in *The Economist*, the *Wall Street Journal*, the *New York Times*, or the Congressional Budget Office.

MGTECON 330. Economics of Organization. 4 Units.

This is an advanced applications economics course that applies recent innovations and high-powered tools to organization and general management. MBA1 students must have a strong background in microeconomics to take the course and should consult with their advisors. The course is appropriate for MBA2 students who have taken either Mgtecon 200 or Mgtecon 203. The course objective is to equip managers with an extensive set of analytical and applicable tools for handling the following topics: organization for coordination, designing incentives for moral hazard, monitoring and private information, applications to scope, scale, global management and mergers, principles for allocating decision power, managing supplier relations, downstream controls, franchising and alliances, bargaining, high order reasoning, repeated interactions and reputation, holdups and strategizing with unawareness. These topics will be covered in a combination of lectures and cases.

MGTECON 331. Health Care Regulation, Finance and Policy. 3 Units.

This course provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the US. Potential topics include: health reform, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), medical malpractice and quality regulation, pharmaceuticals, the corporate practice of medicine, regulation of fraud and abuse, and international comparisons.

MGTECON 332. Analysis of Costs, Risks, and Benefits of Health Care. 4 Units.

For graduate students, and with permission of instructors, advanced undergraduates. This course provides the conceptual basis for understanding how to assess the effectiveness, costs, and cost effectiveness of health-care interventions. Students will gain an understanding of how to assess whether health-care interventions work, and if they work, whether they are worth what they cost. The course will cover principal evaluative techniques for health care, including, cost-effectiveness analysis, cost-benefit analysis, utility assessment, and decision analysis. Emphasis is on the practical application of these techniques. Group project presented at end of quarter. Guest lectures by experts from the medical school, entrepreneurs, pharmaceutical industry, and health care plans. The course content is relevant to researchers in health services and health policy, health-care managers, entrepreneurs, health-care consultants, and physicians.

MGTECON 334. The International Economy. 4 Units.

The objective of this course is to give students an understanding of what international trade policy means for business leaders. To do this, students will have to understand the economic forces that determine the patterns and consequences of international trade. We will analyze trade policy tools used by governments (e.g., tariffs, subsidies and quotas), and examine the role of industry and politics at the domestic and global level in applying these tools. This course will combine lecture, case studies and group interaction.

MGTECON 335. Statistics and Causality. 4 Units.

This is a course on methods for causal inference in statistics, with a particular focus on the use of randomized experiments and observational studies for making decisions under uncertainty. We will discuss some of the statistical methods, implementing them in R. No prior knowledge of R is required. We will discuss a number of detailed applications.

MGTECON 342. Business and Macroeconomics in Today's Global Economy. 3 Units.

This class applies the macroeconomic concepts that you've learned another course (e.g. in MgtEcon 300) to real-time current events. Just as you only really learn to speak a foreign language through immersion, the best way to understand macroeconomics is to use it intensively! In this class, there will be a new topic each week, chosen only days in advance to ensure timeliness. Examples may include "Janet Yellen's Monetary Policies" or "Economic Growth in Latin America" or "Thomas Piketty's New Book on Wealth Inequality." Students will divide into small groups, undertake research on a narrow question of their own choosing related to the general topic, and collectively write a 300-word blog entry to be posted on the (private) class blog at least 24 hours before class meets. Over the next day, students will read each others' entries. Finally, during class time, each group will lead a discussion of their blog post for 15-20 minutes. For more information about this course, please see <http://www.stanford.edu/~chadj/MacroToday.html> after January 15, 2015.

MGTECON 343. The Evolution of Finance. 4 Units.

This course discusses the financial crisis of 2008-9, developments since that time, and the future of finance. We consider how regulation, technology, and the changing world economy will create challenges and opportunities. We have guest speakers for about half of the classes. The list changes from year to year, but 2013's speakers included Tanya Beder, Sue Decker, Jacob Goldfield, Tom Kempner, Ana Marshall, Vincent Reinhart, Larry Summers, and Kevin Warsh.

MGTECON 364. Motivation in Theory and in Practice. 3 Units.

This course focuses on one question: How do organizations motivate their key employees to provide consummate effort? By consummate effort, we mean effort above and beyond what is normal or expected, with particular emphasis on cases where the key employees are knowledge workers performing ambiguous and creative tasks. We will begin with three weeks or so of twice-weekly class sessions, at which different theories of motivation will be explored as theories and as practiced in case studies. This will include both the economic theory of incentives, but also social psychological theories of motivation and, in particular, on when and how economic forces and social psychological forces come into conflict and when and how they can be marshaled together. During this initial three-week period, students in course will organize themselves into teams of 3 to 5 students. Each team will identify a organization or related group of organizations (say, several firms inside the same niche in an industry), and during weeks 4 through 7 of the quarter, each team will investigate how the organization(s) they are studying answer the basic question. Students will be expected to relate what they find to the theoretical constructs of the early part of the quarter. During this period, each team will meet at least weekly with the instructor to review progress achieved and to plan next steps. In the final two weeks or so (depending on the number of teams), teams will present what they have learned about the organizations they are studying to their peers. Each team will make a presentation of 45 minutes to an hour. These presentations should include a full analysis of the organization(s) (any relevant history, business model and strategy, and so forth). They should then answer the basic question, giving to the greatest extent possible tangible measures and evidence for their assertions. This will be followed by a Q&A from the other members of the class, exploring what the teams have presented. Each team will be expected to prepare a written "case-let" of their findings, to be circulated to other members of the class at least three days prior to the in-class discussion. Organizations to be studied must be existing organizations. Teams will NOT be allowed to present "designs" for organizations that they are in the process of founding or that they hope to found. There must be evidence---anecdotal at least, more systematic if possible---of how well the organization's approach to motivation is working. Organizations studied should consent to be "used" in this fashion, although you will be asked to try to gain permission for the case-lets and your presentations to be used more broadly in the GSB's curriculum. The instructor will attempt to "recruit" willing organizations, from which teams can choose, although it is equally preferable if not better for teams to identify on their own the organizations they will studied. Grades will be determined as follows: 20%--class participation in the first three weeks, with emphasis on contribution to case discussions. 20%--group-assigned grade based on the written case-let. 30%--group-assigned grade based on the oral (in class) presentation. 20%--participation in the discussion of the presentations of other groups. 10%--based on an individual "final exam," in which students will be asked to write a short report (three to five pages, double spaced, 12pt) evaluating what they learned, with emphasis on what they consider is important in answering the basic question, on the basis of the course experience. This report will be due on the last day of final exams, may be prepared off campus and emailed in. Students are free to discuss these matters with one another, but each student is expected to be the sole author of his/her "final exam." There are no formal prerequisites for this course, but students considering this course will be well prepared if they have taken a course in human resource management. This course is a Bass Seminar and is limited to enrollment of 25 students. Please note: I have a reputation for requiring a LOT of work from students. This reputation is deserved. I have every intention of enhancing my reputation in this regard, in this course, so caveat discipulus. (Unhappily, you cannot access course evaluation data on the number of hours that students report they work, so you will have to take my word for it: My courses are in the far upper tail of the distribution. You can access data on the question on "Sets High Expectations." And I urge you to read ALL the entries on me at Course Unofficial for MGTECON 200 and 203. If you have any questions, please contact me in the first instance via email, at kreps@stanford.edu.

MGTECON 381. Contemporary Economic Policy. 3 Units.

Economic issues permeate all that happens in government. This topics-based course will exam a variety of historic and current issues on the political agenda where economics is central to decision making. It is taught by faculty who served at the White House in either the Clinton or George W. Bush Administration.

MGTECON 512. The Economics of Internet Search. 2 Units.

This class will explore the economics of the internet search business. The class will consist of lectures, guest speakers, and short student presentations. The course will begin with an overview of internet search, including the technology and engineering as well as the role of search for consumers, in society and the internet industry. We will then study search as a platform market, considering the interaction between the different sides of the market (users, advertisers, and publishers) as well as competition across platforms on different sides of the market. The advertising marketplace will receive special focus, including the design of the auction. We will also study the role of search in the internet ecosystem, examining recent trends towards vertical integration and its impact on the development of independent internet products and services. Finally we will address search as a data-driven business. Throughout, the course will draw parallels to other internet platform businesses, using search as an in-depth case study through which broader themes can be understood.

MGTECON 513. Platform Competition in Digital Markets. 2 Units.

This class will analyze the economics of digital platform markets. The class format will consist of lectures, guest speakers, and student presentations. Concepts will be presented in the context of leading examples of internet and technology platforms such as online advertising, computing technology platforms (e.g. mobile), marketplaces, social networks, cloud computing, and financial technology platforms. The course will begin with economic definitions of platform markets, and it will review the most important insights from recent research in economic theory and strategy. It will then consider the role of scale economies and network effects in determining the dynamics of platform competition and long-run industry structure. Next, the class will consider key strategic decisions for firms, including entry strategies, vertical integration and exclusive deals.

MGTECON 514. Markets of Information. 2 Units.

Valuable information may be distributed among people. We will study the problems associated with identifying, retrieving and aggregating this information. We will turn to the existing solutions currently offered in the market and study their scope and the potential of these recent technologies. Along the way we will gain a better understanding of the various types and dimensions of valuable information. We will study how information flows and how it initially becomes distributed. We will then analyze the strategic aspects of locating information, information transmission, reliability and elicitation. Applications covered include: social networks, entertainment and media, rating systems, expert advice, "wisdom of the crowd" tools, sales forecasting, prediction markets and more.

MGTECON 535. Statistics and Causality. 2 Units.

Most statistical questions involving data ultimately are about causal effects. What is the effect of changing prices on demand? What is the effect of an advertising campaign on demand. In this course we discuss statistical methods for analyzing causal effects. We look at the analysis and design of randomized experiments. We also look at various methods that have been used to establish causal effects in observational studies. Students will develop the skills to assess causal claims and learn to ask the right questions and evaluate statistical analyses. You will carry out research projects and work with statistical software.

MGTECON 558. Technology, Innovation & Entrepreneurship Policy. 2 Units.

This economic policy compressed course will briefly examine a variety of government policies and how each influences technology, innovation, and entrepreneurship. We will examine a range of policy topics from the perspectives of both policymakers and the firms affected by these policies. Possible topics (subject to change) include: high-skilled immigration, the taxation of carried interest, net neutrality, carbon pricing, data privacy, global democracy / censorship, new drug/medical device approval, online education, and encryption. The course is aimed primarily at helping those interested in technology, entrepreneurial, or finance roles understand how policymakers think about and make decisions that affect these sectors. The course is taught by a former senior White House economic advisor to President George W. Bush.

MGTECON 591. Management Practices in Europe, the US and Emerging Markets. 1 Unit.

The course will review the results from a large management practices project involving Harvard, the London School of Economics, McKinsey & Company and Stanford. McKinsey & Company have developed a basic management practice evaluation tool - detailing the 18 key practices in firms - which has been used to evaluate almost 10,000 organizations in manufacturing, retail, healthcare and education across the US, Europe, Asia, Australasia and South America. These results provide a global insight into the basic management practices around monitoring, targets and talent management that firms adopt around the world, their link to performance, and the reasons for differences in these across countries. This will be supplemented with the results from more recent research with Accenture and the World Bank in India carrying out change-management interventions. nnnFull syllabus and lectures from 2011 available here: http://www.stanford.edu/~nbloom/Course_591.zip.

MGTECON 600. Microeconomic Analysis I. 4 Units.

This course provides an introduction to the foundations of modern microeconomic theory. Topics include choice theory, with and without uncertainty, consumer and producer theory, dynamic choice and dynamic programming, social choice and efficiency, and fundamentals of general equilibrium. Students interested in this course should consult the instructor by email: kreps@stanford.edu.

MGTECON 601. Microeconomic Analysis II. 4 Units.

This course studies the roles of information, incentives and strategic behavior in markets. The rudiments of game theory are developed and applied to selected topics regarding auctions, bargaining, and firms' competitive strategies; information economics; and contracting and market design.

MGTECON 602. Auctions, Bargaining, and Pricing. 4 Units.

This course covers auction theory, matching, and related parts of the literature on bargaining and pricing. Key papers in the early part of the course are Myerson and Satterthwaite on bargaining, Myerson on optimal auctions, and Milgrom and Weber's classic work. We then turn to markets in which complicated preferences and constraints, limitations on the use of cash, or variations in contract details among bidders play an important role. Emphasis is on matching markets such as the National Resident Matching Program and asset auctions such as the spectrum auctions.

MGTECON 603. Econometric Methods I. 4 Units.

This is the first course in the sequence in graduate econometrics. The course covers some of the probabilistic and statistical underpinnings of econometrics, and explores the large-sample properties of maximum likelihood estimators. You are assumed to have introductory probability and statistics and matrix theory, and to have exposure to basic real analysis. Topics covered in the course include random variables, distribution functions, functions of random variables, expectations, conditional probabilities and Bayes' law, convergence and limit laws, hypothesis testing, confidence intervals, maximum likelihood estimation, and decision theory.

MGTECON 604. Econometric Methods II. 3 Units.

This course presents a comprehensive treatment of econometric methods used in economics, finance, marketing, and other management disciplines. Among the topics covered are: the classical linear regression analysis, linear simultaneous equations systems, panel data models, generalized method of moments, selection models, and limited dependent variable models. This course uses Matlab or similar computational software, but previous experience with such software is not a prerequisite. This course assumes working knowledge of undergraduate econometrics, basic linear algebra, basic probability theory, and statistics that are covered in MGTECON 603. Those who did not take MGTECON 603 or similar should see the instructor.

MGTECON 605. Econometric Methods III. 4 Units.

This course completes the first-year sequence in econometrics. It develops nonlinear models in detail, as well as methods used to estimate nonlinear models, including nonparametric, semiparametric and moment-based estimators such as GMM. The instructor will discuss both the statistical properties of these estimators and how they are used in practice. Computational issues are explored in detail. Depending on student and instructor interest, we will consider advanced topics and applications, including: simulation methods and Bayesian estimators.

MGTECON 606. Microeconomic Theory for Non-Economist PhDs. 4 Units.

This course will be a first quarter PhD course in microeconomic theory, aimed at PhD students who do not plan to become professional economists. Relative to a course geared to economics PhDs the class will differ in two important ways. First, there will be almost no emphasis on proofs. Second, the topics covered will be broader than the standard set covered in say Econ 202.

MGTECON 608. Multiperson Decision Theory. 4 Units.

Students and faculty review and present recent research papers on basic theories and economic applications of decision theory, game theory and mechanism design. Applications include market design and analyses of incentives and strategic behavior in markets, and selected topics such as auctions, bargaining, contracting, signaling, and computation.

MGTECON 609. Applied Econometrics and Economic Research. 4 Units.

The primary objective of this course is to prepare students to evaluate and produce research in empirical microeconomics. The emphasis will be on the overall process of conducting such research: from defining a clear research question, to collecting suitable data, to selecting and executing an appropriate mode of econometric analysis. Students will be expected to read and discuss papers covering a variety of applied topics. Methodological issues will be discussed in depth wherever they arise, and especially where they are central to understanding a paper's implications, but methodology will not be the central focus of the course. Some of the topics to be covered in the course include: nonlinear pricing in imperfectly competitive markets; innovation and the diffusion of innovations; the economics of advertising; consumer information and product-market outcomes. Other topics will be selected based partly on student input.

MGTECON 610. Macroeconomics. 4 Units.

This course covers various topics in macroeconomics and is designed to expose students to macroeconomic methods, classic papers in the field, and the latest research at the frontier. The current focus is on economic growth. Using theoretical and empirical tools, we consider questions like: How do we understand long-run growth in per capita income? Why are some countries so much richer than others? Other topics include misallocation as a source of TFP differences, the direction of technical change, growth and the environment, the rise in health spending, patenting, and international trade. This course satisfies the GSB PhD macro requirement.

MGTECON 611. Open Economy Macroeconomics. 4 Units.

The goal of this course is to teach students how to use the tools of open economy macroeconomics to connect to the burgeoning literature on institutions in a way that helps them to frame interesting research questions in the area of stabilization, reform, and growth in developing countries. The growth rate of total factor productivity (TFP) plays an essential role in economic growth. In turn, two principal forces drive TFP growth: (1) changes in ideas (i.e. technological change) and (2) changes in institutions. This course will employ the tools of open economy macroeconomics to study the second of these two forces. Recent contributions in the literature focus on the impact of cross-country differences in initial institutions on long-run growth and development. Prominent examples of such institutional differences include the nature of the legal origins and property rights bequeathed to a country by its colonial masters. This is a PhD course in economics, but it is open to students from any discipline (i.e. Political Science, History, International Relations) who are willing to make the analytical investment that is necessary to understand and debate the issues in a logical, coherent, and systematic fashion.

MGTECON 614. Topics in Stabilization and Reform. 4 Units.

This course develops the essential tools of dynamic, open-economy macroeconomics for the purpose of analyzing policy changes in developing countries. The first half of the course develops the work-horse models needed to undertake an analytical study of stabilization and reform: the basic tools of dynamic optimization; dynamic models of the current account, investment, growth, and the real exchange rate; international asset pricing. The second half of the course explores analytical models of policy reform in developing countries: sovereign risk and investment, debt buybacks, moral hazard in international lending; inflation crises, balance of payments crises and stabilization; current account liberalization, capital account liberalization, and optimal sequencing of reforms; political economy of stabilization and adjustment.

MGTECON 615. Topics in Economics of Information. 3 Units.

The goal of this course is to introduce students to current research topics and open issues related to the role of information in markets and other economic mechanisms. Topics may include: information aggregation in prediction markets and other mechanisms, microstructure of financial markets, forecast testing, scoring mechanisms, information in auctions, information in e-commerce and novel marketplaces.

MGTECON 616. Topics in Game Theory. 3 Units.

This is an advanced game theory course and requires a basic background in game theory or an advanced applied game theory course. The course covers foundational topics such as type spaces, modeling reasoning and rationality, game forms, solution refinements and more. A collection of additional topics will be covered independently via problem solving assignments in workshop style meetings with student presentations.

MGTECON 620. Economics of Electronic Commerce and the Internet. 4 Units.

This course is designed to introduce students to research topics in electronic commerce and the economics of the internet. The primary audience is advanced graduate students in economics or closely related areas, but the course is also open to students from related fields such as computer science and operations provided students have completed graduate coursework in economics, game theory, and/or market design. The methodological focus is on applied economic theory models, empirical work, and field experiments. The course requires a literature review and research proposal, which will be presented to the class at the end of the term. Core topics include: economics of platform markets and multi-sided markets, with case studies including online advertising, online auctions, mobile computing, cloud computing, electronic and mobile payment systems, and media markets; markets for information; internet search, including specialized search platforms such as shopping and travel; the impact of the internet on the news media; and the impact of technological and business practice shifts on both old and new industries, including data-driven decision-making, machine learning, and increased reliance on experimentation. Other topics that may be selected according to student interest include social networks, social media, intellectual property and innovation, broader economic impacts of technological innovation, security, internet policy, the impact of the internet on education and health, privacy, and other regulatory issues surrounding the internet.

MGTECON 624. Dynamic Political Economy Theory. 4 Units.

This course is intended to be an introduction to dynamic political economy theory. We will cover research at the frontier of this field and some useful tools. Tools will be primarily dynamic game theory - including Markov models and models of reputation. Topics covered will include dynamic legislative bargaining, dynamic coalition formation, endogenous institutions, endogenous policy formation, and private politics.

MGTECON 628. Reading Group in Industrial Organization. 1 Unit.

This course meets weekly on Tuesdays at Noon. The primary purpose of the course is to read and discuss current working papers in Industrial Organization and related fields (e.g., Econometrics, Marketing, and Labor). Students are required to present papers a couple of times per quarter and both students and faculty may also present their own working papers.

MGTECON 629. Microeconomics Workshop. 3 Units.

Each week, a different economics faculty member will discuss his or her important and/or current research. The course is an important introduction to PhD level research topics and techniques. Attendance is mandatory.

MGTECON 640. Quantitative Methods for Empirical Research. 3 Units.

This is an advanced course on quantitative methods for empirical research. Students are expected to have taken a course in linear models before. In this course I will discuss modern econometric methods for nonlinear models, including maximum likelihood and generalized method of moments. The emphasis will be on how these methods are used in sophisticated empirical work in social sciences. Special topics include discrete choice models and methods for estimating treatment effects.

MGTECON 651. Natural Resource and Energy Economics. 4 Units.

Management and provision non-renewable and renewable natural resources, with considerable attention to energy provision and use. Topics include: fisheries problems and policy; energy industry market structure, pricing, and performance; and policies to facilitate transitions from non-renewable to renewable energy.

MGTECON 652. Personnel Economics. 3 Units.

This seminar will examine applications of labor economics to business issues and firms' practices. Material will include both theoretical and empirical work, and the syllabus will range from classics in Personnel Economics to current (unpublished) research. Some of the topics to be covered include, but are not limited to, compensation practices, assignment of decision rights, organizational structure, attracting, retaining, and displacing employees, and workplace practices (such as team-based organization, profit sharing, etc.).

MGTECON 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, HRMGT 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

MGTECON 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, HRMGT 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

MGTECON 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, HRMGT 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

Economics Courses

ECON 1. Principles of Economics. 5 Units.

The economic way of thinking and the functioning of a modern market economy. The behavior of consumers and firms. Markets for goods and inputs. Analysis of macroeconomic variables: output, employment, inflation, interest rate. Determination of long-run growth and short-term fluctuations. The role of government: regulation, monetary, and fiscal policy.

ECON IV. Principles of Economics. 5 Units.

The economic way of thinking and the functioning of a modern market economy. The behavior of consumers and firms. Markets for goods and inputs. Analysis of macroeconomic variables: output, employment, inflation, interest rate. Determination of long-run growth and short-term fluctuations. The role of government: regulation, monetary, and fiscal policy.

ECON 5. Economics in the News. 1 Unit.

Each week a different Econ faculty member will discuss recent, exciting developments in their field. A particular emphasis will be how economics informs policy debates. The course will provide a preview of upper division courses and research opportunities in economics. Prerequisite: Econ 1, Econ 1A or 1B.

ECON 10. Silicon Valley Meets Wall Street. 1 Unit.

Seminar in applied economics with focus on the microcosm of Silicon Valley, how growth companies are originated, managed and financed from start-up to IPO. Round-table discussion format. Applicable to those students with an interest in technology company formation, growth and finance including interaction with Wall Street. Enrollment limited to 10 students.

ECON 11N. Understanding the Welfare System. 3 Units.

Welfare reform passed by the Federal Government in 1996 heralded a dramatic step in how our nation designs and operates its programs that support poor families. The centerpiece of this legislation known as 'devolution' transferred much responsibility for these programs to the states. States had their first opportunity since the 'war on poverty' of the 1960s to undertake radical changes in setting up their public assistance programs. Recently, many of the reforms instituted in the 1990s are being hotly debated and in some aspects reversed. What flexibility did the states receive under welfare reform, and what considerations are relevant in exercising this flexibility? What selections have states made, and how are their programs and those of the federal government likely to evolve in the future? This seminar will address these questions, exploring how reforms changed welfare and who has been affected by these changes. In addition to covering the patchwork of different programs that currently constitute America's social safety net, the seminar will also scrutinize the makeup and trends in government spending and how our nation defines poverty and eligibility for income support. Moreover, the discussion will illustrate the role that economics plays in assessing the effectiveness of anti-poverty programs and the consequences on families' behavior. Students will participate in a project in which they develop their own recommendations for devising a safety net for poor families in America.

ECON 12. Investment Reflections from a Hedge Fund Career: Mindset & Meditation as Competitive Advantage. 1 Unit.

The class will attempt to relate the most important sources of competitive advantage during the instructor's fifteen years co-managing Scout Capital, a long-short hedge fund. The class will learn Scout's investment framework, in order to apply it to real historical cases. The cases are designed both to illustrate the investment framework in action, and to enable the student to experience the perceptual difficulties that confront professional investors. The class will discuss techniques for managing the mental fog that plagues most investors, with an emphasis on meditation. Students should be prepared to commit 15 minutes per day, every day, to meditation practice during the term of the course. Each class will contain a short guided meditation, and a short group reflection on students' meditation experiences.

ECON 13SC. A Random Walk Down Wall Street. 2 Units.

The title of this course is the title of one of the books that will be required summer reading. The course will introduce modern finance theory and cover a wide range of financial instruments: stocks, bonds, options, mutual funds, exchange traded funds, mortgage back securities, etc. Historical returns on different asset classes will be examined. The efficient market hypothesis and the case for and against index funds will be discussed. The course for 2015 will examine the ongoing policies to stimulate the economy, including the quantitative easing policy of the Federal Reserve. There will be coverage of global financial markets. We will try to reconcile the long-run return on stocks, bonds, and money market instruments with the capital asset pricing model. We will try to connect financial markets with the problems of the real economy including the entitlement programs. We will talk with venture capitalists, Federal Reserve officials, hedge fund and mutual fund managers, and those who manage large institutional endowments. Students will be expected to write a short paper and make an oral presentation to the class. A wide range of topics will be acceptable, including market regulation, the introduction of new financial instruments, the functioning of commodity futures markets, and evaluations of the federal government intervention in financial markets. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

ECON 17N. Energy, the Environment, and the Economy. 3 Units.

Examines the intimate relationship between environmental quality and the production and consumption of energy. Assesses the economics efficiency and political economy implications of a number of current topics in energy and environmental economics. Topics include: the economic theory of exhaustible resources, Greenhouse Gas Emissions (GHG) control (cap and trade mechanisms and carbon fees), GHG emissions offsets, the Strategic Petroleum Reserve (SPR), the "smart" transmission grid for electricity, nuclear energy and nuclear waste, the real cost of renewable energy, natural gas and coal-fired electricity production, the global coal and natural gas markets, Corporate Average Fuel Efficiency (CAFE) and Low-Carbon Fuel Standards (LCFS), Energy Efficiency Investments and Demand Response, and Carbon Capture and Sequestration (CCS). For all topics, there will be reading to explain the economics and engineering behind the topic and class discussion to clarify and elaborate on this interaction.

ECON 18A. The Washington Debate About American Competitiveness. 1 Unit.

One of the central challenges for policymakers is how to make sure the United States remains the world's strongest economy and continues to create good paying jobs. Discusses what the proper role of government should be when it comes to our economy by exploring the history of American economic thought dating back to Alexander Hamilton. Considers the perspective of classical economists, Keynesian economists, and economists identifying themselves as part of the innovation school of economics. Examines various policy alternatives concerning taxes, regulations, immigration, and investment that can foster economic growth.

ECON 18B. Silicon Valley Leaders' Take on America's Economic Future. 1 Unit.

The academic debates about economic policy often miss the perspective of real world business leaders who are navigating a complex, global economy. In this class, we will hear from technology leaders and CEOs from many prominent Silicon Valley companies. They will offer their take on repatriation, immigration, trade issues, and tax reform. We will explore whether there is a disconnect between Congress and Silicon Valley business leaders, and if so, how we can bridge that divide.

ECON 18C. Real World Policy Makers Discuss How the U.S. Can Compete in a Global Economy. 1 Unit.

Silicon Valley leaders and academic economists often do not understand the political constraints policy-makers face when it comes to economic decision-making. We will invite think tank leaders, political leaders, former administration officials, and labor leaders to shed light on what is driving the current economic thinking in Washington. We will explore how Washington views Silicon Valley, and what Silicon Valley companies can do to improve their perception in the Beltway. We also will discuss why Washington policy-makers matter to the future of the Valley, and what they can learn from business leaders here.

ECON 24N. Social Choice & Market Design. 3 Units.

The design of mechanisms for group decision making, addressing questions about how apartment mates should choose rooms and share the rent, how a government should select and pay its suppliers, how a town should elect a mayor, or how students and college ought to be matches to one another. The first three weeks include classic papers by two Nobel-prize winning scholars about matching students and about government procurement. We will ask questions such as: What are the provable properties of these mechanisms? Is it possible for individuals or groups to manipulate the mechanisms for their own advantage? The remaining weeks focus on group decisions that are guided by "voting" mechanisms, showing the inherent trade-offs and proving theorems about the incompatibility among some simple, desirable properties of mechanisms. The ideas treated in this class are being used today to design new mechanisms for voting, matching, auctions and other applications, based on an awareness of the formal properties that the mechanisms may have.

ECON 25N. Public Policy and Personal Finance. 3 Units.

The seminar will provide an introduction and discussion of the impact of public policy on personal finance. Voters regularly rate the economy as one of the most important factors shaping their political views and most of those opinions are focused on their individual bottom lines. In this course we will discuss the rationale for different public policies and how they affect personal financial situations. We will explore personal finance issues such as taxes, loans, charity, insurance, and pensions. Using the context of (hypothetical) personal finance positions, we will discuss the public policy implications of various proposals and how they affect different groups of people, for example: the implications of differential tax rates for different types of income, the promotion of home ownership in the U.S., and policies to care for our aging population. While economic policy will be the focus of much of the course, we will also examine some of the implications of social policies on personal finance as well. There will be weekly readings and several short policy-related writing assignments.

Same as: PUBLPOL 55N

ECON 49. Managerial Economics. 5 Units.

Intermediate microeconomics, with a focus on topics and methods of interest to future managers. Topics include market pricing and price discrimination, incentives, signaling, implicit collusion, decision making under uncertainty, auctions and basic game theory. Use of calculus and math-based analysis. Topics overlap considerably with Econ 50 and Econ 51. Aimed at Juniors and Seniors with non-Econ majors. Does not fulfill Econ major requirements. Economics majors should take Econ 50 and Econ 51.

ECON 50. Economic Analysis I. 5 Units.

Individual consumer and firm behavior under perfect competition. The role of markets and prices in a decentralized economy. Monopoly in partial equilibrium. Economic tools developed from multivariable calculus using partial differentiation and techniques for constrained and unconstrained optimization. Prerequisites taken for letter grades: Econ 1 or 1A or 1V, and Math 51 or CME 100 or CME 100A. Must be taken for a Letter grade if majoring/minoring in Economics.

ECON 51. Economic Analysis II. 5 Units.

Neoclassical analysis of general equilibrium, welfare economics, imperfect competition, externalities and public goods, intertemporal choice and asset markets, risk and uncertainty, game theory, adverse selection, and moral hazard. Multivariate calculus is used. Prerequisite: ECON 50.

ECON 52. Economic Analysis III. 5 Units.

Long-run economic growth and short-run economic fluctuations. Focus on the macroeconomic tools of government: fiscal policy (spending and taxes) and monetary policy, and their effects on growth, employment, and inflation. Prerequisites: ECON 50.

ECON 101. Economic Policy Seminar. 5 Units.

Economic policy analysis, writing, and oral presentation. Topics vary with instructor. Limited enrollment. Prerequisites: Econ 51 and 52, 102B, and two field courses. Some sections require additional prerequisites.

ECON 102A. Introduction to Statistical Methods (Postcalculus) for Social Scientists. 5 Units.

Probabilistic modeling and statistical techniques relevant for economics. Concepts include: probability trees, conditional probability, random variables, discrete and continuous distributions, correlation, central limit theorems, point estimation, hypothesis testing and confidence intervals for both one and two populations. Prerequisite: MATH 41 or equivalent.

ECON 102B. Applied Econometrics. 5 Units.

Hypothesis tests and confidence intervals for population variances, chi-squared goodness-of-fit tests, hypothesis tests for independence, simple linear regression model, testing regression parameters, prediction, multiple regression, omitted variable bias, multicollinearity, F-tests, regression with indicator random variables, simultaneous equation models and instrumental variables. Topics vary slightly depending on the quarter. Prerequisites: Econ 50 and Econ 102A or equivalent. Recommended: computer experience (course often uses STATA software to run regressions).

ECON 102C. Advanced Topics in Econometrics. 5 Units.

The evaluation problem. Identifying and estimating the effects of policies on outcomes of interest (e.g. tax rates on earnings, social security payments on unemployment duration). Identifying and estimating the effects of human capital and demographic variables on earnings and other labor market outcomes (e.g. experience and tenure on earnings, ethnicity and gender on unemployment duration). Topics: Instrumental variables estimation; limited dependent variable models (probit, logit, Tobit models); Panel data techniques (fixed and random effect models, dynamic panel data models), Discontinuity-based methods (Regression discontinuity design, Regression kink design). Prerequisite: Econ 102B.

ECON 106. World Food Economy. 5 Units.

The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on public sector decision making as it relates to food policy.

Same as: EARTHYSYS 106, EESS 106

ECON 107. Causal Inference and Program Evaluation. 5 Units.

Methods for estimating and doing inference for causal effects. Discussion of randomized experiments, matching methods, the role of the propensity score, instrumental variables, regression discontinuity, and natural experiments. Theoretical aspects of these methods as well as detailed applications drawn from economics, political science, education, and health care. Prerequisite: Econ 102A or equivalent.

ECON 110. History of Financial Crises. 4 Units.

Financial crises are as old as financial markets themselves. There are many similarities between historical events. The recent credit crisis, for example, is far from unique. More often than not financial crises are the result of bubbles in certain asset classes or can be linked to a specific form of financial innovation. This course gives an overview of the history of financial crises, asset price bubbles, banking collapses and debt crises. We start with the Tulip mania in 1636 and end with the recent credit and debt crises. The purpose of the course is to understand the causes of past crises and to develop a conceptual framework that ties common elements together. We will discuss the lessons that we can draw for financial markets today. Prerequisites: Econ 50 or Econ 135.

ECON 111. Money and Banking. 5 Units.

The primary course goal is for students to master the logic, intuition and operation of a financial system - money, financial markets (money and capital markets, debt and equity markets, derivatives markets), and financial institutions and intermediaries (the Central Bank, depository institutions, credit unions, pension funds, insurance companies, venture capital firms, investment banks, mutual funds, etc.). In other words, how money/capital change hands between agents over time, directly and through institutions. Material will be both quantitative and qualitative, yet always highly analytical with a focus on active learning - there will be an approximately equal emphasis on solving mathematical finance problems (e.g. option pricing) and on policy analysis (e.g. monetary policy and financial regulation.) Students will not be rewarded for memorizing and regurgitating facts, but rather for demonstrating the ability to reason with difficult problems and situations with which they might not previously be familiar. Prerequisite: Econ 50, 52. Strongly recommended but not required: some familiarity with finance and statistics (e.g. Econ 135 or 140, Econ 102A).

ECON 112. Financial Markets and Institutions: Recent Developments. 5 Units.

The course covers innovations, challenges and proposed changes to the financial system. Topics include new mortgage products, foreclosure rules, securitization, credit ratings, credit derivatives, dealer networks, repo financing, implications for prudential regulation & monetary policy. Emphasis is on quantitative studies of these topics. Prerequisites: Econ 52, Econ 102B.

ECON 114. Economy and Economics of Ancient Greece. 5 Units.

(Formerly CLASSHIS 114.) Cultural and political background for Athens of the 5th and 4th century BC. Athenian economy of the 4th century BC. Economic ideas of Plato, Aristotle, and Xenophon. Pros and Cons of utilitarianism in light of the ethical theories of Plato and Aristotle. Economy and economics of ancient Greece will be compared to the same of ancient China. There is an interesting parallel.
Same as: CLASSICS 183

ECON 116. American Economic History. 5 Units.

The American economy from colonial times to the present, illustrating the role of history in economic life. Topics: U.S. economic development in global and comparative context; slavery as an economic system; emergence of American technology and business organization; economics of the Great Depression and the New Deal; post-World War II economic performance and social change; globalization, information technology, and inequality. Prerequisite: 1 or 1A or 1V.
Same as: AMSTUD 116, HISTORY 156

ECON 118. Development Economics. 5 Units.

The microeconomic problems and policy concerns of less developed countries. Topics include: health and education; risk and insurance; microfinance; agriculture; technology; governance. Emphasis is on economic models and empirical evidence. Prerequisites: 52, 102B.

ECON 119. The Russian Economy. 4-5 Units.

Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development. The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.
Same as: REES 219

ECON 121. Social Science Field Research Methods and Applications. 5 Units.

This course teaches the basics of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course first introduces observational field research and compares it with experimental field research. Significant attention will be devoted to explaining what can and cannot be learned each type of field research. The details of designing both types of field research projects will then be discussed. The basics theory of the design of statistical experiments will be introduced and applied. Topics covered include sample size selection, power and size of statistical hypothesis tests, sample selection bias and methods for accounting for it. Examples of best practice field research studies will be presented as well as examples of commonly committed errors. Practical aspects of field work will also be covered, including efficient and cost-effective data collection, data analysis, teamwork, and common ethical considerations. Students can apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 or 1A or 1V and either STATS 60 or Econ 102A or equivalent.
Same as: PUBLPOL 120, PUBLPOL 220

ECON 124. Economic Growth, Development, and Challenges of East Asia. 5 Units.

This course explores economic growth and development in East Asia and the region's current economic policy issues. For the purpose of this course, we will largely focus on China, Japan, and Korea. However, we will incorporate Southeast Asia when relevant. The first part of the course examines economic growth in East Asia and the development strategies pursued. Cross country comparisons will help draw similarities but also differences in the development processes. We will also discuss the validity of an East Asian model for economic growth. The second part of the course focuses on the specific factors relating to economic development, e.g., human capital, firms, infrastructure, institutions, democracy, political leaders, etc. We will also discuss the current challenges and policy issues. Readings will come from books, journal articles, reports, news articles, and case studies. Many of the readings will have an empirical component and students will be able to develop their understanding of how empirical evidence is presented in articles. Prerequisites: Econ 102B.

ECON 125. Economic Development, Microfinance, and Social Networks. 5 Units.

An introduction to the study of the financial lives of households in less developed countries, focusing on savings, credit, informal insurance, the expansion of microfinance, and social networks. Prerequisites- Econ 52 and 102B.

ECON 126. Economics of Health and Medical Care. 5 Units.

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51.
Same as: BIOMEDIN 156, BIOMEDIN 256, HRP 256

ECON 127. Economics of Health Improvement in Developing Countries. 5 Units.

Application of economic paradigms and empirical methods to health improvement in developing countries. Emphasis is on unifying analytic frameworks and evaluation of empirical evidence. How economic views differ from public health, medicine, and epidemiology; analytic paradigms for health and population change; the demand for health; the role of health in international development. Prerequisites: ECON 50 and ECON 102B.
Same as: MED 262

ECON 128. Economic Development: A Historical Perspective. 5 Units.

The course explores the process of economic development from a historical perspective. It draws on contemporary theories of economic development and the historical experience of various regions over the last millennium. The substantive focus is on the cultural and institutional and social foundations for economic growth. The starker focus is particularly on the Middle East, Europe and China. The course is conducted as a seminar based on in class discussion, readings, and students presentations. Limited Enrollment. Prerequisites: ECON 50, ECON 52, ECON 102B. Recommended: ECON 118.

ECON 132. Economics and Sports. 5 Units.

This course applies microeconomic analysis to professional and amateur sports. Appropriate examination of sports economics requires coverage of advanced fields of specialization within economics. These include industrial organization, labor economics, and public finance. Ultimately, the principal objective of the course is for students to have a more complete understanding of the economic issues affecting the world of sports. You will be able to comment intelligently on economic issues of sports that appear in the news media, such as the impact of the draft system, as well as assess and critique the opinions offered by journalists on, for example, the pay and performance of professional sportsmen and women. This is a unique opportunity to understand why there has been a recent explosion in economists looking both at the market of sports and using sports data to explain or test theories about the wider business world. Prerequisite: Econ 1.

ECON 135. Finance for Non-MBAs. 3 Units.

For graduate students and advanced undergraduates. The foundations of finance; applications in corporate finance and investment management. Financial decisions made by corporate managers and investors with focus on process valuation. Topics include criteria for investment decisions, valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the valuation of derivative securities. Corporate financial instruments including debt, equity, and convertible securities. Equivalent to core MBA finance course, FINANCE 220. Prerequisites: ECON 51, or ENGR 60, or equivalent; ability to use spreadsheets, and basic probability and statistics concepts including random variables, expected value, variance, covariance, and simple estimation and regression.

Same as: MSE 245G

ECON 137. Decision Modeling and Information. 5 Units.

Effective decision models consider a decision maker's alternatives, information and preferences. The construction of such models in single-party situations with emphasis on the role of information. The course then evolves to two-party decision situations where one party has more information than the other. Models examined include: bidding exercises and the winner's curse, the Akerlof Model and adverse selection, the Principal-Agent model and risk sharing, moral hazard and contract design. Prerequisite: ECON 102A or equivalent. Recommended: Econ 50, Optimization and simulation in Excel.

ECON 139D. Directed Reading. 1-10 Unit.

May be repeated for credit.

ECON 140. Introduction to Financial Economics. 5 Units.

Modern portfolio theory and corporate finance. Topics: present value and discounting, interest rates and yield to maturity, various financial instruments including financial futures, mutual funds, the efficient market theory, basic asset pricing theory, the capital asset pricing model, and models for pricing options and other contingent claims. Use of derivatives for hedging. Prerequisites: ECON 51, ECON 102A.

ECON 141. Public Finance and Fiscal Policy. 5 Units.

What role should and does government play in the economy? What are the effects of government spending, borrowing, and taxation on efficiency, equity and economic stability and growth? The course covers economic analysis, statistical evidence and historical and current fiscal policy debates in the U.S. and around the world. Policy topics: Fiscal crises, budget surpluses/deficits; tax reform; social security, public goods, and externalities; fiscal federalism; public investment; and cost-benefit analysis. Prerequisites: ECON 51, ECON 52 (can be taken concurrently).

Same as: PUBLPOL 107

ECON 143. Finance and Society for non-MBAs. 4 Units.

This interdisciplinary course will discuss the role of the financial system in the economy and its interactions with different parts of society. The course will introduce basic finance concepts, cover the basic economic principles essential for understanding the role of finance in the economy, provide an overview of the different institutions in the system, and discuss of policy issues around financial regulation. Topics to be discussed include: the basics of financial decisions and markets; from micro finance to global mega-banks: how and why finance can benefit society as well as endanger and harm; financial regulation: why and how; other people's money: the challenge of effective control, governance, and trust; the politics of banking and finance. Prerequisite: Econ 1.

Same as: PUBLPOL 143

ECON 145. Labor Economics. 5 Units.

Analysis and description of labor markets. Determination of employment, unemployment, hours of work, wages. Welfare programs and work effort. Wage differentials by schooling, experience, gender, and race. Income inequality, changes in inequality, and differences in inequality. Employment contracts, labor unions, and bargaining. International comparisons. Prerequisites: ECON 51, ECON 102B.

ECON 146. Economics of Education. 5 Units.

How a decision to invest in education is affected by factors including ability and family background. Markets for elementary and secondary schooling; topics such as vouchers and charter schools, accountability, expenditure equalization among schools, and the teacher labor market. The market for college education emphasizing how college tuition is determined, and whether students are matched efficiently with colleges. How education affects economic growth, focusing on developing countries. Theory and empirical results. Application of economics from fields such as public economics, labor economics, macroeconomics, and industrial organization. Prerequisites: ECON 50, ECON 102B.

ECON 149. The Modern Firm in Theory and Practice. 5 Units.

Combines the latest theory and empirics on the modern firm. Theoretical topics will include transactions cost theory, contract theory and incentives. Applied topics include the organization of firms in US and internationally. Management practices around information systems, target setting and human resources. Focus on management practices in manufacturing, but also analyze retail, hospitals and schools, plus some recent field-experiments in developing countries. Prerequisites: Econ 51, ECON 102B.

ECON 150. Economic Policy Analysis. 4-5 Units.

The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and ECON 102B.

Same as: PUBLPOL 104, PUBLPOL 204

ECON 152. The Future of Finance. 2 Units.

If you are interested in a career in finance or that touches finance (legal, regulatory, corporate, public policy), this course will give you a useful perspective. We will survey the players and current landscape of the global markets as the world continues to evolve from the financial crisis. We will discuss the sweeping change underway at the policy level by regulators and legislators around the world and this will include guest-lecturer perspectives on where the greatest opportunities exist for students entering or touching the world of finance today. The course will also review, in a non-technical way, the basics of the financial derivatives and other quantitative techniques that are a core part of the global capital markets. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application found on the Public Policy website to the instructor at tbeder@stanford.edu. Please visit <https://publicpolicy.stanford.edu/academics/undergraduate/forms> to locate the Consent Application Form for this class. The form is located on the Public Policy website under "Academics" and "Forms." See Consent Application Form for submission deadline. Same as: ECON 252, PUBLPOL 364, STATS 238

ECON 153. Economics of the Internet. 5 Units.

Economic models and tools used to understand online market phenomena, including standards, network and platform economics, online transactions, advertising, auctions, information, communications, and networking. The contemporary economics literature on internet markets and mobile communications markets. Public policy issues in competition policy, communication policy, and support for innovation. Prerequisites: ECON 51 and ECON 102B.

ECON 154. Law and Economics. 4-5 Units.

This course explores the role of law in promoting economic welfare. Law has many meanings and many aspects, but some version of it is essential to cooperative human interaction and thus to civilization itself. Cooperation often is a positive-sum or welfare-enhancing activity, while competition among individuals, in contrast, is often zero- or negative-sum. Law, among its other functions, can serve as a mechanism to harmonize private incentives to achieve cooperative gains, to maintain an equitable division of those gains, and to deter "cheating." Economic analysis of law focuses on the welfare-enhancing incentive effects of law and law enforcement and on law's role in reducing the risks of cooperation by setting expectations of "what courts or the state will do" in various contingencies. Prerequisite: Econ 50.

Same as: PUBLPOL 106, PUBLPOL 206

ECON 155. Environmental Economics and Policy. 5 Units.

Economic sources of environmental problems and alternative policies for dealing with them (technology standards, emissions taxes, and marketable pollution permits). Evaluation of policies addressing regional air pollution, global climate change, water allocation in the western U.S., and the use of renewable resources. Connections between population growth, economic output, environmental quality, and human welfare. Prerequisite: ECON 50.

ECON 156. Marine Resource Economics and Conservation. 5 Units.

Economic and ecological frameworks to understand the causes of and potential solutions to marine resource degradation. Focus on conservation of marine biodiversity and ecosystem-based management. Applications include: commercial and recreational fisheries, marine reserves, and offshore energy production.

Same as: EARTHSYS 156M, HUMBIO 111M

ECON 157. Imperfect Competition. 5 Units.

The interaction between firms and consumers in markets that fall outside the benchmark competitive model. How firms acquire and exploit market power. Game theory and information economics to analyze how firms interact strategically. Topics include monopoly, price discrimination, oligopoly, collusion and cartel behavior, anti-competitive practices, the role of information in markets, anti-trust policy, and e-commerce. Sources include theoretical models, real-world examples, and empirical papers. Prerequisite: ECON 51.

ECON 158. Regulatory Economics. 5 Units.

Economics 158 examines public policies for dealing with problems arising in markets in which competitive forces are weak. The focus is on monopolies, oligopolies, cartels, and other environments where market mechanisms are unlikely to produce outcomes that benefit consumers more than the alternatives involving costly government intervention. The two main areas examined are competition policy and economic regulation. Competition policy refers to laws that define certain market behavior as illegal because it is harmful to competition or fails to provide consumer benefits that justify its costs to consumers. Economic regulation refers to policies in which government controls prices and/or decides the terms and conditions under which firms can participate in a market. A growing area of study and policy design is the introduction of market mechanisms into formerly regulated industries such as: telecommunications, electricity, airlines, railroads, postal delivery services and environmental regulation. Cross-listed with Law 220. Prerequisites: Econ 51 or equivalent.

ECON 159. Economic, Legal, and Political Analysis of Climate-Change Policy. 5 Units.

This course will advance students understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Theoretical contributions as well as empirical analyses will be considered. In addition to examining economic issues and legal constraints, it will address the political economy of various emissions-reduction strategies. The course will consider policy efforts at the local, national, and international levels. Specific topics include: interactions among overlapping climate policies and between new policies and pre-existing legal or regulatory frameworks; the role that jurisdictional or geographic scale can play in influencing the performance of climate-policy approaches; and numerical modeling and statistical analyses of climate-change policies. Cross-listed with Law 746. Prerequisites: Econ 50 & 51.

ECON 160. Game Theory and Economic Applications. 5 Units.

Introduction to game theory and its applications to economics. Topics: strategic and extensive form games, dominant strategies, Nash equilibrium, subgame-perfect equilibrium, and Bayesian equilibrium. The theory is applied to repeated games, voting, auctions, and bargaining with examples from economics and political science. Prerequisites: Working knowledge of calculus and basic probability theory.

ECON 165. International Finance. 5 Units.

Introduction to international macroeconomics. Topics: intertemporal approach to the current account, real and nominal exchange rate determination, fiscal and monetary policy in open economies, sovereign debt, crises in international financial markets. Prerequisite: ECON 52.

ECON 166. International Trade. 5 Units.

Different sources of comparative advantage in production and trade among nations. Aggregate gains from trade, winners and losers from globalization. International migration, outsourcing and multinational companies. Trade policy and international trade agreements. Theory, empirical evidence, and real-life anecdotes. Lectures supplemented by in-class debates on current topics from the popular press. Prerequisite: ECON 51.

ECON 180. Honors Game Theory. 5 Units.

Rigorous introduction to game theory and applications. Topics include solution concepts for static and dynamic games of complete and incomplete information, signaling games, repeated games, bargaining, and elements of cooperative game theory. Applications mainly from economics, but also political science, biology, and computer science. Prerequisites: Experience with abstract mathematics and willingness to work hard. No background in economics required.

ECON 182. Honors Market Design. 5 Units.

Rigorous introduction to the theory of matching and resource allocation, and its application to practical market design. Theory covers two-sided matching, "house allocation" problems, random assignment, and their variants. Applied topics include school choice, labor market, house allocation, and organ allocation for transplantation. Final paper required. Forms a sequence with ECON 180 and ECON 181, but can be taken independently. Prerequisites: Experience with abstract mathematics and willingness to work hard. No prior knowledge of economics is required, although basic knowledge in game theory is useful.

ECON 183. The Cardinal Fund. 1-3 Unit.

This is an experiential course that will cover the important concepts that underlying investment theory in Financial Economics. Students will manage an investment portfolio of at least \$1 million dollars. In doing so they will learn how risk and return are related in public capital markets. Students are expected to spend a substantial amount of time outside the classroom applying the knowledge they learn in the class. Prerequisites: Econ 51 (or IPS 204A, PubIPol 301A), Econ 102B (or Stats 141, Stats 110, CEE 203, Earthsys 160, Educ 200C, Linguist 277, Psych 252), Econ 140 (or Econ 135), Econ 190 (or MS&E 140).

ECON 190. Introduction to Financial Accounting. 5 Units.

How to read, understand, and use corporate financial statements. Oriented towards the use of financial accounting information (rather than the preparer), and emphasizes the reconstruction of economic events from published accounting reports.

ECON 191. Introduction to Cost Accounting. 5 Units.

Focuses on how managers use accounting information for decision making. Students will study product and service costing, activity based costing, performance management and evaluation, CVP analysis, forecasting, factors to be considered in pricing decision, capital investment analysis, and quality management and measurement.

ECON 198. Junior Honors Seminar. 5 Units.

Primarily for students who expect to write an honors thesis. Weekly sessions discuss writing an honors thesis proposal (prospectus), submitting grant applications, and completing the honors thesis. Readings focus on writing skills and research design. Students select an adviser, outline a program of study for their senior year, and complete a prospectus by the end of the quarter. Enrollment limited to 12. Same as: PUBLPOL 197

ECON 199D. Honors Thesis Research. 1-10 Unit.

In-depth study of an appropriate question and completion of a thesis of very high quality. Normally written under the direction of a member of the Department of Economics (or some closely related department). See description of honors program. Register for at least 1 unit for at least one quarter after your honors application is approved.

ECON 202. Microeconomics I. 2-5 Units.

(Non-Economics graduate students register for 202N.) Open to advanced undergraduates with consent of instructors. Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimization; behavior under uncertainty; partial equilibrium analysis and introduction to models of general equilibrium. Limited enrollment. Prerequisite: thorough understanding of the elements of multivariate calculus and linear algebra.

ECON 202N. Microeconomics I For Non-Economics Ph.Ds. 2-5 Units.

Core Economics modules 1 and 2 for non-Economics PhD students. Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimization; behavior under uncertainty; partial equilibrium analysis and introduction to models of general equilibrium. Limited enrollment. Prerequisite: thorough understanding of the elements of multivariate calculus and linear algebra.

ECON 203. Core Economics: Modules 5 and 6. 2-5 Units.

(Non-Economics graduate students register for 203N.) Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities and public goods. The theory of imperfect competition: static Bertrand and Cournot competition, dynamic oligopoly, entry decisions, entry deterrence, strategic behavior to alter market conditions. Limited enrollment. Prerequisite: ECON 202.

ECON 203N. 203 For Non-Economics Ph.D. Students. 2-5 Units.

Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities, public goods, and asymmetric information. The theory of imperfect competition and other applications. Limited enrollment. Prerequisite: ECON 202N or consent of instructor.

ECON 204. Microeconomics III. 2-5 Units.

Social Choice, including Arrow's theorem, the Gibbard-Satterthwaite theorem, and the Vickrey-Clarke-Groves mechanism. The theory of contracts, emphasizing contractual incompleteness and the problem of moral hazard. Incentive regulation. Competition with imperfect information, including signaling and adverse selection. Competitive equilibrium and the core. Limited enrollment. Non-Econ students need permission of instructor to enroll. Prerequisite: ECON 203.

ECON 210. Macroeconomics I. 2-5 Units.

Dynamic economics applied to aggregate economic fluctuations and economic growth. Solving dynamic, stochastic rational expectation models using discrete time dynamic programming. Growth theory (neoclassical models, growth accounting, technical change, endogenous growth) using optimal control theory. Limited enrollment.

ECON 211. Core Economics: Modules 11 and 12. 2-5 Units.

Growth theory (neoclassical models, growth accounting, technical change, endogenous growth) using optimal control theory. Introduction to financial markets and uncertainty. Limited enrollment. Prerequisite: ECON 210.

ECON 212. Macroeconomics III. 2-5 Units.

General equilibrium with incomplete markets: precautionary savings; income, wealth, and consumption distribution; constrained efficiency. Endogenous market incompleteness: limited commitment, moral hazard, hidden income and hidden savings; recursive contracts. Optimal income taxation: the primal approach; taxation of capital income; optional taxation with heterogeneity; commitment and time inconsistency. Monetary theory and policy: time series techniques to characterize and evaluate policy; models with rational expectations and rigidities; the Lucas critique; time inconsistency; staggered price and wage setting; optimal policy rules; the term structure of interest rates. Limited enrollment. Prerequisites: ECON 203, ECON 211.

ECON 214. Development Economics I. 2-5 Units.

This is a two-part course bridging macro and micro development research. The first part covers the roles of institutions, ethnic conflict, and governance in economic development; and barriers to agricultural productivity in less developed countries. The second part focuses on dynamic models of growth and development, with a focus on migration; technological change; and the functioning of financial markets. Prerequisites: 202 or 202N, 270.

ECON 215. Economic Development II. 2-5 Units.

Microeconomic issues in less developed countries. Topics: health; education; gender; intra-household models; entrepreneurship; market institutions; non-market institutions; political economy. Prerequisites: 202 or 202N, 270.

ECON 216. Development Economics III. 2-5 Units.

Use of quantitative theory to understand various aspects of the growth and development process. Emphasis on family and demographic issues and their importance for development. Theoretical models of fertility and marriage decisions, and their empirical relevance. Unified growth theories: demographic transition and industrial revolution. Family institutions such as marriage payments and polygamy. The political economy of family-related institutions, e.g. the evolution of women's and children's rights. Female labor supply and development. Theories of disease and development. Prerequisite: 202, 203, 204, 210, 211, 212, 270, 271, 272.

ECON 217. Topics in International Macroeconomics: Theory and Evidence for Latin America. 2-5 Units.

Banking systems, interest rates, regulatory policies, and the productivity of capital in developing countries. Controlling inflation: fiscal and monetary policies for macroeconomic stability. Currency crises, exchange rates, and the liberalization of foreign trade. Further applications to transitional socialist economies in Asia and E. Europe.

ECON 220. Political Economy I. 2-5 Units.

Theoretical models of political economy. Potential topics include: basic social choice theory, direct democracy, electoral competition, political accountability, legislative bargaining, lobbying, corruption, nondemocratic succession, conflict and arms races, and institutional change. Attention to economics implications, including taxation, redistribution, and public goods. Prerequisite: 203 recommended.

ECON 225. Economics of Technology and Innovation. 2-5 Units.

Graduate seminar on current research on the economics of innovation. Topics include the design of optimal patent policies, copyright policies, and the role of human capital (science, immigration, skill-biased technical change). Emphasis on empirical analyses of historical and contemporary data.

ECON 226. U.S. Economic History. 2-5 Units.

The role of economic history as a distinctive approach to the study of economics, using illustrations from U.S. history. Topics: historical and institutional foundations of the U.S. rise to world economic preeminence; economic causes and consequences of slavery; the American national system of technology; the Great Depression of the 30s; national economic performance in a globalizing world. Prerequisite: ECON 51 and ECON 52. Intended for graduate students.

ECON 227. European Economic History. 2-5 Units.

European economic history from middle ages to the twentieth century. Topics: competing hypotheses in explaining long term trends in economic growth and cross-country differences in long-term economic growth; formation, function, and persistence of institutions and organizations; the role of institutions and organizations (e.g. apprenticeship, servitude, partnerships, cooperatives, social networks, share cropping, and communes) as solutions to contractual problems; the economics of migration; the changing economic role of the family. Use of economic theory in guiding hypothesis testing, as well as construction of new datasets and the execution of empirical analysis.

ECON 228. Institutions and Organizations in Historical Perspective. 2-5 Units.

The course integrates historical analysis and economic theory in evaluating the nature and role of institutions in economic and political outcomes. The motivating question is the factors determining economic and political developments in the long run and the historical focus is on the Middle East, Europe, and China over the last millennium. The course first examines various approaches for the study of institutions, their nature and dynamics and then focuses on detailed discussions of frontier research papers.

ECON 233. Advanced Macroeconomics I. 2-5 Units.

Topics in the theory and empirics of economic growth. For PhD-level students.

ECON 234. Advanced Macroeconomics II. 2-5 Units.

Modern macroeconomics of aggregate fluctuations in advanced economies, concentrating mainly on the U.S. Current research on sovereign debt, fiscal policy and financial flows, with emphasis on current events. Current research on persistent substandard performance, financial crises, excess unemployment, and other timely topics. The course will be organized around the detailed study of recent research papers. Half of the lectures will be given by guests specializing in macro fluctuations research.

ECON 235. Advanced Macroeconomics III. 2-5 Units.

Current topics to prepare student for research in the field. Recent research in labor-market friction, reallocation, fluctuations, wage and price determination, innovation, and productivity growth. Research methods, presentations skills, and writing in advanced economics.

ECON 236. Financial Economics I. 2-5 Units.

Tools: solving choice problems and equilibrium models with multiple risky assets, many agents, and frictions. Applications: household finance (including housing and mortgage choice); risk sharing and financial innovation; economies; trading volume; international capital flows and financial market integration. Prerequisites: 210, 211, 212.

ECON 237. Financial Economics II. 2-5 Units.

Topics in financial Economics. Discussion of recent academic papers on asset pricing. Student presentations and course paper requirement. Designed for second year PhD students in economics or finance.

ECON 239D. Directed Reading. 1-10 Unit.

May be repeated for credit.

ECON 241. Public Finance and Taxation I. 2-5 Units.

Design of tax systems, transfers intended to alleviate poverty, the effect of taxes on earnings, fees intended to internalize externalities like pollution, school finance and other forms of fiscal federalism, local public goods such as schools. Students will learn to apply sophisticated applications of frontier applied econometric techniques including synthetic controls, regression discontinuity, advanced instrumental variables methods. Prerequisites: ECON 202-204, ECON 210, ECON 270, ECON 271, or equivalent with consent of instructor.

ECON 242. Public Finance and Taxation II. 2-5 Units.

Topics concerning public goods provision, government interventions into private insurance markets, adverse selection, and social insurance design. We also explore questions in the intersection of public and family economics such as the unit of taxation, and the interaction between social insurance and intra-family insurance. Prerequisites: 202, 203, 204, 210, 270, 271, or equivalent with consent of instructor. Recommended: 241.

ECON 246. Labor Economics I. 2-5 Units.

Topics in current applied microeconomic research including intertemporal labor supply models, public policy, program evaluation, job search, migration, consumption behavior. Student and faculty presentations.

ECON 247. Labor Economics II. 2-5 Units.

Recent topics in applied micro, focusing on papers from top journals (QJE, AER, JPE, Econometrica and REStud) over the last ten years. Broad overview of current topic and techniques in applied-micro research. Topics include inequality, polarization and skill-biased technical change, discrimination, technology adoption and the spread of information, management practices, field experiments, peer effects and academic spillovers. Combination of student and faculty presentations. Additional sessions on general presentations, paper writing and research skills to prepare for job market. Class trip to the NBER West-Coast labor meetings at the San Francisco Fed.

ECON 248. Labor Economics III. 2-5 Units.

Topics in current applied microeconomic research including skill-biased technical change, income distribution, program evaluation, job search, migration, consumption behavior. Student and faculty presentations.

ECON 249. Topics in Health Economics. 2-5 Units.

Course will cover various topics in health economics, from theoretical and empirical perspectives. Topics will include demand and supply in health insurance, healthcare provision, physicians' incentives, competition policy in healthcare markets, intellectual property in the context of pharmaceutical drugs, and the interaction between public and private sectors in healthcare markets. Key emphasis on recent work and empirical modelling. Prerequisites: Micro and Econometrics first year sequences (or equivalent).

ECON 250. Environmental Economics. 2-5 Units.

Theoretical and empirical analysis of sources of and solutions to environmental problems, with application to local pollution challenges and global environmental issues such as climate change. Topics include: analysis of market failure, choice of environmental policy instruments, integrating environmental and distortionary taxes, environmental policy making under uncertainty, valuing environmental amenities, and measuring /promoting sustainable development.

ECON 251. Natural Resource and Energy Economics. 2-5 Units.

Management and provision non-renewable and renewable natural resources, with considerable attention to energy provision and use. Topics include: fisheries problems and policy; energy industry market structure, pricing, and performance; and policies to facilitate transitions from non-renewable to renewable energy. Prerequisites: 202, 203, 204, 271, and 272, or equivalents with consent of instructor.

ECON 252. The Future of Finance. 2 Units.

If you are interested in a career in finance or that touches finance (legal, regulatory, corporate, public policy), this course will give you a useful perspective. We will survey the players and current landscape of the global markets as the world continues to evolve from the financial crisis. We will discuss the sweeping change underway at the policy level by regulators and legislators around the world and this will include guest-lecturer perspectives on where the greatest opportunities exist for students entering or touching the world of finance today. The course will also review, in a non-technical way, the basics of the financial derivatives and other quantitative techniques that are a core part of the global capital markets. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application found on the Public Policy website to the instructor at tbeder@stanford.edu. Please visit <https://publicpolicy.stanford.edu/academics/undergraduate/> forms to locate the Consent Application Form for this class. The form is located on the Public Policy website under "Academics" and "Forms." See Consent Application Form for submission deadline. Same as: ECON 152, PUBLPOL 364, STATS 238

ECON 253. Energy Markets: Theory and Evidence from Latin America. 2-5 Units.

What theory and practice around the world and in Latin America tell us about the design of energy markets; how distributional impacts and enforcement capabilities affect their implementation. Topics include: pricing in wholesale electricity markets, role of long-term contracting, auction design, evidence from spot and contract markets ; design of markets for pollution permits, alternative environmental policy instruments, evidence from existing and proposed carbon markets and others, imperfect information, adverse selection in opt-in provisions, effect on innovation, interaction between markets, market power. Advanced undergraduates and masters students are welcome to enroll.

ECON 257. Industrial Organization I. 2-5 Units.

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; price discrimination; price dispersion and consumer search; differentiated products; the role of information in markets, including insurance and adverse selection; auctions; collusion and cartel behavior; advertising; entry and market structure; market dynamics; strategic behavior.

ECON 258. Industrial Organization IIA. 2-5 Units.

Topics include theoretical and empirical analyses of adverse selection and insurance markets; empirical models of learning; vertical restraints and bundling; auctions.

ECON 259. Industrial Organization II B. 2-5 Units.

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; economics of antitrust and regulation, with focus on energy and environmental economics; the role of information asymmetries in markets: adverse selection and moral hazard, with focus on insurance and credit markets.

ECON 260. Industrial Organization III. 2-5 Units.

Current research and policy questions in industrial organization. Course combines lectures by the instructors with student presentations, with an emphasis on initiating dissertation research in industrial organization. Prerequisites: ECON 257, ECON 258.

ECON 265. International Economics I. 2-5 Units.

International macroeconomics and finance, emphasizing current research. The course is organized around the role of different types of frictions (in asset and goods markets) in explaining features of the international macroeconomy. Prerequisites: 202, 203, 204, 210, 211, 212.

ECON 266. International Economics II. 2-5 Units.

This course covers an introduction to models of international trade and economic geography from both a theoretical and an empirical perspective.

ECON 267. Topics in International Trade. 2-5 Units.

Topics from the frontier of current international trade research, presented through recent theoretical and empirical papers. Firm heterogeneity in trade and firms' export decisions. Different types of foreign direct investment. Multinational firms and the interaction between international trade and the theory of the firm. Institutional frictions and their effects on trade and FDI activity. Course goal is to prepare students for doing research in international trade and related fields.

ECON 270. Intermediate Econometrics I. 2-5 Units.

Probability, random variables, and distributions; large sample theory; theory of estimation and hypothesis testing. Limited enrollment. Prerequisites: math and probability at the level of Chapter 2, Paul G. Hoel, Introduction to Mathematical Statistics, 5th ed.

ECON 271. Intermediate Econometrics II. 2-5 Units.

Linear regression model, relaxation of classical-regression assumptions, simultaneous equation models, linear time series analysis. Limited enrollment. Prerequisite: 270.

ECON 272. Intermediate Econometrics III. 2-5 Units.

Continuation of 271. Nonlinear estimation, qualitative response models, limited dependent variable (Tobit) models. Limited enrollment. Prerequisite: 271.

ECON 273. Advanced Econometrics I. 2-5 Units.

Possible topics: parametric asymptotic theory. M and Z estimators. General large sample results for maximum likelihood; nonlinear least squares; and nonlinear instrumental variables estimators including the generalized method of moments estimator under general conditions. Model selection test. Consistent model selection criteria. Nonnested hypothesis testing. Markov chain Monte Carlo methods. Nonparametric and semiparametric methods. Quantile Regression methods.

ECON 274. Advanced Econometrics II. 2-5 Units.

(Formerly 273B); Possible topics: nonparametric density estimation and regression analysis; sieve approximation; contiguity; convergence of experiments; cross validation; indirect inference; resampling methods: bootstrap and subsampling; quantile regression; nonstandard asymptotic distribution theory; empirical processes; set identification and inference, large sample efficiency and optimality; multiple hypothesis testing.

ECON 275. Time Series Econometrics. 2-5 Units.

Stochastic processes and concepts such as stationarity, ergodicity, and mixing. Inference with heteroskedastic and autocorrelated time series; autoregressive and moving average models; unit root processes and asymptotic analysis of such; tests for structural change; vector autoregressive models; cointegration; impulse response analysis; forecasting; ARCH and GARCH volatility models. Prerequisites: 270, 271.

ECON 276. Limited Dependent Variables. 2-5 Units.

(Formerly 274) Parametric and semi-parametric approaches to the estimation of econometric models with discrete or limited dependent variables. Maximum likelihood, linear and nonlinear panel data, duration models, rank estimation and index models, Bayesian approaches and MCMC, measurement error models, dynamic programming discrete choice analysis and dynamic discrete games. models. Prerequisite: ECON 273 or consent of instructor.

ECON 277. Behavioral and Experimental Economics III. 2-5 Units.

Economics 277 is a course for graduate students in the Economics department writing dissertations with behavioral or experimental components. Economics 277 is part of a three course sequence (along with Econ 278 & 279), which has two main objectives: 1) examining theories and evidence related to the psychology of economic decision making; 2) introducing methods of experimental economics, and exploring major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objectives of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

ECON 278. Behavioral and Experimental Economics I. 2-5 Units.

This is the first half of a three course sequence (along with Econ 277 & 279) on behavioral and experimental economics. The sequence has two main objectives: 1) examines theories and evidence related to the psychology of economic decision making, 2) Introduces methods of experimental economics, and explores major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objects of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

ECON 279. Behavioral and Experimental Economics II. 2-5 Units.

This is part of a three course sequence (along with Econ 277 & 278) on behavioral and experimental economics. The sequence has two main objectives: 1) examines theories and evidence related to the psychology of economic decision making, 2) Introduces methods of experimental economics, and explores major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objects of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

ECON 282. Contracts, Information, and Incentives. 2-5 Units.

Basic theories and recent developments in mechanism design and the theory of contracts. Topics include: hidden characteristics and hidden action models with one and many agents, design of mechanisms and markets with limited communication, long-term relationships under commitment and under renegotiation, property rights and theories of the firm.

ECON 283. Theory and Practice of Auction Market Design. 2-5 Units.

Basics of auction theory and recent contributions. Multi-item and combinatorial auctions. Robust auction design. Applied auction design with practical applications. Applied topics may include auctions for Internet advertising, radio spectrum auctions, securities markets, commodities, and complex procurements.

ECON 285. Matching and Market Design. 2-5 Units.

This is an introduction to market design, intended mainly for second year PhD students in economics (but also open to other graduates students from around the university and to undergrads who have taken undergrad market design). It will emphasize the combined use of economic theory, experiments and empirical analysis to analyze and engineer market rules and institutions. In this first quarter we will pay particular attention to matching markets, which are those in which price doesn't matter; do all of the work, and which include some kind of application or selection process. In recent years market designers have participated in the design and implementation of a number of marketplaces, and the course will emphasize the relation between theory and practice, for example in the design of labor market clearinghouses for American doctors, and school choice programs in a growing number of American cities (including New York and Boston), and the allocation of organs for transplantation. Various forms of market failure will also be discussed. Assignment: One final paper. The objective of the final paper is to study an existing market or an environment with a potential role for a market, describe the relevant market design questions, and evaluate how the current market design works and/or propose improvements on the current design.

ECON 286. Game Theory and Economic Applications. 2-5 Units.

Aims to provide a solid basis in game-theoretic tools and concepts, both for theorists and for students focusing in other fields. Technical material will include solution concepts and refinements, potential games, supermodular games, repeated games, reputation, and bargaining models. The class will also address some foundational issues, such as epistemic and evolutionary modeling. Prerequisite: 203 or consent of instructor.

ECON 288. Computational Economics. 2-5 Units.

Overview of numerical analysis. Computational approaches to solving economic problems, including dynamic programming, projection and perturbation. General equilibrium models, new Keynesian models, Krusell-Smith model, international trade models, and dynamic games. Numerical methods for large-scale applications (Smolyak, GSSA, EDS). Parallel computation, GPUs and supercomputers. Prerequisite: equivalent of first-year graduate core economics sequence.

ECON 289. Advanced Topics in Game Theory and Information Economics. 2-5 Units.

Topics course covering a variety of game theory topics with emphasis on market design, such as matching theory and auction theory. Final paper required. Prerequisites: ECON 285 or equivalent. ECON 283 recommended.

ECON 290. Multiperson Decision Theory. 4 Units.

Students and faculty review and present recent research papers on basic theories and economic applications of decision theory, game theory and mechanism design. Applications include market design and analyses of incentives and strategic behavior in markets, and selected topics such as auctions, bargaining, contracting, and computation.

ECON 291. Social and Economic Networks. 2-5 Units.

Synthesis of research on social and economic networks by sociologists, economists, computer scientists, physicists, and mathematicians, with an emphasis on modeling. Includes methods for describing and measuring networks, empirical observations about network structure, models of random and strategic network formation, as well as analyses of contagion, diffusion, learning, peer influence, games played on networks, and networked markets.

ECON 299. Practical Training. 1-10 Unit.

Students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. May be repeated for credit.

ECON 300. Third-Year Seminar. 1-10 Unit.

Restricted to Economics Ph.D. students. Students present current research. May be repeated for credit.

ECON 310. Macroeconomic Workshop. 1-10 Unit.

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ECON 315. Development Workshop. 1-10 Unit.

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ECON 325. Economic History Workshop. 1-10 Unit.

May be repeated for credit.

ECON 335. Experimental/Behavioral Seminar. 1-10 Unit.

Field seminar in experimental and behavioral economics.

ECON 341. Public Economics and Environmental Economics Seminar. 1-10 Unit.

Issues in measuring and evaluating the economic performance of government tax, expenditure, debt, and regulatory policies; their effects on levels and distribution of income, wealth, and environmental quality; alternative policies and methods of evaluation. Workshop format combines student research, faculty presentations, and guest speakers. Prerequisite: ECON 241 or consent of instructor.

ECON 345. Applications Workshop. 1-10 Unit.

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ECON 354. Workshop in Law and Economics. 2-6 Units.

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ECON 355. Industrial Organization Workshop. 1-10 Unit.

Current research in the field by visitors, presentations by students, and discussion of recent papers. Students write an original research paper, make a formal presentation, and lead a structured discussion.

ECON 365. International Trade Workshop. 1-10 Unit.

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ECON 370. Econometrics Workshop. 1-10 Unit.

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ECON 391. Microeconomic Theory Seminar. 1-10 Unit.

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ECON 400. Ph.D. Dissertation. 1-15 Unit.

Pre-TGR dissertation research.(Staff).

ECON 801. TGR Project. 0 Units.

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ECON 802. TGR Dissertation. 0 Units.

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Education Courses

EDUC 11SC. Work and Family. 2 Units.

Examination into the forces behind the rise in women's paid work and subsequent changes in the workplace and in families. Topics include gendered division of labor, decisions about marriage and childrearing, economic issues, employers' role in structuring work and family, and public policy issues such as anti-discrimination laws, divorce laws, and subsidized child care.

EDUC 12SC. Hip Hop as a Universal Language. 2 Units.

This seminar-cipher considers the prospect of Hip Hop as a Universal Language. Hip Hop Culture has captured the minds of youth "all around the world, from Japan to Amsterdam" (like the homie Kurupt says), shaping youth identities, styles, attitudes, languages, fashions, and both physical and political stances. The field of global Hip Hop studies has emerged as scholars around the world grapple with what is arguably the most profound cultural, musical, and linguistic youth movement of the early 21st century. Participants in this seminar-cipher will be engaged in critical discussions around a particular constellation of concerns: Hip Hop Cultures, youth identities, the politics of language, race, and ethnicity, and the simultaneous processes of globalization and localization. Through the examination of various texts (scholarly readings, documentary films, guest speakers and artists), we span the Global Hip Hop Nation through scenes as diverse as Hong Kong's urban center, Germany's Mannheim inner-city district of Weststadt, the Brazilian favelas, the streets of Lagos and Dar es Salaam, and the hoods of the San Francisco Bay Area to explore Hip Hop's global linguistic flows.

EDUC 13SC. Language, Identity, and the Power of Public Discourse. 2 Units.

Have you ever engaged in a conversation with someone who sounds different than you expect? This course explores instances like those that highlight the interaction between language and identity and its implications for learning. The theme of language and identity emerges as significant because of the subtle yet powerful impact it has on our cultural interactions. We have an inherent expectation of how we expect people to communicate. Yet, do these expectations interfere with teaching and learning practices? Many individuals take seminars and classes that focus on teaching professional modes of communication and discourse. This course will offer a detailed examination of scholarship that investigates the power of the subtle messages embedded in language. In addition, to gain a sense of the power of these interactions in practice, we will engage in the following research activities: (a) Participants will engage in school site visits to examine these interactions in practice; (b) Participants will engage in critical interviews of broadcasters at a local television station to discuss the role of language and identity in their presentation; and (c) We will visit a recording studio to discuss the role of language and identity with local hip-hop producers and artists.

EDUC 14SC. Public Education and Schooling: The Great Equalizer or the Fiercely Competitive Field?. 2 Units.

Everyone seems to have an opinion about the American educational landscape. After all, we all have attended schools of various sorts, which help to shape our understandings about education. Yet, the political, social, and cultural terrains are ever-changing, especially within public education. This seminar will focus on some of the main current issues in U.S. urban schools. This course will take an interdisciplinary approach to examining major issues facing public schools today and to discussing effective policies and practices. There are two main components to the seminar: first, students will engage in a review of current educational research and policy; and second, they will conduct some service learning activity in a local, low-income public high school. In small groups, students will co-design projects that both draw on ideas generated from their readings and discussions and involve local high school students and educators. Through various lenses, we will survey the landscape of urban education in the United States and explore myriad theories or explanations for existing conditions, crises, and policies. Students will read a number of works that focus on the multiple environs of the educational system; the economy, the political context, the demands of accountability and standardization, residential patterns, and social and cultural relationships. Such explanations and issues may transcend U.S. boundaries and could be applicable in multiple contemporary urban education settings.

EDUC 32X. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations. Same as: AFRICAAM 32, AMSTUD 32, CSRE 32A, EDUC 432X, TAPS 32

EDUC 98X. Service Learning Practicum. 1 Unit.

For Alternative Spring Break program leaders. The skills and philosophical framework to develop and lead an ASB experience.

EDUC 100A. EAST House Seminar: Current Issues and Debates in Education. 1 Unit.

Education and Society Theme (EAST) House seminar. In autumn quarter, faculty and other scholars from around the University discuss the latest issues, debates, and research in the field of Education. In winter quarter, research and practice pertaining to sex, gender, and education are presented by professionals and scholars. In the spring, the seminar revolves around race, ethnicity, and higher education with a particular emphasis on Asian American issues. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice. Notes: Attendance at first class required. Seminar meets in the EAST House Dining Hall located at 554 Governor's Ave. The seminar is open to all students at Stanford with first-priority given to pre-assign residents of EAST House followed by other residents of EAST and all other undergraduates. Graduate students are allowed to enroll on a space-available basis. Visitors/auditors are not allowed. The seminar is required for all pre-assigned residents of EAST House and is repeatable for credit.

EDUC 100B. EAST House Seminar: Current Issues and Debates in Education. 1 Unit.

Education and Society Theme (EAST) House seminar. In autumn quarter, faculty and other scholars from around the University discuss the latest issues, debates, and research in the field of Education. In winter quarter, research and practice pertaining to sex, gender, and education are presented by professionals and scholars. In the spring, the seminar revolves around race, ethnicity, and higher education with a particular emphasis on Asian American issues. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice. Notes: Attendance at first class required. Seminar meets in the EAST House Dining Hall located at 554 Governor's Ave. The seminar is open to all students at Stanford with first-priority given to pre-assign residents of EAST House followed by other residents of EAST and all other undergraduates. Graduate students are allowed to enroll on a space-available basis. Visitors/auditors are not allowed. The seminar is required for all pre-assigned residents of EAST House and is repeatable for credit. Same as: FEMGEN 107B

EDUC 100C. EAST House Seminar: Current Issues and Debates in Education. 1-2 Unit.

"This is Water:" An Inquiry into the Culture at Stanford and Your Personal Values. In a commencement address at Kenyon College, David Foster Wallace shares the following story: "There are these two young fish swimming along, and they happen to meet an older fish swimming the other way, who nods at them and says, 'Morning, boys. How's the water?' And the two young fish swim on for a bit, and then eventually one of them looks over at the other and goes, 'What the hell is water?'" Wallace goes on to say that "the most obvious, important realities are often the ones that are hardest to see and talk about." In this class, we will explore the water that we are swimming in everyday: the culture at Stanford and our personal values. The two may be in resonance or in tension. Through a variety of readings and ethnographic activities, such as making observations and collecting cultural artifacts, we will become ethnographers of our own institution. We will supplement this inquiry with a personal archeology: digging out our own personal set of values and examining how they connect or conflict with "mainstream" culture at Stanford. This will involve a suite of practices that may prove useful in your everyday life: mindfulness practices, self-reflection prompts, and partner exercises all designed to help you access and articulate your personal values. Notes: Attendance at first class required. Seminar meets in the EAST House Dining Hall located at 554 Governor's Ave. The seminar is open to all students at Stanford with first-priority given to pre-assign residents of EAST House followed by other residents of EAST and all other undergraduates. Graduate students are allowed to enroll on a space-available basis. Visitors/auditors are not allowed. The seminar is required for all pre-assigned residents of EAST House and is repeatable for credit.

EDUC 101. Introduction to Teaching and Learning. 4 Units.

This course is designed to help undergraduates explore career interests in education; it is the core course for the Undergraduate Minor in Education, and fulfills requirements for Honors in Education. The course considers the philosophy, history, politics, professional practice and social structures of teaching in the United States. Students will read and discuss teaching theory and research, participate in learning activities and visit school teaching sites, as well as examine and analyze artifacts and models of teaching.

EDUC 102. Examining Social Structures, Power, and Educational Access. 2-3 Units.

Goal is to prepare Education and Youth Development fellows for their work with adolescents in the Haas Center's pre-college summer programs and to define their role in addressing educational inequities in the summer programs and beyond.

EDUC 103A. Tutoring: Seeing a Child through Literacy. 3-4 Units.

Experience tutoring grade school readers in a low income community near Stanford under supervision. Training in tutoring; the role of instruction in developing literacy; challenges facing low income students and those whose first language is not English. How to see school and print through the eyes of a child. Ravenswood Reads tutors encouraged to enroll. Service Learning Course (certified by Haas Center). May be repeated for credit. Same as: EDUC 203A

EDUC 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.

Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students. Same as: AFRICAAM 106, CSRE 103B, EDUC 337

EDUC 105X. Introduction to Education Research for Undergraduates. 3 Units.

EDUC 105X explores types and purposes and products of education research. Broadly, this seminar course is designed to support Stanford undergraduates in exploring academic and career interests in education; specifically, this course satisfies requirements for the Education Minor, and supports students considering application to the Education Honors Program. In this course we consider what defines education research, and what factors make for quality research. Each week we will read current research by School of Education scholars and welcome the researcher-authors as guest speakers to the class. Students will identify an education topic of interest and write an educational literature review to that topic.

EDUC 106. Interactive Media in Education. 3-5 Units.
Workshop.**EDUC 109X. Educational Issues in Contemporary China. 3-4 Units.**

Reforms such as the decentralization of school finance, emergence of private schools, expansion of higher education, and reframing of educational policy to focus on issues of quality. Have these reforms exacerbated educational inequality.

Same as: EDUC 309X

EDUC 110. Sociology of Education: The Social Organization of Schools. 4 Units.

Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

Same as: EDUC 310, SOC 132, SOC 332

EDUC 111. The Young Adult Novel: A Literature For and About Adolescents. 4 Units.

For undergraduates considering teaching or working with adolescents, and for those planning to apply to the coterminal program in the Stanford Teacher Education program (STEP). Students work together to define the genre of young adult novels. What they reveal about adolescence in America. How to read and teach young adult literature.

EDUC 112X. Urban Education. 3-4 Units.

(Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, CSRE 112X, EDUC 212X, SOC 129X, SOC 229X

EDUC 113X. Gender and Sexuality in Schools. 1-3 Unit.

Issues at the intersection of queer theory and educational practice.

Experiences, rights, and responsibilities of lesbian, gay, bisexual, transgender, intersex, queer, and questioning students and teachers as members of marginalized or majority cultures.

EDUC 114N. Growing Up Bilingual. 3 Units.

This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

Same as: CHILATST 14N, CSRE 14N

EDUC 115N. How to Learn Mathematics. 3 Units.

What is going on in mathematics education in the United States? Why do so many people hate and fear math? What contributes to the high levels of innumeracy in the general population? Why do girls and women opt out of math when they get a chance? In this seminar we will consider seminal research on math learning in K-12 classrooms, including a focus on equity. We will spend time investigating cases of teaching and learning, through watching videos and visiting schools. This seminar is for those who are interested in education, and who would like to learn about ways to help students (and maybe yourselves?) learn and enjoy mathematics. If you have had bad math experiences and would like to understand them better; and put them behind you; this seminar will be particularly good for you. The final project for this class will involve developing a case of one or more math learners, investigating their journeys in the world of math.

EDUC 116N. Howard Zinn and the Quest for Historical Truth. 3 Units.

With more than two million copies in print, Howard Zinn's *A People's History* is a cultural icon. We will use Zinn's book to probe how we determine what was true in the past. *A People's History* will be our point of departure, but our journey will visit a variety of historical trouble spots: debates about whether the US was founded as a Christian nation, Holocaust denial, and the "Birther" controversy of President Obama.

Same as: HISTORY 116N

EDUC 116X. Service Learning as an Approach to Teaching. 3 Units.

History, theory, and practice. Topics include: responsive community partnerships, cultural awareness, the role of reflection, and best practices in service learning.

EDUC 117. Research and Policy on Postsecondary Access. 3 Units.

The transition from high school to college. K-16 course focusing on high school preparation, college choice, remediation, pathways to college, and first-year adjustment. The role of educational policy in postsecondary access. Service Learning Course (certified by Haas Center).

Same as: EDUC 417

EDUC 118S. Designing Your Stanford. 2 Units.

DYS uses a Design Thinking approach to help Freshmen and Sophomores learn practical tools and ideas to make the most of their Stanford experience. Topics include the purpose of college, major selection, educational wayfinding, and innovating college outcomes - all applied through an introduction to Design Thinking. This seminar class incorporates small group discussion, in-class activities, field exercises, personal reflection, and individual coaching. Admission to be confirmed by email to ACESS registered students prior to first class session. More information at www.designingyourstanford.org.

Same as: ME 104S

EDUC 120C. Education and Society. 4-5 Units.

The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

Same as: EDUC 220C, SOC 130, SOC 230

EDUC 121X. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, CSRE 121X, LINGUIST 155

EDUC 123X. Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms. 3-5 Units.

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Prerequisite: graduate status or consent of instructor. Same as: AFRICAAM 130, CSRE 130, EDUC 322

EDUC 126A. Introduction to Public Service Leadership. 1-2 Unit.

Offered through the Haas Center for Public Service. A foundation and vision for a future of public service leadership. Students identify personal values and assess strengths as leaders. The ethics of public service and leadership theory.

EDUC 126B. Public Service Leadership Program Practicum. 1 Unit.

This course is for students in the Public Service Leadership Program offered through the Haas Center for Public Service. The PSLP Practicum provides an opportunity for PSLP students to reflect on their own leadership experiences and to learn from each other's leadership experiences while continuing to build a community of peer service leaders. The PSLP Practicum will meet every other week throughout the quarter.

EDUC 127X. The Wellbeing of Children in Immigrant Families. 2 Units.

This course will examine the many factors that affect the social, educational, and medical wellbeing of children in immigrant families. It will do so through a case study of the immigrant children who currently live in the Buena Vista Mobile Home Park in Palo Alto. The course will approach this issue from a Service-Learning perspective, and will be a collaboration between faculty and students from Stanford and the leaders of the Buena Vista residents association. The course will meet once a week for 90 minutes during the winter quarter. In addition, each student will spend 3-4 hours per week meeting with residents of the Buena Vista Mobile Home Park. To the extent possible, and with parents' knowledge and permission, students will interact with and get to know the children who live in the park, with a focus on children in school grades 6-12.

EDUC 128X. Professional and Leadership Development for Frosh. 1-2 Unit.

As frosh often have difficulty finding relevant job/internships at this early stage in their education, this course represents a more thorough and direct approach to professional and leadership development. As a small cohort within Stern Hall, we will begin early discussion of career interests and exploration, develop an understanding of individual leadership styles, and garner professional leadership skill sets relevant to myriad sectors and resources to aid in this process. Final projects will work toward off site visits during spring break to explore these sectors hands-on and discuss content learned in class with key industry leaders.

EDUC 130. Introduction to Counseling. 3 Units.

The goal of counseling is to help others to create more satisfying lives for themselves. Clients learn to create and capitalize on unexpected events to open up new opportunities. The success of counseling is judged, not by the words and actions of the counselor, but by the progress that the client makes in the real world after counseling itself is ended. Students are encouraged to exert their full efforts within reasonable time limits to improve their competence.

Same as: PSYCH 148

EDUC 131. Mediation for Dispute Resolution. 3 Units.

Mediation as more effective and less expensive than other forms of settling disputes such as violence, lawsuits, or arbitration. How mediation can be structured to maximize the chances for success. Simulated mediation sessions.

Same as: PSYCH 152

EDUC 132N. Religion, Music and Identity. 3 Units.

Music is one of the most powerful artistic media in American culture. From coffee shops to shopping malls, it plays a crucial role in creating both common experiences and individual conceptions of self. Yet, music also has this powerful ability to seemingly transcend particular people, moments, or places. What is it about music that can so strongly anchor us to our own experiences, and paradoxically shake us loose from our mornings and wake us from our everyday lives? Lots of people have stories about music that evidences both of these tendencies. But nowhere else are these two, seemingly opposing qualities on display than in the music of religious communities. Whether we are talking about Gregorian chant, contemporary Christian worship music, Jewish cantillation of Sufi qawwali, music and musical style play a central role in the experience of ritual and in shaping how people understand themselves in relation to it. But what is it about music that fuels that experience? Does music have to be "religious" to do that kind of cultural work? Can you have a "religious" experience in a "secular" setting? The answer might depend on your relationship to the music you are hearing or playing. In this seminar, we are going to explore these questions by attending first and foremost to the sounds of religious life. We are going to begin by listening, and expand our understandings through readings and ethnographic fieldwork. Each of these modes of exploration will provide us with greater insight into the role that music plays in shaping religious experience and, in turn, how people understand themselves in relationship to both religion and music.

EDUC 133N. The Role of Language in Education and Society. 3 Units.

The goal of this course is to explore the various issues affecting educational policy and classroom practice in multilingual, multicultural settings. In this class we will examine US and international cases to illustrate more general concerns relating to learners' bilingual/multilingual development in formal educational settings. We begin at the macro level, looking at policy contexts and program structures, and move to the micro level to consider teaching and learning in the multilingual classroom. Throughout, we consider how discourses and identities are interwoven in multilingual education policy and practice. We will also consider the role of communities in implementing change in schools.

EDUC 134. Career and Personal Counseling. 3 Units.

Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

Same as: EDUC 234, PSYCH 192

EDUC 135X. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 335X, HUMBIO 26, MED 235

EDUC 136. World, Societal, and Educational Change: Comparative Perspectives. 4-5 Units.

Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

Same as: EDUC 306D, SOC 231

EDUC 136B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: AFRICAAM 126B, CSRE 126B, EDUC 236B, PUBLPOL 126B

EDUC 139X. Educating Young STEM Thinkers. 3-5 Units.

The course will introduce students to the design thinking process, the national conversations about the future of STEM careers, and provide opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course will be both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 239X, ME 139, ME 231

EDUC 140. Honors Research. 1-5 Unit.

Provides opportunity for research in pursuit of senior honors theses.

EDUC 145. Writing Across Languages and Cultures: Research in Writing and Writing Instruction. 3-5 Units.

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area.

Same as: CSRE 243, EDUC 243

EDUC 146X. Perspectives on the Education of Linguistic Minorities. 3-4 Units.

Social, political, linguistic, and pedagogical issues associated with educating students who do not speak the language or language variety of the majority society. Focus is on the U.S.; attention to minorities elsewhere. American attitudes toward linguistic and racial minorities. Educational problems of linguistically different children and non-English- or limited-English-speaking children. Approaches to solving problems.

EDUC 148X. Critical Perspectives on Teaching and Tutoring English Language Learners. 3 Units.

Theoretical foundation for volunteer tutors of English language learners in urban environments working with children in school-based programs or adults in community-based settings.

EDUC 149. Theory and Issues in the Study of Bilingualism. 3-5 Units.

Sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, description and measurement, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings.

Same as: EDUC 249

EDUC 155X. First Year Reflections Seminar. 1 Unit.

Restricted to first-year undergraduates; limited enrollment. There are two options for how to participate. You can either enroll in three class weekday sessions weeks 4, 5 & 6 or one Saturday section. These times provide a structured time for students to explore their identities, values, and the kind of lives they want to lead. Exercises and discussions led by faculty, staff, and upper-class student co-facilitators. Tuesday sessions will occur on 1/27, 2/3 & 2/10, Wednesday sessions will occur on 1/28, 2/4 & 2/11, Thursday sessions will occur on 1/29, 2/5 & 2/12, Saturday section is on 1/31, 2/7 OR 2/14 (Saturday sessions are longer and students only participate in one).

EDUC 157X. Education & Poverty: Research & Solutions. 1 Unit.

This year-long workshop focuses on current research regarding the relationship between poverty, schooling, and educational success. Invited speakers will discuss current research and strategies for improving the educational outcomes of low-income students. Students will read and discuss current research and discuss current strategies for improving education for low-income students. Students may enroll for one quarter at a time or for the entire year.

EDUC 165. History of Higher Education in the U.S.. 3-5 Units.

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities.

Same as: AMSTUD 165, EDUC 265, HISTORY 158C

EDUC 170X. Preparation for Independent Public Service Projects. 2 Units.

Open only to recipients of the Haas Summer Fellowship, which offers students the opportunity to initiate and carry out an innovative service project in collaboration with a community partner. Goal is to expand upon the work fellows did during the application process with respect to the feasibility and sustainability of their field projects.

EDUC 171. Early Childhood Education Practicum. 2-4 Units.

Restricted to students who participate in a service learning program focused on early math learning. Training for activities in preschool classrooms. Focus is on the teaching of math to young children, but also includes background on issues related to young children's cognitive, language, and social development; classroom management; cultural diversity; and early childhood education programs. May be repeated for credit.

EDUC 173. Gender and Higher Education: National and International Perspectives. 4 Units.

This course examines the ways in which higher education structures and policies affect females, males, and students in relation to each other and how changes in those structures and policies improve experiences for females and males similarly or differently. Students are expected to gain an understanding of theories and perspectives from the social sciences relevant to an understanding of the role of higher education in relation to structures of gender differentiation and hierarchy. Topics include undergraduate and graduate education; identity and sexuality; gender and science; gender and faculty; and the development of feminist scholarship and pedagogy. Attention is paid to how these issues are experienced by women and men in the United States, including people of color, and by academics throughout the world, and how these have changed over time.

Same as: EDUC 273, FEMST 173, SOC 173, SOC 273

EDUC 176X. The Design of Technologies for Casual Learning - Lab. 1 Unit.

Lab. Studio-based, participatory, and user-centered development of casual learning technologies is explored, using the Apple iPhone as a prototype platform. The term "casual" is borrowed from casual gaming to denote that the learning technologies are meant for learners to use in "extreme informal" learning circumstances (while "on the go", "any time and any place"). The class builds on learning about and synthesizing knowledge, theory and development activity in four areas including learning theories, mobile technologies, games and participatory design processes.

EDUC 177A. Well-Being in Immigrant Children & Youth: A Service Learning Course. 3 Units.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177A, CSRE 177E, HUMBIO 29A

EDUC 177B. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177B, CSRE 177F

EDUC 177C. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177C, CSRE 177G

EDUC 178X. Latino Families, Languages, and Schools. 3-5 Units.

The challenges facing schools to establish school-family partnerships with newly arrived Latino immigrant parents. How language acts as a barrier to home-school communication and parent participation. Current models of parent-school collaboration and the ideology of parental involvement in schooling.

Same as: EDUC 270

EDUC 180. Directed Reading in Education. 1-15 Unit.

For undergraduates and master's degree students. (All Areas).

EDUC 180S. Pre-field Course for Alternative Spring Break. 1 Unit.

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more inform.

EDUC 181. Multicultural Issues in Higher Education. 4 Units.

The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

Same as: EDUC 381

EDUC 183X. Practicum in English-Spanish School & Community Interpreting. 3-4 Units.

This practicum will assist students in developing a set of skills in English-Spanish interpreting that will prepare them to provide interpretation services in school and community settings. The course will build students' abilities to transfer intended meanings between two or more monolingual individuals of who are physically present in a school or community setting and who must communicate with each other for professional (and personal) purposes.

Same as: CHILATST 183X, EDUC 283X

EDUC 185. Master's Thesis. 1-15 Unit.

(all areas).

EDUC 187X. Math Mentoring: Working in the Zone with Learners. 1-2 Unit.

The course focuses on how the tutorial relationship can help students learn mathematics. The course will provide background theory and knowledge as well as provide practical approaches to tutoring, supports for targeting activities to students' needs, selection of materials and activities, and ways to assess the progress of the students and reflect on your own experience. Topics will include social theories of learning, teaching for understanding, and challenges of students who are English language learners. In addition to attending 4, two-hour workshop classes, 1 hour of tutoring is required each week. The course will meet 4 times during the quarter for workshops and discussions following Friday tutoring sessions. Students will submit assignments on the Coursework site on weeks that the course does not meet. A 1 unit section of the course will run in Winter and Spring quarters.

Same as: EDUC 397X

EDUC 189X. Language and Minority Rights. 3 Units.

Language as it is implicated in migration and globalization. The effects of globalization processes on languages, the complexity of language use in migrant and indigenous minority contexts, the connectedness of today's societies brought about by the development of communication technologies. Individual and societal multilingualism; preservation and revival of endangered languages.

Same as: CHILATST 189W, CSRE 189W

EDUC 190. Directed Research in Education. 1-15 Unit.

For undergraduates and master's students. May be repeated for credit. (all areas).

EDUC 191X. Introduction to Survey Research. 3-4 Units.

Planning tasks, including problem formulation, study design, questionnaire and interview design, pretesting, sampling, interviewer training, and field management. Epistemological and ethical perspectives. Issues of design, refinement, and ethics in research that crosses boundaries of nationality, class, gender, language, and ethnicity.

Same as: EDUC 291X

EDUC 192A. Interpersonal Learning & Leadership: An Introduction to the RA Role. 2 Units.

Preparing students for roles as Resident and Community Assistants, "Intelligent Leadership" explores research on college student development, leadership and the complex dynamics of our changing society both within and outside the college environment. Participants will engage in course work that builds skills relevant to their positions and allow students to implement these skills in a real world environment. Through reflection, self-examination and engagement in interpersonal dynamics and analysis, students will examine how their peer group develops while at the university.

EDUC 192B. Interpersonal Learning & Leadership - Row Staff Class. 2 Units.

"Interpersonal Learning & Leadership - Row Staff Class" explores research on leadership and the complex dynamics of our changing society. Participants will engage in course work intended to build skills relevant to being on a Row Staff team. Students will practice self reflection, risk taking, facilitating, decision-making and group leadership. Students will develop strategies to build community and facilitate challenging conversations while creating a safe environment for their peers to do the same.

EDUC 193A. Listen Up! Core Peer Counseling Skills. 2 Units.

Topics: verbal and non-verbal skills, open and closed questions, paraphrasing, working with feelings, summarization, and integration. Individual training, group exercises, role play practice with optional video feedback. Sections on relevance to crisis counseling and student life. Guest speakers from University and community agencies. Students develop and apply skills in University settings.

EDUC 193B. Peer Counseling in the Chicano/Latino Community. 1 Unit.

Topics: verbal and non-verbal attending and communication skills, open and closed questions, working with feelings, summarization, and integration. Salient counseling issues including Spanish-English code switching in communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, and Chicana/o student experience in University settings. Individual training, group exercises, role play, and videotape practice.

EDUC 193C. Psychological Well-Being On Campus: Perspectives Of The Black Diaspora. 1 Unit.

Topics: the concept of culture, Black cultural attributes and their effect on reactions to counseling, verbal and non-verbal attending, open and closed questions, working with feelings, summarization, and integration. Reading assignments, guest speakers, role play, and videotaped practice. Students develop and apply skills in the Black community on campus or in other settings that the student chooses.

EDUC 193F. Psychological Well-Being on Campus: Asian American Perspectives. 1 Unit.

Topics: the Asian family structure, and concepts of identity, ethnicity, culture, and racism in terms of their impact on individual development and the counseling process. Emphasis is on empathic understanding of Asians in America. Group exercises.

Same as: ASNAMST 193F

EDUC 193G. Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities. 1 Unit.

This course examines mental health and psychological well-being across the spectrum of gender and sexual identities. It addresses the unique challenges that face LGBTQ-identified students, and provides tools for supporting peers as they navigate these challenges. Discussion topics include current conceptualizations of gender identity and sexual orientation, including sexual and gender fluidity; the intersection of queer identities with multiple identities such as ethnic/racial identity and faith/spirituality; unpacking stereotypes; queer relationships and sexuality, coming out and disclosure, and mental health issues.

Same as: FEMGEN 193G

EDUC 193N. Peer Counseling in the Native American Community. 1 Unit.

Verbal and non-verbal communication, strategic use of questions, methods of dealing with strong feelings, and conflict resolution. How elements of counseling apply to Native Americans including client, counselor, and situational variables in counseling, non-verbal communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, the impact of family on personal development, gender roles, and the experience of Native American students in university settings. Individual skill development, group exercises, and role practice.

EDUC 193P. Peer Counseling at the Bridge. 1 Unit.

Mental health issues such as relationships, substance abuse, sexual assault, depression, eating disorders, academic stressors, suicide, and grief and bereavement. Guest speakers.

EDUC 193S. Peer Counseling on Comprehensive Sexual Health. 1 Unit.

Information on sexually transmitted infections and diseases, and birth control methods. Topics related to sexual health such as communication, societal attitudes and pressures, pregnancy, abortion, and the range of sexual expression. Role-play and peer-education outreach projects. Required for those wishing to counsel at the Sexual Health Peer Resource Center (SHPRC).

EDUC 196X. The Design of Technologies for Casual Learning. 3 Units.

Studio-based, participatory, and user-centered development of casual learning technologies is explored, using the Apple iPhone as an prototype platform. The term "casual" is borrowed from casual gaming to denote that the learning technologies are meant for learners to use in "extreme informal" learning circumstances (while "on the go", "anytime and any place"). The class builds on learning about and synthesizing knowledge, theory and development activity in four areas including learning theories, mobile technologies, games and participatory design processes.

Same as: EDUC 396X

EDUC 197. Education, Gender, and Development. 4 Units.

Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes. Same as: FEMGEN 297, SOC 134

EDUC 199A. Undergraduate Honors Seminar. 3 Units.

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

EDUC 199B. Undergraduate Honors Seminar. 1 Unit.

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

EDUC 199C. Undergraduate Honors Seminar. 1 Unit.

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

EDUC 200A. Introduction to Data Analysis and Interpretation. 4 Units.

Primarily for master's students in the School of Education. Focus is on reading literature and interpreting descriptive and inferential statistics, especially those commonly found in education. Topics: basic research design, instrument reliability and validity, description statistics, correlation, t-tests, one-way analysis of variance, and simple and multiple regression.

EDUC 200B. Introduction to Qualitative Research Methods. 4 Units.

(Formerly EDUC 151.) Primarily for master's students: An introduction to the core concepts and methods of qualitative research. Through a variety of hands-on learning activities, readings, field experiences, class lectures, and discussions, students will explore the processes and products of qualitative inquiry. This is a graduate level course. No undergraduates may enroll. Priority will be given to GSE students, and final enrollment depends on instructor approval after the first day of class.

EDUC 200C. Introduction to Statistical Methods in Education. 3-4 Units.

(Formerly EDUC 160.) Basic techniques in descriptive and inferential statistics for educational research will be covered with an emphasis on rigorous preparation for intermediate and advanced courses. Topics include central tendency, variance, probability, distributions, confidence interval, t-test, F-test, correlation, regression, and analysis of variance. Non-parametric statistics and graphical principles for data representation will also be addressed. Students will also be introduced to STATA in preparation for subsequent higher level courses.

EDUC 201. History of Education in the United States. 3-5 Units.

How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching.

Same as: AMSTUD 201, HISTORY 158B

EDUC 202. Introduction to Comparative and International Education. 4-5 Units.

Contemporary theoretical debates about educational change and development, and the international dimension of issues in education. Emphasis is on the development of students' abilities to make cross-national and historical comparisons of educational phenomena.

EDUC 202I. International Education Policy Workshop. 4 Units.

This is a project-based workshop. Practical introduction to issues in educational policy making, education reform, educational planning, implementation of policy interventions, and monitoring and evaluation in developing country contexts. Preference to students enrolled in ICE/IEAPA, but open to other students interested in international development or comparative public policy with instructor's consent. Attendance at first class required for enrollment.

EDUC 203. The Anthropology of Education. 3-5 Units.

Learning across situations, organizations, institutions, and cultures. How and when people learn and where, with whom and for what and how answers to these questions change across the lifespan. Schools in relation to other settings in which learning takes place for children, adolescents, and adults. Apprenticeship, mentorship, and learning through observation and imitation.

EDUC 203A. Tutoring: Seeing a Child through Literacy. 3-4 Units.

Experience tutoring grade school readers in a low income community near Stanford under supervision. Training in tutoring; the role of instruction in developing literacy; challenges facing low income students and those whose first language is not English. How to see school and print through the eyes of a child. Ravenswood Reads tutors encouraged to enroll. Service Learning Course (certified by Haas Center). May be repeated for credit.

Same as: EDUC 103A

EDUC 204. Introduction to Philosophy of Education. 3 Units.

How to think philosophically about educational problems. Recent influential scholarship in philosophy of education. No previous study in philosophy required.

Same as: PHIL 231

EDUC 205X. The Impact of Social and Behavioral Science Research on Educational Issues. 3 Units.

Ways in which research intersects with educational policy and practice. Emphasis is on behavioral, social, and cognitive traditions. Topics include early childhood education, early reading, science education, bilingual education, school desegregation, class size reduction, classroom organization, violence and juvenile crime, and affirmative action in higher education. Policy debates and how research informs or fails to inform deliberations and decisions in these areas.

EDUC 206A. Applied Research Methods in International and Comparative Education I: Introduction. 1 Unit.

Required for M.A. students in ICE and IEPA. Orientation to the M.A. program and research project; exploration of resources for study and research.

EDUC 206B. Applied Research Methods in International and Comparative Education II: Master's Paper Proposal. 1-3 Unit.

Required for M.A. students in ICE and IEPA. Development of research skills through theoretical and methodological issues in comparative and international education. Preparation of a research proposal for the M.A. monograph.

EDUC 206C. Applied Research Methods in ICE III: Data Collection and Analysis. 1 Unit.

Required for M.A. students in ICE and IEPA. Practice in data collection and analysis. Preparation of the first draft of the M.A. monograph.

EDUC 206D. Applied Research Methods in International and Comparative Education IV: Master's Paper Workshop. 3 Units.

Conclusion of the M.A. program in ICE and IEPA; required of M.A. students. Reviews of students' research in preparation for their master's monograph.

EDUC 208B. Curriculum Construction. 3-4 Units.

The theories and methods of curriculum development and improvement. Topics: curriculum ideologies, perspectives on design, strategies for diverse learners, and the politics of curriculum construction and implementation. Students develop curriculum plans for use in real settings. Service Learning Course (certified by Haas Center).

EDUC 209A. Policy, Organization, and Leadership Studies Seminar. 1-3 Unit.

This is a required course for all POLS students. The goals of the POLS Seminar (EDUC 209ABC) are to assist students in making the most of their Stanford graduate experience across several dimensions (academic, professional, and social). EDUC 209A is focused on orienting students to the academic and extra-curricular aspects of the experience as quickly as possible, while helping them coalesce as a group and learn how to leverage each other's professional knowledge. Another goal is to help student define their graduate degree goals, so they can plan their year in a very intentional manner that will result in a project or experiences they can highlight during the required Spring quarter POLS Project Forum.

EDUC 209B. Policy, Organization, and Leadership Studies Seminar. 1-3 Unit.

This is a required course for all POLS students. The goals of the POLS Seminar (EDUC 209ABC) are to assist students in making the most of their Stanford graduate experience across several dimensions (academic, professional, and social). EDUC 209B focuses on building career skills and exposing students to a range of education research, policy, and practice and begins helping students conceptualize and frame their Spring POLS Project.

EDUC 209C. Policy, Organization, and Leadership Studies Seminar. 1-3 Unit.

This is a required course for POLS students. The goals of the POLS Seminar (EDUC 209ABC) are to assist students in making the most of their Stanford graduate experience across several dimensions (academic, professional, and social). EDUC 209C focuses on developing the POLS Project for the Spring Forum while continuing to develop career skills and expose students to a range of education research, policy, and practice.

EDUC 210X. Policy, Organization, and Leadership Studies Internship Workshop. 1-3 Unit.

Forum for POLS students to link their academic learning to real world experience through in-class discussions, presentations, and reflective writing. Fall Quarter is focused on understanding the intern's role within the larger organization. Winter Quarter is outward looking with a focus on understanding the broader fields the students' organizations reside within. Spring Quarter focus is on students learning from and being prepared to teach others.

EDUC 211X. Beyond Bits and Atoms - Lab. 1-3 Unit.

This course is a hands-on lab in the prototyping and fabrication of tangible technologies, with a special focus in learning and education. We will learn how to use state-of-the-art fabrication machines (3D printers, 3D scanners, laser cutters, routers) to design educational toolkits, educational toys, science kits, and tangible user interfaces. A special focus of the course will be to design low-cost technologies, particularly for urban school in the US and abroad.

Same as: CS 402L

EDUC 212X. Urban Education. 3-4 Units.

(Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, CSRE 112X, EDUC 112X, SOC 129X, SOC 229X

EDUC 213. Introduction to Teaching. 3-4 Units.

Key concepts in teaching and learning; teacher content knowledge and pedagogical content knowledge; student prior knowledge and preconceptions; cognition and metacognition; classroom culture, motivation, and management; teaching diverse populations; comparison of teaching models; analysis of teaching; standards, accountability, and assessment of learning; assessing teaching quality; online learning and teaching.

EDUC 214. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the iquest;black boxiquest; of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores iquest;museum culturesiquest;; representations of iquest;selfiquest; and iquest;otheriquest; within museums and institutional cultures of the museum world itself.

Same as: AMSTUD 134, ARCHLGY 134, ARCHLGY 234, ARTHIST 284B, CSRE 134, NATIVEAM 134

EDUC 215X. LDT Internship Workshop. 1-3 Unit.

The required internship is a cornerstone of the LDT program. This course will provide students an opportunity to link their academic learning to real world experience through in-class discussions, presentations, and reflective writing. It will allow the program director to monitor the quality of the experience and provide timely advice and support as needed for an optimal learning experience. The course will meet several times each quarter, adjacent to LDT seminar (Fridays, 12-1). An internship agreement will be required at the beginning of the course signed by the faculty advisor, as well as a reflection paper at the end of the course. Students will take the course for 1 unit, unless they request additional units for unpaid internship hours.

EDUC 216. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: AFRICAAM 116, CSRE 216X, HISTORY 255E

EDUC 217X. Histories and Futures of Humanistic Education: Culture and Crisis, Books and MOOCs. 5 Units.

Features of online education as they relate to the humanities and notions of engaged critical learning. Collaborative course, working in tandem with Professor Cathy Davidson's Duke course, The History and Future of High Education, using live chats, Google documents, and other forums to interact with students at Duke and other universities nationally. Each campus uses a syllabus linked to each instructor's angle into this general subject, but many readings and exercises in common. Seeing this as a critical moment in education, to connect this topic to its historical, cultural, political, and ethical implications. The Stanford course looks at early discussions about education and culture (Arnold's Culture and Anarchy) and then works through a key moment in the mid-20th century whose premises still have influence: the Two Cultures (humanities, sciences) debate. Radical responses to educational reform in France and the US in the late 60s, and the changing state of funding, value, and cultural critique in the late 20th and early 21st centuries. The idea of education as a personal, collective, and intellectual endeavor which is shaped by and shapes societies. Focus on the idea of the public good and the relation between education and a democratic society.

Same as: COMPLIT 265, DLCL 265

EDUC 218. Topics in Cognition and Learning: Executive Function. 3 Units.

Executive function is a construct that is rapidly taking on an increasingly central role in bringing together current research in cognitive development, learning, education, and neuroscience. In this seminar we will examine the potential cross-fertilization of these fields of inquiry primarily by reviewing research on learning and individual differences in cognitive neuroscience that may hold relevance to education, as well as reviewing educational research that may hold implications for developmental cognitive neuroscience. This seminar course is designed to engage students in recent advances in this rapidly growing research area via discussions of both historical and late-breaking findings in the literature. By drawing on a breadth of studies ranging from cognitive development, cognitive neuroscience, and educational/training studies, students will gain an appreciation for specific ways interdisciplinary approaches can add value to specific programs of research.

EDUC 219E. The Creative Arts in Elementary Classrooms. 1 Unit.

For STEP Elementary only or for candidates in the Multiple Subjects program. Hands-on exploration of visual arts media and works of art.

EDUC 220A. Introduction to the Economics of Education. 4 Units.

The relationship between education and economic analysis. Topics: labor markets for teachers, the economics of child care, the effects of education on earnings and employment, the effects of education on economic growth and distribution of income, and the financing of education. Students who lack training in microeconomics, register for 220Y for 1 additional unit of credit.

EDUC 220B. Introduction to the Politics of Education. 4 Units.

(Same as GSBGEN 349.) The relationships between political analysis and policy formulation in education; focus is on alternative models of the political process, the nature of interest groups, political strategies, community power, the external environment of organizations, and the implementations of policy. Applications to policy analysis, implementation, and politics of reform. (APA).

EDUC 220C. Education and Society. 4-5 Units.

The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

Same as: EDUC 120C, SOC 130, SOC 230

EDUC 220D. History of School Reform: Origins, Policies, Outcomes, and Explanations. 3-5 Units.

Required for students in the POLS M.A. program; others welcome. Focus is on 20th-century U.S. Intended and unintended patterns in school change; the paradox of reform that schools are often reforming but never seem to change much; rhetorics of reform and factors that inhibit change. Case studies emphasize the American high school. This course is required for POLS students pursuing the PreK-12 concentration.
Same as: HISTORY 258E

EDUC 220Y. Introduction to the Economics of Education: Economics Section. 1-2 Unit.

For those taking 220A who have not had microeconomics before or who need a refresher. Corequisite: 220A.

EDUC 221A. Policy Analysis in Education. 4-5 Units.

Major concepts associated with the development, enactment, and execution of educational policy. Issues of policy implementation, agenda setting and problem formulation, politics, and intergovernmental relations. Case studies. Goal is to identify factors that affect how analysts and policy makers learn about and influence education. Limited enrollment.
Prerequisite: consent of instructor.

EDUC 222. Resource Allocation in Education. 4-5 Units.

Problems of optimization and design, and evaluation of decision experience. Marginal analysis, educational production functions, cost effectiveness and cost-benefit analysis, constrained maximization, program evaluation. Introduction to linear models for large-scale data analysis. Implications to model assumptions.

EDUC 223. Good Districts and Good Schools: Research, Policy, and Practice. 3-4 Units.

Recent studies of districts and schools that exceed expectations in producing desired results for students. Research methodologies, findings of studies, theories of change in reforming schools and districts and efforts to implement results. Components of good schools and districts. Required project studies a school or district to determine goodness. (SSPEP/APA, CTE).

EDUC 224. Social Entrepreneurship and Social Innovation. 2-4 Units.

(Same as STRAMGT 367). This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ "entrepreneurial skills," such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all else. We will study some of the most promising and the best-proven innovations for improving people's lives. We will also examine mature projects that are now tackling the issue of "scale", moving from local innovations to solutions that create deep systemic changes for larger numbers of economically disadvantaged individuals and communities throughout the world. This year we will focus on what are the constraints and opportunities for creating a social enterprise at scale. The process of "scale" poses tremendous challenges. Even when organizations manage to overcome the many obstacles to growth, and achieve appreciable scale, this approach is seldom sufficient to achieve significant social impact on its own. This year our course will pay particular attention to network approaches which require the mobilization of a vast array of actors and resources, but have the potential to generate rapid and sustained social impact.

EDUC 224A. Social Entrepreneurship and Social Innovation. 3 Units.

(Same as STRAMGT 367). This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ "entrepreneurial skills", such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government, or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all else. We will study some of the most promising and the best-proven innovations for improving people's lives. We will also examine mature projects that are now tackling the issue of "scale", moving from local innovations to solutions that create deep systemic changes for larger numbers of economically disadvantaged individuals and communities throughout the world. This year we will focus on what are the constraints and opportunities for creating a social enterprise at scale. The process of "scale" poses tremendous challenges. Even when organizations manage to overcome the many obstacles to growth, and achieve appreciable scale, this approach is seldom sufficient to achieve significant social impact on its own. This year our course will pay particular attention to network approaches which require the mobilization of a vast array of actors and resources, but have the potential to generate rapid and sustained social impact.

EDUC 224B. Social Entrepreneurship and Social Innovation. 2 Units.

(Same as STRAMGT 367). This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ "entrepreneurial skills", such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all else. We will study some of the most promising and the best-proven innovations for improving people's lives. We will also examine mature projects that are now tackling the issue of "scale", moving from local innovations to solutions that create deep systemic changes for larger numbers of economically disadvantaged individuals and communities throughout the world. This year we will focus on what are the constraints and opportunities for creating a social enterprise at scale. The process of "scale" poses tremendous challenges. Even when organizations manage to overcome the many obstacles to growth, and achieve appreciable scale, this approach is seldom sufficient to achieve significant social impact on its own. This year our course will pay particular attention to network approaches which require the mobilization of a vast array of actors and resources, but have the potential to generate rapid and sustained social impact.

EDUC 225X. Business Concepts and Skills for the Social Sector. 3 Units.

Knowledge and tools for conceiving, building and sustaining successful endeavors in education and the broader social sector. Topics include social, organizational and business strategy, market research, financial analysis, communications, leadership and evaluation. Focus on integrating theory with practical applications. Especially beneficial to students who otherwise may not have exposure to topics taught in a business curriculum.

EDUC 226X. Curating Experience: Representation in and beyond Museums. 2-4 Units.

In an age when some 50% of museum visitors only "visit" museums online and when digital technologies have broken open archival access, anyone can be a curator, a critic, an historian, an archivist. In this context, how do museums create experiences that teach visitors about who they are and about the world around them? What are the politics of representation that shape learning in these environments? Using an experimental instructional approach, students will reconsider and redefine what it means to curate experience.

Same as: AMSTUD 226X, CSRE 226X

EDUC 227X. Education Policy in the United States. 3 Units.

The course will provide students from different disciplines with an understanding of the broad educational policy context. The course will cover topics including a) school finance systems; b) an overview of policies defining and shaping the sectors and institutional forms of schooling, c) an overview of school governance, d) educational human-resource policy, e) school accountability policies at the federal and state levels; and f) school assignment policies and law, including intra- and inter-district choice policies, desegregation law and policy. This course intended for Master's students.

Same as: for Master's Students

EDUC 228E. Becoming Literate in School I. 2 Units.

First in a three course sequence. Introduction to reading and language arts theory and methodology for candidates STEP Elementary Teacher program. Instructional methods, formats, and materials.

EDUC 228F. Becoming Literate in School II. 2 Units.

Second in a three-course required sequence of reading and language arts theory and methodology for candidates in the STEP Elementary program. Theories for guiding instruction and curricular choices.

EDUC 228G. Becoming Literate in School III. 2 Units.

Third in a three-course required sequence of reading and language arts theory and methodology for candidates in STEP Elementary Teacher program. Theories for guiding instruction and curricular choices.

EDUC 228H. Literacy, History, and Social Science. 1 Unit.

How elementary school teachers can teach history and social science within a literacy framework. Topics include: historical thinking, reading, and writing; current research; applying nonfiction reading and writing strategies to historical texts; using primary sources with elementary students; adapting instruction to meet student needs; state standards; evaluating curriculum; assessing student knowledge; developing history and social science units; and embedding history and social science into the general literacy curriculum.

EDUC 229A. Learning Design and Technology Seminar. 1 Unit.

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

EDUC 229B. Learning Design and Technology Seminar. 1 Unit.

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

EDUC 229C. Learning Design and Technology Seminar. 1 Unit.

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

EDUC 229D. Learning Design and Technology Seminar. 2-5 Units.

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

EDUC 230X. Social Enterprise. 4 Units.

(Same as STRAMGT 341.) Approaches for creating social value through a social enterprises including nonprofits, for-profits, and hybrid forms of organization. Perspectives include entrepreneur, CEO, funder, and board member. Topics include undertaking the social entrepreneurship process; mobilizing economic and human resources; achieving social objectives with commercial vehicles; crafting alliances; managing growth; measuring and managing performance; governing for excellence. Case studies. Student teams carry out field-based research in a significant strategic or operational issue of a social enterprise.

EDUC 231X. Knowing God: Learning Religion in Popular Culture. 4 Units.

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education.

Same as: AMSTUD 231X, JEWISHST 291X, RELIGST 231X

EDUC 232. Culture, Learning, and Poverty. 2-3 Units.

This course examines the categories and methods used to analyze and explain educational inequalities in the United States from 1950 to present. Approaches to theories of school failure and methods of intervention are distinguished by their ideas on the play of learning, language, cognition, culture, and social class in human development. Particular attention is given to the Culture of Poverty controversies of the 1960s and their recent emergence.

EDUC 233A. Counseling Theories and Interventions from a Multicultural Perspective. 3-5 Units.

In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

Same as: AFRICAAM 233A, CSRE 233A

EDUC 233B. Adolescent Development and Mentoring in the Urban Context. 3 Units.

Continuation of 233A. Topics include: developmental psychology and service learning; collaborating with the community; psychological research on altruism and prosocial behavior; volunteers' motivations; attributions about poverty, and the problem of prejudice.

EDUC 234. Career and Personal Counseling. 3 Units.

Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

Same as: EDUC 134, PSYCH 192

EDUC 235X. The Creative Arts in Schools and Classrooms. 2 Units.

Students work alongside teachers and performing artists to plan and implement classroom activities with elementary school children to prepare them for a Lively Arts performance. Background theory in education and arts education. Students develop a follow-up classroom activity for children in their own art form.

EDUC 236B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: AFRICAAM 126B, CSRE 126B, EDUC 136B, PUBLPOL 126B

EDUC 236X. Beyond Bits and Atoms: Designing Technological Tools. 3-4 Units.

Practicum in designing and building technology-enabled curricula and hands-on learning environments. Students use software toolkits and state-of-the-art fabrication machines to design educational software, educational toolkits, and tangible user interfaces. The course will focus on designing low-cost technologies, particularly for urban school in the US and abroad. We will explore theoretical and design frameworks from the constructionist learning perspective, critical pedagogy, interaction design for children. Same as: CS 402

EDUC 238X. Teacher Policies in Latin America. 3-5 Units.

We will explore the complex, challenging and often troubled world of teacher policy in Latin America. Education policy is an important instrument of change and the hope of many teachers and students. They affect the lives of many people and therefore their design, implementation and evaluation must have high academic and political rigor. The emphasis of this course is on the design and implementation of teacher policies in Latin America. We will focus on how to use empirical evidence to take into account the impact, feasibility and political complexities of designing and implementing teacher policy in LA.

EDUC 239X. Educating Young STEM Thinkers. 3-5 Units.

The course will introduce students to the design thinking process, the national conversations about the future of STEM careers, and provide opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course will be both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 139X, ME 139, ME 231

EDUC 240. Adolescent Development and Learning. 5 Units.

How do adolescents develop their identities, manage their inner and outer worlds, and learn? Presuppositions: that fruitful instruction takes into account the developmental characteristics of learners and the task demands of specific curricula; and that teachers can promote learning and motivation by mediating among the characteristics of students, the curriculum, and the wider social context of the classroom. Prerequisite: STEP student or consent of instructor. (STEP).

EDUC 241S. Organizational Learning. 2 Units.

(Same as OB 586.) How firms learn from their experiences and the opportunities created by flawed learning. Common mistakes in learning and barriers to the adoption of effective practices. How to avoid common mistakes and build organizations that learn more effectively to identify possible opportunities in markets. Concepts and findings from organization theory, psychology, decision theory, and statistics.

EDUC 241X. Organizational Learning. 4 Units.

Why firms do not learn from their experiences and the opportunities created by flawed learning. Common mistakes in learning and barriers to the adoption of effective practices. How to avoid common mistakes and build organizations that learn more effectively to identify possible opportunities in markets. Concepts and findings from organization theory, psychology, decision theory, and statistics. Readings include teaching notes, papers in psychology and organization theory, HBR articles, and *Moneyball* by Michael Lewis who discusses market-level mistakes in professional baseball.

EDUC 242. Language Use in the Chicano Community. 3-5 Units.

The significance and consequences of language diversity in the culture and society of the U.S. Experiences of non-English background individuals through focus on Spanish-English bilingual communities.

Same as: SPANLIT 206

EDUC 243. Writing Across Languages and Cultures: Research in Writing and Writing Instruction. 3-5 Units.

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area.

Same as: CSRE 243, EDUC 145

EDUC 244. Classroom Management and Leadership. 2 Units.

Student and teacher roles in developing a classroom community. Strategies for classroom management within a theoretical framework. STEP secondary only.

EDUC 244E. Elementary Classroom Leadership and Management. 1 Unit.

How to best manage a classroom. Student and teacher roles in developing a classroom community. Strategies for classroom management within a theoretical framework. STEP elementary only.

EDUC 244F. Elementary Classroom Leadership and Management. 1 Unit.

Skills for developing a positive classroom learning environment. Theoretical issues and opportunities to acquire strategies and make links with practice teaching class. STEP elementary only.

EDUC 245. Understanding Racial and Ethnic Identity Development. 3-5 Units.

African American, Native American, Mexican American, and Asian American racial and ethnic identity development; the influence of social, political and psychological forces in shaping the experience of people of color in the U.S. The importance of race in relationship to social identity variables including gender, class, and occupational, generational, and regional identifications. Bi- and multiracial identity status, and types of white racial consciousness.

Same as: AFRICAAM 245, CSRE 245

EDUC 246A. Secondary Teaching Seminar. 3 Units.

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

EDUC 246B. Secondary Teaching Seminar. 5 Units.

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: guided observations, building classroom community, classroom interaction processes, topics in special education portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

EDUC 246C. Secondary Teaching Seminar. 5 Units.

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student. (STEP).

EDUC 246D. Secondary Teaching Seminar. 2-7 Units.

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

EDUC 246E. Elementary Teaching Seminar. 3 Units.

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

EDUC 246F. Elementary Teaching Seminar. 5-7 Units.

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

EDUC 246G. Elementary Teaching Seminar. 3 Units.

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

EDUC 246H. Elementary Teaching Seminar. 4 Units.

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

EDUC 247. Moral and Character Education. 3 Units.

Contemporary scholarship and educational practice related to the development of moral beliefs and conduct in young people. The psychology of moral development; major philosophical, sociological, and anthropological approaches. Topics include: natural capacities for moral awareness in the infant; peer and adult influences on moral growth during childhood and adolescence; extraordinary commitment during adulthood; cultural variation in moral judgment; feminist perspectives on morality; the education movement in today's schools; and contending theories concerning the goals of moral education.

EDUC 248X. Psychology of Pedagogy. 1-3 Unit.

How can methods and insights from psychology inform education practice, particularly in a higher education context? This course aims to develop your skills as critical consumers and producers of empirical findings on teaching and learning. Course involves a quarter-long project to develop a pedagogical research proposal, supplemented and informed by readings, guided discussions, and group workshops.

Same as: PSYCH 277

EDUC 249. Theory and Issues in the Study of Bilingualism. 3-5 Units.

Sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, description and measurement, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings.

Same as: EDUC 149

EDUC 250B. Statistical Analysis in Education: Regression. 4 Units.

Primarily for doctoral students; part of doctoral research core; prerequisite for advanced statistical methods courses in School of Education. Basic regression, a widely used data-analytic procedure, including multiple and curvilinear regression, regression diagnostics, analysis of residuals and model selection, logistic regression. Proficiency with statistical computer packages.

EDUC 250C. Qualitative Analysis in Education. 4 Units.

Primarily for doctoral students; part of doctoral research core. Methods for collecting and interpreting qualitative data including case study, ethnography, discourse analysis, observation, and interview.

EDUC 253X. Inequality, Society, and Education. 3-5 Units.

The course will focus on developing students' understanding of theory and research on several key issues in the relationship between education and inequality: 1) what are the recent patterns and trends in both economic and educational inequality? 2) what kinds of inequality (from a normative/philosophical perspective) should we worry about? 3) how do we measure educational inequality? 4) how are economic and educational inequality linked? 5) what policies/practices might reduce educational inequality? The course will be a graduate student seminar, with enrollment capped at 20-25. Same as: SOC 353X

EDUC 254S. Leadership in Diverse Organizations. 2 Units.

(Same as OB 593) This course is designed to help students improve their capacity to exercise leadership and work effectively with others within the context of culturally diverse groups and organizations. The course is based on the premise that diversity can present unique challenges and opportunities and thereby pushes students to develop crucial leadership skills, many of which are relevant across a variety of situations. The class will address two primary questions: 1) What social and psychological obstacles limit people's ability to work effectively across identity-based differences? 2) What can you do to build the relational and organizational capacity to enable these differences to be a resource for learning and effectiveness within teams and organizations? Students should be prepared to experiment with various conceptual and analytic skills inside and outside of the classroom. While the course focuses on dynamics of race and gender, there will be opportunities for students to explore a variety of other dimensions of identity and difference in organizations, including (but not limited to) sexual orientation, nationality, class, and religion. The course is intended for students who expect to work in culturally diverse groups or organizations and will be equally relevant to those who plan to work in the not-for-profit, public, and for-profit sectors.

EDUC 254X. Leadership in Diverse Organizations. 4 Units.

How improve capacity to exercise leadership and work effectively with others within the context of culturally diverse groups and organizations. Premise is that diversity presents challenges and opportunities that push students to develop leadership skills relevant across a variety of situations. What social and psychological obstacles limit people's ability to work effectively across identity-based differences? What can people do to build the relational and organizational capacity to enable these differences to be a resource for learning and effectiveness within teams and organizations? Focus is on dynamics of race and gender; attention to other dimensions of identity and difference in organizations, including sexual orientation, nationality, class, and religion.

EDUC 255A. Experimental Research Designs in Educational Research. 3-5 Units.

The course will cover the following topics: a) the logic of causal inference and the Fisher/Neyman/Rubin counterfactual causal model (Fisher, 1935; Heckman, 1979; Holland, 1986; Neyman, 1990; Rubin, 1978); b) randomized experiments; c) complex randomized experiments in education (cluster randomized trials, multi-site trials, staggered implementation via randomization, etc.); d) policy experiments with randomization; e) meta-analysis; and f) power in randomized experiments; g) the ethics and politics of randomized experiments.

EDUC 255B. Causal Inference in Quantitative Educational and Social Science Research. 3-5 Units.

Quantitative methods to make causal inferences in the absence of randomized experiment including the use of natural and quasi-experiments, instrumental variables, regression discontinuity, matching estimators, longitudinal methods, fixed effects estimators, and selection modeling. Assumptions implicit in these approaches, and appropriateness in research situations. Students develop research proposals relying on these methods. Prerequisites: exposure to quantitative research methods; multivariate regression.

Same as: SOC 257

EDUC 255C. Applied Quasi-Experimental Research in Education. 3-5 Units.

Course will provide hands-on practice in analysis of data from experimental and quasi-experimental research designs, including a) instrumental variables estimators; b) regression discontinuity estimators; c) difference-in-difference estimators; d) matching estimators; e) fixed effects estimators; and f) panel data methods (including individual fixed effects models, lagged covariate adjustment models, growth models, etc.). Prerequisites: satisfactory completion of EDUC 255B, EDUC 257C or SOC 257. Same as: SOC 258

EDUC 256. Psychological and Educational Resilience Among Children and Youth. 4 Units.

Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations.

Same as: HUMBIO 149

EDUC 257A. Statistical Methods for Behavioral and Social Sciences. 3 Units.

For students with experience in empirical research. Analysis of data from experimental studies through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through log-linear models, logistic regression. Integrated with the use of statistical computing packages. Prerequisite: analysis of variance and regression at the level of STATS 161.

EDUC 257B. Statistical Methods for Behavioral and Social Sciences. 3 Units.

For students with experience in empirical research. Analysis of data from experimental studies through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through log-linear models, logistic regression. Integrated with the use of statistical computing packages. Prerequisite: analysis of variance and regression at the level of STATS 161.

EDUC 258. Literacy Development and Instruction. 3-5 Units.

Literacy acquisition as a developmental and educational process. Problems that may be encountered as children learn to read. How to disentangle home, community, and school instruction from development.

EDUC 259X. Application of Hierarchical Linear Models in Behavioral and Social Research. 4 Units.

The fundamental phenomenon of interest in educational research is the growth in knowledge and skills of individual students. Two facts - that children's growth is typically the object of inquiry and that such growth occurs in organizational settings - correspond to two of the most troublesome and persistent methodological problems in the social sciences: the measurement of change and the assessment of multi-level effects (also referred to as the unit of analysis problem). Although these two methodological problems have distinct, long-standing, and non-overlapping literatures, these problems, in fact, share a common cause - the inadequacy of traditional statistical techniques for the modeling of hierarchy.

EDUC 260X. Statistical Methods for Group Comparisons and Causal Inference. 3 Units.

Critical examination of statistical methods in social science applications, especially for cause and effect determinations. Topics: path analysis, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, longitudinal data, mediating and moderating variables. See <http://web.stanford.edu/~rag/stat209/>.

Prerequisite: intermediate-level statistical methods.

Same as: HRP 239, STATS 209

EDUC 261. Sociocultural Theories of Learning & Development: Vygotsky & Bakhtin. 3 Units.

Grounded in theories of Vygotsky and Bakhtin, this course will review commonly used, but often misunderstood, concepts about how context enters theories of learning and development. Topics will include: distinctions between development and learning; the place of culture in developing higher mental functions; the zone of proximal development, conceptions and misconceptions; contributions of activity theory; importance of heterogeneity and multivocality; and role of language in inquiry; ideological becoming; or idea development. Focus will be on using theory to guide research.

EDUC 262A. Curriculum and Instruction in English. 2 Units.

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. (STEP).

EDUC 262B. Curriculum and Instruction in English. 3 Units.

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. STEP secondary only.

EDUC 262C. Curriculum and Instruction in English. 3 Units.

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. (STEP).

EDUC 263A. Curriculum and Instruction in Mathematics. 2 Units.

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win.

EDUC 263B. Curriculum and Instruction in Mathematics. 3 Units.

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win.

EDUC 263C. Curriculum and Instruction in Mathematics. 3 Units.

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win.

EDUC 263E. Quantitative Reasoning in Mathematics I. 2 Units.

First of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

EDUC 263F. Quantitative Reasoning in Mathematics II. 2-3 Units.

Second of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

EDUC 263G. Quantitative Reasoning in Mathematics III. 2 Units.

Third of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

EDUC 264A. Curriculum and Instruction in World Languages. 2 Units.

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP).

EDUC 264B. Curriculum and Instruction in World Languages. 3 Units.

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. STEP secondary only.

EDUC 264C. Curriculum and Instruction in World Languages. 3 Units.

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP).

EDUC 264E. Methods and Materials in Bilingual Classrooms. 2 Units.

Restricted to STEP elementary teacher candidates in the BCLAD program. Theories, research, and methods related to instruction of Spanish-English bilingual children, grades K-8. Approaches to dual language instruction, and pedagogical and curricular strategies for the instruction of reading, language arts, science, history, social science, and math in Spanish. Assessment issues and practices with bilingual students. In Spanish.

EDUC 265. History of Higher Education in the U.S.. 3-5 Units.

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities.

Same as: AMSTUD 165, EDUC 165, HISTORY 158C

EDUC 266X. Educational Neuroscience. 3 Units.

An introduction to the growing intersection between education research and emerging research on functional brain development. Students will probe the contributions and limitations of emerging theoretical and empirical contribution of neuroscience approaches to specific academic skills such as reading and mathematics, as well as exposure to general processes crucial for educational success, including motivation, attention, and social cognition. Final projects will explore these themes in the service of interventions designed to improve how these functions.

EDUC 267A. Curriculum and Instruction in Science. 2 Units.

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP).

EDUC 267B. Curriculum and Instruction in Science. 3 Units.

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP).

EDUC 267C. Curriculum and Instruction in Science. 3 Units.

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP).

EDUC 267E. Development of Scientific Reasoning and Knowledge. 2 Units.

For STEP elementary teacher candidates. Theories and methods of teaching and learning science. How to develop curricula and criteria for critiquing curricula. Students design a science curriculum plan for a real setting. State and national science frameworks and content standards. Alternative teaching approaches; how to select approaches that are compatible with learner experience and lesson objectives. Focus is on the linguistic and cultural diversity of California public school students.

EDUC 267F. Development of Scientific Reasoning and Knowledge II. 2 Units.

Continuation of 267E. Scientific knowledge and pedagogical skills for supporting science instruction. Topics include: how children build scientific understandings and what that understanding might look and sound like in young children; what school science is and how concepts are connected to the doing of it; physical, life, and earth science constructs.

EDUC 267G. Integrating the Garden into the Elementary Curriculum. 1 Unit.

This mini-course uses the garden and kitchen environments to provide teacher candidates with real-world contexts in which to explore some of the key issues that children face in health, nutrition, and sustainability. Teacher candidates will gain an understanding of how to integrate the various themes with content areas and standards and an appreciation for the importance of addressing children's health needs in an era when the country is facing increased obesity and other health problems.

EDUC 268A. Curriculum and Instruction in History and Social Science. 2 Units.

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

EDUC 268B. Curriculum and Instruction in History and Social Science. 3 Units.

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

EDUC 268C. Curriculum and Instruction in History and Social Science. 3 Units.

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

EDUC 268E. Elementary History and Social Science. 3-4 Units.

Teaching and learning history and social science in the elementary grades. What is included in the discipline and why it is important to teach. The development of historical thinking among children. How students learn and understand content in these disciplines.

EDUC 269X. The Ethics in Teaching. 1 Unit.

Goal is to prepare for the ethical problems teachers confront in their professional lives. Skills of ethical reasoning, familiarity with ethical concepts, and how to apply these skills and concepts in the analysis of case studies. Topics: ethical responsibility in teaching, freedom of speech and academic freedom, equality and difference, indoctrination, and the teaching of values.

EDUC 270. Latino Families, Languages, and Schools. 3-5 Units.

The challenges facing schools to establish school-family partnerships with newly arrived Latino immigrant parents. How language acts as a barrier to home-school communication and parent participation. Current models of parent-school collaboration and the ideology of parental involvement in schooling.

Same as: EDUC 178X

EDUC 271X. Education Policy in the United States. 5 Units.

The course will provide students from different disciplines with an understanding of the broad educational policy context. The course will cover topics including a) school finance systems; b) an overview of policies defining and shaping the sectors and institutional forms of schooling, c) an overview of school governance, d) educational human-resource policy, e) school accountability policies at the federal and state levels; and f) school assignment policies and law, including intra- and inter-district choice policies, desegregation law and policy. This course is intended for PhD students only. Other students may contact the instructor for permission to enroll.

Same as: PhD

EDUC 272X. Understanding and Creating Value-Added Measures of Teacher Effectiveness. 3 Units.

This seminar will explore a variety of approaches to measuring teacher effectiveness using student performance on state standardized tests. We will read the recent research literature on value-added estimation, addressing issues such as bias and measurement error. We also will use administrative data from two large districts to create and compare multiple value-added measures. The class assumes a comfort with OLS regression and basic programming in Stata.

EDUC 273. Gender and Higher Education: National and International Perspectives. 4 Units.

This course examines the ways in which higher education structures and policies affect females, males, and students in relation to each other and how changes in those structures and policies improve experiences for females and males similarly or differently. Students are expected to gain an understanding of theories and perspectives from the social sciences relevant to an understanding of the role of higher education in relation to structures of gender differentiation and hierarchy. Topics include undergraduate and graduate education; identity and sexuality; gender and science; gender and faculty; and the development of feminist scholarship and pedagogy. Attention is paid to how these issues are experienced by women and men in the United States, including people of color, and by academics throughout the world, and how these have changed over time.

Same as: EDUC 173, FEMST 173, SOC 173, SOC 273

EDUC 274X. School Choice: The Role of Charter Schools. 3 Units.

(Formerly EDUC 153X.) Is school choice, including vouchers, charter schools, contract schools, magnet schools, district options, and virtual schools, a threat or an opportunity for public education? Focus is on the charter school movement nationally and in California as reform strategy. Roles and responsibilities of charter schools emphasizing issues of governance, finance, curriculum, standards, and accountability.

EDUC 275X. Leading U.S. Schools. 3-4 Units.

The landscape of schooling in the U.S. is dynamic and replete with ideologies, myths, and beliefs. Organizational theory, leadership theory, and empirical research are lenses through which students will develop a deeper and broader understanding of the similarities and differences among private schools, parochial schools, traditional K-12 schools, charter schools, and alternative schools. Students will connect theory and research to practice by visiting and learning about two or more schools of their choosing.

EDUC 276. Educational Assessment. 3 Units.

Reliability, validity, bias, fairness, and properties of test scores. Uses of tests to monitor, manage, and reform instruction. Testing and competition, meritocracy, achievement gaps, and explanations for group differences.

EDUC 277. Education of Immigrant Students: Psychological Perspectives. 4 Units.

Historical and contemporary approaches to educating immigrant students. Case study approach focuses on urban centers to demonstrate how stressed urban educational agencies serve immigrants and native-born U.S. students when confronted with overcrowded classrooms, controversy over curriculum, current school reform movements, and government policies regarding equal educational opportunity.

EDUC 278. Introduction to Issues in Evaluation. 3-4 Units.

Open to master's and doctoral students with priority to students in the School of Education. Focus is on the basic literature and major theoretical and practical issues in the field of program evaluation. Topics include: defining purpose, obtaining credible evidence, the role of the evaluator, working with stakeholder, values in evaluation, utilization, and professional standards. The course project is to design an evaluation for a complex national or international program selected by the instructor.

EDUC 279X. American Jewish History: Learning to be Jewish in America. 2-4 Units.

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience. History students must take course for at least 3 units.

Same as: AMSTUD 279X, HISTORY 288D, JEWISHST 297X, RELIGST 279X

EDUC 280X. Learning & Teaching of Science. 3 Units.

This course will provide students with a basic knowledge of the relevant research in cognitive psychology and science education and the ability to apply that knowledge to enhance their ability to learn and teach science, particularly at the undergraduate level. Course will involve readings, discussion, and application of the ideas through creation of learning activities. It is suitable for advanced undergraduates and graduate students with some science background.

Same as: PHYSICS 295

EDUC 281X. Technology for Learners. 3 Units.

How can we use technology to improve learning? Many hope that technology will make learning easier, faster, or accessible to more learners. This course explores a variety of different approaches to designing tools for learning, the theories behind them, and the research that tests their effectiveness. Topics include feedback, visualization, games, multimedia, tangible-digital interfaces, simulations, and more. Students will work on teams to identify a need, create a prototype, and design tests to understand its impact. Space is limited. Priority is given to masters students in Education and to masters / upper-level students in Human Computer Interaction.

EDUC 282X. The Politics of Knowledge in the Twentieth Century United States. 3-5 Units.

This course examines the relationship between social scientific knowledge and power in the modern United States. Topics include the emergence of social scientific disciplines, debates over objectivity, and professionalization. The course examines both how universities, philanthropic foundations, and the federal government have shaped knowledge production and how social science has influenced law, social and educational policy, and popular social thought.

EDUC 283. Child Development In and Beyond Schools. 2 Units.

(Formerly EDUC 144). How schools form a context for children's social and cognitive development. Focus is on early and middle childhood. Transactional processes between children and learning opportunities in classroom contexts. Topics include: alternative theoretical perspectives on the nature of child development; early experience and fit with traditional school contexts; assessment practices and implications for developing identities as learners; psychological conceptions of motivational processes and alternative perspectives; the role of peer relationships in schools; and new designs for learning environments. Readings address social science and methodological issues. STEP Elementary only.

EDUC 283X. Practicum in English-Spanish School & Community Interpreting. 3-4 Units.

This practicum will assist students in developing a set of skills in English-Spanish interpreting that will prepare them to provide interpretation services in school and community settings. The course will build students' abilities to transfer intended meanings between two or more monolingual individuals of who are physically present in a school or community setting and who must communicate with each other for professional (and personal) purposes.

Same as: CHILATST 183X, EDUC 183X

EDUC 284. Teaching and Learning in Heterogeneous Classrooms. 3 Units.

Teaching in academically and linguistically heterogeneous classrooms requires a repertoire of pedagogical strategies. Focus is on how to provide access to intellectually challenging curriculum and equal-status interaction for students in diverse classrooms. Emphasis is on group work and its cognitive, social, and linguistic benefits for students. How to prepare for group work, equalize participation, and design learning tasks that support conceptual understanding, mastery of content and language growth. How to assess group products and individual contributions. (STEP).

EDUC 285. Supporting Students with Special Needs. 2-3 Units.

For STEP teacher candidates. Needs of exceptional learners, identification of learning differences and disabilities, and adaptations in the regular inclusion classroom. Legal requirements of special education, testing procedures, development of individualized education plans, and support systems and services. Students follow a special needs learner to understand diagnosis, student needs, and types of services.

EDUC 286B. Second Language Acquisition Research. 4 Units.

Major research findings and theories in second language acquisition. Second language research and theories in formal and informal settings where a second language is learned.

EDUC 287X. Graduate Research Workshop on Psychological Interventions. 3 Units.

Psychological research has the potential to create novel interventions that promote the public good. This workshop will expose students to psychologically 'wise' intervention research and to support their efforts to conduct such interventions, especially in the context of education, broadly conceived, as well as other areas. The first part of the class will address classic interventions and important topics in intervention research, including effective delivery mechanisms, sensitive behavioral outcomes, the role of theory and psychological process, and considerations of the role of time and of mechanisms that can sustain treatment effects over time. In the second part of the class, students will present and receive feedback on their own ongoing and/or future intervention research. Prerequisite: Graduate standing in Psychology or Education, or consent of instructor.

Same as: PSYCH 274

EDUC 288. Organizational Analysis. 4 Units.

Principles of organizational behavior and analysis; theories of group and individual behavior; organizational culture; and applications to school organization and design. Case studies.

Same as: SOC 366

EDUC 289. The Centrality of Literacies in Teaching and Learning. 3 Units.

(Formerly EDUC 166.) Focus is on principles in understanding, assessing, and supporting the reading and writing processes, and the acquisition of content area literacies in secondary schools. Literacy demands within particular disciplines and how to use oral language, reading, and writing to teach content area materials more effectively to all students. (STEP).

EDUC 290. Instructional Leadership: Building Capacity for Excellent Teaching. 3-4 Units.

This course focuses on the role of leaders in designing, supporting and sustaining excellent teaching. How do leaders create the organizational conditions to focus attention on the technical core of instruction, curriculum and assessment. Course goals: 1) explore a variety of educational leadership approaches, 2) investigate the theory of action underlying these approaches to leadership and consider the implications for instructional practice and 3) develop understanding of the relationship between the leadership approach and the learning environment.

EDUC 291. Learning Sciences and Technology Design Research Seminar and Colloquium. 1-3 Unit.

Students and faculty present and critique new and original research relevant to the Learning Sciences and Technology Design doctoral program. Goal is to develop a community of scholars who become familiar with each other's work. Practice of the arts of presentation and scholarly dialogue while introducing seminal issues and fundamental works in the field.

EDUC 291X. Introduction to Survey Research. 3-4 Units.

Planning tasks, including problem formulation, study design, questionnaire and interview design, pretesting, sampling, interviewer training, and field management. Epistemological and ethical perspectives. Issues of design, refinement, and ethics in research that crosses boundaries of nationality, class, gender, language, and ethnicity.

Same as: EDUC 191X

EDUC 292. Academic Writing for Clarity and Grace. 2-4 Units.

Students will acquire helpful writing strategies, habits, and critical faculties; increase their sense of writing as revision; and leave them with resources that will support them in their own lifelong pursuit of good writing. Students will work on revising their own papers and editing papers of other students. Class will focus on exercises in a variety of critical writing skills: framing, concision, clarity, emphasis, rhythm, action, actors, argument, data, quotations, and usage. Course enrollment limited to graduate students.

EDUC 293X. Church, State, & Schools: Issues in Education & Religion. 4 Units.

This course will examine interactions between religion and education, focusing on both formal and experiential sites in which people and communities explore, articulate, encounter, and perform religious ideologies and identities. The class will focus on different religious traditions and their encounters the institutions and structures of education in American culture, both in the United States and as it manifests in American culture transnationally.

Same as: RELIGST 293X

EDUC 294X. History of the Learned Book. 3-5 Units.

The course takes full advantage of the university library's Special Collections to examine the key historic works contributing to the advancement of learning and the organization of knowledge. Beginning with medieval manuscripts and progressing through all areas of human inquiry during the age of print, the course explores the economic and educational history of learned publishing in the West, while examining what these historic artifacts reveal about developments in the structure and authority, production and circulation, technology and aesthetics, of learning and knowledge.

EDUC 295. Learning and Cognition in Activity. 3 Units.

Methods and results of research on learning, understanding, reasoning, problem solving, and remembering, as aspects of participation in social organized activity. Principles of coordination that support cognitive achievements and learning in activity settings in work and school environments.

Same as: PSYCH 261A

EDUC 296X. School Leadership. 3 Units.

Can one person really make a difference for all the students in a school? Accurate or not, that's the expectation faced by school principals. This course will give students practice in translating school improvement ideas into practice and also help them develop a personal vision for school improvement. For students in POLS or MA/MBA program in School of Education.

EDUC 297. Teaching and Learning in Higher Education. 3-4 Units.

This course is co-taught by Mariatte Denman, Associate Director of the Center on Teaching and Learning. It provides POLS students with an opportunity to focus on teaching and learning along with doctoral students from many disciplines throughout the university. Students watch and interview master teachers at Stanford, prepare a syllabus module for a workshop or class they might teach, and learn a range of effective pedagogical methods. Preparing an analytic paper is an alternative for those who do not want to prepare a syllabus module. The course is open not only to POLS students who expect to work in higher education, but also to students interested in K-12 education, and they may develop a teaching module for use in those schools.

Same as: CTL 297

EDUC 298. Seminar on Teaching Introductory Computer Science. 1 Unit.

Faculty, undergraduates, and graduate students interested in teaching discuss topics raised by teaching computer science at the introductory level. Prerequisite: consent of instructor.

Same as: CS 298

EDUC 299. Educating for Equity and Democracy. 2 Units.

(Formerly EDUC 167.) Introduction to the theories and practices of equity and democracy in education. How to think about teaching and schooling in new ways; the individual moral and political reasons for becoming a teacher. (STEP).

EDUC 302. Behavior Design: Connecting People to Nature. 3 Units.

Students learn Behavior Design and practice applying the methods to change human behavior in measurable ways. In this particular course, all projects will focus on one theme: Connecting people to nature.

EDUC 302X. Incentives In Education. 1-4 Unit.

Seminar. Theoretical and empirical literatures from psychology and economics that focus on group and individual incentives and their potential effects. Emphasis is on seminal experiments in psychology and the recent wave of economic field experiments that test the how individual incentives affect educational outcomes and intrinsic motivation.

EDUC 303X. Designing Learning Spaces. 3-4 Units.

Project-based. How space shapes personal interactions and affords learning opportunities in formal and informal settings. How to integrate learning principles into the design of spaces and develop a rubric to assess the impact on learning.

EDUC 304. Foundations and Contemporary Topics in Social-Educational Psychology. 2-4 Units.

At its core, social psychology is concerned with educational problems because it addresses the problem of how to change hearts and minds in lasting ways. This course explores the major ideas, theories, and findings of social psychology, their educational implications, and the insights they shed into how and when people change. There will be a focus on educational issues. Intersections with other disciplines, in particular social development and biology, will be addressed. Historical tensions and traditions, as well as classic studies and theories, will be covered. Graduate students from other disciplines, and advanced undergraduates, are welcome (class size permitting).

Same as: PSYCH 280

EDUC 306A. Economics of Education in the Global Economy. 5 Units.

Case material considers development problems in the U.S. and abroad. Discussion sections on economic aspects of educational development.

EDUC 306B. The Politics of International Cooperation in Education. 3-5 Units.

Education policy, politics, and development. Topics include: politics, interests, institutions, policy, and civil society; how schools and school systems operate as political systems; how policy making occurs in educational systems; and theories of development.

EDUC 306D. World, Societal, and Educational Change: Comparative Perspectives. 4-5 Units.

Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

Same as: EDUC 136, SOC 231

EDUC 306Y. Economic Support Seminar for Education and Economic Development. 1 Unit.

Core economic concepts that address issues in education in developing and developed countries. Supply and demand, elasticity, discount rates, rate of return analysis, utility functions, and production functions. Corequisite: 306A. (Carnoy).

EDUC 307X. Organizing for Diversity: Opportunities and Obstacles in Groups and Organizations. 3-4 Units.

Obstacles in organizations and groups that prevent people from participating, working effectively, and developing relationships in the context of diversity. How to create conditions in which diversity enhances learning and effectiveness? Experiential exercises; students experiment with conceptual and analytic skills inside and outside of the classroom.

EDUC 308X. Mobile Learning Technology for the Marginalized. 1-3 Unit.

Learning design principles as a basis for developing and evaluating mobile learning systems to address educational inequalities in underserved communities. Students analyze mobile learning scenarios, prototypes, and authoring tools while collaborating with research teams to develop a small-scale mobile empowerment scenario addressing education needs such as language, math, health, and civic and life skills in developing countries.

EDUC 309X. Educational Issues in Contemporary China. 3-4 Units.

Reforms such as the decentralization of school finance, emergence of private schools, expansion of higher education, and reframing of educational policy to focus on issues of quality. Have these reforms exacerbated educational inequality.

Same as: EDUC 109X

EDUC 310. Sociology of Education: The Social Organization of Schools. 4 Units.

Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

Same as: EDUC 110, SOC 132, SOC 332

EDUC 311X. Designing Learning for Development: Learning Theories, Technology Design and Social Change. 3 Units.

Perspectives on learning and human development as they relate to prior technological interventions in the development sphere. Case studies in the international development context; historical perspective on learning and development. Methods of inquiry useful in a design process engaging technology within a development framework.

EDUC 312B. Microsociology: Social Structure and Interaction. 4 Units.

How to interpret interpersonal situations using microsociological theories. Focuses on the role of intention, identity, routines, scripts, rituals, conceptual frameworks, talk and emotions in social interaction. Processes by which interactions reverberate outward to transform groups and social structures. Special consideration will be placed on organizational contexts like schools, workplaces and policy decision arenas.

Same as: SOC 224B

EDUC 313X. The Education of American Jews. 4 Units.

This course will take an interdisciplinary approach to the question of how American Jews negotiate the desire to retain a unique ethnic sensibility without excluding themselves from American culture more broadly. Students will examine the various ways in which people debate, deliberate, and determine what it means to be an "American Jew". This includes an investigation of how American Jewish relationships to formal and informal educational encounters through school, popular culture, religious ritual, and politics.

Same as: JEWISHST 393X, RELIGST 313X

EDUC 315X. Race and Ethnicity in Society and Institutions. 1-5 Unit.

Primarily for doctoral students. Major theories and empirical research. Emphasis is on schooling and race, racial identity, urban issues, and the impact of immigration on race relations.

Same as: SOC 347

EDUC 317X. Workshop: Networks, Histories, and Theories of Action. 1-2 Unit.

Yearlong workshop where doctoral students are encouraged to collaborate with peers and faculty who share an interest in researching the network dynamics, histories and theories of action that help explain particular social phenomena. Students present their own research and provide helpful feedback on others' work. Presentations may concern dissertation proposals, grants, article submissions, book proposals, datasets, methodologies and other texts. Repeatable for credit.

Same as: SOC 317W

EDUC 318X. The Discourses of Teaching Reading. 3-5 Units.

Students examine language, social relationships, and students' textual sense-making to further develop their conceptions of reading comprehension and their pedagogical practice as reading teachers. What it means to comprehend text; how classroom discourse matters in the development of textual understanding; and what understandings, purposes, and relationships should matter in classroom talk about text. Field work in which students facilitate small group text discussions for the duration of the quarter at a location of their choice.

EDUC 321. Analysis of Social Interaction. 4 Units.

Practicum on discourse, interactional, and cultural analysis of videotaped data. Analysis of interactional data, and the basis on which analytic claims can be founded. The transcription of speech and movement in social interaction, and how to identify the patterns which participants use to display and interpret cultural meanings. The theoretical assumptions hidden in transcription systems. Prerequisite: first- or second-year graduate student.

EDUC 321X. Leading Social Change: Educational and Social Entrepreneurship. 4 Units.

(Same as OB 385) The course provides an overview of different approaches to leading change in the social sector, drawing primarily, but not exclusively, on case examples in education. While there is a substantial need for innovation and visionary leadership in sectors such as education, social entrepreneurs who want to drive change must appreciate the significant barriers and unique opportunities presented by non-market forces in these sectors. The course will equip students with an appreciation for different mechanisms of change and theories of action as well as some of the challenges of initiating and sustaining meaningful change in social sectors such as education. The course will draw on readings and case studies, and we will benefit from the wisdom of an inspirational group of guest lecturers. While the course will benefit any student concerned with making a positive impact in the world, it is particularly (although not exclusively) appropriate for students in the joint MA/MBA program as well as those who will lead social change through nonprofit consulting or entrepreneurship.
Same as: OB 385

EDUC 322. Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms. 3-5 Units.

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Prerequisite: graduate status or consent of instructor.
Same as: AFRICAAM 130, CSRE 130, EDUC 123X

EDUC 323A. The Practice of Education Policy Analysis. 3-5 Units.

Key issues in the K-12 education policy. Modern theories about the making of policy and its implementation. Preparation to do policy analysis in education.

EDUC 324X. The Ecology of Equality. 1-4 Unit.

A biweekly, one-hour workshop that meets throughout the full academic year. Designed for doctoral students and explores a range of issues pertaining to equity and equality in the United States and globally. Takes an interdisciplinary approach and intended for those who desire a deeper exploration of humanistic, social science and philosophical explanations for existing conditions, crises, and policies in society, as they pertain to various forms of social inequality—with a particular focus on race, ethnicity, class, gender, and sexuality.

EDUC 325A. Proseminar 1. 3 Units.

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?.

EDUC 325B. Proseminar 2. 3 Units.

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?.

EDUC 325C. Proseminar 3. 2-4 Units.

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?.

EDUC 326. Law, Litigation, and Educational Policy. 3 Units.

Same as LAW 364. Restricted to Education graduate students and Law students. Interplay among educational law and policy, administrative decision making, and practice. Issues include the relationship between schooling and the state, nature and scope of students' substantive and procedural rights inside the schoolhouse, and how law and litigation have advanced or stymied the goal of equality of educational opportunity.

EDUC 327A. The Conduct of Qualitative Inquiry. 3-4 Units.

Two quarter sequence for doctoral students to engage in research that anticipates, is a pilot study for, or feeds into their dissertations. Prior approval for dissertation study not required. Students engage in common research processes including: developing interview questions; interviewing; coding, analyzing, and interpreting data; theorizing; and writing up results. Participant observation as needed. Preference to students who intend to enroll in 327C.

Same as: SOC 331

EDUC 327C. The Conduct of Qualitative Inquiry. 1-4 Unit.

For doctoral students. Students bring research data for analysis and writing. Preference to those who have completed 327A.

EDUC 328. Topics in Learning and Technology: Core Mechanics for Learning. 3 Units.

Contents of the course change each year. The course can be repeated. In game play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core mechanics that can drive learning forward, and if so, how to build them into learning environments.

EDUC 328A. Topics in Learning and Technology: Designing Calm. 3 Units.

Contents of the course change each year. The course can be repeated. Stress silently but steadily damages physical and emotional well-being, relationships, productivity, and our ability to learn and remember. This highly experiential and project-oriented class will focus on designing interactive technologies to enable calm states of cognition, emotion, and physiology for better human health, learning, creativity and productivity.
Same as: CS 377D

EDUC 329X. Seminar on Teacher Professional Development. 1-4 Unit.

For master's and doctoral students. Theories, principles, and models of professional development. Issues include: different conceptions of teaching, practice, and development; what gets developed in professional development; pedagogies of professional development; structures to support teacher learning; evaluating professional development; and policy issues.

EDUC 330X. Teaching English Language Learners: Issues in Policy, Leadership, and Instruction. 3-4 Units.

Current perspectives and research on issues facing educators serving the English language learner population. Issues include federal education legislation, civil rights law, national Common Core Standards, content and language proficiency standards assessment and accountability, school improvement models, school structure, community engagement, addressing issues of long-term English learners, programming for newcomer ELLs, early childhood education, and promoting bilingualism.

EDUC 332. Theory and Practice of Environmental Education. 3 Units.

Foundational understanding of the history, theoretical underpinnings, and practice of environmental education as a tool for addressing today's pressing environmental issues. The purpose, design, and implementation of environmental education in formal and nonformal settings with youth and adult audiences. Field trip and community-based project offer opportunities for experiencing and engaging with environmental education initiatives.

EDUC 333A. Understanding Learning Environments. 3 Units.

Advanced seminar. Theoretical approaches to learning used to analyze learning environments and develop goals for designing resources and activities to support effective learning practices.

EDUC 333B. Imagining the Future of Learning: SparkTruck - Designing Mobile Interventions for Education. 4 Units.

Created at the d.school last year, SparkTruck has traveled over 15,000 miles across the USA, teaching thousands of kids how to build stuff and unleash their creativity. In this class, students will explore the potential of a mobile platform for affecting change in the educational ecosystem. Topics will include introductions to the design process, modern prototyping tools, and the complex education ecosystem. Students will work in teams in this project-based class, and an emphasis will be placed on real-world prototyping through hands-on field work in local schools. Interested and qualified students will have the opportunity to embark on a cross-country road trip in the SparkTruck this summer. Open to all graduate students and well-qualified undergrads of any major. Enrollment is limited. Apply at www.sparktruck.org/apply.

Same as: ME 376A

EDUC 334A. Youth and Education Law Project: Clinical Practice. 4 Units.

(Same as LAW 660A). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work offers students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Beginning with the 2009-2010 academic year, each of the Law School's clinical courses is being offered on a full-time basis for 12 credits.

EDUC 334B. Youth and Education Law Project: Clinical Methods. 4 Units.

(Same as LAW 660B). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation, or special education due process hearings. This work offers students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees of the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Beginning with the 2009-2010 academic year, each of the Law School's clinical courses is being offered on a full-time basis for 12 credits.

EDUC 334C. Youth and Education Law Project: Clinical Coursework. 4 Units.

(Same as LAW 660C). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation, or special education due process hearings. This work offers students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Beginning with the 2009-2010 academic year, each of the Law School's clinical courses is being offered on a full-time basis for 12 credits.

EDUC 334X. Education Advocacy Clinic. 2-10 Units.

(Same as LAW 660.) For students enrolled in the Education (M.A.) and Law (J.D.) joint degree program and those who already possess Law degrees only. Students participate in educational rights and reform work with clients and communities, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. May be repeated for credit. Prerequisite: consent of instructor.

EDUC 335X. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 135X, HUMBIO 26, MED 235

EDUC 336. Language, Identity, and Classroom Learning. 1-3 Unit.

As contemporary research focuses on how people act and recognize each other, analyzing interaction while acknowledging identity allows for a dynamic examination of cultural interaction. Broad cultural categorization can be overly expansive in identifying the characteristics of large groups of individuals.

EDUC 336A. Law and Public Policy: Issues in Implementation. 3 Units.

(Same as LAW 636.) This seminar will focus on issues related to achieving successful implementation of the goals of legislation. It is widely recognized that the goals of legislation often are not realized and that the failure frequently rests in breakdowns in the implementation process by the agencies and organizations charged with implementing the legislation. In response to problems in implementation, the institutional context of public policy implementation is changing. One category of innovations, known by names such as "management-based regulation" and "evidence-based" social service delivery, gives broad discretion to street-level service providers but subjects them to intensive monitoring and disciplined performance comparison. Another category applies market concepts to regulation or social services, for example, by creating tradable rights (e.g. pollution allowances) or vouchers (for schools, housing, or healthcare). These, and other, new approaches are affecting both the contours of public law doctrine and the nature of lawyering in the public sector. Lawyers in the public sector are increasingly drawing on skills of institutional design and monitoring of the kind associated with private sector transactional practice. This seminar will examine some of the emerging general themes of innovative policy implementation and look at a range of case studies. Topics will include the conditions under which financial and other rewards and sanctions are useful in bringing about desired behaviors, the pluses and minuses of the creation of markets as alternatives to government run programs, and efforts at improving implementation by improving management activities. Examples will be taken from both regulation and social services, and are likely to include environmental protection, education, child protective services, healthcare, food and workplace safety, nuclear power safety, and regulation of financial institutions. We will invite presentations by academics and practitioners.

EDUC 337. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.

Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

Same as: AFRICAAM 106, CSRE 103B, EDUC 103B

EDUC 338X. Innovations in Education. 3-4 Units.

Each year students in this course explore a new design challenge related to teaching. This year we will focus on creating school models. We welcome graduate students from a wide range of disciplines. Admission by application. Please see more information at <http://dschool.stanford.edu>.

EDUC 339. Advanced Topics in Quantitative Policy Analysis. 1-2 Unit.

For doctoral students. How to develop a researchable question and research design, identify data sources, construct conceptual frameworks, and interpret empirical results. Presentation by student participants and scholars in the field. May be repeated for credit.

EDUC 340. Psychology and American Indian Mental Health. 3-5 Units.

Western medicine's definition of health as the absence of sickness, disease, or pathology; Native American cultures' definition of health as the beauty of physical, spiritual, emotional, and social things, and sickness as something out of balance. Topics include: historical trauma; spirituality and healing; cultural identity; values and acculturation; and individual, school, and community-based interventions. Prerequisite: experience working with American Indian communities.

Same as: NATIVEAM 240

EDUC 341X. Urban School System Reform. 4 Units.

Strategies for large-scale reform of complex school systems. Case studies of urban school systems. Sources include approaches developed in management studies, organizational behavior, and school reform. Political and community contexts; the role of urban superintendents and administrators in creating reform strategies. Factors such as labor relations and the regulatory environment. Guest speakers.

EDUC 342. Child Development and New Technologies. 3 Units.

Focus is on the experiences computing technologies afford children and how these experiences might influence development. Sociocultural theories of development as a conceptual framework for understanding how computing technologies interact with the social ecology of the child and how children actively use technology to meet their own goals. Emphasis is on influences of interactive technology on cognitive development, identity, and social development equity.

EDUC 343X. Navigating the Academic Profession. 1-2 Unit.

For DARE doctoral fellows only. The roles and responsibilities of faculty members in American colleges and universities in the 21st century. How to become productive faculty members within the higher education enterprise.

EDUC 345X. Adolescent Development and Schooling. 3-5 Units.

How the context of school and its relationship to other major context developments (family, peer group, and neighborhood) influence the social, emotional, and cognitive development of secondary school-aged youths. Metatheoretical approaches (mechanistic, organismic, developmental contextualist metamodels) and methods of conducting research on schooling and development (laboratory, survey, ethnographic, intervention). Topics: school transitions during adolescence; the role of school functioning in broader patterns of competence or distress; and how the organization of academic tasks, classrooms, and school environments as a whole can influence adolescent development. Focus is on middle and high school years. (PSE).

EDUC 346. Research Seminar in Higher Education. 4 Units.

Required for higher education students. Major issues, current structural features of the system, the historical context that shaped it, and theoretical frameworks. The purposes of higher education in light of interest groups including students, faculty, administrators, and external constituents. Issues such as diversity, stratification, decentralization, and changes that cut across these groups.

EDUC 347. The Economics of Higher Education. 4 Units.

Topics: the worth of college and graduate degrees, and the utilization of highly educated graduates; faculty labor markets, careers, and workload; costs and pricing; discounting, merit aid, and access to higher education; sponsored research; academic medical centers; and technology and productivity. Emphasis is on theoretical frameworks, policy matters, and the concept of higher education as a public good. Stratification by gender, race, and social class.

EDUC 348X. Policy and Practice in Science Education. 3-4 Units.

Values and beliefs that dominate contemporary thinking about the role and practice of science education, what the distinctive features of science are, and the arguments for its value as part of compulsory education. Research on the conceptual and affective outcomes of formal science education, how the changing nature of contemporary society challenges current practice, and the rationale for an alternative pedagogy, curriculum and assessment.

EDUC 350X. Workshop on New Research. 1 Unit.

This course will integrate attendance and participation at the research lectures given by visitors with separate, faculty-led workshops that discuss the presented study, its methodologies, and the research and policy contexts in which it is situated. This workshop will also provide an opportunity for professional development relevant to academic publishing and effective presentation.

EDUC 351A. Statistical Methods for Longitudinal Data. 2-3 Units.

Research designs and statistical procedures for time-ordered (repeated-measures) data. The analysis of longitudinal panel data is central to empirical research on learning, development, aging, and the effects of interventions. Topics include: measurement of change, growth curve models, analysis of durations including survival analysis, experimental and non-experimental group comparisons, reciprocal effects, stability. See <http://web.stanford.edu/~rag/stat222/>. Prerequisite: intermediate statistical methods.

Same as: STATS 222

EDUC 351B. Statistical Issues in Testing and Assessment. 2-3 Units.

The new book by Howard Wainer, "Uneducated Guesses: Using Evidence to Uncover Misguided Education Policies" is the basis for this seminar. Also included will be supporting research literature and data analysis activities for topics such as college admissions, methods for missing data, assessment of achievement gaps, and the use of value-added analysis. See <http://www-stat.stanford.edu/~rag/ed351B/>.

EDUC 351C. Workshop in Technical Quality of Educational Assessments and Accountability. 3 Units.

Topics include: determinations of accuracy for individual scores and group summaries; design and reporting of educational assessments; achievement instruments in state-level accountability systems; and policy implications of statistical properties. See <http://www.stanford.edu/~rag/>.

EDUC 353C. Problems in Measurement: Generalizability Theory. 3 Units.

Application to analysis of educational achievement data, including performance assessments. Fundamental concepts, computer programs, and actual applications.

EDUC 354. School-Based Decision Making. 4 Units.

Leadership and organizational issues. Leadership as it plays out in the pragmatic demands and tensions of site-level decision processes. Interdependence of several factors critical to school achievement and equity outcomes: governance, culture, instruction, resource alignment, data/inquiry, community engagement. School decision-making as a capacity-building process.

EDUC 355X. Higher Education and Society. 3 Units.

For undergraduates and graduate students interested in what colleges and universities do, and what society expects of them. The relationship between higher education and society in the U.S. from a sociological perspective. The nature of reform and conflict in colleges and universities, and tensions in the design of higher education systems and organizations.

EDUC 356. Street History: Learning the Past in School and Out. 3-5 Units.

Interdisciplinary. Since Herodotus, history and memory have competed to shape minds: history cultivates doubt and demands interpretation; memory seeks certainty and detests that which thwarts its aims. History and memory collide in modern society, often violently. How do young people become historical amidst these forces; how do school, family, nation, and mass media contribute to the process?.

Same as: HISTORY 337C

EDUC 357. Science and Environmental Education in Informal Contexts. 3-4 Units.

There are ever-expanding opportunities to learn science in contexts outside the formal classroom, in settings such as zoos, museums, and science centers. How are issues around science and the environment presented in these contexts, how do people behave and learn in these contexts, and what messages do they take away? This course will cover the learning theories and empirical research that has been conducted in these settings. Case studies of nearby science centers will add an experiential dimension.

EDUC 358X. Learning, Sharing, Publishing, and Intellectual Property. 1-4 Unit.

The educational, historical, legal, economic, technical, and ethical issues entailed in the digital-era openness and sharing of intellectual properties associated with learning (including books, websites, games, journals, etc.). The skills and knowledge for finding, developing, and evaluating resources at all educational levels, based on a grasp of the opportunities and challenges of increasing access to learning in this way. As part its global focus on open learning, the course will be run in conjunction with the OpenKnowledge MOOC "Changing the Global Course of Learning" (<https://class.stanford.edu/courses/Education/OpenKnowledge/Fall2014/about>), offering students the option of both experiencing and studying a MOOC on this theme, which is being co-taught in Mexico, Ghana, Canada, and the U.S. (Stanford and Fordham) in English and Spanish.

EDUC 359B. Science Learning. 2-3 Units.

For doctoral students interested in science education and literacy in school subjects.

EDUC 359C. Science Literacy. 2-3 Units.

The changing debate over conceptions of the nature of science and the calls to broaden it. Themes, directions, limitations, and epistemological foundations of the body of research on the nature of science.

EDUC 359F. Research in Mathematics Education: Conducting Inquiry. 2-4 Units.

This seminar will serve as both a workshop for developing participants' own professional trajectories as mathematics education scholars and a forum for discussion on key issues related to conducting research and making an impact in the field of mathematics education. Participants will be invited to share their own research and to engage in discussions about possible impact. This seminar is restricted to mathematics education students.

EDUC 360X. Developmental Psychopathology and Resilience. 3-4 Units.

In this course students will learn about theoretical, methodological, and empirical issues pertaining to developmental psychopathology and resilience of children and adolescents. The course focuses on (1) current conceptual and empirical issues; (2) cognitive, affective, and motivational processes that underlie some of the most salient childhood mental health symptoms and disorders; (3) family, school, and cultural factors that contribute to developmental psychopathology and resilience; and (4) cutting-edge analytic methods that are currently employed in studies of developmental psychopathology and resilience.

EDUC 361. Workshop: Networks and Organizations. 1-3 Unit.

For students doing advanced research. Group comments and criticism on dissertation projects at any phase of completion, including data problems, empirical and theoretical challenges, presentation refinement, and job market presentations. Collaboration, debate, and shaping research ideas. Prerequisite: courses in organizational theory or social network analysis. Same as: SOC 361W

EDUC 362X. The Science Curriculum: Values and Ideology in a Contested Terrain. 2-4 Units.

The issue of what should be taught in schools is a site of contestation where issues of beliefs, values and ideologies emerge. This course will use the school science curriculum and the history of its development to explore the common positions adopted and argued for in approaching curriculum development. Course will help students develop a knowledge of curriculum reform in school science and a deeper understanding of the arguments that have shaped its present form and their historical antecedents.

EDUC 364. Cognition and Learning. 3-4 Units.

Cognitive psychology is the study of human thought including topics including the nature of expertise, creativity, and memory. Emphasis is on learning. The role of cognitive psychology in helping people learn, and determining the most desirable type of learning and whether people have learned. Students design and conduct their own learning study.

EDUC 365. Social, Emotional, and Personality Development. 3 Units.

Limited to doctoral students in DAPS and those with a background in child and adolescent development. Developmental processes that account for psychological adaptation in social relationships, schools, and other interpersonal settings. Theoretical models of social, personality, and emotional development. Topics such as self-concept, empathy, motivation, aggression, and personality formation.

EDUC 366X. Learning in Formal and Informal Environments. 3 Units.

How learning opportunities are organized in schools and non-school settings including museums, after-school clubs, community art centers, theater groups, aquariums, sports teams, and new media contexts. Sociocultural theories of development as a conceptual framework. Readings from empirical journals, web publications, and books. Collaborative written or multimedia research project in which students observe and document a non-school learning environment.

EDUC 367. Cultural Psychology. 3-5 Units.

(Formerly 292.) The relationship between culture and psychological processes; how culture becomes an integral part of cognitive, social, and moral development. Both historical and contemporary treatments of cultural psychology, including deficit models, crosscultural psychology, ecological niches, culturally specific versus universal development, sociocultural frameworks, and minority child development. The role of race and power in research on cultural psychology.

EDUC 368. Cognitive Development in Childhood and Adolescence. 3-4 Units.

This course aims to broaden and deepen students' understanding of cognitive development from the prenatal period through adolescence. It will examine various theoretical, methodological, and empirical issues pertaining to different domains of cognitive development, such as neurobiological plasticity, infant cognition, theory of mind, memory, language, and executive functions. Throughout the course, as we survey research findings, we will discuss (1) methods that researchers have employed in their study of cognitive development; (2) limitations of current research and directions for future research; and (3) translation of research findings for practitioners and policymakers.

EDUC 370X. Graduate Workshop: Feminist, Gender, and Sexuality Studies. 1-3 Unit.

Theory, methods, and research in feminist, gender, and sexuality studies, through presentations of ongoing work by students, faculty, and guest speakers, and discussion of recent literature and controversies, feminist pedagogy and career development issues. Restricted to doctoral students. Repeatable for credit. Required for PhD Minors in Feminist, Gender, and Sexuality Studies (3 quarters min.). Same as: FEMGEN 299

EDUC 371X. Social Psychology and Social Change. 2-3 Units.

The course is intended an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome. Interested students should contact Shannon Brady (stbrady@stanford.edu). Same as: PSYCH 265

EDUC 373X. Teaching in the Humanities-Research into Adolescent Literacy. 3-5 Units.

Relatively little attention has been paid to the role of humanities courses in teaching both general and disciplinary skills in reading and writing. With the growth of small schools, more middle and high school teachers find themselves teaching 'Humanities' courses. This seminar will explore what it means to teach the humanities, with special attention to how such courses can develop disciplinary reading and writing skills. Course will investigate how we develop tools to assess teaching and learning in the humanities.

EDUC 374. Philanthropy and Civil Society. 1-3 Unit.

Cross-listed with Law (LAW 781), Political Science (POLISCI 334) and Sociology (SOC 374). Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

Same as: POLISCI 334, SOC 374

EDUC 375A. Seminar on Organizational Theory. 5 Units.

The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

Same as: MSE 389, SOC 363A

EDUC 375B. Seminar on Organizations: Institutional Analysis. 3-5 Units.

Seminar. Key lines of inquiry on organizational change, emphasizing network, institutional, and evolutionary arguments.

Same as: SOC 363B

EDUC 376. State Theory and Educational Policy. 4 Units.

The relationship between political system structures and educational change by analyzing theories and interpretations of how political systems function, and the implications of these theories for understanding education. Classical and Marxist interpretations.

EDUC 377. Comparing Institutional Forms: Public, Private, and Nonprofit. 4 Units.

For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education.

Sources include scholarly articles, cases, and historical materials.

Same as: GSBGEN 346, PUBLPOL 317, SOC 377

EDUC 377B. Strategic Management of Nonprofits. 4 Units.

(Same as STRAMGT 368). Strategic, governance, and management issues facing nonprofit organizations and their leaders in the era of venture philanthropy and social entrepreneurship. Development and fundraising, investment management, performance management, and nonprofit finance. Case studies include smaller, social entrepreneurial and larger, more traditional organizations, including education, social service, environment, health care, religion, NGOs, and performing arts.

EDUC 377C. Strategic Philanthropy. 3 Units.

(Also GSBGEN 381). Appropriate for any student driven to effect positive social change from either the for-profit or nonprofit sector, Strategic Philanthropy (GSBGEN 381/ EDUC 377C) will challenge students to expand their own strategic thinking about philanthropic aspiration and action. In recent decades, philanthropy has become an industry in itself - amounting to over \$300 billion in the year 2012. Additionally, the last decade has seen unprecedented innovation in both philanthropy and social change. This course explores the key operational and strategic distinctions between traditional philanthropic entities, such as community foundations, private foundations, and corporate foundations; and innovative models, including funding intermediaries, open-source platforms, technology-driven philanthropies, and venture philanthropy partnerships. Course work will include readings and case discussions that encourage students to analyze both domestic and global philanthropic strategies as they relate to foundation mission, grant making, evaluation, financial management, infrastructure, knowledge management, policy change, and board governance. Guest speakers will consist of high profile philanthropists, foundation presidents, social entrepreneurs and Silicon Valley business leaders creating new philanthropic models. The course will culminate in an individual project in which students will complete a business plan for a \$10 million private foundation.

EDUC 377D. Strategic Leadership of Nonprofits. 4 Units.

Formulating, evaluating, and implementing mission and strategy. Case studies from nonprofits in social services, health care, education, and arts and culture. The interaction of strategy and mission, industry structure and evolution, strategic change, growth and replication, corporate strategy, governance, commercialization, alliances, capacity building, and leadership.

Same as: STRAMGT 378

EDUC 378X. Seminar on Social Change Processes and Organizations. 3-4 Units.

Theories of social change and influence processes within and through organizations. Social change organizations. The interaction of philanthropic institutions and other social change organizations within civil society. Meso-level theories of change.

EDUC 379X. Educational Inequality: Legal and Social Science Perspectives. 3-5 Units.

This class will examine the issue of inequality in primary and secondary education, particularly with respect to race and socioeconomic status, from the perspectives of both law and social science. The course will distinguish between inequality in terms of inputs versus outputs, presenting the empirical evidence about each and the relationship between the two. The course will explore the history of legal and policy responses to persistent inequality, and consider the challenge of contemporary educational inequality and survey the competing policy approaches, from desegregation to increased and redistributed funding to efforts to improve instructional quality, to centralized accountability and testing to market-based solutions.

Same as: LAW 505

EDUC 380. Supervised Internship. 1-15 Unit.

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EDUC 381. Multicultural Issues in Higher Education. 4 Units.

The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

Same as: EDUC 181

EDUC 382. Student Development and the Study of College Impact. 4 Units.

The philosophies, theories, and methods that undergird most research in higher education. How college affects students. Student development theories, models of college impact, and issues surrounding data collection, national databases, and secondary data analysis.

EDUC 386. Leadership and Administration in Higher Education. 2 Units.

Definitions of leadership and leadership roles within colleges and universities. Leadership models and organizational concepts. Case study analysis of the problems and challenges facing today's higher education administrators.

EDUC 387A. Workshop: Comparative Studies of Educational and Political Systems. 1-5 Unit.

Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor.
Same as: SOC 311A

EDUC 387B. Workshop: Comparative Systems of Educational and Political Systems. 1-5 Unit.

Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor.
Same as: SOC 311B

EDUC 387C. Workshop: Comparative Studies of Educational and Political Systems. 1-5 Unit.

Analysis of quantitative and longitudinal data on national educational systems and political structures. Prerequisite: consent of instructor. May be repeated for credit.
Same as: SOC 311C

EDUC 388A. Language Policies and Practices. 2 Units.

For STEP teacher candidates seeking to meet requirements for the English Learner Authorization on their preliminary credential. Historical, political, and legal foundations of education programs for English learners. Theories of second language learning, and research on the effectiveness of bilingual education. Theory-based methods to facilitate and measure English learners' growth in language and literacy acquisition, and create environments which promote English language development and content area learning through specially designed academic instruction in English. (STEP).

EDUC 388F. Introduction to Academic Language. 1 Unit.

This course will provide opportunities for pre-service teachers to begin to develop an understanding of language uses, forms, and mechanics through application of a functional approach to academic language. By exploring language structures (phonology, morphology, syntax, semantics) as well as language-in-use (pragmatics and discourse), teacher candidates will be able to better recognize linguistic demands and challenges of students in the classroom.

EDUC 389X. Race, Ethnicity, and Language. 3-4 Units.

This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations participate in similar, yet different, ways of "doing race" through language, interaction and culture. Readings draw heavily from perspectives in (linguistic) anthropology and sociolinguistics. Prerequisite: consent of instructor.

Same as: ANTHRO 320A, LINGUIST 253

EDUC 390X. Learning Analytics and Computational Modeling in Social Science. 3-4 Units.

Computational modeling and data-mining are dramatically changing the physical sciences, and more recently also the social and behavioral sciences. Traditional analysis techniques are insufficient to investigate complex dynamic social phenomena as social networks, online gaming, diffusion of innovation, opinion dynamics, classroom behavior, and other complex adaptive systems. In this course, we will learn about how modeling, network theory, and basic data-mining can support research in cognitive, and social sciences, in particular around issues of learning, cognitive development, and educational policy.

Same as: CS 424M

EDUC 391X. Engineering Education and Online Learning. 3 Units.

An introduction to best practices in engineering education and educational technology, with a focus on online and blended learning. In addition to gaining a broad understanding of the field, students will experiment with a variety of education technologies, pedagogical techniques, and assessment methods.

Same as: EE 396

EDUC 392X. The Political Economy of Global Higher Education. 3-4 Units.

The course is intended to introduce students to the analysis of higher education and higher educational change in an international context, reviewing critically the current literature and showing how social scientists study higher education using quantitative and qualitative tools. The course will present a model of studying change, review political, sociological, and economic theories applied to higher education, and focus on four important case studies of higher education in the developing world: Brazil, Russia, India, and China, known also as the BRIC countries.

EDUC 393. Proseminar: Education, Business, Politics. 3 Units.

Overview of the field of education for joint degree (M.B.A./M.A.) students.

EDUC 394X. Research in Progress Seminar. 1 Unit.

This seminar will provide a forum where graduate students could discuss prospective research ideas, present ongoing research, and consider theoretical issues of broad interest to the field. In this research in progress seminar students are expected to present ongoing research and have a discussion about it -- or a specific research article related to it --, with the purpose of eliciting feedback from the instructor and other seminar participants.

EDUC 395. Scholarly Writing in Education and the Social Sciences. 3-5 Units.

Focus is on producing articles for scholarly journals in education and the social sciences. Ethics and craft of scholarly publishing. Writing opinion articles for lay audiences on issues of educational and social import.

EDUC 396X. The Design of Technologies for Casual Learning. 3 Units.

Studio-based, participatory, and user-centered development of casual learning technologies is explored, using the Apple iPhone as an prototype platform. The term "casual" is borrowed from casual gaming to denote that the learning technologies are meant for learners to use in "extreme informal" learning circumstances (while "on the go", "anytime and any place"). The class builds on learning about and synthesizing knowledge, theory and development activity in four areas including learning theories, mobile technologies, games and participatory design processes.

Same as: EDUC 196X

EDUC 397X. Math Mentoring: Working in the Zone with Learners. 1-2 Unit.

The course focuses on how the tutorial relationship can help students learn mathematics. The course will provide background theory and knowledge as well as provide practical approaches to tutoring, supports for targeting activities to students' needs, selection of materials and activities, and ways to assess the progress of the students and reflect on your own experience. Topics will include social theories of learning, teaching for understanding, and challenges of students who are English language learners. In addition to attending 4, two-hour workshop classes, 1 hour of tutoring is required each week. The course will meet 4 times during the quarter for workshops and discussions following Friday tutoring sessions. Students will submit assignments on the Coursework site on weeks that the course does not meet. A 1 unit section of the course will run in Winter and Spring quarters.

Same as: EDUC 187X

EDUC 398X. Market-Based Education Reforms. 2 Units.

(Same as GSBGEN 577). This seminar course examines market-based education reforms and evidence on their impacts. Topics considered in depth will include public school choice, charter schools, vouchers, incentives for students and teachers, and accountability. We will pay special attention to the design and operation of education markets, the politics and legal challenges of market-based school reform, and methods for evaluating reform initiatives. The course will draw on cases both within the United States and internationally.

EDUC 399A. Designing Surveys. 1-2 Unit.

This workshop/course is designed for students who are designing a survey for use in a research project. The workshop content draws on relevant cognitive processing theories and research (on comprehension, retrieval, judgment, and reporting). In addition to some readings and a few lectures, this workshop is designed to be highly interactive and practical. By the end of the course students will have designed and pilot tested their survey instrument. Course may be repeated for credit.

EDUC 399X. Mixed Methods Research. 3 Units.

This advanced course will address the theory and practice of mixing inquiry methodologies in social inquiry. The course will cover: 1) selected roots of the contemporary interest in mixing methods, 2) conceptualizations of mixed methods design and analysis, and 3) challenges of mixed methods practice.

EDUC 401A. Mini Courses in Methodology: Statistical Packages for the Social Sciences. 1 Unit.

Statistical analysis using SPSS, including generating descriptive statistics, drawing graphs, calculating correlation coefficients, conducting t-tests, analysis of variance, and linear regression. Building up datasets, preparing datasets for analysis, conducting statistical analysis, and interpreting results.

EDUC 401B. Mini Courses in Methodology: Stata. 1 Unit.

The computer as research tool. Statistical software Stata for data analysis, including t-tests, correlation, ANOVA, and multivariate linear regression.

EDUC 401C. Data Analysis Examples Using R. 1 Unit.

We will do basic and intermediate level data analysis examples, like those that students will have seen in their courses, in R. nExamples include: descriptive statistics and plots, group comparisons, correlation and regression, categorical variables, multilevel data.nSee <http://web.stanford.edu/~rag/ed401/>.

EDUC 401D. Multilevel Modeling Using R. 1 Unit.

Multilevel data analysis examples using R. Topics include: two-level nested data, growth curve modeling, generalized linear models for counts and categorical data, three-level analyses. For more information, see course website: <http://web.stanford.edu/~rag/ed401d/>.

EDUC 403X. Education's Digital Future. 1 Unit.

This course provides an intellectual framework for understanding the revolution in digital learning. It has three broad themes: the evolving state of knowledge on digital learning; the roles of education in modern societies; and the digital transformation of modern life generally. The course will convene over three quarters. All three themes will be addressed during each quarter. Students may enroll for a single quarter and/or participate in all three quarters for the most comprehensive overview.

EDUC 404X. Topics in Brazilian Education: Public Policy and Innovation for the 21st Century. 1-2 Unit.

The objective of this seminar is to provide students from different backgrounds an opportunity to learn about current issues and debates on Brazilian education. The seminar will cover topics on the history of Brazilian education; an overview of current school reforms at the federal level; educational assessments; education and economic growth; educational equity; teacher labor market; technology and education; early childhood; and higher education to Brazil.

EDUC 405X. Teaching the Humanities. 3 Units.

This course, designed for graduate students in the humanities and education, explores approaches to teaching the humanities at both the secondary and collegiate levels, with a focus on the teaching of text, and how the humanities can help students develop the ability to read and think critically. The course explores purposes and pedagogical approaches for teaching humanities through a variety of texts and perspectives. The course is designed as an opportunity for doctoral students in the Humanities both to enrich their own teaching, and to broaden their understanding of professional teaching opportunities, including community college and secondary school teaching.

EDUC 406X. Perspectives on Teacher Learning and Lesson Study. 2-4 Units.

Seminar. Based on peer collaboration, lesson study helps to create professional communities among teachers and support their learning. Research literature, teacher thinking and beliefs, teacher professional development, and conceptual frameworks.

EDUC 407X. Lytics Seminar. 1-4 Unit.

This course is a survey of research methods with applications in online learning. The methods covered are very interdisciplinary, including an introduction to machine learning, text/discourse analysis, causal modeling, and psychometrics. Broader question in research methodology are also covered, including how to formulate a good research question, when to use qualitative or quantitative methods, and the relative merits of theory-driven confirmatory vs. exploratory research. The goal of this course is to support researchers in the online learning space and other fields in their research endeavors.

EDUC 409X. Managing to Outcomes in Education and Other Sectors. 2 Units.

Whether as students, taxpayers, or philanthropists, we share an interest that schools, government agencies, and nonprofit organizations effectively achieve their intended outcomes. This course asks how stakeholders and managers can assess these institutions' performance and commitment to continuous improvement. This seemingly technocratic question is often the center of political controversy, as it is today in criticisms of the student assessments required by No Child Left Behind and of "value-added" assessments of teacher performance.nnEver mindful that performance management is a graveyard of good intentions, we will study the practical aspects of institutional change - including leadership, accountability, learning, and culture ?- that often account for the difference between success and failure. We start with the presumption that you can't manage what you can't measure, but managers can usually measure only proxies rather than ultimate outcomes. In addition to the inevitable slippage between the proxies and ultimate outcomes, there is a tension between using assessments for learning and improvement, on the one hand, and for accountability, incentives, and penalties, on the other. Moreover, people have incentives to "game" any performance evaluation system.nnWe will examine the challenges of managing to outcomes in various contexts, focusing particularly on students' and teachers' performance, but also including the performance of selected government agencies (e.g., police and welfare departments), nonprofit organizations, and foundations. We will focus on the interconnections among strategic planning, performance budgeting, and performance management. We will also look at experiments with new funding vehicles that depend on measuring outcomes, such as social impact bonds, conditional cash transfers, and pay for performance schemes in healthcare and other sectors.

EDUC 411X. Early Childhood Education. 1-4 Unit.

This course addresses a broad set of topics that have implications for developmentally appropriate and effective early childhood education. It begins with children's social, emotional and cognitive development and issues related to poverty, culture and language. We will also examine research evidence on effective instruction for young children, evaluations of preschool interventions, and several current policy debates.

EDUC 412X. Organization Studies Research Workshop. 1-2 Unit.

For graduate students whose research is rooted in organization theory. Participants to present and receive feedback on their work including paper drafts, proposals and dissertation chapter. Sources include recent scholarship. May be repeated for credit.

EDUC 417. Research and Policy on Postsecondary Access. 3 Units.

The transition from high school to college. K-16 course focusing on high school preparation, college choice, remediation, pathways to college, and first-year adjustment. The role of educational policy in postsecondary access. Service Learning Course (certified by Haas Center). Same as: EDUC 117

EDUC 419X. Academic Achievement of Language Minority Students. 3-5 Units.

Emphasis is on the current state of knowledge in the research literature and comparisons to students' experiences and observations in bilingual education, English as a second language, reading instruction, cultural issues in education, and research methods.

EDUC 421X. Powerful Ideas for Learning Sciences and Technology Design. 1-3 Unit.

This course is intended as a graduate level seminar that provides in-depth readings and discussions, Professor Roy Pea's professional reflections, and student essay-writing on topics examined in Dr. Pea's select publications and associated influential writings.

EDUC 424. Introduction to Research in Curriculum and Teacher Education. 2-5 Units.

Required for first-year CTE doctoral students. How to conceptualize, design, and interpret research. How to read, interpret, and critique research; formulate meaningful research questions; evaluate and conduct a literature review; and conceptualize a study. Readings include studies from different research paradigms. Required literature review in an area students expect to explore for their qualifying paper.

EDUC 425X. Advanced Topics in Research on Self and Stigma. 1-3 Unit.

This course focuses on the relevance of self, identity, and stigmatization to understanding and remedying social problems. A key focus will be on how interactions between the self-system and social systems (e.g. schools, workplaces, institutions) drive outcomes over time, including educational and economic inequality. More broadly, class discussion and readings will address a social psychological analysis of intervention and change.

EDUC 432X. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations. Same as: AFRICAAM 32, AMSTUD 32, CSRE 32A, EDUC 32X, TAPS 32

EDUC 437. Curricular Practical Training. 1 Unit.

"Curricular Practical Training" independent study sections specifically created for international students in F-1 Visa Status who wish to receive credit and to be paid for internships.

EDUC 445X. Entrepreneurial Approaches to Education Reform. 2 Units.

(Same as STRAMGT 535) This course will investigate the ways in which entrepreneurs have and could transform K-12 public schooling in the United States, a \$650 billion dollar industry that has a direct and long-term effect on the nation's economy, democracy and culture. We will explore how human capital solutions, new schools, and technology products can all dramatically improve student learning and solve pain points. We will study a variety of ways to evaluate the efficacy, scalability, and financial sustainability of entrepreneurial enterprises serving students, families, educators and administrators in public education. The course will feature for-profit, not-for-profit, as well as double-bottom-line organizations. This course is suitable for students aspiring to be entrepreneurs, leaders in entrepreneurial organizations, leaders in educational organizations, donors or investors. Gloria Lee is a serial education entrepreneur who co-founded Aspire Public Schools, Teaching Channel, and Yu Ming Charter School. She is currently Chief Operating Officer at NewSchools Venture Fund. This course was designed to be taken in tandem with STRAMGT 537: Leading Change in Public Education and the courses will be highly complementary in approach.

EDUC 447X. Leading Change in Public Education. 2 Units.

(Same as STRAMGT 537) American public education is in crisis. What will it take to get it back on track? As in all large-scale enterprises in need of transformative change, leadership matters greatly. This course focuses on what it takes from a strategic and extremely practical perspective to lead change in public education at the systems level. We will meet some of the most exciting educational leaders in public education today and dissect their leadership styles, strategies, innovations and solutions. We will look for lessons from traditional U.S. districts, successful charter management organizations, and international perspectives to determine what it takes to be an effective leader in education reform. Students will debate the strategies and efficacy of how different leaders approached systems-level change, and will form their own working hypotheses of what is needed to help transform the American education system. The course will end with a look at education fellowship programs and other ways for Stanford graduates to take on meaningful leadership roles in K-12 education reform. Dan Katzir worked for Bain & Company, Teach for America, and Sylvan Learning Systems before joining The Broad Foundation as its founding managing director. He is an experienced case study teacher and the editor of *The Redesign of Urban School Systems* (Harvard University Press, 2013). This course was designed to be taken in tandem with STRAMGT 535: Entrepreneurial Approaches to Education Reform and the courses will be highly complementary in approach.

EDUC 453. Doctoral Dissertation. 1-15 Unit.

For doctoral students only. (all areas).

EDUC 465. Seminar in the Pedagogy of Teacher Education. 3 Units.

For doctoral students interested in working in teacher education. Pedagogical approaches, including the use of modeling and simulations and hypermedia materials. Theoretical considerations of how teachers learn to teach.

EDUC 466. Doctoral Seminar in Curriculum Research. 2-4 Units.

Required of all doctoral students in CTE, normally during their second year in the program. Students present their ideas regarding a dissertation or other research project, and prepare a short research proposal that often satisfies their second-year review.

EDUC 470. Practicum. 1-15 Unit.

For advanced graduate students. (all areas).

EDUC 480. Directed Reading. 1-15 Unit.

For advanced graduate students. (all areas).

EDUC 490. Directed Research. 1-15 Unit.

For advanced graduate students. (all areas).

EDUC 493. Workshop in Design and Analysis of Comparative Studies. 1-3 Unit.

A workshop for second-year and later students with data analysis or research design activities including dissertation planning or analysis. Readings and exercises developed around participating student research. Topics have included: multilevel data analysis, within-subjects designs, and implementation of matching methods for comparing non-equivalent groups. Various computing customs accommodated. See <http://web.stanford.edu/~rag/ed493/>. Prerequisite: intermediate statistical methods course work.

EDUC 496. Research in History and Social Science Education. 3-5 Units.

For doctoral students. Literature on historical learning and teaching and corresponding social sciences research designs, assessment, and curriculum evaluation. Same as: HISTORY 464E

EDUC 801. TGR Project. 0 Units.

For advanced graduate students. Instructor consent required. (all areas).

EDUC 802. TGR Dissertation. 0 Units.

For advanced graduate students. Instructor consent required. (all areas).

Education as Self Fashioning Courses

ESF 1. Education as Self-Fashioning: The Active, Inquiring, Beautiful Life. 7 Units.

Moving through history from the Rome of the Emperor Hadrian, to the city-states of Renaissance Italy, to the 18th century republic of the United States, we will examine how self-made men fashioned themselves and their surroundings by educating themselves broadly. We will ask how a liberal education made their active careers richer and more transformational. We will also take up the great debate on whether a liberal education or vocational training is the surest path to advancement. We will engage this debate through the works of W.E.B. Du Bois and Booker T. Washington but consider today's struggle over the same issues; a struggle that engrosses both highly industrialized and developing societies.

ESF 1A. Education as Self-Fashioning: The Active, Inquiring, Beautiful Life. 7 Units.

Moving through history from the Rome of the Emperor Hadrian, to the city-states of Renaissance Italy, to the 18th century republic of the United States, we will examine how self-made men fashioned themselves and their surroundings by educating themselves broadly. We will ask how a liberal education made their active careers richer and more transformational. We will also take up the great debate on whether a liberal education or vocational training is the surest path to advancement. We will engage this debate through the works of W.E.B. Du Bois and Booker T. Washington but consider today's struggle over the same issues; a struggle that engrosses both highly industrialized and developing societies.

ESF 2. Education as Self-Fashioning: How to Become a Global Citizen or the German Tradition of Bildung. 7 Units.

This course considers education not as training in external knowledge or skills but as a lifelong process of development and growth in which an individual cultivates her or his spiritual, cultural and social sensibilities. This concept of education - education as a formative and transformative process in the development of the self - is called Bildung in German and has a long tradition reaching back to the Middle Ages. The term first appears in the writings of the mystic Meister Eckhart who defines it as self-composure which he regards as a crucial stage in our spiritual development. The concept of Bildung takes on a secular meaning in the Reformation, when Ulrich von Hutten first coined the phrase that has become Stanford's motto: Die Luft der Freiheit weht. (The wind of freedom is blowing). What he meant is that the cultivation of oneself leads to the freedom of thought, freedom to act, freedom to assert oneself as an individual, freedom to access knowledge, and freedom to determine one's own role in society. This idea of education as an internal and transformative process is central to debates in the nineteenth century (both in Germany and the United States) in which self-reflection is seen as key to the cultivation of an individual's identity and to her or his role as a member of society. In this course we will read reflections on education as self-fashioning by some of the greatest German thinkers spanning from the Middle Ages to the present. We will also enjoy some contemporary parodies of such reflections. These readings and our discussions will help us to understand Stanford undergraduate education as a transformative process of self-realization in our global society.

ESF 2A. Education as Self-Fashioning: How to Become a Global Citizen or the German Tradition of Bildung.. 7 Units.

This course considers education not as training in external knowledge or skills but as a lifelong process of development and growth in which an individual cultivates her or his spiritual, cultural and social sensibilities. This concept of education - education as a formative and transformative process in the development of the self - is called Bildung in German and has a long tradition reaching back to the Middle Ages. The term first appears in the writings of the mystic Meister Eckhart who defines it as self-composure which he regards as a crucial stage in our spiritual development. The concept of Bildung takes on a secular meaning in the Reformation, when Ulrich von Hutten first coined the phrase that has become Stanford's motto: "Die Luft der Freiheit weht". (The wind of freedom is blowing). What he meant is that the cultivation of oneself leads to the freedom of thought, freedom to act, freedom to assert oneself as an individual, freedom to access knowledge, and freedom to determine one's own role in society. This idea of education as an internal and transformative process is central to debates in the nineteenth century (both in Germany and the United States) in which self-reflection is seen as key to the cultivation of an individual's identity and to her or his role as a member of society. In this course we will read reflections on education as self-fashioning by some of the greatest German thinkers spanning from the Middle Ages to the present. We will also enjoy some contemporary parodies of such reflections. These readings and our discussions will help us to understand Stanford undergraduate education as a transformative process of self-realization in our global society.

ESF 3. Education as Self-Fashioning: How to be a Public Intellectual. 7 Units.

Can education impart more than bookish learning? This is the question that critics have posed since the European Renaissance. Through their reflections, these critics posited an alternative ideal of education that prepared the student for life outside the academy. Over the centuries, this ideal would evolve into what we would today call an iquest; intellectual iquest; iquest; but this modern concept only captures a part of what earlier writers thought learning could achieve. In this course, we will focus on how education can prepare students to engage in public debates and the role that the university can play in public learning.

ESF 3A. Education as Self-Fashioning: How to be a Public Intellectual. 7 Units.

Can education impart more than bookish learning? This is the question that critics have posed since the European Renaissance. Through their reflections, these critics posited an alternative ideal of education that prepared the student for life outside the academy. Over the centuries, this ideal would evolve into what we would today call an intellectual quest; but this modern concept only captures a part of what earlier writers thought learning could achieve. In this course, we will focus on how education can prepare students to engage in public debates and the role that the university can play in public learning.

ESF 4. Education as Self-Fashioning: Learning to Change. 7 Units.

Does education entail changing the self? How much? Why should I change my life? How do I discover that I need to change? Who can rightly tell me how to change? What difference does it make? These and related questions have been around for a long time, yet that makes them no easier to answer today than 2500 years ago. In the 5th century BCE, Socrates found that his answers--based on his own will to change--proved troublesome, and ultimately fatal. His follower, the philosopher Plato, transformed the Socratic exploration into idiosyncratic utopian visions that sought to change the conditions of life--and so make Socrates' fate unrepeatable. Plato's own followers, from Aristotle onward, found new ways to explain, enact, or evade change. Not until the end of antiquity, however, do we find, in Augustine of Hippo (354-430 CE), someone as explicitly and passionately committed to personal change as the early Greek thinker. Bookended by the major figures of the Athenian seeker and the North African, this course will lead students to analyze and compare their own tentative answers with the ideas on self-fashioning that can be found in a range of ancient texts. Students will demonstrate their grasp of the material through a variety of exercises, including a research paper, discourse analyses, and responses in persona.

ESF 4A. Education as Self-Fashioning: Learning to Change. 7 Units.

Does education entail changing the self? How much? Why should I change my life? How do I discover that I need to change? Who can rightly tell me how to change? What difference does it make? These and related questions have been around for a long time, yet that makes them no easier to answer today than 2500 years ago. In the 5th century BCE, Socrates found that his answers--based on his own will to change--proved troublesome, and ultimately fatal. His follower, the philosopher Plato, transformed the Socratic exploration into idiosyncratic utopian visions that sought to change the conditions of life--and so make Socrates' fate unrepeatable. Plato's own followers, from Aristotle onward, found new ways to explain, enact, or evade change. Not until the end of antiquity, however, do we find, in Augustine of Hippo (354-430 CE), someone as explicitly and passionately committed to personal change as the early Greek thinker. Bookended by the major figures of the Athenian seeker and the North African, this course will lead students to analyze and compare their own tentative answers with the ideas on self-fashioning that can be found in a range of ancient texts. Students will demonstrate their grasp of the material through a variety of exercises, including a research paper, discourse analyses, and responses in persona.

ESF 5. Education as Self-Fashioning: Thinking Like a Philosopher. 7 Units.

The Ancient Greek aphorism "Know thyself"; is a centerpiece of wisdom. But knowing one's own mind is not easy, in part because it is not a matter of simply looking inward to find one's proclivities and beliefs; it seems one must look outward to the issues and questions the world presents, and know what one thinks about them. Knowing oneself is in part a matter of knowing one's way around as a thinker, where that is a matter of knowing how to think about issues, when to trust one's judgment and when to withhold it. Fashioning or making oneself into a better (more acute, more sensitive, more judicious) reasoner is something philosophy as a discipline holds out as a promise. In this course, we will take up the first task of becoming better reasoners about a select handful of persistent problems; we will at the same time reflect on what it is that philosophical thinking is, and how it might shape us as thinkers.

ESF 5A. Education as Self-Fashioning: Thinking Like a Philosopher. 7 Units.

The Ancient Greek aphorism "Know thyself" is a centerpiece of wisdom. But knowing one's own mind is not easy, in part because it is not a matter of simply looking inward to find one's proclivities and beliefs; it seems one must look outward to the issues and questions the world presents, and know what one thinks about them. Knowing oneself is in part a matter of knowing one's way around as a thinker, where that is a matter of knowing how to think about issues, when to trust one's judgment and when to withhold it. Fashioning or making oneself into a better (more acute, more sensitive, more judicious) reasoner is something philosophy as a discipline holds out as a promise. In this course, we will take up the first task of becoming better reasoners about a select handful of persistent problems; we will at the same time reflect on what it is that philosophical thinking is, and how it might shape us as thinkers.

ESF 6. Education as Self-Fashioning: The Wind of Freedom. 7 Units.

Stanford's unofficial motto, "the wind of freedom blows," engraved in German on the university seal, invites us to ponder freedom in the context of education. What is the relation between freedom and the "liberal" arts? Does studying free your mind? Does free will even exist? If so, how does education help you develop its potential? This course will look at various authors -- from antiquity through the 20th century -- who have thought about the blessings, burdens, and obligations of human freedom. Beginning with Eve in the Garden of Eden, we will explore how exercising freedom in your personal choices and conduct not only determines your fate as an individual but carries with it a measure of responsibility for the world. We will place special emphasis on the implications of such responsibility in our own time.

ESF 6A. Education as Self-Fashioning: The Wind of Freedom. 7 Units.

Stanford's unofficial motto, "the wind of freedom blows," engraved in German on the university seal, invites us to ponder freedom in the context of education. What is the relation between freedom and the "liberal" arts? Does studying free your mind? Does free will even exist? If so, how does education help you develop its potential? This course will look at various authors -- from antiquity through the 20th century -- who have thought about the blessings, burdens, and obligations of human freedom. Beginning with Eve in the Garden of Eden, we will explore how exercising freedom in your personal choices and conduct not only determines your fate as an individual but carries with it a measure of responsibility for the world. We will place special emphasis on the implications of such responsibility in our own time.

ESF 7. Education as Self-Fashioning: The Transformation of the Self. 7 Units.

Socrates famously claimed that the unexamined life is not worth living. Socrates and other ancient thinkers examined themselves and found that they did not match up to their own ideals. They thus set out to transform themselves to achieve a good and happy life. What is the good life? How do we change ourselves to live a good and happy life? How do literature and philosophy help us to understand ourselves and to achieve our social, ethical, and personal ideals? In this class, we examine Socrates and Augustine's lives and ideas. Each struggled to live a good and happy life. In each case, they urge us to transform ourselves into better human beings. The first half of the course focuses on the Athenian Socrates, who was put to death because he rejected traditional Greek ideals and proclaimed a new kind of ethical goodness. The second half focuses on the North African Augustine, an unhappy soul who became a new man by converting to Christianity. These thinkers addressed questions and problems that we still confront today: What do we consider to be a happy life? Do we need to be good and ethical people to live happily? Is there one correct set of values? How do we accommodate other people's beliefs? Is it possible to experience a transformation of the self? How exactly do we change ourselves to achieve our higher ideals?.

ESF 7A. Education as Self-Fashioning: The Transformation of the Self. 7 Units.

Socrates famously claimed that the unexamined life is not worth living. Socrates and other ancient thinkers examined themselves and found that they did not match up to their own ideals. They thus set out to transform themselves to achieve a good and happy life. What is the good life? How do we change ourselves to live a good and happy life? How do literature and philosophy help us to understand ourselves and to achieve our social, ethical, and personal ideals? In this class, we examine Socrates and Augustine's lives and ideas. Each struggled to live a good and happy life. In each case, they urge us to transform ourselves into better human beings. The first half of the course focuses on the Athenian Socrates, who was put to death because he rejected traditional Greek ideals and proclaimed a new kind of ethical goodness. The second half focuses on the North African Augustine, an unhappy soul who became a new man by converting to Christianity. These thinkers addressed questions and problems that we still confront today: What do we consider to be a happy life? Do we need to be good and ethical people to live happily? Is there one correct set of values? How do we accommodate other people's beliefs? Is it possible to experience a transformation of the self? How exactly do we change ourselves to achieve our higher ideals?.

ESF 8. Education as Self-Fashioning: Recognizing the Self and Its Possibilities. 7 Units.

Some philosophers have argued that we have privileged and direct access to our inner selves. If this were true, it would make self-knowledge perhaps the easiest sort of knowledge to obtain. But there are many considerations that mitigate against this view of self-knowledge. Consider, for example, the slave who is so oppressed that he fully accepts his slavery and cannot even imagine the possibility of freedom for himself. Such a slave fails to recognize his own capacity for freedom and autonomous self-governance. Though the slave is perhaps the extreme case, many people, it seems, fail to recognize the full range of possibilities open to them. In this course, we shall examine both some of the ways in which one's capacity for self-recognition may be distorted and undermined and the role of education in enabling a person to fully recognize the self and its possibilities. What constrains the range of possibilities we see as really open to us? Contrary to the Cartesian, we shall argue that full self-recognition is an often a hard-won achievement. And we shall ask how education might function to give us a less constricted and more liberating sense of the self and its possibilities. We will consider such questions through the lens of philosophy, literature and psychology.

ESF 8A. Education as Self-Fashioning: Recognizing the Self and Its Possibilities. 7 Units.

Some philosophers have argued that we have privileged and direct access to our inner selves. If this were true, it would make self-knowledge perhaps the easiest sort of knowledge to obtain. But there are many considerations that mitigate against this view of self-knowledge. Consider, for example, the slave who is so oppressed that he fully accepts his slavery and cannot even imagine the possibility of freedom for himself. Such a slave fails to recognize his own capacity for freedom and autonomous self-governance. Though the slave is perhaps the extreme case, many people, it seems, fail to recognize the full range of possibilities open to them. In this course, we shall examine both some of the ways in which one's capacity for self-recognition may be distorted and undermined and the role of education in enabling a person to fully recognize the self and its possibilities. What constrains the range of possibilities we see as really open to us? Contrary to the Cartesian, we shall argue that full self-recognition is an often a hard-won achievement. And we shall ask how education might function to give us a less constricted and more liberating sense of the self and its possibilities. We will consider such questions through the lens of philosophy, literature and psychology.

ESF 50. Education as Self-Fashioning Lecture Series. 1 Unit.

One-unit lecture series featuring prominent intellectuals lecturing on the nature and meaning of liberal education (associated with Education as Self-Fashioning.) NOTE: students enrolled in the 7-unit ESF course should NOT add this course to their study list; this 1-unit course is only for non-ESF students who wish to enroll in the lecture series only. Lectures will constitute an ongoing, campus-wide conversation about the aims of liberal education that extends the "First Lecture" featured in New Student Orientation.

Electrical Engineering Courses

EE 10N. How Musical Instruments Work. 3 Units.

Musical instruments, as well as being fun to play, are excellent examples of science, engineering, and the interplay between the two. How does an instrument make sound? Why does a trumpet sound different from a guitar, a flute, or a bell? We will examine the principles of operation of wind, string, percussion, and electronic instruments hands-on in class. Concepts to be investigated include waves, resonators, understanding and measuring sound spectra and harmonic structure of instruments, engineering design of instruments, the historical development of instruments, and the science and engineering that make them possible. Prerequisites: high school math and physics. Recommended: some experience playing a musical instrument.

EE 10SC. Mathematics of the Information Age. 2 Units.

The world may be made of earth, wind, fire, and water, but it runs on information. What is information? How do we measure it, manipulate it, send it, and protect it? Why has everything gone digital and what does this mean? The mathematics of the Information Age is part of your everyday life, from imaging to the Internet. We will discuss the elements of information theory and how information is represented in different ways for different purposes. We will work with the mathematical representation of signals from the classical functions of trigonometry to the spectrum of a general signal. This course will help you understand some of the profound ways mathematics is used to shape and direct these aspects of the modern world. There will be regular assignments, readings, a research project, and a presentation on a topic of your choice that goes beyond the class material.

EE 14N. Things about Stuff. 3 Units.

Preference to freshmen. The stories behind disruptive inventions such as the telegraph, telephone, wireless, television, transistor, and chip are as important as the inventions themselves, for they elucidate broadly applicable scientific principles. Focus is on studying consumer devices; projects include building batteries, energy conversion devices and semiconductors from pocket change. Students may propose topics and projects of interest to them. The trajectory of the course is determined in large part by the students themselves.

EE 15N. The Art and Science of Engineering Design. 3 Units.

The goal of this seminar is to introduce freshmen to the design process associated with an engineering project. The seminar will consist of a series of lectures. The first part of each lecture will focus on the different design aspects of an engineering project, including formation of the design team, developing a project statement, generating design ideas and specifications, finalizing the design, and reporting the outcome. Students will form teams to follow these procedures in designing a term project of their choice over the quarter. The second part of each lecture will consist of outside speakers, including founders of some of the most exciting companies in Silicon Valley, who will share their experiences about engineering design. On-site visits to Silicon Valley companies to showcase their design processes will also be part of the course. The seminar serves three purposes: (1) it introduces students to the design process of turning an idea into a final design, (2) it presents the different functions that people play in a project, and (3) it gives students a chance to consider what role in a project would be best suited to their interests and skills.

EE 17N. Engineering the Micro and Nano Worlds: From Chips to Genes. 3 Units.

Preference to freshmen. The first part is hands-on micro- and nano-fabrication including the Stanford Nanofabrication Facility (SNF) and the Stanford Nanocharacterization Laboratory (SNL) and field trips to local companies and other research centers to illustrate the many applications; these include semiconductor integrated circuits ('chips'), DNA microarrays, microfluidic bio-sensors and microelectromechanical systems (MEMS). The second part is to create, design, propose and execute a project. Most of the grade will be based on the project. By the end of the course you will, of course, be able to read critically a New York Times article on nanotechnology. More importantly you will have experienced the challenge (and fun) of designing, carrying out and presenting your own experimental project. As a result you will be better equipped to choose your major. This course can complement (and differs from) the seminars offered by Profs Philip Wong and Hari Manoharan in that it emphasizes laboratory work and an experimental student-designed project. Prerequisites: high-school physics.

EE 21N. What is Nanotechnology?. 3 Units.

Nanotechnology is an often used word and it means many things to different people. Scientists and Engineers have some notion of what nanotechnology is, societal perception may be entirely different. In this course, we start with the classic paper by Richard Feynman ("There's Plenty of Room at the Bottom"), which laid down the challenge to the nanotechnologists. Then we discuss two classic books that offer a glimpse of what nanotechnology is: *Engines of Creation: The Coming Era of Nanotechnology* by Eric Drexler, and *Prey* by Michael Crichton. Drexler's thesis sparked the imagination of what nano machinery might do, whereas Crichton's popular novel channeled the public's attention to this subject by portraying a disastrous scenario of a technology gone astray. We will use the scientific knowledge to analyze the assumptions and predictions of these classic works. We will draw upon the latest research advances to illustrate the possibilities and impossibilities of nanotechnology.

EE 22N. Medical Imaging Systems. 3 Units.

Preference to freshmen. The technology of major imaging modalities used for disease diagnosis: x-ray, ultrasound, and magnetic resonance; their history, societal impact, and clinical applications. Field trips to a medical center and an imaging research lab. Term paper and presentation. Prerequisites: high school physics and calculus.

EE 23N. Imaging: From the Atom to the Universe. 3 Units.

Preference to freshmen. Forms of imaging including human and animal vision systems, atomic force microscope, microscope, digital camera, holography and three-dimensional imaging, telescope, synthetic aperture radar imaging, nuclear magnetic imaging, sonar and gravitational wave imaging, and the Hubble Space telescope. Physical principles and exposure to real imaging devices and systems.

EE 27N. Electronics Rocks. 3 Units.

Electronics pervades our lives, yet we often feel obliged to let a device function as it was intended. This course is about not being intimidated by voiding a warranty and modding some commercial gadget and about being confident enough to build something cool from scratch. To get there, we will study the basics of "how things work" via "dissection and discussion" and discuss how to hack/mod but focus primarily how to scratch build. Students will be mentored and encouraged to work, in teams, to design and develop a substantial project based on embedded microprocessors and custom circuits as needed. Typical projects include (but are not limited to) microcontrollers such as the Arduino, LED's, sensors, wireless connections to the network or a laptop, and software/firmware as needed. Examples include programmable, color-changing wireless juggling balls, a self-healing mesh-networked hide-and-seek game, and a glowing plasma based clock built from surplus Soviet vacuum tubes and a modern microprocessor. Prerequisites: good hand-eye coordination, intelligence, teamwork skills, curiosity and humility.

EE 41. Physics of Electrical Engineering. 5 Units.

How everything from electrostatics to quantum mechanics is used in common high-technology products. Electrostatics are critical in micro-mechanical systems used in many sensors and displays, and Electromagnetic waves are essential in all high-speed communication systems. How to propagate energy on transmission lines, optical fibers, and in free space. Which aspects of modern physics are needed to generate light for the operation of a DVD player or TV. Introduction to semiconductors, solid-state light bulbs, and laser pointers. Hands-on labs to connect physics to everyday experience. Prerequisites: Physics 43. Same as: ENGR 40P

EE 46. Engineering For Good: Save the World and Have Fun Doing It. 3 Units.

Projects that provide immediate and positive impact on the world. Focus is on global health by learning from experts in this field. Students work on real-world projects with help from members of NGOs and social entrepreneurial companies as part of the hand-on learning experience. Prerequisite: ENGR 40 or EE 122A or CS 106B or consent of instructor.

EE 47. Press Play: Interactive Device Design. 3 Units.

Introduction to the human-centered and technical workings behind interactive devices ranging from cellphones and video controllers to smart cars and appliances. Students build a working MP3 player prototype of their own design, using embedded microcontrollers, digital audio decoders and component sensors, and other electronic hardware. Topics include electronics prototyping, interface prototyping, sensors and actuators, micro-controller development, physical prototyping, and user testing. Prerequisite: CS106A and X or consent of instructor.

EE 60N. Man versus Nature: Coping with Disasters Using Space Technology. 4 Units.

Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. GER:DB-EngrAppSci. Same as: GEOPHYS 60N

EE 65. Modern Physics for Engineers. 3 Units.

This course introduces the core ideas of modern physics that enable applications ranging from solar energy and efficient lighting to the modern electronic and optical devices and nanotechnologies that sense, process, store, communicate and display all our information. Though the ideas have broad impact, the course is widely accessible to engineering and science students with only basic linear algebra and calculus through simple ordinary differential equations as mathematics background. Topics include the quantum mechanics of electrons and photons (Schrödinger's equation, atoms, electrons, energy levels and energy bands; absorption and emission of photons; quantum confinement in nanostructures), the statistical mechanics of particles (entropy, the Boltzmann factor, thermal distributions), the thermodynamics of light (thermal radiation, limits to light concentration, spontaneous and stimulated emission), and the physics of information (Maxwell's demon, reversibility, entropy and noise in physics and information theory). Pre-requisite: Physics 41. Pre- or co-requisite: Math 53 or CME 102.

EE 92A. Making and Breaking Things. 1 Unit.

This course will feature weekly visiting speakers who will guide class members through the hands-on process of assembling or dissection novel interactive devices and products. The course is meant to provide students hands-on experience with component sensing and computing technologies, a working knowledge of different materials and methods used in modern-day prototyping and manufacture, and exposure to people engaged in designing novel devices within the field of interactive device design. Activities will feature a wide and evolving range of domains such as textile sensors, hacking wireless radio, making LED light sculptures, taking apart toys, shape deposition modeling and more.

EE 100. The Electrical Engineering Profession. 1 Unit.

Lectures/discussions on topics of importance to the electrical engineering professional. Continuing education, professional societies, intellectual property and patents, ethics, entrepreneurial engineering, and engineering management.

EE 101A. Circuits I. 4 Units.

First of two-course sequence. Introduction to circuit modeling and analysis. Topics include creating the models of typical components in electronic circuits and simplifying non-linear models for restricted ranges of operation (small signal model); and using network theory to solve linear and non-linear circuits under static and dynamic operations. Prerequisite: ENGR40 or ENGR40M is useful but not strictly required.

EE 101B. Circuits II. 4 Units.

Second of two-course sequence. MOS large-signal and small-signal models. MOS amplifier design including DC bias, small signal performance, multistage amplifiers, frequency response, and feedback. Prerequisite: EE101A, EE102A.

EE 102A. Signal Processing and Linear Systems I. 4 Units.

Concepts and tools for continuous- and discrete-time signal and system analysis with applications in signal processing, communications, and control. Mathematical representation of signals and systems. Linearity and time invariance. System impulse and step responses. System frequency response. Frequency-domain representations: Fourier series and Fourier transforms. Filtering and signal distortion. Time/frequency sampling and interpolation. Continuous-discrete-time signal conversion and quantization. Discrete-time signal processing. Prerequisite: MATH 53 or CME 102.

EE 102B. Signal Processing and Linear Systems II. 4 Units.

Continuation of EE 102A. Concepts and tools for continuous- and discrete-time signal and system analysis with applications in communications, signal processing and control. Analog and digital modulation and demodulation. Sampling, reconstruction, decimation and interpolation. Finite impulse response filter design. Discrete Fourier transforms, applications in convolution and spectral analysis. Laplace transforms, applications in circuits and feedback control. Z transforms, applications in infinite impulse response filter design. Prerequisite: EE 102A.

EE 103. Introduction to Matrix Methods. 4-5 Units.

Introduction to applied linear algebra with emphasis on applications. Vectors, norm, and angle; linear independence and orthonormal sets. Matrices, left and right inverses, QR factorization. Least-squares and model fitting, regularization and cross-validation, time-series prediction, and other examples. Constrained least-squares; applications to least-norm reconstruction, optimal control, and portfolio optimization. Newton methods and nonlinear least-squares. Prerequisites: MATH 51 or CME 100. Same as: CME 103

EE 107. Networked Systems. 3 Units.

Networks form the interconnect that stitch together our digital and physical lives. They underpin cloud computing, our mobile connectivity, as well as the means to connect the large number of sensors that will pervade our physical surroundings. This class will provide hands on introduction to how networks at these different scales are designed, from datacenters to embedded low power networks. Students will learn these concepts through a project that involves building a wireless network from the ground up using software radios. Students will also learn how to use these networks to build embedded applications (e.g. wireless controlled network of drones, localization systems using WiFi). The goal is to introduce students to larger concepts in electrical engineering and computer systems: the role of abstraction and layering, building reliable systems out of unreliable components and dynamic sharing of scarce resources. Prerequisites: EE 102A or ENGR 40M.

EE 108. Digital System Design. 4 Units.

Digital circuit, logic, and system design. Digital representation of information. CMOS logic circuits. Combinational logic design. Logic building blocks, idioms, and structured design. Sequential logic design and timing analysis. Clocks and synchronization. Finite state machines. Microcode control. Digital system design. Control and datapath partitioning. Lab. Undergraduates must enroll for 4 units. *In Autumn, enrollment preference is given to EE majors. Formerly EE 108A.

EE 109. Digital Systems Design Lab. 4 Units.

The design of integrated digital systems encompassing both customized software and hardware. Software/hardware design tradeoffs. Algorithm design for pipelining and parallelism. System latency and throughput tradeoffs. FPGA optimization techniques. Integration with external systems and smart devices. Firmware configuration and embedded system considerations. Enrollment limited to 25; preference to graduating seniors. Prerequisites: 108B, and CS 106B or X.

EE 114. Fundamentals of Analog Integrated Circuit Design. 3-4 Units.

Analysis and simulation of elementary transistor stages, current mirrors, supply- and temperature-independent bias, and reference circuits. Overview of integrated circuit technologies, circuit components, component variations and practical design paradigms. Differential circuits, frequency response, and feedback will also be covered. Performance evaluation using computer-aided design tools. Undergraduates must take EE 114 for 4 units. Prerequisite: 101B. GER:DB-EngrAppSci. Same as: EE 214A

EE 116. Semiconductor Device Physics. 3 Units.

The fundamental operation of semiconductor devices and overview of applications. The physical principles of semiconductors, both silicon and compound materials; operating principles and device equations for junction devices (diodes, bipolar transistor, photo-detectors). Introduction to quantum effects and band theory of solids. Prerequisite: ENGR 40. Corequisite: 101B.

EE 118. Introduction to Mechatronics. 4 Units.

Technologies involved in mechatronics (intelligent electro-mechanical systems), and techniques to apply this technology to mechatronic system design. Topics include: electronics (A/D, D/A converters, op-amps, filters, power devices); software program design, event-driven programming; hardware and DC stepper motors, solenoids, and robust sensing. Large, open-ended team project. Prerequisites: ENGR 40, CS 106, or equivalents. Same as: ME 210

EE 122A. Analog Circuits Laboratory. 3 Units.

The course covers practical applications of mixed-signal circuits, including simple amplifiers, filters (passive, op-amp, switched-capacitor and digital-signal-processor-based), oscillators, power supplies, sensors and interface (input/output) circuits. Practical design skills, computer-aided design, and circuit fabrication and debugging are core topics. The design process is learned through proposing, designing, simulating, building, debugging, and demonstrating a substantial and novel team project. Radio frequency and largely digital projects not suitable for EE 122. Prerequisite: basic electronics laboratory experience with solid working knowledge of circuit analysis, Fourier and Laplace methods.

EE 122B. Introduction to Biomedical Electronics. 3 Units.

EE122B is a laboratory course covering the design and realization of key components and architectures of modern biomedical electronics systems, their application in clinical and research measurements, and practical matters in their safe reduction to practice. Material in each topic area begins with an overview of the underlying physiology. Details are presented beginning with the molecular, cellular, organ-level origins of the biosignals, followed by the relevant transduction principles, nature of the signals (amplitude, frequency spectrum, etc.), and their processing and clinical use. Specific engineering topics include safety in biomedical instruments, fundamentals of analog/digital conversion and filtering techniques for biosignals, typical transducers (biopotential, electrochemical, temperature, pressure, acoustic, movement), applications (cardiovascular medicine, neurology, pulmonology, etc.) and interfacing circuits. Prerequisite: EE122A or equivalent hands-on mixed-signal design experience and solid working knowledge of EE122A topics (see course description).

EE 124. Introduction to Neuroelectrical Engineering. 3 Units.

Fundamental properties of electrical activity in neurons, technology for measuring and altering neural activity, and operating principles of modern neurological and neural prosthetic medical systems. Topics: action potential generation and propagation, neuro-MEMS and measurement systems, experimental design and statistical data analysis, information encoding and decoding, clinical diagnostic systems, and fully-implantable neural prosthetic systems design. Prerequisite: EE 101A and EE 102A.

EE 133. Analog Communications Design Laboratory. 3-4 Units.

Design, testing, and applications. Amplitude modulation (AM) using multiplier circuits. Frequency modulation (FM) based on discrete oscillator and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phased-lock loop (PLL) techniques, characterization of key parameters, and their applications. Practical aspects of circuit implementations. Labs involve building and characterization of AM and FM modulation/demodulation circuits and subsystems. Enrollment limited to 30 undergraduates and coterminial EE students. Prerequisite: EE101B. Undergraduate students enroll in EE133 and Graduate students enroll in EE233. Recommended: EE114/214A. Same as: EE 233

EE 134. Introduction to Photonics. 4 Units.

Photonics, optical components, and fiber optics. Conceptual and mathematical tools for design and analysis of optical communication, sensor and imaging systems. Experimental characterization of semiconductor lasers, optical fibers, photodetectors, receiver circuitry, fiber optic links, optical amplifiers, and optical sensors. Class project on confocal microscopy or other method of sensing or analyzing biometric data. Laboratory experiments. Prerequisite: 41 or equivalent.

EE 136. Introduction to Nanophotonics and Nanostructures. 3 Units.

Electromagnetic and quantum mechanical waves and semiconductors. Confining these waves, and devices employing such confinement. Localization of light and applications: metallic mirrors, photonic crystals, optical waveguides, microresonators, plasmonics. Localization of quantum mechanical waves: quantum wells, wires, and dots. Generation of light in semiconductors: spontaneous and stimulated emission, lasers, and light emitting diodes. Devices incorporating localization of both electromagnetic and quantum mechanical waves such as resonant cavity quantum well lasers and microcavity-based single photon sources. System-level applications such as optical communications, biochemical sensing, and quantum cryptography. Prerequisite: basic familiarity with electromagnetic and quantum mechanical waves and semiconductors at the level of EE 41 or equivalent.

EE 142. Engineering Electromagnetics. 3 Units.

Introduction to electromagnetism and Maxwell's equations in static and dynamic regimes. Electrostatics and magnetostatics: Gauss's law, Coulomb's law, Faraday's law, Ampere's law, Biot-Savart's laws. Electric and magnetic potentials. Boundary conditions. Electric and magnetic field energy. Electrodynamics: Wave equation; Electromagnetic waves; Phasor form of Maxwell's equations. Solution of the wave equation in 1D free space: Wavelength, wave-vector, forward and backward propagating plane waves. Poynting's theorem. Propagation in lossy media, skin depth. Reflection and refraction at planar boundaries, total internal reflection. Solutions of wave equation for various 1D-3D problems: Electromagnetic resonators, waveguides periodic media, transmission lines. Formerly EE 141. Pre-requisites: Phys 43 or EE 42, CME 100, CME 102 (recommended).

EE 151. Sustainable Energy Systems. 3 Units.

Energy demand is expected to grow by 30% by 2025, while at the same time the European Union is demanding a carbon footprint at 1990 levels. We examine energy flow in the US and Europe, and deduce from it a strategy for sustainable growth. Potential solutions include distributed small scale networked energy generation, solar energy, wind and water, as well as nuclear energy. A systems perspective allows optimization. Fundamental concepts will be demonstrated in class through hands-on experiments.

EE 152. Green Electronics. 4 Units.

Many green technologies including hybrid cars, photovoltaic energy systems, efficient power supplies, and energy-conserving control systems have at their heart intelligent, high-power electronics. This course examines this technology and uses green-tech examples to teach the engineering principles of modeling, optimization, analysis, simulation, and design. Topics include power converter topologies, periodic steady-state analysis, control, motors and drives, photovoltaic systems, and design of magnetic components. The course involves a hands-on laboratory and a substantial final project. Required: EE101B, EE102A, EE108A. Recommended: ENGR40 or EE122A.

EE 153. Power Electronics. 3-4 Units.

Addressing the energy challenges of today and the environmental challenges of the future will require efficient energy conversion techniques. This course will discuss the circuits used to efficiently convert ac power to dc power, dc power from one voltage level to another, and dc power to ac power. The components used in these circuits (e.g., diodes, transistors, capacitors, inductors) will also be covered in detail to highlight their behavior in a practical implementation. A lab will be held with the class where students will obtain hands on experience with power electronic circuits. Formerly EE 292J. Same as: EE 253

EE 168. Introduction to Digital Image Processing. 3-4 Units.

Computer processing of digital 2-D and 3-D data, combining theoretical material with implementation of computer algorithms. Topics: properties of digital images, design of display systems and algorithms, time and frequency representations, filters, image formation and enhancement, imaging systems, perspective, morphing, and animation applications. Instructional computer lab exercises implement practical algorithms. Final project consists of computer animations incorporating techniques learned in class. Prerequisite: Matlab programming.

EE 169. Introduction to Bioimaging. 3 Units.

Bioimaging is important for both clinical medicine, and medical research. This course will provide an introduction to several of the major imaging modalities, using a signal processing perspective. The course will start with an introduction to multi-dimensional Fourier transforms, and image quality metrics. It will then study projection imaging systems (projection X-Ray), backprojection based systems (CT, PET, and SPECT), systems that use beam forming (ultrasound), and systems that use Fourier encoding (MRI). Prerequisites: EE102A, EE102B.

EE 178. Probabilistic Systems Analysis. 4 Units.

Introduction to probability and statistics and their role in modeling and analyzing real world phenomena. Events, sample space, and probability. Discrete random variables, probability mass functions, independence and conditional probability, expectation and conditional expectation. Continuous random variables, probability density functions, independence and expectation, derived densities. Transforms, moments, sums of independent random variables. Simple random processes. Limit theorems. Introduction to statistics: significance, estimation and detection. Prerequisites: basic calculus.

EE 179. Analog and Digital Communication Systems. 3 Units.

This course covers the fundamental principles underlying the analysis, design and optimization of analog and digital communication systems. Design examples will be taken from the most prevalent communication systems today: cell phones, Wifi, radio and TV broadcasting, satellites, and computer networks. Analysis techniques based on Fourier transforms and energy/power spectral density will be developed. Mathematical models for random variables and random (noise) signals will be presented, which are used to characterize filtering and modulation of random noise. These techniques will then be used to design analog (AM and FM) and digital (PSK and FSK) communication systems and determine their performance over channels with noise and interference. Prerequisite: 102A. Not offered AY 14-15, and students are encouraged to enroll in EE 107 instead.

EE 180. Digital Systems Architecture. 3-4 Units.

The design of processor-based digital systems. Instruction sets, addressing modes, data types. Assembly language programming, low-level data structures, introduction to operating systems and compilers. Processor microarchitecture, microprogramming, pipelining. Memory systems and caches. Input/output, interrupts, buses and DMA. System design implementation alternatives, software/hardware tradeoffs. Labs involve the design of processor subsystems and processor-based embedded systems. Formerly EE 108B. Prerequisite: CS107 (required) and EE108 (recommended but not required).

EE 190. Special Studies or Projects in Electrical Engineering. 1-15 Unit.

Independent work under the direction of a faculty member. Individual or team activities involve lab experimentation, design of devices or systems, or directed reading. Course may be repeated for credit.

EE 191. Special Studies and Reports in Electrical Engineering. 1-15 Unit.

Independent work under the direction of a faculty member given for a letter grade only. If a letter grade given on the basis of required written report or examination is not appropriate, enroll in 190. Course may be repeated for credit.

EE 191A. Special Studies and Reports in Electrical Engineering. 1 Unit.

EE191A is part of the Accelerated Calculus for Engineers program. Independent work under the direction of a faculty member given for a letter grade only. EE 191A counts as a Math one unit seminar course: it is this unit that constitutes the ACE program.

EE 191W. Special Studies and Reports in Electrical Engineering. 3-10 Units.

WIM-version of EE 191. For EE students using special studies (e.g., honors project, independent research project) to satisfy thenwriting-in-major requirement. A written report that has gone through revision with an advisor is required. An advisor from the Writing Center is recommended. Same as: WIM

EE 192X. Stanford's Little Box Challenge. 1-15 Unit.

IGoogle has announced the "Littlebox" competition to build the smallest possible 2kW inverter . This challenge provides an ideal opportunity to provide a number of exciting educational and design opportunities for engineering students. The first few class meetings will be lecture format describing the competition and the work that has been done to date: Mechanical modeling, Matlab model, Buck and unfolding bridge designs. In parallel, students will be matched in teams for studies that need to be done: DC-Link implementation, QR-topology, Multi-level Approaches, Control implementation, GaN implementation, SiC investigations, Capacitor studies, Inductor studies, Thermal Design, EMI study, Etc. The problems span many topics: embedded and control systems design, power electronics, digital and analog design, programming in C & FPGAs, mechanical and thermal design and testing. We welcome motivated undergraduate and graduate students with a variety of backgrounds. Same as: EE 292X

EE 202. Electrical Engineering in Biology and Medicine. 3 Units.

Open to all. Primarily biological in nature, introduction to the physiological and anatomic aspects of medical instrumentation. Areas include patient monitoring, imaging, medical transducers, the unique aspects of medical electronic systems, the socio-economic impact of technology on medical care, and the constraints unique to medicine. Prerequisite: familiarity with circuit instrumentation techniques as in 101B.

EE 203. The Entrepreneurial Engineer. 1 Unit.

Seminar. For prospective entrepreneurs with an engineering background. Contributions made to the business world by engineering graduates. Speakers include Stanford and other engineering and M.B.A. graduates who have founded large and small companies in nearby communities. Contributions from EE faculty and other departments including Law, Business, and MS&E. May be repeated for credit.

EE 204. Business Management for Electrical Engineers and Computer Scientists. 3 Units.

For graduate students with little or no business experience. Leading computer, high-tech, and Silicon Valley companies and their best practices. Tools and frameworks for analyzing decisions these companies face. Corporate strategy, new product development, marketing, sales, distribution, customer service, financial accounting, outsourcing, and human behavior in business organizations. Case studies. Prerequisite: graduate standing.

EE 204S. Business Management for Electrical Engineers and Computer Scientists. 3 Units.

For SCPD students; see EE204.

EE 212. Integrated Circuit Fabrication Processes. 3 Units.

For students interested in the physical bases and practical methods of silicon VLSI chip fabrication, or the impact of technology on device and circuit design, or intending to pursue doctoral research involving the use of Stanford's Nanofabrication laboratory. Process simulators illustrate concepts. Topics: principles of integrated circuit fabrication processes, physical and chemical models for crystal growth, oxidation, ion implantation, etching, deposition, lithography, and back-end processing. Required for 410.

EE 213. Digital MOS Integrated Circuits. 3 Units.

Looks a little more deeply at how digital circuits operate, what makes a gate digital, and how to "cheat" to improve performance or power. To aid this analysis we create a number of different models for MOS transistors and choose the simplest one that can explain our the circuit's operation, using both hand and computer analysis. We explore static, dynamic, pulse-mode, and current mode logic, and show how they are used in SRAM design. Topics include sizing for min delay, noise and noise margins, power dissipation. The class uses memory design (SRAM) as a motivating example. DRAM and EEPROM design issues are also covered. Formerly EE 313. Prerequisites: EE 101B, EE 108A. Recommended: EE 271.

EE 214A. Fundamentals of Analog Integrated Circuit Design. 3-4 Units.

Analysis and simulation of elementary transistor stages, current mirrors, supply- and temperature-independent bias, and reference circuits. Overview of integrated circuit technologies, circuit components, component variations and practical design paradigms. Differential circuits, frequency response, and feedback will also be covered. Performance evaluation using computer-aided design tools. Undergraduates must take EE 114 for 4 units. Prerequisite: 101B. GER:DB-EngrAppSci. Same as: EE 114

EE 214B. Advanced Analog Integrated Circuit Design. 3 Units.

Analysis and design of analog integrated circuits in advanced MOS and bipolar technologies. Device operation and compact modeling in support of circuit simulations needed for design. Emphasis on quantitative evaluations of performance using hand calculations and circuit simulations; intuitive approaches to design. Analytical and approximate treatments of noise and distortion; analysis and design of feedback circuits. Design of archetypal analog blocks for networking and communications such as broadband gain stages and transimpedance amplifiers. Prerequisites: EE114/214A.

EE 216. Principles and Models of Semiconductor Devices. 3 Units.

Carrier generation, transport, recombination, and storage in semiconductors. Physical principles of operation of the p-n junction, heterojunction, metal semiconductor contact, bipolar junction transistor, MOS capacitor, MOS and junction field-effect transistors, and related optoelectronic devices such as CCDs, solar cells, LEDs, and detectors. First-order device models that reflect physical principles and are useful for integrated-circuit analysis and design. Prerequisite: 116 or equivalent.

EE 222. Applied Quantum Mechanics I. 3 Units.

Emphasis is on applications in modern devices and systems. Topics include: Schrödinger's equation, eigenfunctions and eigenvalues, solutions of simple problems including quantum wells and tunneling, quantum harmonic oscillator, coherent states, operator approach to quantum mechanics, Dirac notation, angular momentum, hydrogen atom, calculation techniques including matrix diagonalization, perturbation theory, variational method, and time-dependent perturbation theory with applications to optical absorption, nonlinear optical coefficients, and Fermi's golden rule. Prerequisites: MATH 52 and 53, PHYSICS 65 (or PHYSICS 43 and 45).

EE 223. Applied Quantum Mechanics II. 3 Units.

Continuation of 222, including more advanced topics: quantum mechanics of crystalline materials, methods for one-dimensional problems, spin, systems of identical particles (bosons and fermions), introductory quantum optics (electromagnetic field quantization, coherent states), fermion annihilation and creation operators, interaction of different kinds of particles (spontaneous emission, optical absorption, and stimulated emission). Quantum information and interpretation of quantum mechanics. Other topics in electronics, optoelectronics, optics, and quantum information science. Prerequisite: 222.

EE 225. Biochips and Medical Imaging. 3 Units.

The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies. Same as: MATSCI 382, SBIO 225

EE 228. Basic Physics for Solid State Electronics. 3 Units.

Topics: energy band theory of solids, energy bandgap engineering, classical kinetic theory, statistical mechanics, and equilibrium and non-equilibrium semiconductor statistics. Prerequisite: course in modern physics.

EE 230. Biophotonics: Light in Biology. 3 Units.

This course will provide an introduction to the use of optics in biology, primarily focusing on microscopy from an engineering perspective (i.e., the focus of the course is more on technology than biology). Course material will be interspersed with labs to provide hands-on experience with common techniques in modern microscopy (e.g., brightfield, fluorescence, confocal and phase contrast microscopy). Background in college physics strongly recommended. Programming experience with Matlab required.

EE 233. Analog Communications Design Laboratory. 3-4 Units.

Design, testing, and applications. Amplitude modulation (AM) using multiplier circuits. Frequency modulation (FM) based on discrete oscillator and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phased-lock loop (PLL) techniques, characterization of key parameters, and their applications. Practical aspects of circuit implementations. Labs involve building and characterization of AM and FM modulation/demodulation circuits and subsystems. Enrollment limited to 30 undergraduates and coterminous EE students. Prerequisite: EE101B. Undergraduate students enroll in EE133 and Graduate students enroll in EE233. Recommended: EE114/214A. Same as: EE 133

EE 234. Photonics Laboratory. 3 Units.

Photonics and fiber optics with a focus on communication and sensing. Experimental characterization of semiconductor lasers, optical fibers, photodetectors, receiver circuitry, fiber optic links, optical amplifiers, and optical sensors and photonic crystals. Prerequisite: EE 242 or equivalent. Recommended: EE 236A.

EE 236A. Modern Optics. 3 Units.

Geometrical optics, aberrations, optical instruments, radiometry. Ray matrices and Gaussian beams. Wave nature of light. Plane waves: at interfaces, in media with varying refractive index. Diffraction and Fourier optics. Interference, single-beam interferometers (Fabry-Perot), multiple-beam interferometers (Michelson, Mach-Zehnder). Polarization, Jones and Stokes calculus. Formerly EE 268. Prerequisites: EE 141 or familiarity with electromagnetism and plane waves.

EE 236AL. MODERN OPTICS - LABORATORY. 1 Unit.

The Laboratory Course allows students to work hands-on with optical equipment to conduct five experiments that compliment the lecture course. Examples are Gaussian Beams and Resonators, Interferometers, and Diffraction.

EE 236B. Guided Waves. 3 Units.

Maxwell's equations, constitutive relations. Kramers-Kronig relations. Modes in waveguides: slab, rectangular, circular. Photonic crystals, surface plasmon modes. General properties of waveguide modes: orthogonality, phase and group indices, group velocity dispersion. Chirped pulse propagation in dispersive media and its connection to Gaussian beam propagation. Time lens. Waveguide technologies: glass, silicon, III-V semiconductor, metallic. Waveguide devices: fibers, lasers, modulators, arrayed waveguide gratings. Scattering matrix description of passive optical devices, and constraints from energy conservation, time-reversal symmetry and reciprocity. Mode coupling, directional couplers, distributed-feedback structures. Resonators from scattering matrix and input-output perspective. Micro-ring resonators. Formerly EE 235. Prerequisites: EE 236A and EE 242 or familiarity with differential form of Maxwell's equations.

EE 236C. Lasers. 3 Units.

Atomic systems, spontaneous emission, stimulated emission, amplification. Three- and four-level systems, rate equations, pumping schemes. Laser principles, conditions for steady-state oscillation. Transverse and longitudinal mode control and tuning. Exemplary laser systems: gas (HeNe), solid state (Nd:YAG, Ti:sapphire) and semiconductors. Elements of laser dynamics and noise. Formerly EE231. Prerequisites: EE 236B and familiarity with modern physics and semiconductor physics. Recommended: EE 216 and EE 223 (either may be taken concurrently).

EE 237. Solar Energy Conversion. 3 Units.

Basics of solar energy conversion in photovoltaic devices. Solar cell device physics: electrical and optical. Crystalline silicon, thin film and multi-junction solar cells. Solar system issues including module assembly, inverters, and micro-inverters. Concentrated solar power. Flip classroom model is used supplementing classroom lectures with short videos. Guest speakers include distinguished engineers, entrepreneurs and venture capitalists actively engaged in solar industry. Recommended: EE116, EE216.

EE 242. Electromagnetic Waves. 3 Units.

Continuation of 141. Maxwell's equations. Plane waves in lossless and lossy media. Skin effect. Flow of electromagnetic power (Poynting's theorem). Reflection and refraction of waves at planar boundaries. Snell's law and total internal reflection. Reflection and refraction from lossy media. Guided waves. Parallel-plate and dielectric-slab waveguides. Hollow wave-guides, cavity resonators, microstrip waveguides, optical fibers. Interaction of fields with matter and particles. Antennas and radiation of electromagnetic energy. Prerequisite: 141 or PHYSICS 120.

EE 243. Semiconductor Optoelectronic Devices. 3 Units.

Semiconductor physics and optical processes in semiconductors. Operating principles and practical device features of semiconductor optoelectronic materials and heterostructures. Devices include: optical detectors (p-i-n, avalanche, and MSM); light emitting diodes; electroabsorptive modulators (Franz-Keldysh and QCSE), electrorefractive (directional couplers, Mach-Zehnder), switches (SEEDs); and lasers (waveguide and vertical cavity surface emitting). Prerequisites: semiconductor devices and solid state physics such as EE 216 or equivalent.

EE 247. Introduction to Optical Fiber Communications. 3 Units.

Fibers: single- and multi-mode, attenuation, modal dispersion, group-velocity dispersion, polarization-mode dispersion. Nonlinear effects in fibers: Raman, Brillouin, Kerr. Self- and cross-phase modulation, four-wave mixing. Sources: light-emitting diodes, laser diodes, transverse and longitudinal mode control, modulation, chirp, linewidth, intensity noise. Modulators: electro-optic, electro-absorption. Photodiodes: p-i-n, avalanche, responsivity, capacitance, transit time. Receivers: high-impedance, transimpedance, bandwidth, noise. Digital intensity modulation formats: non-return-to-zero, return-to-zero. Receiver performance: Q factor, bit-error ratio, sensitivity, quantum limit. Sensitivity degradations: extinction ratio, intensity noise, jitter, dispersion. Wavelength-division multiplexing. System architectures: local-area, access, metropolitan-area, long-haul. Prerequisites: 102A, 242 or consent of instructor.

EE 248. Fundamentals of Noise Processes. 3 Units.

Fundamentals of statistic, Fourier analysis, statistical and quantum mechanics, and linear and nonlinear circuit theory. Thermal, quantum and 1/f noise in resistors, pn junctions, lasers, and parametric amplifiers. Energy efficiency (bit/photon) and spectral efficiency (bit/s/Hz) in coherent and single photon optical communications. Protocols and security in quantum cryptography. Decoherence of qubits in quantum computation. Prerequisites: elementary device, circuit, and electromagnetic waves to the level of 101A,B and 242.

EE 251. High-Frequency Circuit Design Laboratory. 3 Units.

Students will study the theory of operation of instruments such as the time-domain reflectometer, sampling oscilloscope and vector network analyzer. They will build on that theoretical foundation by designing, constructing and characterizing numerous wireless building blocks in the upper-UHF range (e.g., up to about 500MHz), in a running series of laboratory exercises that conclude in a final project. Examples include impedance-matching and coupling structures, filters, narrowband and broadband amplifiers, mixers/modulators, and voltage-controlled oscillators.

EE 252. Antennas. 3 Units.

This course aims to cover the theory, simulation, and hands-on experiment in antenna design. Topics include: basic parameters to describe the performance and characteristics of an antenna, link budget analyses, solving the fields from a Hertzian dipole, duality, equivalence principle, reciprocity, linear wire antenna, circular loop antenna, antenna array, slot and patch antennas, helical antennas, wideband antennas, size reduction techniques, wideband small antennas, and circularly polarized (CP) small antennas. Students will learn to use a commercial electromagnetic stimulator in lab sessions. A final project is designed to solve a research antenna design problem in biomedical area or wireless communications. Prerequisite: EE 141 or Physics 120 or equivalent. Enrollment capacity limited to 25 students.

EE 253. Power Electronics. 3-4 Units.

Addressing the energy challenges of today and the environmental challenges of the future will require efficient energy conversion techniques. This course will discuss the circuits used to efficiently convert ac power to dc power, dc power from one voltage level to another, and dc power to ac power. The components used in these circuits (e.g., diodes, transistors, capacitors, inductors) will also be covered in detail to highlight their behavior in a practical implementation. A lab will be held with the class where students will obtain hands on experience with power electronic circuits. Formerly EE 292J. Same as: EE 153

EE 254. Advanced Topics in Power Electronics. 3 Units.

In this course, we will study the practical issues related to the practical design of power electronic converters. We will also explore the trade-offs involved in selecting among the different circuits used to convert ac to dc, dc to ac and back to dc over a wide range of power levels suitable for different applications. In Advanced Topics in Power Electronic, as a multidisciplinary field, we will discuss power electronics circuits, extraction of transfer functions in Continuous and discontinuous conduction mode, voltage and current control of power converters, design of input/output filters to meet Electro Magnetic Interference specifications, layout of power electronics circuits and put this knowledge in a very practical context.

EE 256. Numerical Electromagnetics. 3 Units.

Principles and applications of numerical techniques for solving practical electromagnetics problems. Finite-difference time-domain (FDTD) method and finite-difference frequency-domain (FDFD) method for solving 2D and 3D Maxwell's equations. Numerical analysis of stability, dispersion, and dissipation. Perfectly matched layer (PML) absorbing boundaries. Total-field/scattered-field (TF/SF) method. Interaction of electromagnetic waves with dispersive and anisotropic media. Homework assignments require programming and the use of MATLAB or other equivalent tools. Prerequisite: 242 or equivalent.

EE 257. Applied Optimization Laboratory (Geophys 258). 3-4 Units.

Application of optimization and estimation methods to the analysis and modeling of large observational data sets. Laboratory exercises using inverse theory and applied linear algebra to solve problems of indirect and noisy measurements. Emphasis on practical solution of scientific and engineering problems, especially those requiring large amounts of data, on digital computers using scientific languages. Also addresses advantages of large-scale computing, including hardware architectures, input/output and data bus bandwidth, programming efficiency, parallel programming techniques. Student projects involve analyzing real data by implementing observational systems such as tomography for medical and Earth observation uses, radar and matched filtering, multispectral/multitemporal studies, or migration processing. Prerequisites: Programming with high level language. Recommended: EE261, EE263, EE178, ME300 or equivalent.

Same as: GEOPHYS 258

EE 261. The Fourier Transform and Its Applications. 3 Units.

The Fourier transform as a tool for solving physical problems. Fourier series, the Fourier transform of continuous and discrete signals and its properties. The Dirac delta, distributions, and generalized transforms. Convolutions and correlations and applications; probability distributions, sampling theory, filters, and analysis of linear systems. The discrete Fourier transform and the FFT algorithm. Multidimensional Fourier transform and use in imaging. Further applications to optics, crystallography. Emphasis is on relating the theoretical principles to solving practical engineering and science problems. Prerequisites: Math through ODEs, basic linear algebra, Comfort with sums and discrete signals, Fourier series at the level of 102A.

EE 262. Two-Dimensional Imaging. 3 Units.

Time and frequency representations, two-dimensional auto- and cross-correlation, Fourier spectra, diffraction and antennas, coordinate systems and the Hankel and Abel transforms, line integrals, impulses and sampling, restoration in the presence of noise, reconstruction and tomography, imaging radar. Tomographic reconstruction using projection-slice and layergarm methods. Students create software to form images using these techniques with actual data. Final project consists of design and simulation of an advanced imaging system. Prerequisite: EE261. Recommended: EE278, EE279.

EE 263. Introduction to Linear Dynamical Systems. 3 Units.

Applied linear algebra and linear dynamical systems with application to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-input/multi-output systems, impulse and step matrices; convolution and transfer matrix descriptions. Control, reachability, and state transfer; observability and least-squares state estimation. Prerequisites: linear algebra and matrices as in MATH 103; differential equations and Laplace transforms as in EE 102A.

Same as: CME 263

EE 264. Digital Signal Processing. 3-4 Units.

This is a course on digital signal processing techniques and their applications. Topics include: review of DSP fundamentals; discrete-time random signals; sampling and multi-rate systems; oversampling and quantization in A-to-D conversion; properties of LTI systems; quantization in fixed-point implementations of filters; digital filter design; discrete Fourier Transform and FFT; spectrum analysis using the DFT; and parametric signal modeling. The course will also discuss applications of DSP in areas such as speech and audio processing, autonomous vehicles, and software radio. An optional (1 unit) project will provide a hands-on opportunity to explore the application of DSP theory to practical real-time applications. Prerequisite: EE102A and EE102B or equivalent.

EE 265. Digital Signal Processing Laboratory. 3-4 Units.

Applying 102A,B to real-world signal processing applications. Lab exercises use a programmable DSP to implement signal processing tasks. Topics: A/D conversion and quantization, sampling theorem, Z-transform, discrete-time Fourier transform, digital filter design and implementation, spectral analysis, rate conversion, wireless data communication, and OFDM receiver design. Prerequisites: 102A,B. Recommended: 261.

EE 266. Stochastic Control. 3 Units.

Introduction to stochastic control, with applications taken from a variety of areas including supply-chain optimization, advertising, finance, dynamic resource allocation, caching, and traditional automatic control. Markov decision processes, optimal policy with full state information for finite-horizon case, infinite-horizon discounted, and average stage cost problems. Bellman value function, value iteration, and policy iteration. Approximate dynamic programming. Linear quadratic stochastic control. Formerly EE365. Prerequisites: EE 263, EE 178 or equivalent.

Same as: MSE 251

EE 271. Introduction to VLSI Systems. 3 Units.

Provides a quick introduction to MOS transistors and IC fabrication and then creates abstractions to allow you to create and reason about complex digital systems. It uses a switch resistor model of a transistor, uses it to model gates, and then shows how gates and physical layout can be synthesized from Verilog or SystemVerilog descriptions. Most of the class will be spent on providing techniques to create designs that can be validated, are low power, provide good performance, and can be completed in finite time. Prerequisites: 101A, 108A and 108B; familiarity with transistors, logic design, Verilog and digital system organization.

EE 272. Design Projects in VLSI Systems. 3-4 Units.

An introduction to mixed signal design. Working in teams you will create a small mixed-signal VLSI design using a modern design flow and CAD tools. The project involves writing a Verilog model of the chip, creating a testing/debug strategy for your chip, wrapping custom layout to fit into a std cell system, using synthesis and place and route tools to create the layout of your chip, and understanding all the weird stuff you need to do to tape-out a chip. Useful for anyone who will build a chip in their Ph.D. Pre-requisites: EE271 and experience in digital/analog circuit design.

EE 273. Digital Systems Engineering. 3 Units.

Electrical issues in the design of high-performance digital systems, including signaling, timing, synchronization, noise, and power distribution. High-speed signaling methods; noise in digital systems, its effect on signaling, and methods for noise reduction; timing conventions; timing noise (skew and jitter), its effect on systems, and methods for mitigating timing noise; synchronization issues and synchronizer design; clock and power distribution problems and techniques; impact of electrical issues on system architecture and design. Prerequisites: EE101A and EE108A. Recommended: EE114/214A.

EE 278. Introduction to Statistical Signal Processing. 3 Units.

Review of basic probability and random variables. Random vectors and processes; convergence and limit theorems; IID, independent increment, Markov, and Gaussian random processes; stationary random processes; autocorrelation and power spectral density; mean square error estimation, detection, and linear estimation. Formerly EE 278B. Prerequisites: EE178 and linear systems and Fourier transforms at the level of EE102A,B or EE261.

EE 279. Introduction to Digital Communication. 3 Units.

Digital communication is a rather unique field in engineering in which theoretical ideas have had an extraordinary impact on the design of actual systems. The course provides a basic understanding of the analysis and design of digital communication systems, building on various ideas from probability theory, stochastic processes, linear algebra and Fourier analysis. Topics include: detection and probability of error for binary and M-ary signals (PAM, QAM, PSK), receiver design and sufficient statistics, controlling the spectrum and the Nyquist criterion, bandpass communication and up/down conversion, design trade-offs: rate, bandwidth, power and error probability, coding and decoding (block codes, convolutional coding and Viterbi decoding). Prerequisites: 179 or 261, and 178 or 278.

EE 282. Computer Systems Architecture. 3 Units.

Course focuses on how to build modern computing systems, namely notebooks, smartphones, and data centers, covering primarily their hardware architecture and certain system software aspects. For each system class, we cover the system architecture, processor technology, advanced memory hierarchy and I/O organization, power and energy management, and reliability. We will also cover topics such as interactions with system software, virtualization, solid state storage, and security. The programming assignments allow students to explore performance/energy tradeoffs when using heterogeneous hardware resources on smartphone devices. Prerequisite: EE108B. Recommended: CS 140.

EE 283B. Embedded Wireless Systems. 3 Units.

The structure and implementation of hardware/software systems for low power embedded sensors; how to build hardware/software systems that can run unattended for years on small batteries. Topics: hardware trends, energy profiles, execution models, sensing, aggregation, storage, application requirements, allocation, power management, resource management, scheduling, time synchronization, programming models, software design, and fault tolerance. Students discuss papers and research a final project building working systems on low-power embedded devices.

EE 284. Introduction to Computer Networks. 3 Units.

Structure and components of computer networks; functions and services; packet switching; layered architectures; OSI reference model; physical layer; data link layer; error control; window flow control; media access control protocols used in local area networks (Ethernet, Token Ring, FDDI) and satellite networks; network layer (datagram service, virtual circuit service, routing, congestion control, Internet Protocol); transport layer (UDP, TCP); application layer.

EE 284B. Advanced Topics in Networking. 3-4 Units.

Classic papers, new ideas, and research papers in networking. Architectural principles: naming, addressing, routing; congestion control, traffic management, QoS; wireless and mobility; overlay networks and virtualization; network security; switching and routing; content distribution; and proposals for future Internet structures. Prerequisite: 144 or equivalent. Same as: CS 244

EE 287A. Computer and Network Security. 3 Units.

For seniors and first-year graduate students. Principles of computer systems security. Attack techniques and how to defend against them. Topics include: network attacks and defenses, operating system security, application security (web, apps, databases), malware, privacy, and security for mobile devices. Course projects focus on building reliable code. Prerequisite: 110. Recommended: basic Unix. Same as: CS 155

EE 290A. Curricular Practical Training for Electrical Engineers. 1 Unit.

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

EE 290B. Curricular Practical Training for Electrical Engineers. 1 Unit.

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

EE 290C. Curricular Practical Training for Electrical Engineers. 1 Unit.

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

EE 290D. Curricular Practical Training for Electrical Engineers. 1 Unit.

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

EE 292B. Micro and Nanoscale Biosensing for Molecular Diagnostics. 3 Units.

The course covers state-of-the-art and emerging bio-sensors, biochips, microfluidics, which will be studied in the context of molecular diagnostics. Students will briefly learn the relevant biology, biochemistry, and molecular biology pertinent to molecular diagnostics. Students will also become equipped with a thorough understanding of the interfaces between electronics, fluidics, and molecular biology. Topics will include microfluidics and mass transfer limits, electrode-electrolyte interfaces, electrochemical noise processes, biosensor system level characterization, determination of performance parameters such as throughput, detection limit, and cost, integration of sensor with microfluidics, and electronic readout circuitry architectures. Emphasis will be placed on in-depth quantitative design of biomolecular sensing platforms.

EE 292C. Chemical Vapor Deposition and Epitaxy for Integrated Circuits and Nanostructures. 1 Unit.

Fundamental aspects of CVD are initially considered, first focusing on processes occurring in the gas phase and then on those occurring on the surface. Qualitative understanding is emphasized, with minimal use of equations. Adding energy both thermally and by using a plasma is discussed; atomic-layer deposition is briefly considered. Examples of CVD equipment are examined. The second portion of the tutorial examines layers deposited by CVD. The focus is on group IV semiconductors; especially epitaxial and heteroepitaxial deposition, in which the crystal structure of the depositing layer is related to that of the substrate. Polycrystalline silicon and the IC interconnect system are then discussed. Finally, the use of high-density plasmas for rapid gap filling is contrasted with alternative CVD dielectric deposition processes.

EE 292H. Engineering and Climate Change. 1 Unit.

The purpose of this seminar series course is to help students and professionals develop the tools to apply the engineering mindset to problems that stem from climate change, in order to consider and evaluate possible stabilizing, remedial and adaptive approaches. This course is not a crash course on climate change or policy. Instead it will focus on learning about and discussing climate problems that seem most likely to benefit from the engineering mindset. Each week Dr. Field and/or a guest speaker will lead a short warm-up discussion/activity and then deliver a talk in his/her area of expertise. It will wrap up with small-group and full-class discussions of related challenges/opportunities and possible engineering-oriented solutions. nClass members are asked to do some background reading before each class and to submit a question before each lecture. May be repeated for credit.

EE 292I. Insanely Great Products: How do they get built?. 1 Unit.

Great products emerge from a sometimes conflict-laden process of collaboration between different functions within companies. This Seminar seeks to demystify this process via case-studies of successful products and companies. Engineering management and businesspeople will share their experiences in discussion with students. Previous companies profiled: Apple, Intel, Facebook, and Genentech -- to name a few. Previous guests include: Jon Rubinstein (NeXT, Apple, Palm), Diane Greene (VMware), and Ted Hoff (Intel). Pre-requisites: None.

EE 292K. Intelligent Energy Projects. 3 Units.

Energy systems must have the intelligence to cope with rapid changes in energy supply, demand, distribution, and storage. This course is a project course focusing on a selected areas of intelligent energy systems: Demand Response, Optimal Power Flow and Locational Marginal Pricing, energy systems monitoring, control analysis of distribution systems, and associated system architecture. Prerequisites: Consent of instructor. Basic probability (EE 278), optimization (EE 364A), Matlab and C++ programming. Experience with cvx a plus.

EE 292L. Nanomanufacturing. 3 Units.

Fundamentals of nanomanufacturing technology and applications. Topics include recent developments in process technology, lithography and patterning. Technology for FinFET transistors, NAND flash and 3D chips. Manufacturing of LEDs, thin film and crystalline solar cells. Flip classroom model is used supplementing classroom lectures with short videos. Guest speakers include distinguished engineers, entrepreneurs and venture capitalists actively engaged in nanomanufacturing. Prerequisite: background in device physics and process technology. Recommended: EE116, EE216, EE212.

EE 292M. Parallel Processors Beyond Multi-Core Processing. 2 Units.

The current parallel computing research emphasizes multi-cores, but there are alternative array processors with significant potential. This hands-on seminar focuses on SIMD (Single-Instruction, Multiple-Data) massively parallel processors, with weekly programming assignments. Topics: Flynn's Taxonomy, parallel architectures, the K-SIMD simulator, principles of SIMD programming, parallel sorting with sorting networks, string comparison with dynamic programming (edit distance, Smith-Waterman), arbitrary-precision operations with fixed-point numbers, reductions, vector and matrix multiplication, asynchronous algorithms on SIMD ("SIMD Phase Programming Model"), Mandelbrot set, analysis of parallel performance. Prerequisites: EE108B and EE282. Recommended: CS140.

EE 292P. Power Management Integrated Circuits. 3 Units.

Analysis of power management architectures and circuits in CMOS VLSI technology. Circuit-level design of integrated linear voltage regulators and highly-efficient switching power converters. Overview of significant topics: high-frequency converters, switched capacitor converters, battery chargers, digital control and layout of power converters. Prerequisite: EE214A or equivalent.

EE 292T. SmartGrids and Advanced Power Systems Seminar. 1-2 Unit.

A series of seminar and lectures focused on power engineering. Renowned researchers from universities and national labs will deliver bi-weekly seminars on the state of the art of power system engineering. Seminar topics may include: power system analysis and simulation, control and stability, new market mechanisms, computation challenges and solutions, detection and estimation, and the role of communications in the grid. The instructors will cover relevant background materials in the in-between weeks. The seminars are planned to continue throughout the next academic year, so the course may be repeated for credit. Same as: CEE 272T

EE 292X. Stanford's Little Box Challenge. 1-15 Unit.

IGoogle has announced the "Littlebox" competition to build the smallest possible 2kW inverter. This challenge provides an ideal opportunity to provide a number of exciting educational and design opportunities for engineering students. The first few class meetings will be lecture format describing the competition and the work that has been done to date: Mechanical modeling, Matlab model, Buck and unfolding bridge designs. In parallel, students will be matched in teams for studies that need to be done: DC-Link implementation, QR-topology, Multi-level Approaches, Control implementation, GaN implementation, SiC investigations, Capacitor studies, Inductor studies, Thermal Design, EMI study, Etc. The problems span many topics: embedded and control systems design, power electronics, digital and analog design, programming in C & FPGAs, mechanical and thermal design and testing. We welcome motivated undergraduate and graduate students with a variety of backgrounds. Same as: EE 192X

EE 293A. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units. Same as: ENERGY 293A, MATSCI 156, MATSCI 256

EE 293B. Fundamentals of Energy Processes. 3 Units.

For seniors and graduate students. Covers scientific and engineering fundamentals of renewable energy processes involving heat. Thermodynamics, heat engines, solar thermal, geothermal, biomass. Recommended: MATH 41, 43; PHYSICS 41, 43, 45. Same as: ENERGY 293B

EE 300. Master's Thesis and Thesis Research. 1-15 Unit.

Independent work under the direction of a department faculty. Written thesis required for final letter grade. The continuing grade 'N' is given in quarters prior to thesis submission. See 390 if a letter grade is not appropriate. Course may be repeated for credit.

EE 303. Autonomous Implantable Systems. 3 Units.

Integrating electronics with sensing, stimulation, and locomotion capabilities into the body will allow us to restore or enhance physiological functions. In order to be able to insert these electronics into the body, energy source is a major obstacle. This course focuses on the analysis and design of wirelessly powered catheter-deliverable electronics. Emphases will be on the interaction between human and electromagnetic fields in order to transfer power to the embedded electronics via electromagnetic fields, power harvesting circuitry, electrical-tissue interface, and sensing and actuating frontend designs. Prerequisites: EE 252 or equivalent.

EE 304. Neuromorphics: Brains in Silicon. 3 Units.

This course introduces neuromorphic system design, starting at the device level, going through the circuit level, and ending up at the system level. At the device level, it covers MOS transistor operation in the subthreshold region. At the circuit level, it covers silicon neuron and synapse design. And at the system level, it covers reroutable interconnection. At the end of the course, you will understand how various neuromorphic architectures request; area and energy use scale with network size. Prerequisites: EE114 & EE108A. Same as: BIOE 313

EE 308. Advanced Circuit Techniques. 3 Units.

Design of advanced analog circuits at the system level, including switching power converters, amplitude-stabilized and frequency-stabilized oscillators, voltage references and regulators, power amplifiers and buffers, sample-and-hold circuits, and application-specific op-amp compensation. Approaches for finding creative design solutions to problems with difficult specifications and hard requirements. Emphasis on feedback circuit techniques, design-oriented thinking, and hands-on experience with modern analog building blocks. Several designs will be built and evaluated, along with associated laboratory projects.

EE 309. Semiconductor Memory Devices and Technology. 3 Units.

The functionality and performance of ULSI systems are increasingly dependent upon the characteristics of the memory subsystem. This course introduces the student to various memory devices: SRAM, DRAM, NVRAM (non-volatile memory). This course will cover various aspects of semiconductor memories, including basic operation principles, device design considerations, device scaling, device fabrication, memory array addressing and readout circuits. Various cell structures (e.g. 1T-1C, 6T, 4T, 1T-1R, 0T-1R, 1S-1R, floating gate FLASH, SONOS, NROM), and memory organization (open bit-line, folded bit-line, NAND, NOR, cross-point etc.). This course will include a survey of new memory concepts (e.g. magnetic tunnel junction memory (MRAM, SST-RAM), ferroelectric memory (FRAM), phase change memory (PCM), metal oxide resistive switching memory (RRAM), nanoconductive bridge memory (CBRAM)). Offered Alternate years. Pre-requisite: EE 216. Preferred: EE 316.

EE 310. Integrated Circuits Technology and Design Seminar. 1 Unit.

State-of-the-art micro- and nanoelectronics, nanotechnology, advanced materials, and nanoscience for device applications. Prerequisites: EE216, EE316. May be repeated for credit.

EE 311. Advanced Integrated Circuits Technology. 3 Units.

What are the practical and fundamental limits to the evolution of the technology of modern MOS devices and interconnects? How are modern devices and circuits fabricated and what future changes are likely? Advanced techniques and models of MOS devices and back-end (interconnect and contact) processing. What are future device structures and materials to maintain progress in integrated electronics? MOS front-end and back-end process integration. Prerequisites: EE212, EE216 or equivalent.

EE 314A. RF Integrated Circuit Design. 3 Units.

Design of RF integrated circuits for communications systems, primarily in CMOS. Topics: the design of matching networks and low-noise amplifiers at RF, mixers, modulators, and demodulators; review of classical control concepts necessary for oscillator design including PLLs and PLL-based frequency synthesizers. Design of low phase noise oscillators. Design of high-efficiency (e.g., class E, F) RF power amplifiers, coupling networks. Behavior and modeling of passive and active components at RF. Narrowband and broadband amplifiers; noise and distortion measures and mitigation methods. Overview of transceiver architectures. Prerequisite: EE214B.

EE 314B. Advanced RF Integrated Circuit Design. 3 Units.

Analysis and design of modern communication circuits and systems with emphasize on design techniques for high-frequency (into mm-wave) ICs. Topics include MOS, bipolar, and BiCMOS high-frequency integrated circuits, including power amplifiers, extremely wideband amplifiers, advanced oscillators, phase-locked loops and frequency-translation circuits. Design techniques for mm-wave silicon ICs (on-chip low-loss transmission lines, unilateralization techniques, in-tegrated antennas, harmonic generation, etc) will also be studied. Prerequisite: EE314A or equivalent course in RF or microwave.

EE 315A. VLSI Signal Conditioning Circuits. 3 Units.

Design and analysis of integrated circuits for active filters, precision gain stages, and sensor interfaces in CMOS VLSI technology. Operational transconductance amplifiers; sampled-data and continuous-time analog filters. Analysis of noise and amplifier imperfections; compensation techniques such as correlated double sampling. Sensor interfaces for micro-electromechanical and biomedical applications. Layout techniques for analog integrated circuits. Prerequisites: EE214B.

EE 315B. VLSI Data Conversion Circuits. 3 Units.

Architectural and circuit level design and analysis of integrated analog-to-digital and digital-to-analog interfaces in CMOS VLSI technology. Fundamental circuit elements such as sampling circuits and voltage comparators. Circuits and architectures for Nyquist-rate and oversampling analog-to-digital and digital-to-analog conversion; digital decimation and interpolation filters. Examples of calibration and digital enhancement techniques. Prerequisite: EE 214B. Recommended: EE 315A.

EE 316. Advanced VLSI Devices. 3 Units.

In modern VLSI technologies, device electrical characteristics are sensitive to structural details and therefore to fabrication techniques. How are advanced VLSI devices designed and what future changes are likely? What are the implications for device electrical performance caused by fabrication techniques? Physical models for nanometer scale structures, control of electrical characteristics (threshold voltage, short channel effects, ballistic transport) in small structures, and alternative device structures for VLSI. Prerequisites: 212 and 216, or equivalent.

EE 319. Advanced Nanoelectronic Devices and Technology. 3 Units.

Recent advances in materials science, device physics and structures, and processing technology, to extend VLSI device scaling towards atomistic and quantum-mechanical physics boundaries. Topics include: mobility-enhancement techniques; nanomaterial structures including tube, wire, beam, and crystal; conducting polymer; 3D FET; gate-wraparound FET; nonvolatile memory phenomena and devices; self-assembly; flash annealing; plasma doping; and nano patterning. Prerequisites: 216, 316.

EE 320. Nanoelectronics. 3 Units.

This course covers the device physics and operation principles of nanoelectric devices, with a focus on devices for energy-efficient computation. Topics covered include devices based on new nanomaterials such as carbon nanotubes, semiconductor nanowires, and 2D layered materials such as graphene; non-FET based devices such as nanoelectromechanical (NEM) relay, single electron transistors (SET) and resonant tunneling diodes (RTD); as well as FET-based devices such as tunnel FET. Devices targeted for both logic and memory applications are covered. Prerequisites: Undergraduate device physics, EE222, EE216, EE316. Recommended courses: EE223, EE228, EE311.

EE 323. Energy in Electronics. 3 Units.

This course examines energy in modern nanoelectronics, from fundamentals to system-level issues. Topics include fundamental aspects like energy transfer through electrons and phonons, ballistic limits of current and heat, meso- to macroscale mobility and thermal conductivity. The course also examines applied topics including power dissipation in nanoscale devices (FinFETs, phase-change memory, nanowires, graphene, nanotubes), circuit leakage, thermal breakdown, thermometry, heat sinks, and thermal challenges in densely integrated systems.

EE 327. Properties of Semiconductor Materials. 3 Units.

Modern semiconductor devices and integrated circuits are based on unique energy band, carrier transport, and optical properties of semiconductor materials. How to choose these properties for operation of semiconductor devices. Emphasis is on quantum mechanical foundations of the properties of solids, energy bandgap engineering, semi-classical transport theory, semi-conductor statistics, carrier scattering, electro-magneto transport effects, high field ballistic transport, Boltzmann transport equation, quantum mechanical transitions, optical absorption, and radiative and non-radiative recombination that are the foundations of modern transistors and optoelectronic devices. Prerequisites: EE216 or equivalent.

EE 328. Physics of Advanced Semiconductor Devices. 3 Units.

Principles governing the operation of modern semiconductor devices. Assumptions and approximations commonly made in analyzing devices. Emphasis is on the application of semiconductor physics to the development of advanced semiconductor devices such as heterojunctions, HJ-bipolar transistors, HJ-FETs, nanostructures, tunneling, single electron transistor and photonic devices. Use of SENTARUS, a 2-D Poisson solver, for simulation of ultra-small devices. Examples related to state-of-the-art devices and current device research. Prerequisite: 216. Recommended: 316.

EE 329. The Electronic Structure of Surfaces and Interfaces. 3 Units.

Physical concepts and phenomena for surface science techniques probing the electronic and chemical structure of surfaces, interfaces and nanomaterials. Microscopic and atomic models of microstructures; applications including semiconductor device technology, catalysis and energy. Physical processes of UV and X-ray photoemission spectroscopy, Auger electron spectroscopy, surface EXAFS, low energy electron diffraction, electron/photon stimulated ion desorption, scanning tunneling spectroscopy, ion scattering, energy loss spectroscopy and related imaging methods; and experimental aspects of these surface science techniques. Prerequisites: PHYSICS 70 and MATSCI 199/209, or consent of instructor. Same as: PHOTON 329

EE 331. Biophotonics: Light in Medicine and Biology. 3 Units.

Current topics and trends in the use of light in medicine and for advanced microscopy. Course begins with a review of relevant optical principles (basic physics required). Key topics include: light-tissue interactions; sensing and spectroscopy; contrast-enhanced imaging; super-resolution and label-free microscopy; medical applications of light for diagnostics, in-vivo imaging, and therapy; nanophotonics and array technologies. Open to non-majors; programming experience (Matlab and/or C) required.

EE 332. Laser Dynamics. 3 Units.

Dynamic and transient effects in lasers including spiking, Q-switching, mode locking, frequency modulation, frequency and spatial mode competition, linear and nonlinear pulse propagation, pulse shaping. Formerly EE 232. Prerequisite: 236C.

EE 334. Micro and Nano Optical Device Design. 3 Units.

Lecture and project course on design and analysis of optical devices with emphasis on opportunities and challenges created by scaling to the micrometer and nanometer ranges. The emphasis is on fundamentals, combined with some coverage of practical implementations. Prerequisite: EE 242 or equivalent.

EE 336. Nanophotonics. 3 Units.

Recent developments in micro- and nanophotonic materials and devices. Basic concepts of photonic crystals. Integrated photonic circuits. Photonic crystal fibers. Superprism effects. Optical properties of metallic nanostructures. Sub-wavelength phenomena and plasmonic excitations. Meta-materials. Prerequisite: Electromagnetic theory at the level of 242. Same as: MATSCI 346

EE 340. Optical Micro- and Nano-Cavities. 3 Units.

Optical micro- and nano-cavities and their device applications. Types of optical cavities (microdisks, microspheres, photonic crystal cavities, plasmonic cavities), and their electromagnetic properties, design, and fabrication techniques. Cavity quantum electrodynamics: strong and weak-coupling regime, Purcell factor, spontaneous emission control. Applications of optical cavities, including low-threshold lasers, optical modulators, quantum information processing devices, and bio-chemical sensors. Prerequisites: Advanced undergraduate or basic graduate level knowledge of electromagnetics, quantum.

EE 345. Optical Fiber Communication Laboratory. 3 Units.

Experimental techniques in optical fiber communications and networking. Experimental investigation of key optical communications components including fibers, lasers, modulators, photodiodes, optical amplifiers, and WDM multiplexers and demultiplexers. Fundamental optical communications systems techniques: eye diagrams, BER measurements, experimental evaluation of nonlinearities. Prerequisites: Undergraduate physics and optics.

EE 346. Introduction to Nonlinear Optics. 3 Units.

Wave propagation in anisotropic, nonlinear, and time-varying media. Microscopic and macroscopic description of electric-dipole susceptibilities. Free and forced waves; phase matching; slowly varying envelope approximation; dispersion, diffraction, space-time analogy. Harmonic generation; frequency conversion; parametric amplification and oscillation; electro-optic light modulation. Raman and Brillouin scattering; nonlinear processes in optical fibers. Prerequisites: 242, 236C.

EE 348. Advanced Optical Fiber Communications. 3 Units.

Optical amplifiers: gain, saturation, noise. Semiconductor amplifiers. Erbium-doped fiber amplifiers. System applications: preamplified receiver performance, amplifier chains. Raman amplifiers, lumped vs. distributed amplification. Group-velocity dispersion management: dispersion-compensating fibers, filters, gratings. Interaction of dispersion and nonlinearity, dispersion maps. Multichannel systems. Wavelength-division multiplexing components: filters, multiplexers. WDM systems, crosstalk. Time, subcarrier, code and polarization-division multiplexing. Comparison of modulation techniques: differential phase-shift keying, phase-shift keying, quadrature-amplitude modulation. Comparison of detection techniques: noncoherent, differentially coherent, coherent. Prerequisite: 247.

EE 349. Advanced Topics in Nano-Optics and Plasmonics. 3 Units.

Electromagnetic phenomena at the nanoscale. Dipolar interactions between emitters and nanostructures, weak and strong coupling, surface plasmon polaritons and localized plasmons, electromagnetic field enhancements, and near-field coupling between metallic nanostructures. Numerical tools will be taught and used to simulate nano-optical phenomena.

EE 355. Imaging Radar and Applications. 3 Units.

Radar remote sensing, radar image characteristics, viewing geometry, range coding, synthetic aperture processing, correlation, range migration, range/Doppler algorithms, wave domain algorithms, polar algorithm, polarimetric processing, interferometric measurements. Applications: surface deformation, polarimetry and target discrimination, topographic mapping surface displacements, velocities of ice fields. Prerequisites: EE261. Recommended: EE254, EE278, EE279. Same as: GEOPHYS 265

EE 356. Resonant Power Converters and Magnetic Design. 3 Units.

In this course, we will study the design of Resonant power converters which are capable of operating at higher frequencies than their hard-switch counterparts. Resonant converters are found in high performance applications where high control bandwidth and high power density are required. We will also explore practical design issues and trade off in selecting converter topologies in high performance application. We will discuss the design and modeling of high frequency magnetic elements, gate drives and resonant snubbers.

EE 359. Wireless Communications. 3-4 Units.

This course will cover advanced topics in wireless communications for voice, data, and multimedia. Topics include: an overview of current and future wireless systems; wireless channel models including path loss, shadowing, and statistical multipath channel models; fundamental capacity limits of wireless channels; digital modulation and its performance in fading and intersymbol interference; techniques to combat fading including adaptive modulation, diversity, and multiple antenna systems (MIMO); techniques to combat intersymbol interference including equalization, multicarrier modulation (OFDM), and spread spectrum; and an overview of wireless network design. Prerequisite: 279 or instructor consent.

EE 360. Multiuser Wireless Systems and Networks. 3 Units.

Design, analysis, and fundamental limits. Topics include multiuser channel capacity, multiple and random access techniques, interference mitigation, cellular system design, ad hoc wireless network design, sensor networks, "green" wireless networks, cognitive radios, and cross-layer design. Prerequisite: EE 359.

EE 364A. Convex Optimization I. 3 Units.

Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, basic probability.

Same as: CME 364A, CS 334A

EE 364B. Convex Optimization II. 3 Units.

Continuation of 364A. Subgradient, cutting-plane, and ellipsoid methods. Decentralized convex optimization via primal and dual decomposition. Monotone operators and proximal methods; alternating direction method of multipliers. Exploiting problem structure in implementation. Convex relaxations of hard problems. Global optimization via branch and bound. Robust and stochastic optimization. Applications in areas such as control, circuit design, signal processing, and communications. Course requirements include project. Prerequisite: 364A.

Same as: CME 364B

EE 367. Computational Imaging and Display. 3 Units.

Spawned by rapid advances in optical fabrication and digital processing power, a new generation of imaging technology is emerging: computational cameras at the convergence of applied mathematics, optics, and high-performance computing. Similar trends are observed for modern displays pushing the boundaries of resolution, contrast, 3D capabilities, and immersive experiences through the co-design of optics, electronics, and computation. This course serves as an introduction to the emerging field of computational imaging and displays. Students will learn to master bits and photons.

Same as: CS 448I

EE 368. Digital Image Processing. 3 Units.

Image sampling and quantization color, point operations, segmentation, morphological image processing, linear image filtering and correlation, image transforms, eigenimages, multiresolution image processing, noise reduction and restoration, feature extraction and recognition tasks, image registration. Emphasis is on the general principles of image processing. Students learn to apply material by implementing and investigating image processing algorithms in Matlab and optionally on Android mobile devices. Term project. Recommended: EE261, EE278.

Same as: CS 232

EE 369A. Medical Imaging Systems I. 3 Units.

Imaging internal structures within the body using high-energy radiation studied from a systems viewpoint. Modalities covered: x-ray, computed tomography, and nuclear medicine. Analysis of existing and proposed systems in terms of resolution, frequency response, detection sensitivity, noise, and potential for improved diagnosis. Prerequisite: EE 261.

EE 369B. Medical Imaging Systems II. 3 Units.

Imaging internal structures within the body using non-ionizing radiation studied from a systems viewpoint. Modalities include ultrasound and magnetic resonance. Analysis of ultrasonic systems including diffraction and noise. Analysis of magnetic resonance systems including physics, Fourier properties of image formation, and noise. Prerequisite: EE 261.

EE 369C. Medical Image Reconstruction. 3 Units.

Reconstruction problems from medical imaging, including magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET). Problems include reconstruction from non-uniform frequency domain data, automatic deblurring, phase unwrapping, reconstruction from incomplete data, and reconstruction from projections. Prerequisite: 369B.

EE 371. Advanced VLSI Circuit Design. 3 Units.

Design of high-performance digital systems, the things that cause them to fail, and how to avoid these problems. Topics will focus on current issues including: wiring resistance and how to deal with it, power and Gnd noise and regulation, clock (or asynchronous) system design and how to minimize clocking overhead, high-speed I/O design, energy minimization including leakage control, and structuring your Verilog code to result in high-performance, low energy systems. Extensive use of modern CAD tools. Prerequisites: 271 and 313, or consent of instructor.

EE 373A. Adaptive Signal Processing. 3 Units.

Learning algorithms for adaptive digital filters. Self-optimization. Wiener filter theory. Quadratic performance functions, their eigenvectors and eigenvalues. Speed of convergence. Asymptotic performance versus convergence rate. Applications of adaptive filters to statistical prediction, process modeling, adaptive noise canceling, adaptive antenna arrays, adaptive inverse control, and equalization and echo canceling in modems. Artificial neural networks. Cognitive memory/human and machine. Natural and artificial synapses. Hebbian learning. The Hebbian-LMS algorithm. Theoretical and experimental research projects in adaptive filter theory, communications, audio systems, and neural networks. Biomedical research projects, supervised jointly by EE and Medical School faculty. Recommended: EE263, EE264, EE278.

EE 373B. Adaptive Neural Networks. 3 Units.

Artificial neural networks. Feedforward layered networks. Backpropagation algorithm. Recurrent neural networks. Autoassociative neural networks. Principal component analysis. Clustering algorithms. Applications of neural networks to pattern recognition, speech recognition, adaptive control, nonlinear adaptive filtering, and cognitive memory. Modeling human memory. Design of human-like memory for computers, with applications to face recognition, image processing, and complex control. Continuation of research projects begun in 373A. Prerequisite: 373A.

EE 376A. Information Theory. 3 Units.

The fundamental ideas of information theory. Entropy and intrinsic randomness. Data compression to the entropy limit. Huffman coding. Arithmetic coding. Channel capacity, the communication limit. Gaussian channels. Kolmogorov complexity. Asymptotic equipartition property. Information theory and Kelly gambling. Applications to communication and data compression. Prerequisite: EE178 or STATS 116, or equivalent. Same as: STATS 376A

EE 376B. Network Information Theory. 3 Units.

Network information theory deals with the fundamental limits on information flow in networks and the optimal coding schemes that achieve these limits. It aims to extend Shannon's point-to-point information theory and the Ford-Fulkerson max-flow min-cut theorem to networks with multiple sources and destinations. The course presents the basic results and tools in the field in a simple and unified manner. Topics covered include: multiple access channels, broadcast channels, interference channels, channels with state, distributed source coding, multiple description coding, network coding, relay channels, interactive communication, and noisy network coding. Prerequisites: EE376A. Same as: STATS 376B

EE 376C. Universal Schemes in Information Theory. 3 Units.

Universal schemes for lossless and lossy compression, channel coding and decoding, prediction, denoising, and filtering. Characterization of performance limitations in the stochastic setting: entropy rate, rate-distortion function, channel capacity, Bayes envelope for prediction, denoising, and filtering. Lempel-Ziv lossless compression, and Lempel-Ziv based schemes for lossy compression, channel coding, prediction, and filtering. Discrete universal denoising. Compression-based approach to denoising. The compound decision problem. Prerequisites: EE278, EE376A, EE376B.

EE 376D. Wireless Information Theory. 3 Units.

Information theory forms the basis for the design of all modern day communication systems. The original theory was primarily point-to-point, studying how fast information can flow across an isolated noisy communication channel. Until recently, there has been only limited success in extending the theory to a network of interacting nodes. Progress has been made in the past decade driven by engineering interest in wireless networks. The course provides a unified overview of this recent progress made in information theory of wireless networks. Starting with an overview of the capacity of fading and multiple-antenna wireless channels, we aim to answer questions such as: What is the optimal way for users to cooperate and exchange information in a wireless network? How much benefit can optimal cooperation provide over traditional communication architectures? How can cooperation help to deal with interference between multiple wireless transmissions? Formerly EE361. Prerequisites: EE376A.

EE 377. Information Theory and Statistics. 3 Units.

Information theoretic techniques in probability and statistics. Fano, Assouad, and Le Cam methods for optimality guarantees in estimation. Large deviations and concentration inequalities (Sanov's theorem, hypothesis testing, the entropy method, concentration of measure). Approximation of (Bayes) optimal procedures, surrogate risks, f-divergences. Penalized estimators and minimum description length. Online game playing, gambling, no-regret learning. Prerequisites: EE 376A (or equivalent) or STATS 300A. Same as: STATS 311

EE 378A. Statistical Signal Processing. 3 Units.

Random signals in electrical engineering. Discrete-time random processes: stationarity and ergodicity, covariance sequences, power spectral density, parametric models for stationary processes. Fundamentals of linear estimation: minimum mean squared error estimation, optimum linear estimation, orthogonality principle, the Wold decomposition. Causal linear estimation of stationary processes: the causal Wiener filter, Kalman filtering. Parameter estimation: criteria of goodness of estimators, Fisher information, Cramer-Rao inequality, Chapman-Robbins inequality, maximum likelihood estimation, method of moments, consistency, efficiency. ARMA parameter estimation: Yule-Walker equations, Levinson-Durbin algorithm, least squares estimation, moving average parameter estimation, modified Yule-Walker method for model order selection. Spectrum estimation: sample covariances, covariance estimation, Bartlett formula, periodogram, periodogram averaging, windowed periodograms. Prerequisites: EE 278.

EE 378B. Inference, Estimation, and Information Processing. 3 Units.

Techniques and models for signal, data and information processing, with emphasis on incomplete data, non-ordered index sets and robust low-complexity methods. Linear models; regularization and shrinkage; dimensionality reduction; streaming algorithms; sketching; clustering, search in high dimension; low-rank models; principal component analysis. Applications include: positioning from pairwise distances; distributed sensing; measurement/traffic monitoring in networks; finding communities/clusters in networks; recommendation systems; inverse problems. Prerequisites: EE278 and EE263 or equivalent. Recommended but not required: EE378A.

EE 379. Digital Communication. 3 Units.

Modulation: linear, differential and orthogonal methods; signal spaces; power spectra; bandwidth requirements. Detection: maximum likelihood and maximum a posteriori probability principles; sufficient statistics; correlation and matched-filter receivers; coherent, differentially coherent and noncoherent methods; error probabilities; comparison of modulation and detection methods. Intersymbol interference: single-carrier channel model; Nyquist requirement; whitened matched filter; maximum likelihood sequence detection; Viterbi algorithm; linear equalization; decision-feedback equalization. Multi-carrier modulation: orthogonal frequency-division multiplexing; capacity of parallel Gaussian channels; comparison of single- and multi-carrier techniques. Prerequisite: EE102B, EE278.

EE 380. Colloquium on Computer Systems. 1 Unit.

Live presentations of current research in the design, implementation, analysis, and applications of computer systems. Topics range over a wide range and are different every quarter. Topics may include fundamental science, mathematics, cryptography, device physics, integrated circuits, computer architecture, programming, programming languages, optimization, applications, simulation, graphics, social implications, venture capital, patent and copyright law, networks, computer security, and other topics of related to computer systems. May be repeated for credit.

EE 382C. Interconnection Networks. 3 Units.

The architecture and design of interconnection networks used to communicate from processor to memory, from processor to processor, and in switches and routers. Topics: network topology, routing methods, flow control, router microarchitecture, and performance analysis. Enrollment limited to 30. Prerequisite: 282.

EE 382E. Advanced Multi-Core Systems. 3 Units.

In-depth coverage of the architectural techniques used in modern, multi-core chips for mobile and server systems. Advanced processor design techniques (superscalar cores, VLIW cores, multi-threaded cores, energy-efficient cores), cache coherence, memory consistency, vector processors, graphics processors, heterogeneous processors, and hardware support for security and parallel programming. Students will become familiar with complex trade-offs between performance-power-complexity and hardware-software interactions. A central part of CS316 is a project on an open research question on multi-core technologies. Prerequisites: EE 108B. Recommended: CS 149, EE 282. Same as: CS 316

EE 384A. Internet Routing Protocols and Standards. 3 Units.

Local area networks addressing and switching; IEEE 802.1 bridging protocols (transparent bridging, virtual LANs). Internet routing protocols: interior gateways (RIP, OSPF) and exterior gateways (BGP); multicast routing; multiprotocol label switching (MPLS). Routing in mobile networks: Mobile IP, Mobile Ad Hoc Networks (MANET), Wireless Mesh Networks. Prerequisite: EE 284 or CS 144.

EE 384B. Multimedia Communication over the Internet. 3 Units.

Applications and requirements. Traffic generation and characterization: voice encoding (G.711, G.729, G.723); image and video compression (JPEG, H.261, MPEG-2, H.263, H.264), TCP data traffic. Quality impairments and measures. Networking technologies: LAN technologies; home broadband services (ADSL, cable modems, PONs); and wireless LANs (802.11). Network protocols for multimedia applications: resource reservation (RSVP); differentiated services (DiffServ); and real-time transport protocol (RTP, RTCP). Audio-video-data conferencing standards: Internet architecture (SDP, SAP, SIP); ITU recommendations (H.320, H.323 and T.120); and real-time streaming protocol (RTSP). Emphasis will be placed on advances in network infrastructure and new services (VoIP, IPTV, Peer-to-peer communications, etc.) Prerequisite: 284 or CS 144. Recommended: 384A.

EE 384C. Wireless Local and Wide Area Networks. 3 Units.

Characteristics of wireless communication: multipath, noise, and interference. Communications techniques: spread-spectrum, CDMA, and OFDM. IEEE 802.11 physical layer specifications: FHSS, DSSS, IEEE 802.11b (CCK), and 802.11a/g (OFDM). IEEE 802.11 media access control protocols: carrier sense multiple access with collision avoidance (CSMA/CA), point coordination function (PCF), IEEE802.11e for differentiated services. IEEE 802.11 network architecture: ad hoc and infrastructure modes, access point functionality. Management functions: synchronization, power management and association. IEEE 802.11s Mesh Networks. IEEE 802.16 (WiMAX) network architecture and protocols: Physical Layer (OFDMA) and Media Access Control Layer. Current research papers in the open literature. Prerequisite: EE 284 or CS 244A.

EE 384E. Networked Wireless Systems. 3 Units.

Design and implementation of wireless networks and mobile systems. The course will commence with a short retrospective of wireless communication and initially touch on some of the fundamental physical layer properties of various wireless communication technologies. The focus will then shift to design of media access control and routing layers for various wireless systems. The course will also examine adaptations necessary at transport and higher layers to cope with node mobility and error-prone nature of the wireless medium. Finally, it will conclude with a brief overview of other related issues including emerging wireless/mobile applications.

Prerequisites: EE 284.

Same as: CS 244E

EE 384M. Network Science. 3 Units.

Modern large-scale networks consist of (i) Information Networks, such as the Web and Social Networks, and (ii) Data Centers, which are networks interconnecting computing and storage elements for servicing the users of an Information Network. This course is concerned with the mathematical models and the algorithms used in Information Networks and Data Centers. Prerequisite: EE178 or CS365.

EE 384S. Performance Engineering of Computer Systems & Networks. 3 Units.

Modeling and control methodologies for high-performance network engineering, including: Markov chains and stochastic modeling, queueing networks and congestion management, dynamic programming and task/processor scheduling, network dimensioning and optimization, and simulation methods. Applications for design of high-performance architectures for wireline/wireless networks and the Internet, including: traffic modeling, admission and congestion control, quality of service support, power control in wireless networks, packet scheduling in switches, video streaming over wireless links, and virus/worm propagation dynamics and countermeasures. Enrollment limited to 30. Prerequisites: basic networking technologies and probability.

EE 384X. Packet Switch Architectures. 3 Units.

The theory and practice of designing packet switches, such as Internet routers, and Ethernet switches. Introduction: evolution of switches and routers. Output queued switches: motivation and methods for providing bandwidth and delay guarantees. Switching: output queueing, parallelism in switches, distributed shared memory switches, input-queued switches, combined input-output queued switches, how to make fast packet buffers, buffered crossbar switches. Scheduling input queued crossbars: connections with bipartite graph matching, algorithms for 100% throughput, practical algorithms and heuristics. Looking forward: Architectures and switches for data center networks. Prerequisites: EE284 or CS 244A. Recommended: EE 178 or EE 278 or STAT 116.

EE 385A. Robust and Testable Systems Seminar. 1-4 Unit.

Student/faculty discussions of research problems in the design of reliable digital systems. Areas: fault-tolerant systems, design for testability, production testing, and system reliability. Emphasis is on student presentations and Ph.D. thesis research. May be repeated for credit. Prerequisite: consent of instructor.

EE 386. Robust System Design. 3 Units.

Causes of system malfunctions; techniques for building robust systems that avoid or are resilient to such malfunctions through built-in error detection and correction, prediction, self-test, self-recovery, and self-repair; case studies and new research problems. Prerequisites: 108A,B, 282.

EE 387. Algebraic Error Control Codes. 3 Units.

Theory and implementation of algebraic codes for detection and correction of random and burst errors. Introduction to finite fields. Linear block codes, cyclic codes, Hamming codes, BCH codes, Reed-Solomon codes. Decoding algorithms for BCH and Reed-Solomon codes. Prerequisites: elementary probability, linear algebra.

EE 387A. Advanced Topics in Cryptography. 3 Units.

Topics: Pseudo randomness, multiparty computation, pairing-based and lattice-based cryptography, zero knowledge protocols, and new encryption and integrity paradigms. May be repeated for credit. Prerequisite: 255.

EE 390. Special Studies or Projects in Electrical Engineering. 1-15 Unit.

Independent work under the direction of a faculty member. Individual or team activities may involve lab experimentation, design of devices or systems, or directed reading. May be repeated for credit.

EE 391. Special Studies and Reports in Electrical Engineering. 1-15 Unit.

Independent work under the direction of a faculty member; written report or written examination required. Letter grade given on the basis of the report; if not appropriate, student should enroll in 390. May be repeated for credit.

EE 392AA. Advanced Digital Transmission. 3 Units.

This course will develop insights into fundamentals and design of state-of-the-art physical-layer transmission systems. Specific attention will be paid to transmission in non-ideal environments with limited spectra and spatial interference. A theory of parallel channels is used to develop multi-carrier methods, vector coding, and generalized decision-feedback approaches. Students will be expected to design and analyze performance of systems operating close to fundamental limits for a variety of practical channels, wireline or wireless. Prerequisites: EE379 or equivalent; understanding of probability, random processes, digital signal processing (including basic matrix and matlab skills).

EE 392E. VLSI Signal Processing. 3 Units.

DSP architecture design. Study of circuit and architecture techniques in energy-area-performance space, design methodology based on a data-flow graph model that leads to hardware implementation. We explore automated wordlength reduction, direct and recursive filters, time-frequency analysis and other examples. The project focuses on architecture exploration for selected DSP algorithms. Useful for algorithm designers who consider hardware constraints and for circuit designers who prototype DSP algorithms in hardware. Prerequisites: EE102B and EE108A; Recommended: EE264 and EE271.

EE 392F. Logic Synthesis of VLSI Circuits. 3 Units.

Similar to former 318. Solving logic design problems with CAD tools for VLSI circuits. Exact and heuristic algorithms for logic synthesis. Representation and optimization of combinational logic functions (encoding problems, binary decision diagrams) and of multiple-level networks (algebraic and Boolean methods, don't-care set computation, timing verification, and optimization); and modeling and optimization of sequential functions and networks (retiming), semicustom libraries, and library binding. Prerequisites: familiarity with logic design, algorithm development, and programming.

EE 392I. Seminar on Trends in Computing and Communications. 1 Unit.

Lectures series and invited talks on current trends in computing and communications, and ongoing initiatives for research and open innovation. This year's focus on evolving cloud computing architectures and their impact on the enterprise; big data trends and rise of the third platform; software as a service; wireless and cellular network architectures; mobility and mobile data proliferation; open mobile platforms (e.g. Android); multi-homed mobile networking, associated data communication and mobile resource trade-offs, and system implementation in smartphones and Android devices.

EE 392L. Modern Cellular Communication Systems. 3 Units.

Theoretical and practical aspects of design, development, and implementation of modern cellular communication systems including principles, requirements and constraints of system design and deployment using examples from real-life cellular systems. Topics include radio access network protocols; homogenous and heterogeneous network architectures; power, mobility, and interference management; spectrum allocations; network capacity and user throughput; multi-antenna transmission techniques; RF and baseband signal processing; unicast and broadcast multimedia services; multi-radio platforms; and future trends in cellular communications. Suggested prerequisites: EE359, EE264, EE279, and EE278 or equivalents.

EE 392N. INTELLIGENT ENERGY SYSTEMS. 1 Unit.

The key systems engineering steps for design of automated systems in application to of existing and future intelligent energy systems. Existing design approaches and practices for the energy systems. Every second lecture of the course will be a guest lecture discussing the communication system design for a certain type of energy system. They will alternate with guest lectures discussing the on-line analytical functions.

EE 392P. Nanoscale Device Physics. 3 Units.

The course develops an understanding of nanoscale devices relevant to information manipulation: electronic drawing on ballistic, single electron, quantum confinement, and phase transitions such as ferroelectric, metal-insulator, and structural; magnetic employing field-switching, spin-torque and spin Hall; photonic using photonic bandgaps and non-linearities; and mechanical employing deflection, torsion and resonance. The physical phenomena that these connect to are electron-phonon effects in dielectrics, mesoscopic and single-electron phenomena, phase transitions, magnetic switching, spin-torque effect, Casimir effect, plasmonics, and their coupled interactions. Prerequisites: EE 216 or equivalent. Recommended: EE 222.

EE 392Q. Parallel Processors Beyond Multicores Processing. 3 Units.

The current parallel computing research emphasizes multi-cores, but there are alternative array processors with significant potential. This hands-on course focuses on SIMD (Single-Instruction, Multiple-Data) massively parallel processors. Topics: Flynn's Taxonomy, parallel architectures, Kestrel architecture and simulator, principles of SIMD programming, parallel sorting with sorting networks, string comparison with dynamic programming (edit distance, Smith-Waterman), arbitrary-precision operations with fixed-point numbers, reductions, vector and matrix multiplication, image processing algorithms, asynchronous algorithms on SIMD ("SIMD Phase Programming Model"), Mandelbrot set, analysis of parallel performance.

EE 392R. Analog-to-Digital Conversion. 3 Units.

This course teaches the theoretical and practical aspects of designing analog-to-digital and digital-to-analog converters. During this course sampling and amplitude discretization theory are reviewed. Several converters and building blocks are analyzed on electronic circuit level and suitability for various systems is considered. Specific properties and their application are shown. Next to Nyquist converters also oversampled and noise-shaping topologies are re-viewed. Impact of mismatch of components is extensively discussed. Prerequisites: EE214B or equivalent.

EE 392T. Seminar in Chip Test and Debug. 1 Unit.

Seminars by industry professionals in digital IC manufacturing test and silicon debug. Topics include yield and binsplit modeling, defect types and detection, debug hardware, physical analysis, and design for test/debug circuits. Case studies of silicon failures. Prerequisite: basic digital IC design (271 or 371).

EE 392X. Power Electronics Control and Energy-Aware Design. 3 Units.

The course surveys control techniques for power management and renewable energy sources. The overall aim is to provide a broad overview on control and power electronics for intelligent energy management. Specific topics include: (1) Systematic discussion of concepts underlying control techniques and relevant design/optimization methods, (2) Impact of the power conversion topology and the quality of the passive components on control effectiveness, and (3) Power architecture and control issues relevant to system level optimization in photovoltaic applications.

EE 395. Electrical Engineering Instruction: Practice Teaching. 1-15 Unit.

Open to advanced EE graduate students who plan to make teaching their career. Students conduct a section of an established course taught in parallel by an experienced instructor. Enrollment limited.

EE 396. Engineering Education and Online Learning. 3 Units.

An introduction to best practices in engineering education and educational technology, with a focus on online and blended learning. In addition to gaining a broad understanding of the field, students will experiment with a variety of education technologies, pedagogical techniques, and assessment methods.

Same as: EDUC 391X

EE 398A. Image and Video Compression. 3 Units.

Replaces EE398. The principles of source coding for the efficient storage and transmission of still and moving images. Entropy and lossless coding techniques. Run-length coding and fax compression. Arithmetic coding. Rate-distortion limits and quantization. Lossless and lossy predictive coding. Transform coding, JPEG. Subband coding, wavelets, JPEG2000. Motion-compensated coding, MPEG. Students investigate image and video compression algorithms in Matlab or C. Term project. Prerequisites: EE261, EE278.

EE 400. Thesis and Thesis Research. 1-15 Unit.

Limited to candidates for the degree of Engineer or Ph.D. May be repeated for credit.

EE 402A. Topics in International Technology Management. 1 Unit.

Theme for Autumn 2014 is *request; New Trends in Start-Up Company Acceleration: Toward the Rise of the Global Start-Up*. *request; The series features new incubator and accelerator programs in Silicon Valley and select Asia economies that promote early development of international business operations by start-up companies. How can start-up companies cope with the challenges of business globalization? What are the implications of these new models of incubation for the future of Asia economies and for Silicon Valley? Distinguished speakers from industry and government. May be repeated for credit. Please see syllabus for specific requirements, which may differ from those of other seminars at Stanford.*

EE 402S. Topics in International Advanced Technology Research. 1 Unit.

Theme for Spring 2013 is a survey of industry interests related to Ph.D. research in EE. Views from venture investors, corporate executives, and others in regard to mid-term future market demands in application areas such as cloud computing and analytics, energy and cleantech, robotics, transportation, medical devices and systems, etc. Perspectives into identifying and selecting a dissertation topic and maximizing the impact of research in industry and the academic world. Presentations and discussions by industry and university experts.

EE 402T. Entrepreneurship in Asian High-Tech Industries. 1 Unit. Distinctive patterns and challenges of entrepreneurship in Asia; update of business and technology issues in the creation and growth of start-up companies in major Asian economies. Distinguished speakers from industry, government, and academia. Course may be repeated for credit.

EE 410. Integrated Circuit Fabrication Laboratory. 3-4 Units. Fabrication, simulation, and testing of a submicron CMOS process. Practical aspects of IC fabrication including silicon wafer cleaning, photolithography, etching, oxidation, diffusion, ion implantation, chemical vapor deposition, physical sputtering, and electrical testing. Students also simulate the CMOS process using process simulator TSUPREM4 of the structures and electrical parameters that should result from the process flow. Taught in the Stanford Nanofabrication Facility (SNF). Preference to students pursuing doctoral research program requiring SNF facilities. Enrollment limited to 20. Prerequisites: EE 212, EE 216, consent of instructor.

EE 412. Advanced Nanofabrication Laboratory. 3 Units. Experimental projects and seminars on integrated circuit fabrication using epitaxial, oxidation, diffusion, evaporation, sputtering, and photolithographic processes with emphasis on techniques for achieving advanced device performance. May be repeated for additional credit. Prerequisites: ENGR341 or EE410 or consent of instructor.

EE 414. RF Transceiver Design Laboratory. 3 Units. Students design, build, and test GHz transceivers using microstrip construction techniques and discrete components. The design, construction, and experimental characterization of representative transceiver building blocks: low noise amplifiers (LNAs), diode ring mixers, PLL-based frequency synthesizers, voltage-controlled oscillators (VCOs), power amplifiers (PAs), and microstrip filters and patch antennas. The characteristics of passive microstrip components (including interconnect). Emphasis is on a quantitative reconciliation of theoretical predictions and extensive experimental measurements performed with spectrum and network analyzers, time-domain reflectometers (TDRs), noise figure meter and phase noise analyzers. Prerequisites: EE 314, EE 251.

EE 464. Semidefinite Optimization and Algebraic Techniques. 3 Units. This course focuses on recent developments in optimization, specifically on the use of convex optimization to address problems involving polynomial equations and inequalities. The course covers approaches for finding both exact and approximate solutions to such problems. We will discuss the use of duality and algebraic methods to find feasible points and certificates of infeasibility, and the solution of polynomial optimization problems using semidefinite programming. The course covers theoretical foundations as well as algorithms and their complexity. Prerequisites: EE364A or equivalent course on convex optimization.

EE 469B. RF Pulse Design for Magnetic Resonance Imaging. 3 Units. Magnetic resonance imaging (MRI) and spectroscopy (MRS) based on the use of radio frequency pulses to manipulate magnetization. Analysis and design of major types of RF pulses in one and multiple dimensions, analysis and design of sequences of RF pulses for fast imaging, and use of RF pulses for the creation of image contrast in MRI. Prerequisite: 369B.

EE 801. TGR Project. 0 Units.

EE 802. TGR Dissertation. 0 Units.
May be repeated for credit.

Energy Resources Engineering Courses

ENERGY 11SC. Energy in the Southwest. 2 Units.

We will examine the technical, social, and political issues surrounding energy management and use in the West, using California, Nevada, and Arizona as our field laboratory. Students will explore a number of energy narratives, such as: Who supplies our energy and from what sources? How is it transported? Who distributes to users and how do they do it? Water for energy and energy for water; two intertwined natural resources; Meeting carbon emission goals by 2020; Conflicts between desert ecosystems and renewable energy development. We will place particular emphasis on renewable energy sources and the water-energy nexus, a critically important issue for the arid and semi-arid southwest. Central to the course will be field exploration in northern and southern California, as well as neighboring areas in Arizona and Nevada, to tour sites such as wind and solar facilities, geothermal plants, hydropower pumped storage, desalination plants, water pumping stations, a liquid fuels distribution operations center, and California's Independent System Operator. Students will have the opportunity to meet with community members and with national, state, and regional authorities to discuss Western energy challenges and viable solutions. We will also take advantage of Stanford's own energy systems with site visits to the new energy facilities. Woven throughout will be an introduction to the basics of energy and energy politics through discussions, lectures, and with the help of guest speakers. Over the summer, students will be responsible for assigned readings, online interactive materials, and relevant recent news articles. Participants will return to Stanford by September 19. Travel expenses during the course will be provided (except incidentals) by the Bill Lane Center for the American West and Sophomore College.

Same as: CEE 16SC, POLISCI 25SC

ENERGY 24. Making Molehills out of Mountains: Energy and Development in Appalachia. 1 Unit.

Preparation for Alternative Spring Break trip to examine the past, present, and future role of energy in Appalachia. Positive and negative impacts of energy production; meetings with energy industry leaders, community groups, and policymakers. The larger role of energy development and energy issues in society. May be repeated for credit.

ENERGY 101. Energy and the Environment. 3 Units.

Energy use in modern society and the consequences of current and future energy use patterns. Case studies illustrate resource estimation, engineering analysis of energy systems, and options for managing carbon emissions. Focus is on energy definitions, use patterns, resource estimation, pollution. Recommended: MATH 21 or 42.

Same as: EARTHSYS 101

ENERGY 101A. Energizing California. 1 Unit.

A weekend field trip featuring renewable and nonrenewable energy installations in Northern California. Tour geothermal, bioenergy, and natural gas field sites with expert guides from the Department of Energy Resources Engineering. Requirements: One campus meeting and weekend field trip. Enrollment limited to 25. Freshman have first choice.

ENERGY 102. Renewable Energy Sources and Greener Energy Processes. 3 Units.

The energy sources that power society are rooted in fossil energy although energy from the core of the Earth and the sun is almost inexhaustible; but the rate at which energy can be drawn from them with today's technology is limited. The renewable energy resource base, its conversion to useful forms, and practical methods of energy storage. Geothermal, wind, solar, biomass, and tidal energies; resource extraction and its consequences.

Recommended: MATH 21 or 42.

Same as: EARTHSYS 102

ENERGY 104. Transition to sustainable energy systems. 3 Units.

This course explores the transition to a sustainable energy system at large scales (national and global), and over long time periods (decades). Explores the drivers of global energy demand and the fundamentals of technologies that can meet this demand sustainably. Focuses on constraints affecting large-scale deployment of technologies, as well as inertial factors affecting this transition. Problems will involve modeling global energy demand, deployment rates for sustainable technologies, technological learning and economics of technical change. Recommended: ENERGY 101, 102.

ENERGY 110. Engineering Economics. 3 Units.

The success of energy projects and companies is judged by technical, economic and financial criteria. This course will introduce concepts of engineering economy, e.g., time value of money, life cycle costs and financial metrics, and explore their application to the business of energy. We will use case studies, business school cases and possibly industry guest lecturers. Examples from the hydrocarbon businesses that dominate energy today will provide the framework for the analysis of both conventional and renewable energy.

ENERGY 120. Fundamentals of Petroleum Engineering. 3 Units.

Lectures, problems, field trip. Engineering topics in petroleum recovery; origin, discovery, and development of oil and gas. Chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media.

Same as: ENGR 120

ENERGY 120A. Flow Through Porous Media Laboratory. 1 Unit.

Laboratory measurements of permeability and porosity in rocks. Applications to subsurface fluid mechanics. Course is intended as an accompaniment to Energy 120.

ENERGY 121. Fundamentals of Multiphase Flow. 3 Units.

Multiphase flow in porous media. Wettability, capillary pressure, imbibition and drainage, Leverett J-function, transition zone, vertical equilibrium. Relative permeabilities, Darcy's law for multiphase flow, fractional flow equation, effects of gravity, Buckley-Leverett theory, recovery predictions, volumetric linear scaling, JBN and Jones-Rozelle determination of relative permeability. Frontal advance equation, Buckley-Leverett equation as frontal advance solution, tracers in multiphase flow, adsorption, three-phase relative permeabilities.

Same as: ENERGY 221

ENERGY 123. When Technology Meets Reality; An In-depth Look at the Deepwater Horizon Blowout and Oil Spill. 1 Unit.

The Deepwater Horizon blowout and spill in April 2010 occurred on one of the most advanced deepwater drilling rigs in the world operated by one of the most experienced companies. In this course we will look at and discuss the technologies and management practices involved in deepwater drilling and discuss how an accident like this happens and what could have been done differently to avoid it. We will focus on the Horizon and also look briefly at other high profile industrial and technological accidents.

ENERGY 125. Modeling and Simulation for Geoscientists and Engineers. 3 Units.

Hands-on. Topics include deterministic and statistical modeling applied to problems such as flow in the subsurface, atmospheric pollution, biological populations, wave propagation, and crustal deformation. Student teams define and present a modeling problem.

ENERGY 130. Well Log Analysis I. 3 Units.

For earth scientists and engineers. Interdisciplinary, providing a practical understanding of the interpretation of well logs. Lectures, problem sets using real field examples: methods for evaluating the presence of hydrocarbons in rock formations penetrated by exploratory and development drilling. The fundamentals of all types of logs, including electric and non-electric logs.

ENERGY 141. Seismic Reservoir Characterization. 3-4 Units.

(Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112.

Same as: ENERGY 241, GEOPHYS 241A

ENERGY 146. Reservoir Characterization and Flow Modeling with Outcrop Data. 3 Units.

Project addressing a reservoir management problem by studying an outcrop analog, constructing geostatistical reservoir models, and performing flow simulation. How to use outcrop observations in quantitative geological modeling and flow simulation. Relationships between disciplines. Weekend field trip.

Same as: ENERGY 246, GES 246

ENERGY 153. Carbon Capture and Sequestration. 3-4 Units.

CO₂ separation from syngas and flue gas for gasification and combustion processes. Transportation of CO₂ in pipelines and sequestration in deep underground geological formations. Pipeline specifications, monitoring, safety engineering, and costs for long distance transport of CO₂. Comparison of options for geological sequestration in oil and gas reservoirs, deep unmineable coal beds, and saline aquifers. Life cycle analysis.

Same as: ENERGY 253

ENERGY 154. Energy in Transition: Technology, Policy and Politics. 2 Units.

The \$6 trillion dollar global energy sector is in the midst of change; increasing global demand, retiring energy assets, and abundant technology choices are creating an atmosphere of commercial dynamism. What is clear is that decision-making in the energy sector is not simply based on technology attributes. Through the lenses of TECHNOLOGY, POLICY AND POLITICS, this class will consider how new and improved energy technologies actually make their way into the marketplace in the real world.

ENERGY 155. Undergraduate Report on Energy Industry Training. 1-3 Unit.

On-the-job practical training under the guidance of on-site supervisors. Required report detailing work activities, problems, assignments and key results. Prerequisite: written consent of instructor.

ENERGY 158. Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull. 3 Units.

This research-based seminar will evaluate the impact of market interventions in commercializing four segments of our energy mix: wind, photovoltaics, lighting, and batteries. To accelerate the development of new technologies to reduce greenhouse gas emissions and improve national security, governments use policies like direct R&D funding, financial incentives or penalties, mandatory targets or caps, and performance standards to create market conditions that favor emerging technologies. Findings outlining the most effective mix of interventions over time will be submitted for publication. Enrollment limited to 12 graduate and co-term students. Those interested please email a paragraph to cathyzo@stanford.edu by September 16, 2013 expressing why you want to take part and research experience you can bring to the seminar.

ENERGY 160. Modeling Uncertainty in the Earth Sciences. 3 Units. Whether Earth Science modeling is performed on a local, regional or global scale, for scientific or engineering purposes, uncertainty is inherently present due to lack of data and lack of understanding of the underlying phenomena. This course highlights the various issues, techniques and practical modeling tools available for modeling uncertainty of complex 3D/4D Earth systems. The course focuses on a practical breath rather than theoretical depth. Topics covered are: the process of building models, sources of uncertainty, probabilistic techniques, spatial data analysis and geostatistics, grid and scale, spatio-temporal uncertainty, visualizing uncertainty in large dimensions, Monte Carlo simulation, reducing uncertainty with data, value of information. Applications to both local (reservoir, aquifer) and global (climate) are covered through literature study. Extensive software use with SGEMS and Petrel. Project homework. Prerequisites: algebra (CME 104 or equivalent), introductory statistics course (CME 106 or equivalent). Same as: ENERGY 260

ENERGY 167. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties. 3 Units. Appraisal of development and remedial work on oil and gas wells; appraisal of producing properties; estimation of productive capacity, reserves; operating costs, depletion, and depreciation; value of future profits, taxation, fair market value; original or guided research problems on economic topics with report. Prerequisite: consent of instructor. Same as: ENERGY 267

ENERGY 171. Energy Infrastructure, Technology and Economics. 3 Units. Oil and gas represents more than 50% of global primary energy. In delivering energy at scale, the industry has developed global infrastructure with supporting technology that gives it enormous advantages in energy markets; this course explores how the oil and gas industry operates. From the perspective of these established systems and technologies, we will look at the complexity of energy systems, and will consider how installed infrastructure enables technology development and deployment, impacts energy supply, and how existing infrastructure and capital invested in fossil energy impacts renewable energy development. Prerequisites: Energy 101 and 102 or permission of instructor. Same as: ENERGY 271

ENERGY 175. Well Test Analysis. 3 Units. Lectures, problems. Application of solutions of unsteady flow in porous media to transient pressure analysis of oil, gas, water, and geothermal wells. Pressure buildup analysis and drawdown. Design of well tests. Computer-aided interpretation.

ENERGY 180. Oil and Gas Production Engineering. 3 Units. Design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120. Same as: ENERGY 280

ENERGY 191. Optimization of Energy Systems. 3-4 Units. Introductory mathematical programming and optimization using examples from energy industries. Emphasis on problem formulation and solving, secondary coverage of algorithms. Problem topics include optimization of energy investment, production, and transportation; uncertain and intermittent energy resources; energy storage; efficient energy production and conversion. Methods include linear and nonlinear optimization, as well as multi-objective and goal programming. Tools include Microsoft Excel and AMPL mathematical programming language. Prerequisites: MATH 41, MATH 51, or consent of instructor. Programming experience helpful (e.g., CS 106A, CS 106B). Same as: ENERGY 291

ENERGY 192. Undergraduate Teaching Experience. 1-3 Unit. Leading field trips, preparing lecture notes, quizzes under supervision of the instructor. May be repeated for credit.

ENERGY 193. Undergraduate Research Problems. 1-3 Unit. Original and guided research problems with comprehensive report. May be repeated for credit.

ENERGY 194. Special Topics in Energy and Mineral Fluids. 1-3 Unit. May be repeated for credit.

ENERGY 199. Senior Project and Seminar in Energy Resources. 3-4 Units. Individual or group capstone project in Energy Resources Engineering. Emphasis is on report preparation. May be repeated for credit.

ENERGY 201. Laboratory Measurement of Reservoir Rock Properties. 3 Units. In this course, students will learn methods for measuring reservoir rock properties. Techniques covered include core preservation and sample preparation; Rock petrography; Interfacial tension of fluids; Measurement of contact angles of fluids on reservoir media; Capillary pressure measurement and interpretation; Absolute and effective porosities; Absolute permeability; Multiphase flow including relative permeability and residual saturation. The class will be 1 3-hour lecture/lab per week, with readings and weekly assignments. A field trip to a professional core characterization lab may be included.

ENERGY 202. Petroleum Industry Performance Management. 1 Unit. Coming up with the right technical solution is only the beginning iquest; it must be implemented. The art and science of Performance Management. How to guarantee results with Leading and Lagging KPIquest;s (Key Performance Indicators). Assessment using the FAIRTM Model (Focus, Accountability, Involvement, Response). Operating RhythmTM: Business Reviews, Boardwalks, One-Pagers, Handover, and Crew Talks. Project management iquest;s implementation plans, milestones, and clear deliverables. Sustainability. After Action Reviews (AAR iquest;s). Continuous Improvement (CI). Coaching iquest;s GROW Model (Goal, Reality, Options, Will). The ABC Model (Antecedent iquest; Behavior iquest; Consequence). Students will solve three Case Studies with these tools; the instructor will present the actual solution iquest; what worked, what didn iquest;t, and why.

ENERGY 212. Advanced Programming for Scientists and Engineers. 3 Units. Advanced topics in software programming, debugging, and performance optimization are covered. The capabilities and usage of common libraries and frameworks such as BLAS, LAPACK, FFT, PETSc, and MKL/ACML are reviewed. Computer representation of integer and floating point numbers, and interoperability between C/C++ and Fortran is described. More advanced software engineering topics including: representing data in files, application checkpoint/restart, signals, unit and regression testing, and build automation. The use of debugging tools including static analysis, gdb, and Valgrind are introduced. An introduction to computer architecture covering processors, memory hierarchy, storage, and networking provides a foundation for understanding software performance. Profiles generated using gprof and perf are used to help guide the performance optimization process. Computational problems from various science and engineering disciplines will be used in individual and group assignments. Prerequisites: CME 200/ME 300A and CME 211 or equivalent level of programming proficiency in Python and C/C++. Same as: CME 212

ENERGY 221. Fundamentals of Multiphase Flow. 3 Units. Multiphase flow in porous media. Wettability, capillary pressure, imbibition and drainage, Leverett J-function, transition zone, vertical equilibrium. Relative permeabilities, Darcy's law for multiphase flow, fractional flow equation, effects of gravity, Buckley-Leverett theory, recovery predictions, volumetric linear scaling, JBN and Jones-Rozelle determination of relative permeability. Frontal advance equation, Buckley-Leverett equation as frontal advance solution, tracers in multiphase flow, adsorption, three-phase relative permeabilities. Same as: ENERGY 121

ENERGY 222. Advanced Reservoir Engineering. 3 Units.

Lectures, problems. General flow equations, tensor permeabilities, steady state radial flow, skin, and succession of steady states. Injectivity during fill-up of a depleted reservoir, injectivity for liquid-filled reservoirs. Flow potential and gravity forces, coning. Displacements in layered reservoirs. Transient radial flow equation, primary drainage of a cylindrical reservoir, line source solution, pseudo-steady state. May be repeated for credit. Prerequisite: 221.

ENERGY 223. Reservoir Simulation. 3-4 Units.

Fundamentals of petroleum reservoir simulation. Equations for multicomponent, multiphase flow between gridblocks comprising a petroleum reservoir. Relationships between black-oil and compositional models. Techniques for developing black-oil, compositional, thermal, and dual-porosity models. Practical considerations in the use of simulators for predicting reservoir performance. Class project. Prerequisite: 221 and 246, or consent of instructor. Recommended: CME 206.

ENERGY 224. Advanced Reservoir Simulation. 3 Units.

Topics include modeling of complex wells, coupling of surface facilities, compositional modeling, dual porosity models, treatment of full tensor permeability and grid nonorthogonality, local grid refinement, higher order methods, streamline simulation, upscaling, algebraic multigrid solvers, unstructured grid solvers, history matching, other selected topics. Prerequisite: 223 or consent of instructor. May be repeated for credit.

ENERGY 225. Theory of Gas Injection Processes. 3 Units.

Lectures, problems. Theory of multicomponent, multiphase flow in porous media. Miscible displacement: diffusion and dispersion, convection-dispersion equations and its solutions. Method of characteristic calculations of chromatographic transport of multicomponent mixtures. Development of miscibility and interaction of phase behavior with heterogeneity. May be repeated for credit. Prerequisite: CME 200.

ENERGY 226. Thermal Recovery Methods. 3 Units.

Theory and practice of thermal recovery methods: steam drive, cyclic steam injections, and in situ combustion. Models of combined mass and energy transport. Estimates of heated reservoir volume and oil recovery performance. Wellbore heat losses, recovery production, and field examples.

ENERGY 227. Enhanced Oil Recovery. 3 Units.

The physics, theories, and methods of evaluating chemical, miscible, and thermal enhanced oil recovery projects. Existing methods and screening techniques, and analytical and simulation based means of evaluating project effectiveness. Dispersion-convection-adsorption equations, coupled heat, and mass balances and phase behavior provide requisite building blocks for evaluation.

ENERGY 230. Advanced Topics in Well Logging. 3 Units.

State of the art tools and analyses; the technology, rock physical basis, and applications of each measurement. Hands-on computer-based analyses illustrate instructional material. Guest speakers on formation evaluation topics. Prerequisites: 130 or equivalent; basic well logging; and standard practice and application of electric well logs.

ENERGY 240. Geostatistics. 2-3 Units.

Geostatistical theory and practical methodologies for quantifying and simulating spatial and spatio-temporal patterns for the Earth Sciences. Real case development of models of spatial continuity, including variograms, Boolean models and training images. Estimation versus simulation of spatial patterns. Loss functions. Estimation by kriging, co-kriging with secondary data. Dealing with data on various scales. Unconditional and conditional Boolean simulation, sequential simulation for continuous and categorical variables. Multi-variate geostatistical simulation. Probabilistic and pattern-based approaches to multiple-point simulation. Trend, secondary variable, auxiliary variable and probability-type constraints. Quality control techniques on generated models. Workflows for practical geostatistical applications in mining, petroleum, hydrogeology, remote sensing and environmental sciences. prerequisites: Energy 160/260 or basic course in data analysis/statistics. Same as: GES 240

ENERGY 241. Seismic Reservoir Characterization. 3-4 Units.

(Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112.

Same as: ENERGY 141, GEOPHYS 241A

ENERGY 242. Topics in Advanced Geostatistics. 3-4 Units.

Conditional expectation theory and projections in Hilbert spaces; parametric versus non-parametric geostatistics; Boolean, Gaussian, fractal, indicator, and annealing approaches to stochastic imaging; multiple point statistics inference and reproduction; neural net geostatistics; Bayesian methods for data integration; techniques for upscaling hydrodynamic properties. May be repeated for credit. Prerequisites: 240, advanced calculus, C++/Fortran. Same as: EESS 263

ENERGY 246. Reservoir Characterization and Flow Modeling with Outcrop Data. 3 Units.

Project addressing a reservoir management problem by studying an outcrop analog, constructing geostatistical reservoir models, and performing flow simulation. How to use outcrop observations in quantitative geological modeling and flow simulation. Relationships between disciplines. Weekend field trip.

Same as: ENERGY 146, GES 246

ENERGY 247. Stochastic Simulation. 3 Units.

Characterization and inference of statistical properties of spatial random function models; how they average over volumes, expected fluctuations, and implementation issues. Models include point processes (Cox, Poisson), random sets (Boolean, truncated Gaussian), and mixture of Gaussian random functions. Prerequisite: 240.

ENERGY 251. Thermodynamics of Equilibria. 3 Units.

Lectures, problems. The volumetric behavior of fluids at high pressure. Equation of state representation of volumetric behavior. Thermodynamic functions and conditions of equilibrium, Gibbs and Helmholtz energy, chemical potential, fugacity. Phase diagrams for binary and multicomponent systems. Calculation of phase compositions from volumetric behavior for multicomponent mixtures. Experimental techniques for phase-equilibrium measurements. May be repeated for credit.

ENERGY 252. Chemical Kinetics Modeling. 3 Units.

Fundamentals of chemical reaction kinetics in homogeneous and heterogeneous reaction systems from a molecular perspective. Development and application of the theory of chemical kinetics, including collision, transition state, and surface reactivity approaches. Relationships between thermodynamics and kinetics to overall mechanism predictions. Introduction to Gaussian 03. Lab involves chemical modeling including ab initio electronic structure calculations (Hartree-Fock, configuration interaction, coupled cluster, and many-body perturbation theory) and thermodynamic predictions.

ENERGY 253. Carbon Capture and Sequestration. 3-4 Units.

CO₂ separation from syngas and flue gas for gasification and combustion processes. Transportation of CO₂ in pipelines and sequestration in deep underground geological formations. Pipeline specifications, monitoring, safety engineering, and costs for long distance transport of CO₂. Comparison of options for geological sequestration in oil and gas reservoirs, deep unmineable coal beds, and saline aquifers. Life cycle analysis. Same as: ENERGY 153

ENERGY 255. Master's Report on Energy Industry Training. 1-3 Unit.

On-the-job training for master's degree students under the guidance of on-site supervisors. Students submit a report detailing work activities, problems, assignments, and key results. May be repeated for credit. Prerequisite: consent of adviser.

ENERGY 256. Electronic Structure Theory and Applications to Chemical Kinetics. 3 Units.

Fundamentals of electronic structure theory as it applies to chemical reaction kinetics in homogeneous and heterogeneous reaction systems. Development and application of the theory of chemical kinetics, including traditional and harmonic transition state theories. Relationships between thermodynamics and kinetics to overall mechanism predictions. Lab involves chemical modeling including ab initio electronic structure calculations (Hartree-Fock, configuration interaction, coupled cluster, and many-body perturbation theory) and thermodynamic predictions. DFT calculations for catalysis applications are also covered. Prerequisite: quantum mechanics. Same as: CHEMENG 444

ENERGY 259. Presentation Skills. 1 Unit.

For teaching assistants in Energy Resources Engineering. Five two-hour sessions in the first half of the quarter. Awareness of different learning styles, grading philosophies, fair and efficient grading, text design; presentation and teaching skills, PowerPoint slide design; presentation practice in small groups. Taught in collaboration with the Center for Teaching and Learning.

ENERGY 260. Modeling Uncertainty in the Earth Sciences. 3 Units.

Whether Earth Science modeling is performed on a local, regional or global scale, for scientific or engineering purposes, uncertainty is inherently present due to lack of data and lack of understanding of the underlying phenomena. This course highlights the various issues, techniques and practical modeling tools available for modeling uncertainty of complex 3D/4D Earth systems. The course focuses on a practical breath rather than theoretical depth. Topics covered are: the process of building models, sources of uncertainty, probabilistic techniques, spatial data analysis and geostatistics, grid and scale, spatio-temporal uncertainty, visualizing uncertainty in large dimensions, Monte Carlo simulation, reducing uncertainty with data, value of information. Applications to both local (reservoir, aquifer) and global (climate) are covered through literature study. Extensive software use with SGEMS and Petrel. Project homework. Prerequisites: algebra (CME 104 or equivalent), introductory statistics course (CME 106 or equivalent). Same as: ENERGY 160

ENERGY 267. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties. 3 Units.

Appraisal of development and remedial work on oil and gas wells; appraisal of producing properties; estimation of productive capacity, reserves; operating costs, depletion, and depreciation; value of future profits, taxation, fair market value; original or guided research problems on economic topics with report. Prerequisite: consent of instructor. Same as: ENERGY 167

ENERGY 269. Geothermal Reservoir Engineering. 3 Units.

Conceptual models of heat and mass flows within geothermal reservoirs. The fundamentals of fluid/heat flow in porous media; convective/conductive regimes, dispersion of solutes, reactions in porous media, stability of fluid interfaces, liquid and vapor flows. Interpretation of geochemical, geological, and well data to determine reservoir properties/characteristics. Geothermal plants and the integrated geothermal system.

ENERGY 271. Energy Infrastructure, Technology and Economics. 3 Units.

Oil and gas represents more than 50% of global primary energy. In delivering energy at scale, the industry has developed global infrastructure with supporting technology that gives it enormous advantages in energy markets; this course explores how the oil and gas industry operates. From the perspective of these established systems and technologies, we will look at the complexity of energy systems, and will consider how installed infrastructure enables technology development and deployment, impacts energy supply, and how existing infrastructure and capital invested in fossil energy impacts renewable energy development. Prerequisites: Energy 101 and 102 or permission of instructor. Same as: ENERGY 171

ENERGY 273. Special Topics in Energy Resources Engineering. 1-3 Unit.**ENERGY 275. Quantitative Methods in Basin and Petroleum System Modeling. 1-3 Unit.**

Examine the physical processes operating in sedimentary basins by deriving the basic equations of fundamental, coupled geologic processes such as fluid flow and heat flow, deposition, compaction, mass conservation, and chemical reactions. Through hands-on computational exercises and instructor-provided "recipes," students will deconstruct the black box of basin modeling software. Students write their own codes (Matlab) as well as gain expertise in modern finite-element modeling software (PetroMod, COMSOL). Same as: GES 256

ENERGY 280. Oil and Gas Production Engineering. 3 Units.

Design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120. Same as: ENERGY 180

ENERGY 281. Applied Mathematics in Reservoir Engineering. 3 Units.

The philosophy of the solution of engineering problems. Methods of solution of partial differential equations: Laplace transforms, Fourier transforms, wavelet transforms, Green's functions, and boundary element methods. Prerequisites: CME 204 or MATH 131, and consent of instructor.

ENERGY 284. Optimization and Inverse Modeling. 3 Units.

Treatment of deterministic and stochastic optimization, gradient-based optimization, polytope method, generalized least squares, non-linear least squares and confidence intervals by numerical methods and bootstrap. Adjoint method for gradient calculation. Genetic algorithms and simulated annealing. Development of proxy functions using regression techniques and neural networks. Application of optimization methods to solving non-linear inverse problems. Bayesian method, rejection sampling, metropolis sampling, uncertainty quantification. Parameterization of high-dimensional problems through various expansion techniques. Examples of various Earth sciences inverse problems including flow and wave equations. Requirements: CME 106 and 200 (or equivalent courses).

ENERGY 285A. SUPRI-A Research Seminar: Enhanced Oil Recovery. 1 Unit.

Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-A group. May be repeated for credit. Prerequisite: consent of instructor.

ENERGY 285B. SUPRI-B Research Seminar: Reservoir Simulation. 1 Unit.

Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in SUPRI-B (reservoir simulation) program. May be repeated for credit. Prerequisite: consent of instructor.

ENERGY 285C. SUPRI-C Research Seminar: Gas Injection Processes. 1 Unit.

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-D well test analysis group. May be repeated for credit. Prerequisite: consent of instructor.

ENERGY 285D. SUPRI-D Research Seminar: Well Test Analysis. 1 Unit.

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-D well test analysis group. May be repeated for credit. Prerequisite: consent of instructor. (Horne).

ENERGY 285F. SCRF Research Seminar: Geostatistics and Reservoir Forecasting. 1 Unit.

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SCRF (Stanford Center for Reservoir Forecasting) program. Prerequisite: consent of instructor.

ENERGY 285G. Geothermal Reservoir Engineering Research Seminar. 1 Unit.

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the geothermal energy group. Presentation required for credit. Prerequisite: consent of instructor.

ENERGY 285S. Smart Fields Research Seminar: Horizontal Well Technology. 1 Unit.

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in Smart Fields (productivity and injectivity of horizontal wells) program. Prerequisite: consent of instructor.

ENERGY 290. Numerical Modeling of Fluid Flow in Heterogeneous Porous Media. 3 Units.

How to mathematically model and solve elliptic partial differential equations with variable and discontinuous coefficients describing flow in highly heterogeneous porous media. Topics include finite difference and finite volume approaches on structured grids, efficient solvers for the resulting system of equations, Krylov space methods, preconditioning, multi-grid solvers, grid adaptivity and adaptivity criteria, multiscale approaches, and effects of anisotropy on solver efficiency and accuracy. MATLAB programming and application of commercial or public domain simulation packages. Prerequisite: CME 200, 201, and 202, or equivalents with consent of instructor.

ENERGY 291. Optimization of Energy Systems. 3-4 Units.

Introductory mathematical programming and optimization using examples from energy industries. Emphasis on problem formulation and solving, secondary coverage of algorithms. Problem topics include optimization of energy investment, production, and transportation; uncertain and intermittent energy resources; energy storage; efficient energy production and conversion. Methods include linear and nonlinear optimization, as well as multi-objective and goal programming. Tools include Microsoft Excel and AMPL mathematical programming language. Prerequisites: MATH 41, MATH 51, or consent of instructor. Programming experience helpful (e.g., CS 106A, CS 106B).

Same as: ENERGY 191

ENERGY 293A. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units.

Same as: EE 293A, MATSCI 156, MATSCI 256

ENERGY 293B. Fundamentals of Energy Processes. 3 Units.

For seniors and graduate students. Covers scientific and engineering fundamentals of renewable energy processes involving heat. Thermodynamics, heat engines, solar thermal, geothermal, biomass. Recommended: MATH 41, 43; PHYSICS 41, 43, 45.

Same as: EE 293B

ENERGY 293C. Energy from Wind and Water Currents. 3 Units.

This course focuses on the extraction of energy from wind, waves and tides. The emphasis in the course is technical leading to a solid understanding of established extraction systems and discussion of promising new technologies. We will also cover resource planning and production optimization through observations and computer simulations. The course includes at least one weekend field trip, and may include experiments in wind tunnel and/or flume. Prerequisites: CEE 176B or EE 293B, programming experience, understanding of fluid mechanics, electrical systems, and engineering optimization.

ENERGY 295. Quantitative environmental assessment of energy systems. 1 Unit.

Graduate seminar on quantitative environmental assessment of energy technologies. Assessment methods for analyzing multi-device and multi-technology energy systems (e.g., full energy production request; pathways request;). Methodological coverage includes process-model life cycle assessment (LCA), energy embodied request; in materials, energy return on energy invested, and cumulative exergy consumption. Exploration of theoretical modeling of multi-technology systems using matrix formulations. Tools used include MATLAB and openLCA life cycle assessment software. Prerequisites: linear algebra and some programming experience helpful (e.g., CS 106A-B).

ENERGY 300. Graduate Directed Reading. 1-7 Unit.

Independent studies under the direction of a faculty member for which academic credit may properly be allowed.

ENERGY 301. The Energy Seminar. 1 Unit.

Interdisciplinary exploration of current energy challenges and opportunities, with talks by faculty, visitors, and students. May be repeated for credit. Same as: CEE 301

ENERGY 355. Doctoral Report on Energy Industry Training. 1-3 Unit.

On-the-job training for doctoral students under the guidance of on-site supervisors. Students submit a report on work activities, problems, assignments, and results. May be repeated for credit. Prerequisite: consent of adviser.

ENERGY 359. Teaching Experience in Energy Resources Engineering. 1 Unit.

For TAs in Energy Resources Engineering. Course and lecture design and preparation; lecturing practice in small groups. Classroom teaching practice in an Energy Resources Engineering course for which the participant is the TA (may be in a later quarter). Taught in collaboration with the Center for Teaching and Learning.

ENERGY 360. Advanced Research Work in Energy Resources Engineering. 1-10 Unit.

Graduate-level work in experimental, computational, or theoretical research. Special research not included in graduate degree program. May be repeated for credit.

ENERGY 361. Master's Degree Research in Energy Resources Engineering. 1-6 Unit.

Experimental, computational, or theoretical research. Advanced technical report writing. Limited to 6 units total.nn (Staff).

ENERGY 362. Engineer's Degree Research in Energy Resources Engineering. 1-10 Unit.

Graduate-level work in experimental, computational, or theoretical research for Engineer students. Advanced technical report writing. Limited to 15 units total, or 9 units total if 6 units of 361 were previously credited.

ENERGY 363. Doctoral Degree Research in Energy Resources Engineering. 1-10 Unit.

Graduate-level work in experimental, computational, or theoretical research for Ph.D. students. Advanced technical report writing.

ENERGY 365. Special Research Topics in Energy Resources Engineering. 1-15 Unit.

Graduate-level research work not related to report, thesis, or dissertation. May be repeated for credit.

ENERGY 369. Practical Energy Studies. 1-3 Unit.

Students work on realistic industrial reservoir engineering problems. Focus is on optimization of production scenarios using secondary or tertiary recovery techniques. When possible, projects are conducted in direct collaboration with industry. May be repeated for credit.

ENERGY 801. TGR Project. 0 Units.

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ENERGY 802. TGR Dissertation. 0 Units.

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Engineering Courses

ENGR 10. Introduction to Engineering Analysis. 4 Units.

Integrated approach to the fundamental scientific principles that are the cornerstones of engineering analysis: conservation of mass, atomic species, charge, momentum, angular momentum, energy, production of entropy expressed in the form of balance equations on carefully defined systems, and incorporating simple physical models. Emphasis is on setting up analysis problems arising in engineering. Topics: simple analytical solutions, numerical solutions of linear algebraic equations, and laboratory experiences. Provides the foundation and tools for subsequent engineering courses. Prerequisite: AP Physics and AP Calculus or equivalent.

ENGR 14. Intro to Solid Mechanics. 4 Units.

Introduction to engineering analysis using the principles of engineering solid mechanics. Builds on the math and physical reasoning concepts in Physics 41 to develop skills in evaluation of engineered systems across a variety of fields. Foundational ideas for more advanced solid mechanics courses such as ME80 or CEE101A. Interactive lecture sessions focused on mathematical application of key concepts, with weekly complementary lab session on testing and designing systems that embody these concepts. Limited enrollment, subject to instructor approval. Pre-requisite: Physics 41.

ENGR 15. Dynamics. 4 Units.

The application of Newton's Laws to solve 2-D and 3-D static and dynamic problems, particle and rigid body dynamics, freebody diagrams, and equations of motion, with application to mechanical, biomechanical, and aerospace systems. Computer numerical solution and dynamic response. Prerequisites: Calculus (differentiation and integration) such as MATH 41; and ENGR 14 (statics and strength) or a mechanics course in physics such as PHYSICS 41.

ENGR 20. Introduction to Chemical Engineering. 3 Units.

Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, energy, production of chemicals, materials processing, and purification. Prerequisite: CHEM 31. Same as: CHEMENG 20

ENGR 25B. Biotechnology. 3 Units.

Biology and chemistry fundamentals, genetic engineering, cell culture, protein production, pharmaceuticals, genomics, viruses, gene therapy, evolution, immunology, antibodies, vaccines, transgenic animals, cloning, stem cells, intellectual property, governmental regulations, and ethics. Prerequisites: CHEM 31 and MATH 41 or equivalent courage. Same as: CHEMENG 25B

ENGR 25E. Energy: Chemical Transformations for Production, Storage, and Use. 3 Units.

An introduction and overview to the challenges and opportunities of energy supply and consumption. Emphasis on energy technologies where chemistry and engineering play key roles. Review of energy fundamentals along with historical energy perspectives and current energy production technologies. In depth analyses of solar thermal systems, biofuels, photovoltaics and electrochemical devices (batteries and fuel cells). Prerequisites: high school chemistry or equivalent. Same as: CHEMENG 25E

ENGR 30. Engineering Thermodynamics. 3 Units.

The basic principles of thermodynamics are introduced in this course. Concepts of energy and entropy from elementary considerations of the microscopic nature of matter are discussed. The principles are applied in thermodynamic analyses directed towards understanding the performances of engineering systems. Methods and problems cover socially responsible economic generation and utilization of energy in central power generation plants, solar systems, refrigeration devices, and automobile, jet and gas-turbine engines.

ENGR 31. Chemical Principles with Application to Nanoscale Science and Technology. 4 Units.

Preparation for engineering disciplines emphasizing modern technological applications of solid state chemistry. Topics include: crystallography; chemical kinetics and equilibria; thermodynamics of phase changes and reaction; quantum mechanics of chemical bonding, molecular orbital theory, and electronic band structure of crystals; and the materials science of basic electronic and photonic devices. Prerequisite: AP 4 or 5 Chemistry, or equivalent, or successful completion of CHEM 31x placement test, or college chemistry background in stoichiometry, periodicity, Lewis and VSEPR structures, dissolution/precipitation and acid/base reactions, gas laws, and phase behavior.

ENGR 40. Introductory Electronics. 5 Units.

Overview of electronic circuits and applications. Electrical quantities and their measurement, including operation of the oscilloscope. Basic models of electronic components including resistors, capacitors, inductors, and the operational amplifier. Frequency response of linear circuits, including basic filters, using phasor analysis. Digital logic fundamentals, logic gates, and basic combinatorial logic blocks. Lab. Lab assignments. Enrollment limited to 200.

ENGR 40A. Introductory Electronics. 3 Units.

Abbreviated version of E40, for students not pursuing degree in Electrical Engineering. Instruction to be completed in the first seven weeks of the quarter. Overview of electronic circuits and applications. Electrical quantities and their measurement, including operation of the oscilloscope. Basic models of electronic components including resistors, capacitors, inductors, and the operational amplifier. Lab. Lab assignments. Enrollment limited to 200.

ENGR 40M. An Intro to Making: What is EE. 3-5 Units.

Is a hands-on class where students learn to make stuff. Through the process of building, you are introduced to the basic areas of EE. Students build a "useless box" and learn about circuits, feedback, and programming hardware, a light display for your desk and bike and learn about coding, transforms, and LEDs, a solar charger and an EKG machine and learn about power, noise, feedback, more circuits, and safety. And you get to keep the toys you build.

ENGR 40P. Physics of Electrical Engineering. 5 Units.

How everything from electrostatics to quantum mechanics is used in common high-technology products. Electrostatics are critical in micro-mechanical systems used in many sensors and displays, and Electromagnetic waves are essential in all high-speed communication systems. How to propagate energy on transmission lines, optical fibers, and in free space. Which aspects of modern physics are needed to generate light for the operation of a DVD player or TV. Introduction to semiconductors, solid-state light bulbs, and laser pointers. Hands-on labs to connect physics to everyday experience. Prerequisites: Physics 43.

Same as: EE 41

ENGR 50. Introduction to Materials Science, Nanotechnology Emphasis. 4 Units.

The structure, bonding, and atomic arrangements in materials leading to their properties and applications. Topics include electronic and mechanical behavior, emphasizing nanotechnology, solid state devices, and advanced structural and composite materials.

ENGR 50E. Introduction to Materials Science, Energy Emphasis. 4 Units.

Materials structure, bonding and atomic arrangements leading to their properties and applications. Topics include electronic, thermal and mechanical behavior; emphasizing energy related materials and challenges.

ENGR 50M. Introduction to Materials Science, Biomaterials Emphasis. 4 Units.

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

ENGR 60. Engineering Economy. 3 Units.

Fundamentals of economic analysis. Interest rates, net present value, and internal rate of return. Applications to personal and corporate financial decisions. Mortgage evaluation, insurance decision, hedging/risk reduction, project selection, capital budgeting, and investment valuation. Effects of taxes on personal and business decisions. Investment decisions under uncertainty and utility theory. Please see <http://www.stanford.edu/class/engr60>. Prerequisites: precalculus and elementary probability.

ENGR 62. Introduction to Optimization. 4 Units.

Formulation and analysis of linear optimization problems. Solution using Excel solver. Polyhedral geometry and duality theory. Applications to contingent claims analysis, production scheduling, pattern recognition, two-player zero-sum games, and network flows. Prerequisite: CME 100 or MATH 51.

Same as: MSE 111

ENGR 70A. Programming Methodology. 3-5 Units.

Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Uses the Java programming language. Emphasis is on good programming style and the built-in facilities of the Java language. No prior programming experience required. Summer quarter enrollment is limited. Priority given to Stanford students.

Same as: CS 106A

ENGR 70B. Programming Abstractions. 3-5 Units.

Abstraction and its relation to programming. Software engineering principles of data abstraction and modularity. Object-oriented programming, fundamental data structures (such as stacks, queues, sets) and data-directed design. Recursion and recursive data structures (linked lists, trees, graphs). Introduction to time and space complexity analysis. Uses the programming language C++ covering its basic facilities. Prerequisite: 106A or equivalent. Summer quarter enrollment is limited. Priority given to Stanford students.

Same as: CS 106B

ENGR 70X. Programming Abstractions (Accelerated). 3-5 Units.

Intensive version of 106B for students with a strong programming background interested in a rigorous treatment of the topics at an accelerated pace. Additional advanced material and more challenging projects.

Prerequisite: excellence in 106A or equivalent, or consent of instructor. Same as: CS 106X

ENGR 80. Introduction to Bioengineering. 4 Units.

Broad but rigorous overview of the field of bioengineering, centered around the common theme of engineering analysis and design of biological systems. Topics include biomechanics, systems and synthetic biology, physical biology, biomolecular engineering, tissue engineering, and devices. Emphasis on critical thinking and problem solving approaches, and quantitative methods applied to biology. 4 units, Spr (Cochran).

Same as: BIOE 80

ENGR 90. Environmental Science and Technology. 3 Units.

Introduction to environmental quality and the technical background necessary for understanding environmental issues, controlling environmental degradation, and preserving air and water quality. Material balance concepts for tracking substances in the environmental and engineering systems.

Same as: CEE 70

ENGR 100. Teaching Public Speaking. 3 Units.

The theory and practice of teaching public speaking and presentation development. Lectures/discussions on developing an instructional plan, using audiovisual equipment for instruction, devising tutoring techniques, and teaching delivery, organization, audience analysis, visual aids, and unique speaking situations. Weekly practice speaking. Students serve as apprentice speech tutors. Those completing course may become paid speech instructors in the Technical Communications Program. Prerequisite: consent of instructor.

ENGR 103. Public Speaking. 3 Units.

Priority to Engineering students. Introduction to speaking activities, from impromptu talks to carefully rehearsed formal professional presentations. How to organize and write speeches, analyze audiences, create and use visual aids, combat nervousness, and deliver informative and persuasive speeches effectively. Weekly class practice, rehearsals in one-on-one tutorials, videotaped feedback. Limited enrollment.

ENGR 105. Feedback Control Design. 3 Units.

Design of linear feedback control systems for command-following error, stability, and dynamic response specifications. Root-locus and frequency response design techniques. Examples from a variety of fields. Some use of computer aided design with MATLAB. Prerequisite: EE 102, ME 161, or equivalent.

ENGR 110. Perspectives in Assistive Technology (ENGR 110). 1-3 Unit.

Seminar and student project course. Explores the medical, social, ethical, and technical challenges surrounding the design, development, and use of technologies that improve the lives of people with disabilities and older adults. Guest lecturers include engineers, clinicians, and individuals with disabilities. Tours of local facilities, assistive technology faire, and movie screening. Juniors, seniors, and graduate students from any discipline welcome. Enrollment limited to class capacity of 45. 1 unit for seminar attendance only (CR/NC) or individual project (letter grade). 3 units for students who pursue a team-based assistive technology project. Projects can be continued as independent study in Spring Quarter. See <http://enr110.stanford.edu/>. Service Learning Course (certified by Haas Center for Public Service).

Same as: ENGR 210

ENGR 113A. Solar Decathlon 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA.

Same as: ENGR 213A

ENGR 113B. Solar Decathlon 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA.

Same as: ENGR 213B

ENGR 113C. Solar Decathlon 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA.

Same as: ENGR 213C

ENGR 113D. SOLAR DECATHLON 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA.

Same as: ENGR 213D

ENGR 115. Design the Tech Challenge. 2 Units.

Students work with Tech Museum of San Jose staff to design the Tech Challenge, a yearly engineering competition for 6-12th grade students. Brainstorming, field trips to the museum, prototyping, coaching, and presentations to the Tech Challenge advisory board. See at <http://techchallenge.thetech.org>. May be repeated for credit.

Same as: ENGR 215

ENGR 118. Cross-Cultural Design for Service. 3 Units.

Students spend the summer in China working collaboratively to use design thinking for a project in the countryside. Students learn and apply the principles of design innovation including user research, ideation, prototyping, storytelling and more in a cross cultural setting to design a product or service that will benefit Chinese villagers. Students should be prepared to work independently in a developing region of China, to deal with persistent ambiguity, and to work with a cross-cultural, diverse team of students on their projects. Applications for Summer 2012 were due in March.

ENGR 120. Fundamentals of Petroleum Engineering. 3 Units.

Lectures, problems, field trip. Engineering topics in petroleum recovery; origin, discovery, and development of oil and gas. Chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media.

Same as: ENERGY 120

ENGR 129. The Internet in Global Context. 4 Units.

Explore how the technologies of global connectivity are reshaping the relationships between nations, companies, and citizens, and, in turn, how nations, companies, and citizens are themselves reshaping those technologies to fit and promote their own interests. Also will examine three broad themes that arise out of the first analysis: technological determinism, technological solutionism, and technological regulation. Finally, will consider the implications of our study for what it means to be a technology professional and a citizen. Open only to students who are studying in one of the Bing Overseas Studies programs. Permission number from the instructor required for enrollment.

ENGR 130. Science, Technology, and Contemporary Society. 4-5 Units.

Key social, cultural, and values issues raised by contemporary scientific and technological developments; distinctive features of science and engineering as sociotechnical activities; major influences of scientific and technological developments on 20th-century society, including transformations and problems of work, leisure, human values, the fine arts, and international relations; ethical conflicts in scientific and engineering practice; and the social shaping and management of contemporary science and technology.

ENGR 131. Ethical Issues in Engineering. 4 Units.

Moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; the ethics of whistle blowing; ethical conflicts of engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations; ethical issues arising from engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Case studies, guest practitioners, and field research. Limited enrollment.

ENGR 140A. Leadership of Technology Ventures. 3-4 Units.

First of three-part sequence for students selected to the Mayfield Fellows Program. Management and leadership within high technology startups, focusing on entrepreneurial skills related to product and market strategy, venture financing and cash flow management, team recruiting and organizational development, and the challenges of managing growth and handling adversity in emerging ventures. Other engineering faculty, founders, and venture capitalists participate as appropriate. Recommended: accounting or finance course (MS&E 140, ECON 90, or ENGR 60).

ENGR 140B. Leadership of Technology Ventures. 1-2 Unit.

Open to Mayfield Fellows only; taken during the summer internship at a technology startup. Students exchange experiences and continue the formal learning process. Activities journal. Credit given following quarter.

ENGR 140C. Leadership of Technology Ventures. 2-3 Units.

Open to Mayfield Fellows only. Capstone to the 140 sequence. Students, faculty, employers, and venture capitalists share recent internship experiences and analytical frameworks. Students develop living case studies and integrative project reports.

ENGR 145. Technology Entrepreneurship. 4 Units.

How do you create a successful start-up? What is entrepreneurial leadership in a large firm? What are the differences between an idea and true opportunity? How does an entrepreneur form a team and gather the resources necessary to create a great enterprise? Mentor-guided project focused on developing students' startup ideas, immersion in nuances of innovation and early stage entrepreneurship, case studies, research on the entrepreneurial process, and the opportunity to network with Silicon Valley's top entrepreneurs and venture capitalists. For undergraduates of all majors who seek to understand the formation and growth of high-impact start-ups in areas such as information, energy, medical and consumer technologies. No prerequisites. Limited enrollment.

ENGR 150. Data Challenge Lab. 1-6 Unit.

In this lab, students develop the practical skills of data science by solving a series of increasingly difficult, real problems. Skills developed include: data manipulation, exploratory data analysis, data visualization, and predictive modeling. The data challenges each student undertakes are based upon their current skills. Students receive one-on-one coaching and see how expert practitioners solve the same challenges. Limited enrollment; application required. May be repeated for credit. See <http://datalab.stanford.edu> for more information.

ENGR 154. Vector Calculus for Engineers. 5 Units.

Computation and visualization using MATLAB. Differential vector calculus: analytic geometry in space, functions of several variables, partial derivatives, gradient, unconstrained maxima and minima, Lagrange multipliers. Introduction to linear algebra: matrix operations, systems of algebraic equations, methods of solution and applications. Integral vector calculus: multiple integrals in Cartesian, cylindrical, and spherical coordinates, line integrals, scalar potential, surface integrals, Green's theorem, divergence, and Stokes' theorem; theorems. Examples and applications drawn from various engineering fields. Prerequisites: MATH 41 and 42, or 10 units AP credit. Note: Students enrolled in section 100-02 and 100A-02 are required to attend the discussion sections on Thursdays 5:15-6:45. Same as: CME 100

ENGR 155A. Ordinary Differential Equations for Engineers. 5 Units.

Analytical and numerical methods for solving ordinary differential equations arising in engineering applications: Solution of initial and boundary value problems, series solutions, Laplace transforms, and nonlinear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, finite differences. Introduction to MATLAB programming as a basic tool kit for computations. Problems from various engineering fields. Prerequisite: CME 100/ENGR 154 or MATH 51. Same as: CME 102

ENGR 155B. Linear Algebra and Partial Differential Equations for Engineers. 5 Units.

Linear algebra: matrix operations, systems of algebraic equations, Gaussian elimination, undetermined and overdetermined systems, coupled systems of ordinary differential equations, eigensystem analysis, normal modes. Fourier series with applications, partial differential equations arising in science and engineering, analytical solutions of partial differential equations. Numerical methods for solution of partial differential equations: iterative techniques, stability and convergence, time advancement, implicit methods, von Neumann stability analysis. Examples and applications from various engineering fields. Prerequisite: CME 102/ENGR 155A. Same as: CME 104

ENGR 155C. Introduction to Probability and Statistics for Engineers. 3-4 Units.

Probability: random variables, independence, and conditional probability; discrete and continuous distributions, moments, distributions of several random variables. Topics in mathematical statistics: random sampling, point estimation, confidence intervals, hypothesis testing, non-parametric tests, regression and correlation analyses; applications in engineering, industrial manufacturing, medicine, biology, and other fields. Prerequisite: CME 100/ENGR 154 or MATH 51. Same as: CME 106

ENGR 159Q. Japanese Companies and Japanese Society. 3 Units.

Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. Same as: MATSCI 159Q

ENGR 192. Engineering Public Service Project. 1-2 Unit.

Volunteer work on a public service project with a technical engineering component. Project requires a faculty sponsor and a community partner such as a nonprofit organization, school, or individual. Required report. See <http://soe.stanford.edu/publicservice>. May be repeated for credit. Prerequisite: consent of instructor.

ENGR 199. Special Studies in Engineering. 1-15 Unit.

Special studies, lab work, or reading under the direction of a faculty member. Often research experience opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the section number corresponding to the particular faculty member. May be repeated for credit. Prerequisite: consent of instructor.

ENGR 199W. Writing of Original Research for Engineers. 1-3 Unit.

Technical writing in science and engineering. Students produce a substantial document describing their research, methods, and results. Prerequisite: completion of freshman writing requirements; prior or concurrent in 2 units of research in the major department; and consent of instructor. WIM for BioMedical Computation.

ENGR 202S. Writing: Special Projects. 1 Unit.

Writing tutorial for students working on non-course projects such as theses, journal articles, and conference papers. Weekly individual conferences.

ENGR 202W. Technical Writing. 3 Units.

How to write clear, concise, and well-ordered technical prose. Principles of editing for structure and style. Applications to a variety of genres in engineering and science.

ENGR 205. Introduction to Control Design Techniques. 3 Units.

Review of root-locus and frequency response techniques for control system analysis and synthesis. State-space techniques for modeling, full-state feedback regulator design, pole placement, and observer design. Combined observer and regulator design. Lab experiments on computers connected to mechanical systems. Prerequisites: 105, MATH 103, 113. Recommended: Matlab.

ENGR 206. Control System Design. 3-4 Units.

Design and construction of a control system and working plant. Topics include: linearity, actuator saturation, sensor placement, controller and model order; linearization by differential actuation and sensing; analog op-amp circuit implementation. Emphasis is on qualitative aspects of analysis and synthesis, generation of candidate design, and engineering tradeoffs in system selection. Large team-based project. Limited enrollment. Prerequisite: 105.

ENGR 207A. Linear Control Systems I. 3 Units.

Introduction to control of discrete-time linear systems. State-space models. Controllability and observability. The linear quadratic regulator. Prerequisite: 105 or 205.

ENGR 207B. Linear Control Systems II. 3 Units.

Probabilistic methods for control and estimation. Statistical inference for discrete and continuous random variables. Linear estimation with Gaussian noise. The Kalman filter. Prerequisite: EE 263.

ENGR 209A. Analysis and Control of Nonlinear Systems. 3 Units.

Introduction to nonlinear phenomena: multiple equilibria, limit cycles, bifurcations, complex dynamical behavior. Planar dynamical systems, analysis using phase plane techniques. Describing functions. Lyapunov stability theory. SISO feedback linearization, sliding mode control. Design examples. Prerequisite: 205.

ENGR 210. Perspectives in Assistive Technology (ENGR 110). 1-3 Unit.

Seminar and student project course. Explores the medical, social, ethical, and technical challenges surrounding the design, development, and use of technologies that improve the lives of people with disabilities and older adults. Guest lecturers include engineers, clinicians, and individuals with disabilities. Tours of local facilities, assistive technology faire, and movie screening. Juniors, seniors, and graduate students from any discipline welcome. Enrollment limited to class capacity of 45. 1 unit for seminar attendance only (CR/NC) or individual project (letter grade). 3 units for students who pursue a team-based assistive technology project. Projects can be continued as independent study in Spring Quarter. See <http://engr110.stanford.edu/>. Service Learning Course (certified by Haas Center for Public Service). Same as: ENGR 110

ENGR 213. Solar Decathlon. 1-4 Unit.

Open to all engineering majors. Project studio for all work related to the Solar Decathlon 2013 competition. Each student will develop a personal work plan for the quarter with his or her advisor and perform multidisciplinary collaboration on designing systems for the home or pre-construction planning. Work may continue through the summer as a paid internship, as well as through the next academic year. For more information about the team and the competition, please visit solardecathlon.stanford.edu.

ENGR 213A. Solar Decathlon 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113A

ENGR 213B. Solar Decathlon 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113B

ENGR 213C. Solar Decathlon 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113C

ENGR 213D. SOLAR DECATHLON 2015. 3 Units.

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113D

ENGR 215. Design the Tech Challenge. 2 Units.

Students work with Tech Museum of San Jose staff to design the Tech Challenge, a yearly engineering competition for 6-12th grade students. Brainstorming, field trips to the museum, prototyping, coaching, and presentations to the Tech Challenge advisory board. See at <http://techchallenge.thetech.org>. May be repeated for credit. Same as: ENGR 115

ENGR 231. Transformative Design. 3-5 Units.

Project-based. How interactive technologies can be designed to encourage behavioral transformation. Topics such as self-efficacy, social support, and mechanism of cultural change in domains such as weight-loss, energy conservation, or safe driving. Lab familiarizes students with hardware and software tools for interaction prototyping. Students teams create functional prototypes for self-selected problem domains. Prerequisite: consent of instructor. Design Institute class; see <http://dschool.stanford.edu>. Same as: ANTHRO 332

ENGR 240. Introduction to Micro and Nano Electromechanical Systems. 3 Units.

Miniaturization technologies now have important roles in materials, mechanical, and biomedical engineering practice, in addition to being the foundation for information technology. This course will target an audience of first-year engineering graduate students and motivated senior-level undergraduates, with the goal of providing an introduction to M/NEMS fabrication techniques, selected device applications, and the design tradeoffs in developing systems. The course has no specific prerequisites, other than graduate or senior standing in engineering; otherwise, students will require permission of the instructors.

ENGR 245. The Lean LaunchPad: Getting Your Lean Startup Off the Ground. 3-4 Units.

Apply the "Lean Startup" principles; "business model canvas," "customer development" and "Agile Engineering" to prototype, test, and iterate your idea while discovering if you have a profitable business model. This is the class adopted by the NSF and NIH as the Innovation Corps. Apply and work in teams. Info sessions held in November and December. Team applications required in December. Proposals can be software, hardware, or service of any kind. Projects are experiential and require incrementally building the product while talking to customers/partners each week. Prerequisite: interest and passion in exploring whether a technology idea can become a real company. Limited enrollment.

ENGR 250. Data Challenge Lab. 1-6 Unit.

In this lab, students develop the practical skills of data science by solving a series of increasingly difficult, real problems. Skills developed include: data manipulation, exploratory data analysis, data visualization, and predictive modeling. The data challenges each student undertakes are based upon their current skills. Students receive one-on-one coaching and see how expert practitioners solve the same challenges. Limited enrollment; application required. May be repeated for credit. See <http://datalab.stanford.edu> for more information.

ENGR 280. From Play to Innovation. 2-4 Units.

Focus is on enhancing the innovation process with playfulness. The class will be project-based and team-centered. We will investigate the human "state of play" to reach an understanding of its principal attributes and how important it is to creative thinking. We will explore play behavior, its development, and its biological basis. We will then apply those principles through design thinking to promote innovation in the corporate world. Students will work with real-world partners on design projects with widespread application. This course requires an application. You can find the application here: dschool.stanford.edu/classes.

ENGR 281. d.media 4.0 - Designing Media that Matters. 2-3 Units.

Design practicum; project-based. Explore the why & how of designing media. What motivates our consumption of media, what real needs linger beneath the surface? How do you design a new media experience? Join us and find out. The world is Changing, What Are You Going to Do About It? In the shift from a consumer culture to a creative society has old media institutions collapsing while participatory media frameworks are emerging. Media designers of all types have an opportunity and responsibility to make this change positive. 3 Projects explore: Communication Design, Digital Interaction, User Motivations. Admission by application. See dschool.stanford.edu/classes for more information.

ENGR 290. Graduate Environment of Support. 1 Unit.

For course assistants (CAs) and tutors in the School of Engineering tutorial and learning program. Interactive training for effective academic assistance. Pedagogy, developing course material, tutoring, and advising. Sources include video, readings, projects, and role playing.

ENGR 298. Seminar in Fluid Mechanics. 1 Unit.

Interdepartmental. Problems in all branches of fluid mechanics, with talks by visitors, faculty, and students. Graduate students may register for 1 unit, without letter grade; a letter grade is given for talks. May be repeated for credit.

ENGR 299. Special Studies in Engineering. 1-15 Unit.

Special studies, lab work, or reading under the direction of a faculty member. Often research experience opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the corresponding section. Prerequisite: consent of instructor.

ENGR 311A. Women's Perspectives. 1 Unit.

Master's and Ph.D. seminar series driven by student interests. Possible topics: time management, career choices, health and family, diversity, professional development, and personal values. Guest speakers from academia and industry, student presentations with an emphasis on group discussion. Graduate students share experiences and examine scientific research in these areas. May be repeated for credit.

ENGR 311B. Designing the Professional. 1 Unit.

How to Get a Life as well as a PhD: Seminar open to ALL doctoral students (Humanities, Sciences and Engineering). Apply principles of design thinking to designing your professional life following Stanford. Topics include: Introduction to "design thinking", a framework for vocational wayfinding and locating profession within life overall; tools to investigate multiple professional paths. Creation of personal "Odyssey Plan" to innovate multiple prototypes for post-PhD professional launch.

ENGR 312. Science and Engineering Course Design. 2-3 Units.

For students interested in an academic career and who anticipate designing science or engineering courses at the undergraduate or graduate level. Goal is to apply research on science and engineering learning to the design of effective course materials. Topics include syllabus design, course content and format decisions, assessment planning and grading, and strategies for teaching improvement. Same as: CTL 312

ENGR 313. Topics in Engineering and Science Education. 1-2 Unit.

This seminar series focuses on topics related to teaching science, technology, engineering, and math (STEM) courses based on education research. Each year focuses on a different topic related to STEM education. This course may be repeated for credit each year. This year we will explore how to design assessments and give feedback to facilitate student learning through a series of discussions, in-class activities and guest lectures based on current STEM education literature. Throughout the quarter, there will be several opportunities for directly practicing and applying STEM education strategies to specific teaching goals in your field.

ENGR 341. Micro/Nano Systems Design and Fabrication. 3-5 Units.

Laboratory course in micro and nano fabrication technology that combines lectures on theory and fundamentals with hands-on training in the Stanford Nanofabrication Facility. Prerequisite: ENGR 240 or equivalent.

ENGR 342. MEMS Laboratory II. 3-4 Units.

Emphasis is on tools and methodologies for designing and fabricating N/MEMS-based solutions. Student interdisciplinary teams collaborate to invent, develop, and integrate N/MEMS solutions. Design alternatives fabricated and tested with emphasis on manufacturability, assembly, test, and design. Limited enrollment. Prerequisite: ENGR 341.

ENGR 350. Data Impact Lab. 1-6 Unit.

In this lab, multi-disciplinary teams of students tackle high-impact, unsolved problems for social sector partners. Teams receive mentorship and coaching from Stanford faculty, domain experts, and data science experts from industry. Sample projects include innovations for: poverty alleviation in the developing world, local government services, education, and healthcare. Limited enrollment; application required. May be repeated for credit. See <http://datalab.stanford.edu> for more information.

English Courses

ENGLISH 1. History and Theory of Novel Group. 1 Unit.

This reading group, organized by the Undergraduate Initiative of the Center for the Study of the Novel (CSN), is intended for undergraduates interested in the study of the novel. The group will meet four times in the Spring Quarter, to discuss works by major theorists of the novel, including Lukacs, Watt, Bakhtin, Barthes, Foucault, Moretti, Sedgwick, and others. Discussions will be led by CSN's graduate coordinators, Elena Dancu (DLCL) and Mark Taylor (English). All readings will be available on CourseWork.

Same as: DLCL 1

ENGLISH 1D. Dickens Book Club. 1 Unit.

Through the academic year, we will read one Dickens novel, one number a week for 19 weeks, as the Victorians would have done as they read the serialized novel over the course of 19 months. The group gets together once a week for an hour and a half to discuss each number, to look carefully at the pattern that the author is weaving, to guess, as the Victorians would have done, what might be coming next, and to investigate the Victorian world Dickens presents. We look carefully at themes, characters, metaphorical patterns, and scenes that form Dickens' literary world, and spend increasing time evaluating the critique that Dickens levels at Victorian life. The weekly gatherings are casual; the discussion is lively and pointed.

ENGLISH 9CE. Creative Expression in Writing. 3 Units.

Primary focus on giving students a skill set to tap into their own creativity. Opportunities for students to explore their creative strengths, develop a vocabulary with which to discuss their own creativity, and experiment with the craft and adventure of their own writing. Students will come out of the course strengthened in their ability to identify and pursue their own creative interests.

ENGLISH 9CT. Special Topics in Creative Expression. 3 Units.

Focus on a particular topic or process of creative expression. Primary focus on giving students a skill set to tap into their own creativity. Opportunities for students to explore their creative strengths, develop a vocabulary with which to discuss their own creativity, and experiment with the craft and adventure of their own writing. Students will come out of the course strengthened in their ability to identify and pursue their own creative interests.

ENGLISH 15SC. The New Millennium Mix: Crossings of Race & Culture. 2 Units.

Recently, The New York Times and the National Geographic have hailed the "new face of America" as young, global, and hybrid. The NY Times gave this demographic a name: Generation E.A. (Ethnically Ambiguous). Our course examines the political and aesthetic implications of Generation E.A., and the hot new vogue for all things mixed. Galvanized by the 2000 census with its "mark one or more" (MOOM) racial option, dozens of organizations, websites, affinity and advocacy groups, modeling and casting agencies, television pilots, magazines, and journals--all focused on multi-racial/multi-cultural experiences--have emerged in the last few years. We will analyze representations of mixed race and multiculturalism in law, literature, history, art, performance, film, comedy, and popular culture. These cultural and legal events are changing the way we talk and think about race. nImportantly, our seminar also broadens this discussion beyond race, exploring how crossings of the color-line so often intersect with other aspects of experience related to gender, religion, culture, or class.nField trips, films, communal lunches, and interactive assignments help us explore the current controversies over mixed-race identification and, more generally, the expressive and political possibilities for representing complex identities. Requirements include three two- to three-page analytical writing assignments, a presentation that can include an optional artistic or media component, and a final group-designed project. nIf you are a citizen of the 21st century, this class is for and about you. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

ENGLISH 17SI. Muggles, Mermaids, and Metaphors: Race in Harry Potter. 1-2 Unit.

How do divisions between wizards and Muggles or purebloods and Muggle-borns reflect race in our own society? How are books, films, and fan creations coloured by characters, and consumers, experiences of race? And how can understanding literature be relevant to social change? This course is designed to introduce students with no prior background in CSRE to race-critical approaches to literature and pop culture. Some familiarity with the Harry Potter series is preferred.

ENGLISH 18SI. From Canon to 'Fanon': Fan Fiction and the Democratization of Literature. 1-2 Unit.

Fan fiction has been called one of the great unsung popular literary movements of the past fifty years. Long in existence but increasingly mainstream, the genre has emerged onto the 21st-century literary landscape as a cultural force to be reckoned with. This course will treat fan fiction as a legitimate genre of literature worthy of academic attention and analysis. We will examine both text and context, considering tropes and style of 'fanfic' as well as cultural impact and influence. Key themes of the course include intertextuality, reader-response criticism, new literacies, and fanfic as a medium for narrative expansion and transgression.

ENGLISH 21. Introduction to American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 121.) An exploration of the diverse political, racial, social, and aesthetic questions which inform works of American literature from the early national period to the late twentieth century.

Same as: AMSTUD 121, ENGLISH 121

ENGLISH 23. American Literature and Culture to 1855. 3-5 Units.

(English majors and others taking 5 units, register for ENGLISH 123 or AMSTUD 150). A survey of early American writings, including sermons, poetry, captivity and slave narratives, essays, autobiography, and fiction, from the colonial era to the eve of the Civil War.

Same as: AMSTUD 150, ENGLISH 123

ENGLISH 43. Introduction to African American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history.

Same as: AFRICAAM 43, AMSTUD 143, ENGLISH 143

ENGLISH 43A. American Indian Mythology, Legend, and Lore. 3-5 Units.

(English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, "Black Elk Speaks."

Same as: ENGLISH 143A, NATIVEAM 143A

ENGLISH 47N. Sports and Culture. 3 Units.

Stanford has the most successful student-athlete program in the country (maybe ever) and athletics are an enormously important aspect of Stanford's student culture. This course looks in depth at sports in American culture. Through film, essays, fiction, poetry and other media, we will explore an array of topics including representations of the athlete, violence, beauty, the mass media, ethics, college sports, race and gender.

ENGLISH 48N. The American Songbook and Love Poetry. 3 Units.

A study of performances (Billie Holiday, Frank Sinatra etc) of songs by classic American composers (Porter, Rogers and Hart, Cohen).

ENGLISH 51N. The Sisters: Poetry & Painting. 3 Units.

Poetry and painting have often been called the "sister arts". Why? Sometimes a poem or a painting stands out to us, asking that we stay with it, that we remember it, although we cannot exactly say why. Poems have a way of making pictures in the mind, and paintings turn "rhymes" amid the people, places, and things they portray. Each is a concentrated world, inviting an exhilarating closeness of response: why does this line come first? Why does the artist include that detail? Who knows but that as we write and talk about these poems and pictures we will be doing what John Keats said a painter does: that is, arriving at a "trembling delicate and snail-horn perception of Beauty." Each week explore the kinship between a different pair of painter and poet and also focuses on a particular problem or method of interpretation. Some of the artist/poet combinations we will consider: Shakespeare and Caravaggio; Jorie Graham and (the photographer) Henri Cartier-Bresson; Alexander Pope and Thomas Gainsborough; William Wordsworth and Caspar David Friedrich; Christina Rossetti and Mary Cassatt; Walt Whitman and Thomas Eakins; Thomas Hardy and Edward Hopper.

ENGLISH 65N. Contemporary Women Fiction Writers. 3 Units.

Preference to freshmen. Novels and story collections addressing childhood, coming of age, and maturity; love, sexuality, orientation; the experience of violence and the politics, domestic and global, of women's lives. Texts include Gordimer, Eisenberg, Latiolais, Munro, O'Brien, and others.

ENGLISH 79N. The Renaissance: Culture as Conflict. 3 Units.

Focus is on the Renaissance not as a cultural rebirth but as a scene of cultural conflict. Course materials are selected from Renaissance art, history, philosophy, politics, religion, and travel writing; authors include More, Luther, Erasmus, Machiavelli, Michelangelo, Montaigne, Shakespeare. Among the conflicts we will explore are: old (world)/new (world), wealth/poverty, individual/collectivity, manuscript/print, religion/secularism, Catholicism/Protestantism, monarchism/republicanism, femininity/masculinity, heterosexuality/homosexuality.

ENGLISH 81. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track; majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English. Same as: CLASSICS 42, COMPLIT 181, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

ENGLISH 90. Fiction Writing. 5 Units.

The elements of fiction writing: narration, description, and dialogue. Students write complete stories and participate in story workshops. May be repeated for credit. Prerequisite: PWR 1 (waived in summer quarter).

ENGLISH 90V. Fiction Writing. 5 Units.

Online workshop course that explores the ways in which writers of fiction have used language to examine the world, to create compelling characters, and to move readers. We will begin by studying a selection of stories that demonstrate the many techniques writers use to create fictional worlds; we'll use these stories as models for writing exercises and short assignments, leading to a full story draft. We will study figurative language, character and setting development, and dramatic structure, among other elements of story craft. Then, each student will submit a full draft and receive feedback from the instructor and his/her classmates. This course is taught entirely online, but retains the feel of a traditional classroom. Optional synchronous elements such as discussion and virtual office hours provide the student direct interaction with both the instructor and his/her classmates. Feedback on written work is requested; both offered to and given by the student is essential to the course and creates class rapport.

ENGLISH 91. Creative Nonfiction. 5 Units.

(Formerly 94A.) Historical and contemporary as a broad genre including travel and nature writing, memoir, biography, journalism, and the personal essay. Students use creative means to express factual content.

ENGLISH 92. Reading and Writing Poetry. 5 Units.

Prerequisite: PWR 1. Issues of poetic craft. How elements of form, music, structure, and content work together to create meaning and experience in a poem. May be repeated for credit.

ENGLISH 94. Creative Writing Across Genres. 5 Units.

For minors in creative writing. The forms and conventions of the contemporary short story and poem. How form, technique, and content combine to make stories and poems organic. Prerequisite: 90, 91, or 92.

ENGLISH 100A. Literary History I. 5 Units.

First in a three quarter sequence. Team-taught, and ranging in subject matter across almost a millennium from the age of parchment to the age of Facebook, this required sequence of classes is the department's account of the major historical arc traced so far by literature in English. It maps changes and innovations as well as continuities, ideas, and aesthetic forms, providing a grid of knowledge and contexts for other, more specialized classes.

ENGLISH 100B. Literary History II. 5 Units.

Second in a three quarter sequence. Team-taught, and ranging in subject matter across almost a millennium from the age of parchment to the age of Facebook, this required sequence of classes is the department's account of the major historical arc traced so far by literature in English. It maps changes and innovations as well as continuities, ideas as well as aesthetic forms, providing a grid of knowledge and contexts for other, more specialized classes.

ENGLISH 100C. Literary History III. 5 Units.

Third in a three quarter sequence. Team-taught, and ranging in subject matter across almost a millennium from the age of parchment to the age of Facebook, this required sequence of classes is the department's account of the major historical arc traced so far by literature in English. It maps changes and innovations as well as continuities, ideas as well as aesthetic forms, providing a grid of knowledge and contexts for other, more specialized classes.

ENGLISH 102. Chaucer. 5 Units.

An introduction to Chaucer's writings, including *The Canterbury Tales*, *The Book of the Duchess*, and *The Parliament of Fowls*. Readings in Middle English. No prior knowledge of Middle English or medieval literature is expected.

ENGLISH 106E. Dante and Aristotle. 5 Units.

Focuses on Dante and Aristotle's writings about the cosmos, love, and the good. Readings will include Dante's *Commedia*, Aristotle's *Nicomachean Ethics* and *De caelo*, Aquinas's *Summa theologiae*, and Richard of St. Victor's *Benjamin Minor*. All readings will be in English.
Same as: PHIL 193D

ENGLISH 111B. Medieval Romance. 5 Units.

Romance emerges as a distinct genre in the Middle Ages, defined not just by love stories but by quests and battles and otherworldly creatures. Study of its origins and development, focusing on Middle English texts. About half of the class will be devoted to Chaucer, including some of the "Canterbury Tales" and "Troilus and Criseyde". Readings include some Arthurian literature: "Sir Gawain and the Green Knight", as well as popular romances such as "Sir Orfeo" and "Floris and Blancheflour". No knowledge of Middle English or medieval literature is expected.

ENGLISH 113L. Latin 500-1600 CE. 5 Units.

The aim of the course is to familiarize students with medieval Latin and neo-Latin through a reading of various short texts drawn from philosophical, religious, political, historical, and literary works. Students will devote most of their efforts to preparing translations for class. We shall also discuss some peculiarities of post-classical Latin grammar.
Prerequisite: CLASSLAT 1, 2 & 3, or equivalent.
Same as: CLASSICS 6L, PHIL 113L, PHIL 213L, RELIGST 173X

ENGLISH 115A. Shakespeare and Modern Critical Developments. 5 Units.

Approaches include gender studies and feminism, race studies, Shakespeare's geographies in relation to the field of cultural geography, and the importance of religion in the period.

ENGLISH 115C. Hamlet and the Critics. 5 Units.

Focus is on Shakespeare's *Hamlet* as a site of rich critical controversy from the eighteenth century to the present. Aim is to read, discuss, and evaluate different approaches to the play, from biographical, theatrical, and psychological to formalist, materialist, feminist, new historicist, and, most recently, quantitative. The ambition is to see whether there can be great literature without (a) great (deal of) criticism. The challenge is to understand the theory of literature through the study of its criticism.
Same as: TAPS 151C

ENGLISH 118. Literature and the Brain. 5 Units.

Recent developments in and neuroscience and experimental psychology have transformed the way we think about the operations of the brain. What can we learn from this about the nature and function of literary texts? Can innovative ways of speaking affect ways of thinking? Do creative metaphors draw on embodied cognition? Can fictions strengthen our "theory of mind" capabilities? What role does mental imagery play in the appreciation of descriptions? Does (weak) modularity help explain the mechanism and purpose of self-reflexivity? Can the distinctions among types of memory shed light on what narrative works have to offer?.
Same as: ENGLISH 218, FRENCH 118, FRENCH 318, PSYCH 118F

ENGLISH 121. Introduction to American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 121.) An exploration of the diverse political, racial, social, and aesthetic questions which inform works of American literature from the early national period to the late twentieth century.

Same as: AMSTUD 121, ENGLISH 21

ENGLISH 122A. Austen and Woolf. 5 Units.

Reading of three novels by Jane Austen; arguably the most influential and gifted of British female novelists; and three novels by Virginia Woolf, whose debt to Austen was immense. Topics include the relationship between women writers and the evolution of the English novel; the extraordinary predominance of the marriage plot in Austen's fiction (and the various transformations Woolf works on it); each novelist's relationship to the cultural and social milieu in which she wrote.

ENGLISH 123. American Literature and Culture to 1855. 3-5 Units.

(English majors and others taking 5 units, register for ENGLISH 123 or AMSTUD 150). A survey of early American writings, including sermons, poetry, captivity and slave narratives, essays, autobiography, and fiction, from the colonial era to the eve of the Civil War.
Same as: AMSTUD 150, ENGLISH 23

ENGLISH 124. The American West. 5 Units.

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ARTHIST 152, HISTORY 151, POLISCI 124A

ENGLISH 125B. Make It New: Literature of the Jazz Age. 3-5 Units.

Introduction to modernism through a survey of its major writers and the world in which they wrote. We will look at poets like T.S. Eliot and Gertrude Stein who changed the language, prose-writers like James Joyce and Ernest Hemingway who changed the story, painters like Pablo Picasso and Henri Matisse who changed the view, and populists like Louis Armstrong and Charlie Chaplin who changed the scene. Along the way we will think about the basic questions of modernism: Who was involved? How did they interact? And perhaps most importantly, what features make their work modernist? With brief but lively introductions to this world, students will gain entry into academic habits of mind through authors and artists they already love.

ENGLISH 126D. Victorian Sex. 5 Units.

How can we make sense of a culture of extraordinary sexual repression that nevertheless seemed fully preoccupied with sex? Examination of the depictions of sex in Victorian literary and cultural texts. Authors include: Collins, Braddon, the Brownings, Swinburne, Stoker and Wilde.
Same as: FEMGEN 126D

ENGLISH 129. The Grotesque: Studies in the Bizarre and Unnatural. 5 Units.

Investigation of the history of the grotesque in literature, art and film from the eighteenth century until today. What kinds of messages or ideas can be better conveyed by the grotesque than by the beautiful? What techniques and tactics have been developed by authors seeking to shock or surprise us? And why are we, as an audience, attracted to representations of objects or events which seem designed to repel us? Together, we will study renditions of the Grotesque in literature (*Grimmsquest; Fairy Tales*, Poequest;s short stories, and Hoffmانيquest;s *The Sandman*), film (Murnauquest;s *Nosferatu*) and theoretical writing (Freud and Nietzsche).

ENGLISH 143. Introduction to African American Literature. 3-5 Units.

(English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history.

Same as: AFRICAAM 43, AMSTUD 143, ENGLISH 43

ENGLISH 143A. American Indian Mythology, Legend, and Lore. 3-5 Units.

(English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, "Black Elk Speaks."

Same as: ENGLISH 43A, NATIVEAM 143A

ENGLISH 144A. Writing and Fighting: Literature of the First World War One Hundred Years On. 5 Units.

2014 marks the hundredth anniversary of the Great War, the 'war to end all wars' and the war that infamously was meant to be over in four months and dragged on for four blood-soaked years. This course will introduce students to the wide literary production, especially the poetic and novelistic output, borne by the experience of war to demonstrate the intimate relationship between political, cultural and aesthetic crises of the 1914-1918 period. Wide access to newly available online text and film archives will be central to our examinations.

ENGLISH 146. Development of the Short Story: Continuity and Innovation. 5 Units.

Exploration of the short story form's ongoing evolution as diverse writers address love, death, desire. Maupassant, D.H. Lawrence, Woolf, Flannery O'Connor, Hurston, and others. Required for Creative Writing emphasis. All majors welcome.

ENGLISH 146C. Hemingway, Hurston, Faulkner, and Fitzgerald. 5 Units.

While Hemingway and Fitzgerald were flirting with the expatriate avant-garde in Europe, Hurston and Faulkner were performing anthropological field-work in the local cultures of the American South. Focus on the tremendous diversity of concerns and styles of four writers who marked America's coming-of-age as a literary nation with their multifarious experiments in representing the regional and the global, the racial and the cosmopolitan, the macho and the feminist, the decadent and the impoverished.

Same as: AMSTUD 146C

ENGLISH 150. Poetry and the Internet. 5 Units.

How has contemporary poetry been transformed by the Internet and other new media. How have poets responded to the new media forms, from Facebook to Twitter, that now absorb the attention of so many people? How have poets utilized the torrents of information accessible to them with a few keystrokes? Focus will mostly be on poetry written after 2000; secondary readings will draw from literary criticism, media theory, and sociology.

ENGLISH 150D. Women Poets. 5 Units.

The development of women's poetry from the 17th to the 20th century. How these poets challenge and enhance the canon, amending and expanding ideas of tone, voice and craft, while revising societal expectations of the poet's identity. Poets include Katharine Philips, Letitia Barbauld, Elizabeth Barrett Browning, Charlotte Mew, Sylvia Plath, and Adrienne Rich.

Same as: FEMGEN 150D

ENGLISH 151F. Angelheaded Hipsters: Beat Writers of San Francisco and New York. 5 Units.

Reading of central writers of the Beat movement (Ginsberg, Kerouac, di Prima, Snyder, Whalen) as well as some related writers (Creeley, Gunn, Levertov). Issues explored include NY and SF, Buddhism and leftist politics, poetry and jazz. Some exposure to reading poems to jazz accompaniment. Examination of some of the writers and performers growing out of the Beats: Bob Dylan, rock music, especially from San Francisco, and jazz.

ENGLISH 152C. The JFK Era and American Literature. 5 Units.

Few U.S. presidents have exerted so great a fascination on the national and global post-World War II imagination as John F. Kennedy. As the 2013's semi-centennial anniversary of Kennedy's assassination attests, the production of films, television and multimedia programs, biographies, conspiracy theories, academic studies, and literary texts about the iconic JFK and his fabled, thousand-day presidency continues unabated. In this course, we will explore the attention Kennedy has drawn from writers and filmmakers like Norman Mailer, Lorraine Hansberry, Don DeLillo, Oliver Stone, Mario Vargas Llosa, and Stephen King.

Same as: AMSTUD 152C

ENGLISH 152G. Harlem Renaissance. 5 Units.

Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of "vicious Modernism", as a "BangClash", that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context.

Same as: AFRICAAM 152G, AMSTUD 152G

ENGLISH 152K. Mixed-Race Politics and Culture. 5 Units.

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? This course approaches issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st-century U.S. Issues surrounding the role of multiculturalism, immigration, acculturation, racial representation, and racial prejudice in American society. Topics include the political and social formation of race; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of census categories and the rise of the multiracial movement.

Same as: AFRICAAM 226, AMSTUD 152K, CSRE 152K

ENGLISH 153A. James Joyce. 5 Units.

A close reading of Joyce's works, including *Dubliners*, *A Portrait of the Artist as a Young Man*, *Ulysses*, and *Finnegans Wake*. We will also read *Stephen Hero*, the abandoned draft of *A Portrait*, *Giacomo Joyce*, several of Joyce's speeches, letters and poems, and the play *Exiles*. We'll devote some attention to his biographies, and also watch clippings from the two film versions of *Ulysses*: Joseph Strick's *Ulysses*:(1967) and Sean Walsh's *Bloom* (2004). We will read some of the classics of Joyce criticism (Wilson, Levin, Lukacs), as well as later, more contemporary approaches (Jameson, Moretti, Duffy, Gibson, Wicke, Latham, Rubenstein, Walkowitz).

ENGLISH 153D. Cybernetics; or Control and Communication in the Postwar Novel. 5 Units.

The title of this course plays on Norbert Wiener's highly influential 1948 book, *Cybernetics; or Control and Communication in the Animal and the Machine*. Though hardly remembered today, the field that it inaugurated, cybernetics, enjoyed a non-specialist following that was nearly unprecedented in the history of science, influencing philosophy, social science, and literature and the arts in particular. This course will track the influence of key cybernetic concepts entropy, information, feedback, control upon four US novels published after 1960.

ENGLISH 154J. Prep Schools, Frat Houses, and Hogwarts: The Campus in 20th & 21st Century Literature. 3-5 Units.

This course examines the representation of campus life across a variety of media and genres: from Willa Cather's *My Antonia*; *The Professor*; *House* (1925) to Todd Phillips's *Old School* (2003) to Vampire Weekend's *Harvest Brunch*; *Quest*; *Campus* (2008) and beyond. By studying the evolution of the campus over the twentieth and twenty-first centuries, we will explore how artists dealt with the school as an increasingly unavoidable part of modern experience. Why do artists rebel so vehemently against the school system? Why do schools like teaching novels that are all about how terrible schools are? What can and can't we learn in class?

ENGLISH 157E. Murder: A Course on Narrative Representation. 3-5 Units.

While murder often kicks off light, popular fictions like *Sherlock* or *Poirot*, it is also often central to more philosophical representations of the darkest, most antisocial extremes of the human psyche. In this course, we consider this intriguing range of murder's narrative function and meaning. We study how representational strategies and genre conventions inform audience expectations and responses; analyze how plot and style interact; and discuss the slippery lines between nonfiction, true crime, and fiction. By the end of the course, students should have a working understanding of key concepts from narratology, genre studies, and reader response criticism.

ENGLISH 157G. Gaming and Literature: Exploring Connections between Interactive Media and Literary Analysis. 5 Units.

Whether struggling as dragon born or raiding ancient tombs, character and story in video games are crucial to an immersive experience. Whether by design or imagination, we vest ourselves in the challenges and puzzles in stories of alien attack, myth and magic, and constructed worlds. Literature and gaming are converging, transforming pixels into rich environments where gamers spend months or years. This course connects characteristics of games and select literary works, guiding analyses of story-driven, active game systems. Students explore story development and critical processes for the synthesis of various game types, and explore social issues connecting games and society.

ENGLISH 160. Poetry and Poetics. 5 Units.

Introduction to the reading of poetry, with emphasis on how the sense of poems is shaped through diction, imagery, and technical elements of verse.

ENGLISH 161. Narrative and Narrative Theory. 5 Units.

An introduction to stories and storytelling--that is, to narrative. What is narrative? When is narrative fictional and when non-fictional? How is it done, word by word, sentence by sentence? Must it be in prose? Can it be in pictures? How has storytelling changed over time? Focus on various forms, genres, structures, and characteristics of narrative.

ENGLISH 162W. Writing Intensive Seminar in English. 5 Units.

Small literature-based, writing-intensive seminars taught by advanced graduate students in the English Ph.D. program. The goal will be to produce a high-quality final research paper. Courses will be oriented around a single text or a small group of texts in conversation with a larger spectrum of scholarship and knowledge in literary criticism and theory, film, painting, or material culture. The small format will allow undergraduates to receive detailed commentary and one-on-one feedback on their writing. Same as: WISE

ENGLISH 163D. Shakespeare: The Ethical Challenge. 5 Units.

Was the eighteenth century right in proclaiming Shakespeare to be the greatest moral philosopher? What are the ethical challenges Shakespeare's major plays still pose for us? Can we divorce ethical decisions from the contingencies of experience? We will ask a series of normative ethical questions (to do with pleasure, power, old age, self-sacrifice, and truth telling) and attempt to answer them in relation to the dramatic situation of Shakespeare's characters on the one hand and our own cultural situation on the other. The ethical challenge of Shakespearean drama will be set against selected readings in ethical theory. Same as: TAPS 163D

ENGLISH 164. Senior Seminar. 5 Units.

Small-class format focused on the close reading of literary texts and analysis of literary criticism. This class answers the questions: How do literary critics do what they do? What styles and gambits make criticism vibrant and powerful? Goal is to examine how one goes about writing a lucid, intelligent, and convincing piece of literary criticism based on original research.

ENGLISH 164C. Senior Capstone Seminar. 5 Units.

Do you want to reflect critically on your time in the English Major? Do you want to design your own Senior Seminar project? This course is writing intensive, and involves the proposal, cultivation, and production of a 15-page student-designed research paper that consolidates the arc of a compelling literary critical interest. Substitutes for the Senior Seminar. Open to all English seniors who wish to write a long critical essay (we cannot at this time accept creative writing capstones).

ENGLISH 168. Imagining the Oceans. 5 Units.

How has Western culture constructed the world's oceans since the beginning of global ocean exploration? How have imaginative visions of the ocean been shaped by marine science, technology, exploration, commerce and leisure? Authors read might include Cook, Equiano, and Steinbeck; Defoe, Verne, Stevenson, Conrad, Woolf and Hemingway; Coleridge, Baudelaire, Moore, Bishop and Walcott. Films by Painlevé and Bigelow. Seminar co-ordinated with a spring 2015 Cantor Arts Center public exhibition. Visits to Cantor; other possible field trips include Hopkins Marine Station and SF Maritime Historical Park. Same as: COMPLIT 168, FRENCH 168

ENGLISH 172C. Easy Riders and Migrant Laborers: American Mobility in Literature and Film. 3-5 Units.

The open road; a quintessential American image. This seminar explores the stories of open space, social mobility, and renewed possibilities that pervade American literature, film, and culture. What accounts for the pull of the open road? What roles have these stories played in American identity? We'll pursue and complicate these ideas, examining how differences of class, race, gender, and national origin inflect them. The focus will be the twentieth century, a period that witnessed the rise of U.S. global power, mass immigration, and the freeway. Authors/directors include Jack Kerouac, Dennis Hopper, Tomasa's Rivera, Bharati Mukherjee, Ridley Scott, and Simon Ortiz.

ENGLISH 172D. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: CSRE 196C, PSYCH 155, SOC 146, TAPS 165

ENGLISH 172E. The Literature of the Americas. 5 Units.

A wide-ranging overview of the literatures of the Americas from a comparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes--the Harlem Renaissance, the Beats, magic realism, Noigandres--in unaccustomed conversation with each other.

Same as: AMSTUD 142, COMPLIT 142, CSRE 142

ENGLISH 175C. Literature and Culture of the American Landscape. 5 Units.

This course examines a wide range of American literary engagements with nature: as a determinant of national character and destiny; as a source of spiritual, sexual, and moral revitalization; as a battleground for the survival of races and ethnicities; as a molding mechanism of citizenship and gender; as the basis of a national art and culture; and as a resource for exploitation or preservation.

ENGLISH 182J. "When We Dead Awaken": Breakthroughs in Conceptions of the Gendered Self in Literature and the Arts. 4-5 Units.

Remarkable breakthroughs in conceptions of the gendered self are everywhere evident in literature and the arts, beginning primarily with the Early Modern world and continuing into today. Many of these works inhere in innovations in literary and artistic forms in order to capture and even evoke the strong cognitive, or psychological, dimension of such iquest;awakenings.iquest; The reader, or viewer, is often challenged to adapt her or his mind to new forms of thought, such as John Donne's iquest;seventeenth century creation of the Dramatic Monologue, a form popular with modern writers, which requires the reader's iquest;cognitive iquest;presence.iquest; in order to fill out the dramatic scene. In so doing, the reader often supplies the presence of the female voice and thereby enters into her self-consciousness and inner thoughts. Adrienne Rich, for example, specifically iquest;rewrites.iquest; one of Donne's major poems from the female perspective. This can be, in Rich's words, an iquest;awakening.iquest; for the active reader, as he or she assumes that often-unspoken female perspective. The course will also explore male conceptions of the self and how such conceptions are often grounded in cultural attitudes imposed on male subjects, which can contribute to gender-bias toward women, a subject often neglected in exploring gendered attitudes, but which is now gaining more study, for example, in Shakespeare's iquest;Othello.iquest; Readings from recent developments in the neurosciences and cognitive studies will be included in our study of artistic forms and how such forms can activate particular mindsets. Writers and artists will include Shakespeare, Michelangelo, John Donne, Virginia Woolf, Adrienne Rich, Gertrude Stein, Picasso, June Wayne, and Edward Albee's iquest;1960's play, iquest;Who's Afraid of Virginia Woolf?iquest;.

Same as: FEMGEN 112, FEMGEN 212

ENGLISH 183F. Introduction to Critical Theory. 5 Units.

An introduction to critical theory, beginning with some of the defining moments of its history in the 20th century, to current developments in the field in the context of the contemporary global skepticism of humanistic critique, both in its institutional capacity and within the larger public sphere. Texts by Louis Althusser, Michel Foucault, Helene Cixous, Michael Hardt and Antonio Negri, Edward Said, David Lodge and others.

ENGLISH 184. The Novel, the Global South. 5 Units.

Literary inventiveness and social significance of novelistic forms from the Great Depression to the present.

Same as: COMPLIT 123

ENGLISH 184C. Data and Knowledge in the Humanities. 5 Units.

How different disciplines understand and use data, and how skills such as interpretation and critical thought work with data to create knowledge. How the introduction of mathematics reshaped disciplines like cosmology and sociology in the past and how, in the present, the humanities are facing the same challenges with the emergence of fields such as spatial history and the digital humanities. In addition to readings and class discussion, this course will also feature guest lectures from scholars from different disciplines, including the natural and social sciences, who will discuss how their fields create knowledge from data.

ENGLISH 184H. Text Technologies: A History. 5 Units.

Beginning with cave painting, carving, cuneiform, hieroglyph, and other early textual innovations, survey of the history of writing, image, sound, and byte, all text technologies employed to create, communicate and commemorate. Focus on the recording of language, remembrance and ideas explicating significant themes seen throughout history; these include censorship, propaganda, authenticity, apocalypticism, technophobia, reader response, democratization and authority. The production, transmission and reception of tablet technology, the scroll, the manuscript codex and handmade book, the machine-made book, newspapers and ephemera; and investigate the emergence of the phonograph and photograph, film, radio, television and digital multimedia. The impact of these various text technologies on their users, and try to draw out similarities and differences in our cultural and intellectual responses to evolving technologies. STS majors must have senior status to enroll in this senior capstone course.

Same as: STS 200D

ENGLISH 186. Tales of Three Cities: New York, Chicago, Los Angeles. 5 Units.

How urban form and experience shape literary texts and how literary texts participate in the creation of place, through the literature of three American cities as they ascended to cultural and iconographical prominence: New York in the early to mid 19th century; Chicago in the late 19th and early 20th centuries; and Los Angeles in the mid to late 20th century.

Same as: AMSTUD 186

ENGLISH 189A. Dead White Men on Trial: Feminism and the Novel. 3-5 Units.

The determination of gender is a form of reading: reading bodies, reading gestures, reading histories. In the spirit of that feminist insight, this course will offer an introduction to feminism through fiction and criticism that thematizes reading in its diverse forms. Students will explore the relationship between interpretation and experience, identity and performance, from both the social feminist angle and the literary-critical angle. We will acquaint ourselves with foundational feminist novels, from *Jane Eyre* to *To the Lighthouse* to *Their Eyes Were Watching God*, and pair them with critical theory that addresses feminism in conversation with race, class, ability, and sexual orientation. Students will be encouraged to consider contemporary applications of the historical thought, and will have the option of writing a final paper that analyzes a contemporary text of their choice. The class will also require short writing assignments that will develop students' facility with argumentation and academic essay forms.

ENGLISH 190. Intermediate Fiction Writing. 5 Units.

May be taken twice for credit. Lottery. Priority to last quarter/year in school, majors in English with Creative Writing emphasis, and Creative Writing minors. Prerequisite: 90 or 91.

ENGLISH 190F. Fiction into Film. 5 Units.

Workshop. For screenwriting students. Story craft, structure, and dialogue. Assignments include short scene creation, character development, and a long story. How fictional works are adapted to screenplays, and how each form uses elements of conflict, time, summary, and scene. Priority to seniors and Film Studies majors. Prerequisite: 90.

ENGLISH 190G. The Graphic Novel. 5 Units.

Interdisciplinary. Evolution, subject matter, form, conventions, possibilities, and future of the graphic novel genre. Guest lectures. Collaborative creation of a graphic novel by a team of writers, illustrators, and designers. Prerequisite: consent of instructor.

ENGLISH 190H. The Graphic Novel. 5 Units.

Continuation of English 190G. Interdisciplinary. Evolution, subject matter, form, conventions, possibilities, and future of the graphic novel genre. Guest lectures. Collaborative creation of a graphic novel by a team of writers, illustrators, and designers. Prerequisite: consent of instructor.

ENGLISH 190T. Special Topics in Intermediate Fiction Writing. 5 Units.

Focus on a particular topic or process. Work includes aspects of reading short stories and novels, writing at least 30-50 pages of fiction, and responding to peers' work in workshop. May be repeated for credit. Prerequisite: 91 or 90.

ENGLISH 190V. Reading for Writers. 5 Units.

Taught by the Stein Visiting Fiction Writer. Prerequisite: 90.

ENGLISH 191. Intermediate Creative Nonfiction. 5 Units.

Continuation of 91. Workshop. The application of advanced storytelling techniques to fact-based personal narratives, emphasizing organic writing, discovering audience, and publication. Guest lecturers, collaborative writing, and publication of the final project in print, audio, or web formats. Prerequisite: 91 or 90.

ENGLISH 192. Intermediate Poetry Writing. 5 Units.

May be taken twice. Lottery. Priority to last quarter/year in school, majors in English with Creative Writing emphasis, and Creative Writing minors. Prerequisite: 92.

ENGLISH 192V. The Occasions of Poetry. 5 Units.

Taught by the Mohr Visiting Poet. Prerequisite: 92.

ENGLISH 194. Individual Research. 5 Units.

See section above on Undergraduate Programs, Opportunities for Advanced Work, Individual Research.

ENGLISH 195W. Writing Center Peer Tutor Seminar. 3 Units.

For students selected to serve as peer writing tutors in the Stanford Writing Center and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work. Same as: PWR 195, PWR 295

ENGLISH 196A. Honors Seminar: Critical Approaches to Literature. 5 Units.

Overview of literary-critical methodologies, with a practical emphasis shaped by participants' current honors projects. Restricted to students in the English Honors Program.

ENGLISH 197. Seniors Honors Essay. 1-10 Unit.

In two quarters.

ENGLISH 198. Individual Work. 1-5 Unit.

Undergraduates who wish to study a subject or area not covered by regular courses may, with consent, enroll for individual work under the supervision of a member of the department. 198 may not be used to fulfill departmental area or elective requirements without consent. Group seminars are not appropriate for 198.

ENGLISH 198A. CS+English ePortfolio. 1-3 Unit.

Students will begin planning and assembling materials for the joint major capstone project (to be completed in the senior year). Designed to be taken in the junior year for three quarters. During the first and second quarters, students should enroll in one unit. In the first two quarters, students will survey the field of digital humanities and start compiling an ePortfolio that showcases their favorite work in literature and programming, reflections on the two fields, and begin to develop plans for the capstone project. For the third quarter, students should enroll in three units. The central goal for the third quarter is completion of an adviser-approved proposal for the capstone project (to be completed in the senior year). In this course students will refine your proof-of-concept from the previous quarter and deliver the ePortfolio.

ENGLISH 198L. Individual Work: Levinthal Tutorial. 5 Units.

Undergraduate writers work individually with visiting Stegner Fellows in poetry, fiction, and if available, nonfiction. Students design their own curriculum; Stegner Fellows act as writing mentors and advisers. Prerequisites: 90, 91, or 92; submitted manuscript.

ENGLISH 199. Senior Independent Essay. 1-10 Unit.

Open, with department approval, to seniors majoring in non-Honors English who wish to work throughout the year on a 10,000 word critical or scholarly essay. Applicants submit a sample of their expository prose, proposed topic, and bibliography to the Director of Undergraduate Studies before preregistration in May of the junior year. Each student accepted is responsible for finding a department faculty adviser. May be repeated for credit.

ENGLISH 201. The Bible and Literature. 5 Units.

Differences in translations of the Bible into English. Recognizing and interpreting biblical allusion in texts from the medieval to modern periods. Readings from the Bible and from British, Canadian, American, and African American, and African literature in English.

ENGLISH 202. History of the Book. 5 Units.

Taught in the Department of Special Collections, the course examines the book as both a developing concept and as a material object, from scroll to codex, from manuscript to print, from cold type to electronic medium. Basic bibliographical and paleographical techniques will be taught, and readings in history and theory will be discussed. Attention will focus particularly on the use of books, and hence on the history of reading practices, including marginalia and other marks of ownership. Students will be expected to develop their own projects from among the riches of Stanford's rare book collection. The final project may be a collaborative one, with contributions by the class as a whole. This has typically been the preparation of an edition of a manuscript or piece of ephemera in Stanford's collection.

ENGLISH 218. Literature and the Brain. 5 Units.

Recent developments in and neuroscience and experimental psychology have transformed the way we think about the operations of the brain. What can we learn from this about the nature and function of literary texts? Can innovative ways of speaking affect ways of thinking? Do creative metaphors draw on embodied cognition? Can fictions strengthen our "theory of mind" capabilities? What role does mental imagery play in the appreciation of descriptions? Does (weak) modularity help explain the mechanism and purpose of self-reflexivity? Can the distinctions among types of memory shed light on what narrative works have to offer?. Same as: ENGLISH 118, FRENCH 118, FRENCH 318, PSYCH 118F

ENGLISH 234G. Narrating the British Empire. 4-5 Units.

This course will explore the historical and cultural reality of the British Empire in a global and comparative context, through works of fiction and non-fiction, history, memoir and a range of cultural chronicles. What relationship did British colonialism have with modernity and the European Enlightenment, and with neoliberalism and globalization that followed decolonization? Texts: CLR James's *Beyond a Boundary*, Jamaica Kincaid's *A Small Place*, Nirad Chaudhuri's *The Autobiography of an Unknown Indian*, Alan Paton's *Cry, The Beloved Country*, Witi Ihimaera's *Dear Miss Mansfield*.

Same as: HISTORY 234G, HISTORY 334G

ENGLISH 239B. Literature and Social Online Learning. 3-5 Units.

Study, develop, and test new digital methods, games, apps, interactive social media uses to innovate how the humanities can engage and educate students and the public today. Exploring well-known literary texts, digital storytelling forms and literary communities online, students work individually and in interdisciplinary teams to develop innovative projects aimed at bringing literature to life. Tasks include literary role-plays on Twitter; researching existing digital pedagogy and literary projects, games, and apps; reading and coding challenges; collaborative social events mediated by new technology. Minimal prerequisites which vary for students in CS and the humanities; please check with instructors.

Same as: COMPLIT 239B, CS 27

ENGLISH 250. Poetry, Transhistorically. 5 Units.

The course considers representative works by ten poets from the Renaissance to the present. Each set of poems is framed by a problem in poetics such as artifice and sound, the making of voice, the meaning of lyric, and the nature of historicist and biographical interpretation. Shakespeare, Gray, Wordsworth, Whitman, E.B. Browning, Yeats, H.D., Olson, Wolcott, and Hejinian; and readings in recent poetic theory.

ENGLISH 290. Advanced Fiction Writing. 5 Units.

Workshop critique of original short stories or novel. Prerequisites: manuscript, consent of instructor, and 190-level fiction workshop.

ENGLISH 292. Advanced Poetry Writing. 5 Units.

Focus is on generation and discussion of student poems, and seeking published models for the work.

ENGLISH 300A. Advanced Paleography. 5 Units.

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment.

Same as: CLASSICS 216, HISTORY 315, RELIGST 329X

ENGLISH 303. Experiment and the Novel. 5 Units.

A double exploration of experiment in the novel from 1719 into the 19th century. Taking off from Zola's "The Experimental Novel," consideration of the novel's aspect as scientific instrument. Taking the idea of experimental fiction in the usual sense of departures from standard practice, consideration of works that seem to break away from techniques of "realism" devised prior to 1750, with "Robinson Crusoe" as the representative of that mode.. Texts by: Defoe, Sterne, Walpole, Godwin, Lewis, Goethe, and Shelley.

Same as: COMPLIT 353A

ENGLISH 303C. The Networks of Enlightenment. 5 Units.

In this course, we will use the emerging methods of social network analysis to investigate imaginative worlds of eighteenth-century literature and the role that social connections play in the Enlightenment. Together we will read and analyze Restoration comedies (*The Man of Mode*), eighteenth-century tragedies (*Venice Preserved*), Gothic novels (*The Castle of Otranto*) and early social novels (*Evelina*). We will identify and study the shapes of the relationships in these texts as we use networking tools, such as iGraph and Gephi, to visualize the social world of the text. Previous technical experience is not required as this course also serves as a method-based introduction to network analysis in the humanities.

ENGLISH 305H. Readings in Close Reading. 5 Units.

The difference between reading and reading closely. Is close reading a specific method of literary criticism or theory, or does it describe a sensibility that can accompany any interpretation? Categories and frameworks for this ubiquitous, often undefined critical practice. Traditions of close reading: formalism, psychoanalysis, ideological critique, and hermeneutics. Focus is on Freud, Empson, Barthes, de Man and contemporary critics.

ENGLISH 308B. Gilded Age American Literature. 5 Units.

Introduction to the creative innovations and the political tensions that stemmed from the formation of a multicultural society during the age of industrialization. We will attempt to place literary works in their historical and cultural contexts, while also surveying recent critical and theoretical developments in areas such as Realism, Naturalism, Regionalism, Minority and Race Studies, and so on.

ENGLISH 310. The Transatlantic Renaissance. 5 Units.

The emergence of a transatlantic culture in the early modern period. How is the Renaissance of Europe and England fashioned in a conversation with the cultural forms and material realities of the colonial Americas? And how do colonial writings expand and complicate the available understanding of the Renaissance? Readings in Columbus, More, Hakluyt, Spenser, Shakespeare, the Inca Garcilaso de la Vega.

Same as: COMPLIT 332

ENGLISH 314. Epic and Empire. 5 Units.

Focus is on Virgil's *Aeneid* and its influence, tracing the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

Same as: COMPLIT 320A

ENGLISH 314E. English Drama Before Shakespeare. 5 Units.

English dramatic and theatrical culture from the mystery cycles of the late medieval period to the establishment of professional playhouses in late sixteenth-century London. Different dramatic genres (interludes, moralities, farces, tragedies, comedies, histories, pastoral plays), performance venues (streets, households, inns, schools, universities, court, playhouses), and dramatic traditions (classical, native, continental European) will be represented. Authors (of those who have names) range from Medwall, Skelton, Heywood, Preston, and Edwards to Lyly, Kyd, Greene, Peele, and Marlowe.

Same as: TAPS 341E

ENGLISH 327. Genres of the Novel. 5 Units.

Provides students with an overview of some major genres in the history of the modern novel, along with major theorists in the critical understanding of the form. Novels might include works by Cervantes, Defoe, Lafayette, Radcliffe, Goethe, Scott, Balzac, Melville, and Woolf. Theorists might include Lukacs, Bakhtin, Jameson, Gallagher, Barthes, Kristeva, and Bourdieu. *PLEASE NOTE: Course for graduate students only.*

Same as: COMPLIT 327, FRENCH 327

ENGLISH 332. Ancients, Moderns, and Postmoderns. 5 Units.

Literary critics and art historians depend on accounts of modernity, post-modernity, and antiquity that are normative even as they claim to be historicist. We will ask what needs these accounts have served historically, what their theoretical consequences are, and how we should write cultural criticism today. Readings will range from the renaissance to the present, with an emphasis on the historicist turn of the late eighteenth century. Authors may include Petrarch, Winckelmann, Schiller, the Schlegels, Hegel, Nietzsche, Benjamin, Lyotard, and Jameson.

ENGLISH 334A. Concepts of Modernity I: Philosophical Foundations. 5 Units.

In the late eighteenth century Immanuel Kant proclaimed his age to be "the genuine age of criticism." He went on to develop the critique of reason, which set the stage for many of the themes and problems that have preoccupied Western thinkers for the last two centuries. This fall quarter course is intended as an introduction to these themes and problems. We begin this course with an examination of Kant's philosophy before approaching a number of texts that extend and further interrogate the critique of reason. In addition to Kant, we will read texts by Hegel, Marx, Nietzsche, Weber, Freud, Lukacs, and Heidegger. This course is the first of a two-course sequence. Priority to graduate students in MTL and English. The course will be capped at 12 students.

Same as: GERMAN 300, MTL 334A

ENGLISH 334B. Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization. 5 Units.

Emphasis on world-system theory, theories of coloniality and power, and aesthetic modernity/postmodernity in their relation to culture broadly understood.

Same as: COMPLIT 334B, MTL 334B

ENGLISH 338. The Gothic in Literature and Culture. 5 Units.

This course examines the Gothic as both a narrative subgenre and an aesthetic mode, since its 18th century invention. Starting with different narrative genres of Gothic expression such as the Gothic novel, the ghost tale, and the fantastic tale by writers such as Walpole, Radcliffe, Sade, Poe, and E.T.A. Hoffmann, the course goes on to ask how the Gothic sensibility permeates a wide range of 19th century cultural phenomena that explore the dark side of Enlightenment, from Romantic poetry and art to melodrama, feuilleton novels, popular spectacles like the wax museum and the morgue. If time permits, we will also ask how the Gothic is updated into our present in popular novels and cinema. Critical readings will examine both the psychology of the Gothic sensibility and its social context, and might be drawn from theorists such as Benjamin, Freud, Lacan, Kristeva, and Zizek. Same as: COMPLIT 338, FRENCH 338

ENGLISH 362E. Uncle Tom's Cabin and the Archive. 5 Units.

Introduction to the theories, methods, and politics of the archive in literary studies, using "Uncle Tom's Cabin" and its extensive archives as the frame. Investigation of this novel's forms of circulation, contexts, visual and material culture, adaptations, and revisions will be supported and challenged both by readings in the theories and politics of the archive (including Derrida, Foucault, and Spivak) and the development of research skills in traditional and digital archives.

ENGLISH 362F. Transnational American Studies. 5 Units.

Exploration of the transnational turn in American Studies, focusing on how transnational perspectives enrich and complicate our understanding of American literature, history and the arts. Readings include recent work in transnational American Studies. Topics include experiments with ways of using digital technology to allow archival materials in different locations to be in conversation with each other.

ENGLISH 362G. African American Modernism. 5 Units.

A course exploring the aesthetic continuities and divergences, the artistic collaborations and political arguments, between Harlem Renaissance and Modernist writers across the color line in the first half of the twentieth century.

ENGLISH 363D. Feminist Theory: Thinking Through/With/About the Gendered Body. 5 Units.

Organized around a series of case studies, this graduate feminist theory course will consider issues related to the complex relationship between sex, gender, sexuality, biological reproduction, violence, and social power. It is a core course for the PhD minor in Feminist, Gender, and Sexuality Studies. Enrollment is limited to PhD-level students.

Same as: FEMGEN 363D

ENGLISH 368A. Imagining the Oceans. 5 Units.

How has Western culture constructed the world's oceans since the beginning of global ocean exploration? How have imaginative visions of the ocean been shaped by marine science, technology, exploration, commerce and leisure? Primary authors read might include Cook, Banks, Equiano, Ricketts, and Steinbeck; Defoe, Cooper, Verne, Conrad, Woolf and Hemingway; Coleridge, Baudelaire, Moore, Bishop and Walcott. Critical readings include Schmitt, Rediker and Linebaugh, Baucom, Best, Corbin, Auden, Sontag and Heller-Roazen. Films by Sekula, Painleveacute; and Bigelow. Seminar coordinated with a 2015 Cantor Arts Center public exhibition. Visits to the Cantor; other possible field trips include Hopkins Marine Station and SF Maritime Historical Park. Open to graduate students only.

Same as: COMPLIT 368A, FRENCH 368A

ENGLISH 373C. Text of Shakespeare. 5 Units.

The Shakespearean text from script and performance to quartos, folios, editions, and back to script and performance. What has constituted a "good" text of Shakespeare, and what is bad about "bad" quartos? The ethics and politics of editing; the relation of editorial practice to stage practice on the one hand, and to what we want Shakespeare to be on the other? Plays with multiple original texts will be studied: "Romeo and Juliet, Hamlet, King Lear".

ENGLISH 376C. Tragic Form and Political Theory. 5 Units.

Tragic form and political theory have in common a profound interest in the conflictual foundation of human society. This course will explore how the two intellectual approaches define the actors of conflict, its causes, and its possible [or impossible] resolution.

Same as: COMPLIT 376C, PHIL 376C

ENGLISH 383A. The Ballad Tradition. 3-5 Units.

This team-taught cross-disciplinary course traces the history and aesthetics of the ballad in German, English, and Scottish literature, from the 18th century to the early 20th century. No knowledge of German is required, but reading knowledge is a plus.

Same as: COMPLIT 227A, GERMAN 200

ENGLISH 384D. The Palliser Novels. 5 Units.

Readings include Anthony Trollope's six Palliser novels, *Can You Forgive Her?* (1864), *Phineas Finn* (1869), *The Eustace Diamonds* (1873), *Phineas Redux* (1874), *The Prime Minister* (1876) and *The Duke's Children* (1879). Topics include: writing in serial; writing across the novel form; Victorian realism; the family saga and multi-volume characterization.

ENGLISH 390. Graduate Fiction Workshop. 3 Units.

For Stegner fellows in the writing program. May be repeated for credit. Prerequisite: consent of instructor.

ENGLISH 392. Graduate Poetry Workshop. 3 Units.

For Stegner fellows in the writing program. May be repeated for credit. Prerequisite: consent of instructor.

ENGLISH 394. Independent Study. 1-10 Unit.

Preparation for first-year Ph.D. qualifying examination.

ENGLISH 395. Ad Hoc Graduate Seminar. 1-5 Unit.

Three or more graduate students who wish in the following quarter to study a subject or an area not covered by regular courses and seminars may plan an informal seminar and approach a member of the department to supervise it.

ENGLISH 396. Introduction to Graduate Study for Ph.D. Students. 5 Units.

Required for first-year graduate students in English. The major historical, professional, and methodological approaches to the study of literature in English.

ENGLISH 396L. Pedagogy Seminar I. 2 Units.

Required for first-year Ph.D students in English, Modern Thought and Literature, and Comparative Literature. Preparation for surviving as teaching assistants in undergraduate literature courses. Focus is on leading discussions and grading papers.

Same as: COMPLIT 396L

ENGLISH 396P. Publication Workshop: The Article. 3-5 Units.

A practical and theoretical study of the genre of the journal article, with critical reflection on its status as a gateway to academic professionalization and as a highly specialized form of public address. We will be reading articles published over the last decade across a diverse range of journals, focusing on issues surrounding methodology, style, tone, and audience. Participants will also work on developing an already polished piece of writing into the form of an article potentially publishable by a peer-reviewed publication. Admission by application in Winter quarter.

ENGLISH 396R. Old and Modern(ist) Reading Group. 2 Units.

This two-quarter-long reading group will alternate from week-to-week between Old English Biblical and Elegaic Poetry and David Jones's twentieth-century transnational Modernist masterpiece, "Anathemata" (which W. H. Auden called very probably the finest long poem written in English in this century). Students can choose to join biweekly for just Old English (in the original language) or just David Jones, or complete both sets of allied reading.

ENGLISH 398. Research Course. 1-18 Unit.

A special subject of investigation under supervision of a member of the department. Thesis work is not registered under this number.

ENGLISH 398L. Literary Lab. 2-5 Units.

Gathering and analyzing data, constructing hypotheses and designing experiments to test them, writing programs [if needed], preparing visuals and texts for articles or conferences. Requires a year-long participation in the activities of the Lab.

Same as: COMPLIT 398L

ENGLISH 398R. Revision and Development of a Paper. 4-5 Units.

Students revise and develop a paper under the supervision of a faculty member with a view to possible publication.

ENGLISH 398W. Orals, Publication and Dissertation Workshop. 2 Units.

For third- and fourth-year graduate students in English. Strategies for studying for and passing the oral examination, publishing articles, and for writing and researching dissertations and dissertation proposals. May be repeated for credit.

ENGLISH 399. Thesis. 1-10 Unit.

For M.A. students only. Regular meetings with thesis advisers required.

ENGLISH 802. TGR Dissertation. 0 Units.

English for Foreign Students Courses

EFSLANG 197. Directed Study. 1-3 Unit.**EFSLANG 397. Directed Study. 1-3 Unit.****EFSLANG 683P. Workshop in Pronunciation for International Students. 2-3 Units.**

(1-2 units). Provides support in the development of clear, comprehensible English pronunciation. Includes attention to individual sounds as well as stress, rhythm, and intonation. Students taking the course for 3 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

EFSLANG 683R. Workshop in Reading and Vocabulary for International Students. 1-2 Unit.

(1-2 units). Provides support in the development of English reading skills for academic purposes, including work on comprehension, speed, and critical interpretation, along with strategies for improving vocabulary. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

EFSLANG 683S. Workshop in Oral Communication for International Students. 1-2 Unit.

(1-2 units) Provides support in the development of listening and speaking skills in English, including academic listening, small group discussion, oral presentation, and intercultural communication. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

EFSLANG 683W. Workshop in Written Communication for International Students. 1-2 Unit.

(1-2 units). Provides support in the development of English writing skills for non-natives. Writing assignments are negotiated with the instructor and may include practice in composition, SAT or TOEFL writing, and writing university application essays and statements of purpose. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

EFSLANG 684A. Language and Culture of Sports in the USA. 1-2 Unit.

Provides an overview of American sports culture, focusing on three of the most popular sports: basketball, baseball, and American football. Through an introduction to their rules and histories, students gain familiarity with the unique language patterns that surround discussions of sports, as well as the many sports-related metaphors and idioms in non-sports conversations in business and everyday life. Students learn and practice relevant language forms across all skills. Students taking the course for 2 units will have additional individual assignments and a 50-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

EFSLANG 684M. Language and Culture of Multimedia Communication. 1-2 Unit.

) Develops students' abilities to read, analyze, understand and produce multimedia and multimodal writing for digital contexts. Students will learn how to read, analyze, and understand the content and the patterns of language typically used in different types of multimodal writing (writing that uses words, images, video, and/or music). Students will create multimedia compositions for digital contexts. Students taking the course for 2 units will have additional individual assignments and a 50-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

EFSLANG 684S. Language and Culture of Silicon Valley. 1-2 Unit.
Provides an overview of Silicon Valley's unique culture and language patterns via exposure to authentic materials, such as blogs and videos, and interaction with students and professionals in local industry. Participants learn and practice language forms characteristic of this region across all skills. Those taking the course for 2 units will have additional individualized assignments and a 50-minute tutorial each week. Limited to visiting non-native English speaking undergraduates and students in the High School Summer College program. (1-2 units).

EFSLANG 687X. American Language and Culture: Silicon Valley First Session. 3 Units.

Closed enrollment. Intensive English language and U.S. culture program. Enrollment limited to 14.

EFSLANG 687Y. American Language and Culture: Silicon Valley, Second Session. 3 Units.

Closed enrollment. Intensive English language and U.S. culture program. Enrollment limited to 14. Course may be repeated once.

EFSLANG 688. Intensive English and Academic Orientation for Foreign Graduate Students. 6 Units.

Goal is to prepare incoming international graduate students for full-time study. Academic orientation and instruction in academic writing, listening, discussion, oral presentation, and spoken usage. Enrollment limited to 14. Course may be repeated once.

EFSLANG 688A. Intensive Spoken English. 3 Units.

For current graduate students. Includes work on listening, oral presentation, discussion, and conversational interaction. May fulfill any two of the following EFS requirements, subject to approval by the EFS Director: EFSLANG 690A, 690B, 691, 693B.

EFSLANG 688B. Intensive Academic Writing. 3 Units.

For current graduate students. Focus on academic writing, with some work in reading and vocabulary development. Engineering, science, humanities, and social science students prepare a research paper; business students write one or more case studies. Fulfills requirement for EFSLANG 697 or 698A, subject to approval by the EFSLANG Director.

EFSLANG 688V. Intensive English and Academic Orientation for Stanford Visiting Scholars. 5 Units.

Goal is to improve English proficiency and introduce the university environment. Writing, pronunciation, listening, discussion, oral presentation, and spoken usage. Enrollment limited to 14.

EFSLANG 689A. Exploring the Language and Culture of Sports in the USA. 1 Unit.

Develops familiarity with three of the most popular sports in the United States: football, baseball, and basketball. Beginning with an overview of the rules of each game and its history, students are introduced to the patterns of language that surround sports culture and pervade American communication even outside sports-related interactions. Students examine academic and popular sources on sports, focusing on the language of sports culture, metaphors, and idioms that occur in daily English language use through practice of the language forms both inside and outside the classroom. Intended for current graduate students and graduate summer visitors.

EFSLANG 689B. Building Communication Skills through Improvisation. 1 Unit.

Focus on building a range of English communication skills through improvisation activities. Participants explore theatrical techniques that teach collaboration, spontaneity, team building, storytelling, and confident public speaking with connections to academic, professional, and personal situations. Course is co-taught by an improvisation expert and an ESL instructor. No previous improvisation or theater experience necessary.

EFSLANG 689E. Learning English on Your Own. 1 Unit.

Independent English language learning. Learning strategies and objectives, setting and maintaining practice schedules, and evaluating progress. Focus is on exploiting web-based resources. Individual meetings.

EFSLANG 689H. American Humor. 1 Unit.

Analysis of jokes, humorous stories, and situations through modern media. Practice in advanced listening comprehension and English idioms.

EFSLANG 689L. Living in the USA. 1 Unit.

Life and relationships outside the University classroom. Goal is to familiarize international students with the cultural expectations and forms of language use in a variety of situations in the University community and in other social situations. Enrollment limited to 14.

EFSLANG 689P. Pronunciation. 2 Units.

The sounds of English, and stress, intonation, and rhythm patterns important to natural-sounding speech. Enrollment limited to 14.

EFSLANG 689S. Exploring Silicon Valley Language and Culture. 1 Unit.

Focus on developing communicative skills in the context of Silicon Valley with its unique culture and language patterns. Through analysis and discussion of language and content from authentic materials, such as popular blogs and videos, students gain familiarity with local norms for interacting with the people who live and work in this region. Includes topics relevant to entrepreneurs, tech professionals, and students as well as a short individual project. Intended for both new and continuing international graduate students.

EFSLANG 689T. Interacting in California's Vineyard Culture. 1 Unit.

Focuses on communicative skills in the context of California's renowned wine culture. Emphasis on the language of wine using appropriate terminology, and interacting knowledgeably with restaurant and retail wine staff. Topics include learning the fundamentals of vineyard techniques, varietal characteristics, tasting techniques, drinking and ordering etiquette. Course is co-taught by a wine expert and an ESL instructor. Class consists of a short interactive lecture, a communicative activity such as role playing, and a tasting of four specially selected wines. Participants must be at least 21 years old. Fee.

EFSLANG 689V. Vocabulary and Idiom. 1 Unit.

Building vocabulary for academic success. Idiomatic language, and what idioms and metaphors reflect about American culture. Enrollment limited to 14.

EFSLANG 689W. Working in the USA. 1 Unit.

The language and culture of the workplace. Goal is to familiarize international students with the cultural expectations of situations in the business setting and in social situations related to business.

EFSLANG 690A. Interacting in English. 1-3 Unit.

Strategies for communicating effectively in social and academic settings. Informal and formal language used in campus settings, including starting and maintaining conversations, asking questions, making complaints, and contributing ideas and opinions. Simulations and discussions, with feedback on pronunciation, grammar, and usage. Enrollment limited to 14.

EFSLANG 690B. Academic Discussion. 1-3 Unit.

Skills for effective participation in classroom settings, seminars, and research group meetings. Pronunciation, grammar, and appropriateness for specific tasks. Feedback on language and communication style. Enrollment limited to 14. May be repeated once for credit. Prerequisite: EFSLANG 690A or consent of instructor.

EFSLANG 690C. Advanced Interacting in English. 1-3 Unit.

Communication skills for extended discourse such as storytelling and presenting supported arguments. Development of interactive listening facility and overall intelligibility and accuracy. Goal is advanced fluency in classroom, professional and social settings. Identification of and attention to individual patterned errors. May be repeated once for credit. Prerequisite: EFSLANG 690B or consent of instructor. Enrollment limited to 14.

EFSLANG 691. Oral Presentation. 1-3 Unit.

For advanced graduate students. Practice in academic presentation skills; strategy, design, organization, and use of visual aids. Focus is on improving fluency and delivery style, with videotaping for feedback on language accuracy and usage. Enrollment limited to 14. May be repeated once for credit.

EFSLANG 692. Speaking and Teaching in English. 1-3 Unit.

For non-native speakers who must teach in English. Focus is on developing clarity, intelligibility, and effectiveness through weekly presentations simulating actual teaching assistant responsibilities. Enrollment limited to 14. May be repeated once for credit.

EFSLANG 693A. Listening Comprehension. 1-3 Unit.

Strategies for effective listening in an academic setting, focusing on identifying key ideas in lectures. Practice in understanding words and phrases commonly encountered in classroom settings. Computer-based exercises for comprehension of rapid, natural speech. Enrollment limited to 14.

EFSLANG 693B. Advanced Listening Comprehension, and Vocabulary Development. 1-3 Unit.

Listening strategies and vocabulary for understanding English in academic and non-academic contexts. Discussion and interpretation of communicative intent. Computer-based and video exercises across a range of genres; individual project. May be repeated once for credit. Prerequisite: EFSLANG 693A or consent of instructor.

EFSLANG 693R. Graduate Reading and Vocabulary Development. 1-3 Unit.

Strategies for improving graduate and professional academic reading comprehension and critical analysis. Focus on applying specific techniques for different reading purposes. Expansion of both general and field-specific academic vocabulary and idioms. Includes individual reading projects.

EFSLANG 694. English for Business, Industry and Professional Life. 1-3 Unit.

For advanced graduate students. Task-based practice of language appropriate for professional settings in industry and related teamwork. Simulation of the roles of manager, applicant, subordinate, and coworker. Prerequisite: EFSLANG 693A, or consent of instructor. Enrollment limited to 14.

EFSLANG 695A. Pronunciation and Intonation. 1-3 Unit.

Recognition and practice of American English sounds, stress, and intonation patterns for greater comprehension and intelligibility. Analysis of problem areas. Biweekly tape assignments and tutorials. May be repeated once for credit. Enrollment limited to 14.

EFSLANG 695B. Advanced Pronunciation and Intonation. 1-3 Unit.

Continuation of EFSLANG 695A, focusing on American English sounds, stress, rhythm, and intonation patterns. Emphasis is on self-monitoring, integrated with short presentations. Biweekly tape assignments and tutorials. Enrollment limited to 14. May be repeated for credit three times. Prerequisite: EFSLANG 695A.

EFSLANG 696. Understanding American Humor. 1-3 Unit.

Recognizing rhetorical devices, jokes, and character types common to spoken humor in film and television programs. Crosscultural discussion. Prerequisite: EFSLANG 690B, EFSLANG 693B or consent of the instructor. Repeatable once for credit. Enrollment limited to 14.

EFSLANG 697. Writing Fundamentals. 1-3 Unit.

Focus is on improving grammatical accuracy and vocabulary, building fluency, and learning the structure and conventions of English correspondence, reports, and short academic papers. Enrollment limited to 14.

EFSLANG 698A. Writing Academic English. 1-3 Unit.

Strategies and conventions for graduate writing. Emphasis is on fluency, organization, documentation, and appropriateness for writing tasks required in course work. Enrollment limited to 14. May be repeated once for credit.

EFSLANG 698B. Advanced Graduate Writing. 1-3 Unit.

Focus on clarity, accuracy, and appropriate style. For graduate students experienced in English writing and currently required to write for courses and research. Class meetings and individual conferences. Prerequisite: EFSLANG 698A. Enrollment limited to 14. May be repeated once for credit.

EFSLANG 698C. Writing and Presenting Research. 1-3 Unit.

For advanced graduate students completing major research projects. Revising and editing strategies for preparing papers, conference abstracts, and poster presentations. Adapting content and style to different audiences. Students present their research with participant feedback. Enrollment limited to 14. May be repeated once for credit. Prerequisite: EFSLANG 698B and EFSLANG 691 or consent of instructor.

Environment and Resources Courses

ENVRES 200. Sustaining Action: Research, Analysis and Writing for the Public. 3 Units.

Preference to graduate students and senior undergraduates in environmental, natural and social sciences, engineering, journalism. Students help produce and publish SAGE, an eco advice column, by choosing, researching, and answering questions about sustainable living submitted by Stanford alumni and the general public. Prerequisite: admission by application, available from instructor, thayden@stanford.edu. (Meets Earth Systems WIM requirement).

Same as: EARTHSYS 200

ENVRES 215. Digital Storytelling for Researchers. 1-3 Unit.

A starting point in multimedia storytelling for graduate students who are actively involved in research. Students gain project-based experience in still photography, audio podcasting, online slideshows and web video production and editing, enabling them to record and report their own research stories from the lab and field. Enrollment limited, consent of the instructor required.

ENVRES 225. E-IPER Current Topics Seminar. 1 Unit.

For E-IPER Ph.D and Joint M.S. students only. Weekly presentations of E-IPER students' research and other program-related projects. Occasional guest speakers. Individual or team presentation, active participation, and regular attendance required for credit. May be taken for credit a maximum of two times.

ENVRES 230. Field Survey Data Collection & Analysis. 3 Units.

In this course we will examine a range of issues related to the collection and analysis of survey data. Topics will include initiating a survey, designing an instrument, conducting enumeration, converting data from questionnaires to digital files, data analysis, empirical modeling and presenting results. Technical components will also be highly focused on application and implementation, and while prior training in econometrics would be useful, it will not be a prerequisite. The course will be tailored so that some of the specific topics covered will be based on the needs and interests of the students.

ENVRES 238. Commercial Agriculture Seminar. 1 Unit.

Practical survey of the agriculture industry with a focus on the US. Speakers are agricultural practitioners, including executives from commercial farming, agriculture private equity funds, agricultural equipment and seed suppliers, food marketing and retail companies, and novel early-stage ag tech companies. By the end, students will have a high-level grasp of real-world agricultural operations from planting, to harvest, to retail sales in the grocery store and obtain a greater understanding/appreciation of the food we eat every day. May be repeated for credit.

ENVRES 240. Environmental Decision-Making and Risk Perception. 1-3 Unit.

Mobilizing successful conservation efforts to mitigate climate change and preserve both local and global ecosystems requires a new way of thinking. This course will investigate the barriers to pro-environmental behavior and the heuristics and biases that cloud our ability to respond effectively to environmental problems, using insights from behavioral economics, neuroeconomics, and environmental risk perception. Emphasis on interdisciplinary applications of recent research, and implications for environmental policymaking and persuasive messaging.

ENVRES 250. Environmental Governance. 3 Units.

This interdisciplinary course presents an overview of environmental governance through an examination of how and why societies manage the relationships between human beings and the natural world. By comparing regulatory, community-based, and incentive-based environmental management systems, we address why certain environmental problems are managed as they are, and what approaches to environmental management are more (or less) successful. Designed for graduate students and upper-level undergraduates with some exposure to both the natural sciences (ecology/environmental chemistry), and the social sciences (anthropology, economics, political science, or sociology). A pre-course incoming survey is required.

Same as: CEE 277C

ENVRES 255. Innovative Transportation Systems. 3 Units.

Research seminar. Evaluation of the technologies and business model innovations that are transforming our transportation system. Study of existing examples like Tesla, Uber, Lyft, Rideshare, ZipCar, the Google self-driving car, Urban Engines. Identification of additional technologies, business model changes, and economic productivity opportunities to reduce fuel/energy use, increase asset utilization, reduce congestion and accidents. Part of a year long sequence that will lead to pilots jointly with companies to test new innovations. Students are encouraged but not required to enroll in the entire sequence which will include pilot design in the winter and pilot launch in the spring with potential option for summer internships at participating companies. Prerequisite: innovation, engineering, or modeling course.

ENVRES 256. Innovative Transportation Systems 2. 3 Units.

Pilot project workshop course. Building on fall quarter transportation research seminar, this course will develop a set of pilot projects jointly with transport companies (uber, Caltrain, Hovee, etc), cities (SF, Palo Alto, Mountain View), and large employers (Google, Apple, Facebook, Stanford). Pilots will incorporate technologies and business model innovations that are transforming our transportation system such as ride, car, and bike sharing, transit apps and intermodal optimization, electric vehicles, and demand management programs. Pilots will test economics, user behavior and choices, incentive systems, and new business models. Goal is to identify and scale opportunities to improve transport economic productivity, increase convenience and choice/flexibility, reduce fuel/energy use, increase asset utilization, reduce congestion and accidents, broaden access and simplify commuting. Part of a year long sequence but open to new students - no prerequisites. Spring quarter class will launch and assess pilots and create options for internships in companies to scale projects.

ENVRES 265. The Changing Electricity Resource Mix: The Rise of Distributed Solar, Storage, and Demand Response. 3 Units.

Research seminar. Evaluation of the technologies, regulatory frameworks, and business models that are starting to transform power systems. Examination of the technical characteristics and economics of distributed solar generation, storage, demand response, and grid management. Investigation of how policy and regulation can inhibit or accelerate deployment of new generation and demand-side resources. Participants will identify >10 utilities who could target meeting 35% of their energy needs through a combination of distributed solar, storage, and demand response. First part of a year-long sequence that will create real-world test beds for innovations that can address major resource challenges - in this case, the changing power system. The entire sequence will include identifying utility pilot sites in the fall, securing utility participation and then engaging in pilot design in the winter, launching pilots in the field in the spring, and the option for summer internships at participating utilities. Enrollment by application only and limited to 12 Masters and PhD students. Recommended Prerequisites: ENERGY 102, CEE 173, CEE 207, EARTHSYS 103 (or other energy technology background).

ENVRES 266. The Changing Electricity Resource Mix: The Rise of Distributed Solar, Storage, and Demand Response. 3 Units.

Research seminar. Based on evaluation of the technologies, regulatory frameworks, and business models that are starting to transform power systems undertaken in ENVRES 265, participants in this course will design pilot projects to be implemented in cooperation with utility partners and with the support of technology providers, policy makers and NGOs. Pilot projects may include applications of distributed solar generation, storage, demand response, and grid operations. This course is the second part of a year-long sequence that will create real-world test beds for innovations that can address major resource challenges - in this case, the changing power system. The pilots designed in this course will be launched in the field in the spring, with the option for summer internships at participating utilities. Results will be documented and published so that learning can be shared and innovative solutions can be replicated by others. Enrollment by application only and limited to 16 Masters and PhD students. Required prerequisite: ENVRES 265 (or by special permission from instructor).

ENVRES 267. The Changing Electricity Resource Mix: The Rise of Distributed Solar, Storage, and Demand Response. 3 Units.

Research seminar -- continuation of ENVRES 265 and 266. As part of Stanford's Energy Transformation Collaborative, participants implement pilot projects in cooperation with utility partners and with the support of technology providers, policy makers and NGOs. Projects include applications of distributed solar generation, storage, demand response, energy efficiency and grid operations. This course is the third part of a year-long sequence designed to create real-world test beds for innovations that can address major resource challenges - in this case, the changing power system. The pilots will be launched in the field in the spring, with the potential for summer internships at participating utilities. Results will be documented and published so that learning can be shared and innovative solutions can be replicated by others. Enrollment available to ENVRES 266 participants only (or by special permission from instructor).

ENVRES 270. Graduate Practicum in Environment and Resources. 1-5 Unit.

Opportunity for E-IPER students to pursue areas of specialization in an institutional setting such as a laboratory, clinic, research institute, governmental agency, non-governmental organization, or multilateral organization. Meets US CIS requirements for off-campus employment with endorsement from designated school official.

ENVRES 275. The Practice of Mining and Its Social and Environmental Context. 2 Units.

Seminar focused on one of the world's oldest industries: mining. Mining is a major industrial process that underpins the provision of many of the resources that we use in our daily lives; it is also a process that has defined landscapes and communities in sometimes positive and often negative ways. Mining is often neglected in balanced discussions of resource use and sustainability, and this course aims to give students context to help ensure that its lessons are not forgotten.

ENVRES 277C. Specialized Writing and Reporting: Environmental Journalism. 4-5 Units.

(Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu. Same as: COMM 177C, COMM 277C, EARTHSYS 177C, EARTHSYS 277C

ENVRES 280. Introduction to Environmental Science. 2 Units.

For E-IPER Joint M.S. students only. This course functions as a gateway for E-IPER Joint M.S. students to learn about the variety of environmental science conducted by the program's affiliated faculty. Topics include oceans, green chemistry, water policy, energy, and others. Students engage in problem solving related to the application of science to business, law, and the conservation of natural resources.

ENVRES 290. Capstone Project Seminar in Environment and Resources. 1-3 Unit.

Required for E-IPER Joint M.S. students. Propose, conduct and publicly present final individual or team projects demonstrating the integration of professional (M.B.A., J.D., or M.D.) and M.S. in Environment and Resources degrees. Presentation and submission of final product required. 3 total units required; can all be taken during one quarter or divided over two sequential quarters.

ENVRES 300. Introduction to Resource, Energy and Environmental Economics. 3 Units.

Examination of environmental, energy and natural resource management problems through the lens of economics, with an emphasis on hands-on practical problem-solving. Topics include market failure, cost-benefit analysis, finance, risk & uncertainty, non-market valuation, regulation, green accounting, rent, renewable resources, exhaustible resources, including energy, and biodiversity. Prerequisite: proficiency in multivariate calculus. Knowledge of basic microeconomics helpful but not essential. Open only to PhD students.

ENVRES 315. Environmental Research Design Seminar. 1 Unit.

Required core course for first year E-IPER Ph.D. students; optional for Joint M.S. students; other graduate students with instructor's permission. Series of faculty presentations and student-led discussions on interdisciplinary research design as exemplars of the research design theories discussed in ENVRES 320. Designing Environmental Research. Topics parallel the ENVRES 320 syllabus. Corequisite: ENVRES 320.

ENVRES 320. Designing Environmental Research. 3-4 Units.

Required core course restricted to first year E-IPER Ph.D. students. Research design options for causal inference in environmentally related research. Major philosophies of knowledge and how they relate to research objectives and design choices. Identification of critical elements within a broad range of research designs. Evaluation of the types of research questions for which different designs are suited, emphasizing fit between objectives, design, methods, and argument. Development of individual research design proposals, including description and justification understandable to a non-specialist.

ENVRES 330. Research Approaches for Environmental Problem Solving. 3 Units.

Required core course for first year E-IPER Ph.D. students. How to develop and implement interdisciplinary research in environment and resources. Assignments include development of research questions, a preliminary literature review, and a summer funding proposal. Course is structured on peer critique and student presentations of work in progress. Corequisite: ENVRES 398 with a faculty member chosen to explore a possible dissertation topic.

ENVRES 340. E-IPER PhD Writing Seminar. 1-2 Unit.

Restricted to second year E-IPER PhD students only. Actively pursue one or more writing goals relevant to this stage in their graduate studies in a structured setting. Set specific writing goals, create and follow a plan for reaching these goals, and receive substantive feedback on their written products from their peers. Examples of writing products include, but are not limited to, the student's dissertation proposal, E-IPER Fields of Inquiry essay, a literature review, or a grant or fellowship application. By the end of the course, students are expected to have completed or have made substantial progress toward their writing goal.

ENVRES 380. Collaborating with the Future: Launching Large Scale Sustainable Transformations. 3-4 Units.

This project-based d.school class combines Design Thinking Processes, Behavioral Sciences, and elements of Diffusion Theory. Tools and theories introduced in class will be used to structure large-scale transformations that simultaneously create value on environmental, societal, and economic fronts. We encourage students to use this class as a launching pad for real initiatives. Primarily meant for Graduate Students. (Especially qualified/motivated Seniors will be considered). Admission to the class is through an application process which ends on March 3. Please find instructions and applications at <https://dschool.stanford.edu/groups/largetransformations/>.

ENVRES 398. Directed Individual Study in Environment and Resources. 1-9 Unit.

Under supervision of an E-IPER affiliated faculty member on a subject of mutual interest. Joint M.S. students must submit an Independent Study Agreement for approval.

ENVRES 399. Directed Research in Environment and Resources. 1-15 Unit.

For advanced graduate students. Under supervision of an E-IPER affiliated faculty member. Joint M.S. students must submit an Independent Study Agreement for approval.

ENVRES 410. Ph.D. Qualifying Tutorial. 1 Unit.

For Ph.D. students only. Under supervision of an E-IPER affiliated faculty member.

ENVRES 801. TGR Project. 0 Units.

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ENVRES 802. TGR Dissertation. 0 Units.

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Environmental Earth System Sciences Courses

EESS 10SC. In the Age of the Anthropocene: Coupled-Human Natural Systems of Southeast Alaska. 2 Units.

Southeast Alaska is often described as America's "last frontier," embodying a physical reality of the "pristine" that was once revered by the early romantics and founders of the modern conservation movement throughout Western North America. Although endowed with more designated Wilderness land than any other state, Alaska remains a working landscape: a mixed cash-subsistence economy where communities rely upon the harvest and export of natural resources. Here, ecosystem services remain tangible, and people living in communities that are unconnected by roads confront questions of sustainability on a daily basis. This field-based course introduces students to the global questions of land use change and sustainable resource management in the American West through the place-based exploration of Southeast Alaska. Focused on four key social-ecological challenges -- fisheries, forestry, tourism, and energy -- the coupled human-natural systems of Southeast Alaska provide a unique lens for students to interpret broader resource management and conservation issues. The curriculum balances field explorations and classroom lectures with community exploration in which students will engage with fishermen, hatchery workers, forest managers, loggers, mill owners, tour operators, tourists, city officials, citizens, and Native residents. Students will catch their own salmon, walk through old-growth and logged forests, kayak next to glacial moraines, and witness the impacts of human activities, both local and global, on the social-ecological systems around them. In the context of rapidly changing ecosystems, students will confront the historical, ecological, and economic complexities of environmental stewardship in this region. By embedding their experiences within frameworks of land change science, land-ocean interactions, ecosystem ecology, and natural resource management and economics, students will leave this course ready to apply what they have learned to the global challenges of sustainability and conservation that pervade systems far beyond Alaska. This course is co-sponsored by the School of Earth Sciences and takes place in Sitka, Alaska. Students arrange for their arrival in Seattle, WA on August 30; all subsequent travel is made possible by Sophomore College and the School of Earth Sciences.

EESS 12SC. Environmental and Geological Field Studies in the Rocky Mountains. 2 Units.

The Rocky Mountain area, ecologically and geologically diverse, is being strongly impacted by changing land-use patterns, global and regional environmental change, and societal demands for energy and natural resources. This three-week field program emphasizes coupled environmental and geological problems in the Rocky Mountains and will cover a broad range of topics including the geologic origin of the American West from three billion years ago to the recent; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West that are related to changing land-use patterns and increased demand for its abundant natural resources. These broad topics are integrated into a coherent field study by examining earth/environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin that host abundant gas and oil reserves and also contain the long-term climate history of this region; and 3) the volcanic center of Yellowstone National Park and mountainous region of Teton National Park, and the economic and environmental problems associated with gold mining and extraction of oil and gas in areas adjoining these national parks. Students will complete six assignments based upon field exercises, working in small groups to analyze data and prepare reports and maps. Lectures will be held in the field prior to and after fieldwork. Note: This course involves one week of backpacking in the Wind Rivers and hiking while staying in cabins near Jackson Hole, Wyoming, and horseback riding in the Dubois area of Wyoming. Students must arrive in Salt Lake City on Monday, Sept. 1. (Hotel lodging will be provided for the night of Sept. 1, and thereafter students will travel as a Sophomore College group.) We will return to campus on Sunday, Sept. 21. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

Same as: EARTHSYS 12SC, GES 12SC

EESS 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration. 3 Units.

This course examines the motivations and experiences of polar explorers under the harshest conditions on Earth, as well as the chronicles of their explorations and hardships, dating to the 1500s for the Arctic and the 1700s for the Antarctic. Materials include *The Worst Journey in the World* by Aspley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Optional field trip into the high Sierra in March.

Same as: EARTHSYS 38N, GES 38N

EESS 42. The Global Warming Paradox II. 1 Unit.

Further discussion of the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Discussions of topics of student interest, including peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks. Focus is on student engagement in on-campus and off-campus activities. Prerequisite: EESS 41N or EARTHSYS 41N or consent of instructor.

Same as: EARTHSYS 42

EESS 43. The Global Warming Paradox III. 1 Unit.

Further discussion of the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Discussions explore topics of student interest, including peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks. Focus is on student engagement in on-campus and off-campus activities. May be repeat for credit.

EESS 46N. Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough. 3 Units.

Preference to freshmen. Field trips to sites in the Elkhorn Slough, a small agriculturally impacted estuary that opens into Monterey Bay, a model ecosystem for understanding the complexity of estuaries, and one of California's last remaining coastal wetlands. Readings include Jane Caffrey's *Changes in a California Estuary: A Profile of Elkhorn Slough*. Basics of biogeochemistry, microbiology, oceanography, ecology, pollution, and environmental management.

Same as: EARTHSYS 46N

EESS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay. 3 Units.

This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

Same as: CEE 50N, EARTHSYS 49N

EESS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays. 3 Units.

Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay.

Same as: EARTHSYS 56Q

EESS 57Q. Climate Change from the Past to the Future. 3 Units.

Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

Same as: EARTHSYS 57Q

EESS 60. Food, Water and War: Life on the Mekong. 1 Unit.

Preparatory course for Bing Overseas Studies summer course in Cambodia. Prerequisite. Requires instructor consent.

EESS 61Q. Food and security. 3 Units.

The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

Same as: EARTHSYS 61Q, INTNLREL 61Q

EESS 101. Environmental and Geological Field Studies in the Rocky Mountains. 3 Units.

Three-week, field-based program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such as acid mine drainage and changing land-use patterns.

Same as: EARTHSYS 100, GES 101

EESS 105. Food and Community: New Visions for a Sustainable Future. 3 Units.

Through this course students will learn about the community and outreach component of the urban gardening movement. Over the quarter students will learn about urban farming, about projects that work to increase access of the most underserved to fresh and local food, and about the challenges surrounding these efforts. The theme of the course will be stories- stories of food and community, of innovation, and of service. Students will learn through engaging in conversation with different leaders in the local food movement. Additionally, through hands-on learning and participation, students will become familiar with different types of community food projects in the Bay Area, including urban farms, free food giveaways, food banks, and gleaning projects. Service Learning Course (certified by Haas Center). Limited enrollment. May be repeated for credit.

Same as: EARTHSYS 105

EESS 106. World Food Economy. 5 Units.

The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on public sector decision making as it relates to food policy.

Same as: EARTHSYS 106, ECON 106

EESS 107. Control of Nature. 3 Units.

Think controlling the earth's climate is science fiction? It is when you watch *Snowpiercer* or *Dune*, but scientists are already devising geoengineering schemes to slow climate change. Will we ever resurrect the woolly mammoth or even a T. Rex (think Jurassic Park)? Based on current research, that day will come in your lifetime. Who gets to decide what species to save? And more generally, what scientific and ethical principles should guide our decisions to control nature? In this course, we will examine the science behind ways that people alter and engineer the earth, critically examining the positive and negative consequences. We'll explore these issues first through popular movies and books and then, more substantively, in scientific research.

Same as: EARTHSYS 107

EESS 111. Biology and Global Change. 4 Units.

The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing.

Same as: BIO 117, EARTHSYS 111

EESS 112. Human Society and Environmental Change. 4 Units.

Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1.

Same as: EARTHSYS 112, HISTORY 103D

EESS 117. Earth Sciences of the Hawaiian Islands. 4 Units.

Progression from volcanic processes through rock weathering and soil-ecosystem development to landscape evolution. The course starts with an investigation of volcanic processes, including the volcano structure, origin of magmas, physical-chemical factors of eruptions. Factors controlling rock weathering and soil development, including depth and nutrient levels impacting plant ecosystems, are explored next. Geomorphic processes of landscape evolution including erosion rates, tectonic/volcanic activity, and hillslope stability conclude the course. Methods for monitoring and predicting eruptions, defining spatial changes in landform, landform stability, soil production rates, and measuring biogeochemical processes are covered throughout the course. This course is restricted to students accepted into the Earth Systems of Hawaii Program.

Same as: EARTHSCI 117, EARTHSYS 117

EESS 118. Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions. 3 Units.

Integrating the science of natural hazards, methods for quantitatively estimating the risks that these hazards pose to populations and property, engineering solutions that might best ameliorate these risks and increase resilience to future events, and policy and economic decision-making studies that may increase long-term resilience to future events. Panel discussions by outside experts exploring the science, engineering, policy, and economics that underly the hazards, risks, and strategies for increasing resilience. Group assignments to evaluate the way in which natural hazards, and human population and developing interact in megacities to produce risk, and what strategies might be adopted in each area to reduce risks posed by the specific hazards faced by these urban areas.

Same as: EESS 218, GEOPHYS 118, GEOPHYS 218, GES 118, GES 218

EESS 122. GIS for good: Applications of GIS for International Development and Humanitarian Assistance. 3-4 Units.

This service-learning course exposes students to geographic information systems (GIS) as a tool for exploring alternative solutions to complex environmental and humanitarian issues in the international arena. The project-based, interdisciplinary structure of this class gives primary emphasis to the use of GIS for field data collection, mapping, analysis and visualization that allows for multi-criteria assessment of community development. Those with no prior GIS experience will be required to take an introductory GIS workshop hosted by the Geospatial Center in Branner Library during the first two weeks of class.

Same as: EARTHSYS 127, EESS 222

EESS 141. Remote Sensing of the Oceans. 3-4 Units.

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

Same as: EARTHSYS 141, EARTHSYS 241, EESS 241, GEOPHYS 141

EESS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: EARTHSYS 146A, EARTHSYS 246A, EESS 246A, GEOPHYS 146A, GEOPHYS 246A

EESS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A or EESS 246A, or CEE 164 or CEE 262D, or consent of instructor.

Same as: EARTHSYS 146B, EARTHSYS 246B, EESS 246B, GEOPHYS 146B, GEOPHYS 246B

EESS 148. Introduction to Physical Oceanography. 4 Units.

The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

Same as: CEE 164, CEE 262D, EARTHSYS 164

EESS 151. Biological Oceanography. 3-4 Units.

Required for Earth Systems students in the oceans track. Interdisciplinary look at how oceanic environments control the form and function of marine life. Topics include distributions of planktonic production and abundance, nutrient cycling, the role of ocean biology in the climate system, expected effects of climate changes on ocean biology. Local weekend field trips. Designed to be taken concurrently with Marine Chemistry (EESS/EARTHSYS 152/252). Prerequisites: BIO 43 and EESS 8 or equivalent.

Same as: EARTHSYS 151, EARTHSYS 251, EESS 251

EESS 152. Marine Chemistry. 3-4 Units.

Introduction to the interdisciplinary knowledge and skills required to critically evaluate problems in marine chemistry and related disciplines. Physical, chemical, and biological processes that determine the chemical composition of seawater. Air-sea gas exchange, carbonate chemistry, and chemical equilibria, nutrient and trace element cycling, particle reactivity, sediment chemistry, and diagenesis. Examination of chemical tracers of mixing and circulation and feedbacks of ocean processes on atmospheric chemistry and climate. Designed to be taken concurrently with Biological Oceanography (EESS/EARTHSYS 151/251).

Same as: EARTHSYS 152, EARTHSYS 252, EESS 252

EESS 155. Science of Soils. 3-4 Units.

Physical, chemical, and biological processes within soil systems. Emphasis is on factors governing nutrient availability, plant growth and production, land-resource management, and pollution within soils. How to classify soils and assess nutrient cycling and contaminant fate. Recommended: introductory chemistry and biology.

Same as: EARTHSYS 155

EESS 156. Soil and Water Chemistry. 1-4 Unit.

(Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

Same as: EARTHSYS 156, EARTHSYS 256, EESS 256

EESS 158. Geomicrobiology. 3 Units.

How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

Same as: EARTHSYS 158, EARTHSYS 258, EESS 258

EESS 162. Remote Sensing of Land. 4 Units.

The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

Same as: EARTHSYS 142, EARTHSYS 242, EESS 262

EESS 164. Fundamentals of Geographic Information Science (GIS). 3-4 Units.

Survey of geographic information including maps, satellite imagery, and census data, approaches to spatial data, and tools for integrating and examining spatially-explicit data. Emphasis is on fundamental concepts of geographic information science and associated technologies. Topics include geographic data structure, cartography, remotely sensed data, statistical analysis of geographic data, spatial analysis, map design, and geographic information system software. Computer lab assignments.

Same as: EARTHSYS 144

EESS 173. Aquaculture and the Environment: Science, History, and Policy. 3 Units.

Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures. By application only - instructor consent required. Contact gerhart@stanford.edu or dhklinger@stanford.edu prior to first day of class.

Same as: EARTHSYS 173, EARTHSYS 273, EESS 273

EESS 179S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings.

Same as: CEE 179S, CEE 279S, EARTHSYS 179S

EESS 181. Urban Agriculture in the Developing World. 3-4 Units.

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application.

Same as: EARTHSYS 181, EARTHSYS 281, EESS 281, URBANST 181

EESS 183. Food Matters: Agriculture in Film. 1 Unit.

Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.

Same as: EARTHSYS 183, EARTHSYS 283, EESS 283

EESS 184. Climate and Agriculture. 3-4 Units.

The effects of climate change on global agriculture and food security, and the effects of agriculture on climate change. An overview of different lines of evidence used to measure impacts and adaptations, and to quantify future impacts, risks, and adaptation needs for agro-ecosystems and society. Enrollment limited to 25; priority to juniors, seniors, and graduate students. Prerequisites: ECON 106/206 or permission of instructor.

Same as: EARTHSYS 184, EARTHSYS 284, EESS 284

EESS 208. Topics in Geobiology. 1 Unit.

Reading and discussion of classic and recent papers in the field of Geobiology. Co-evolution of Earth and life; critical intervals of environmental and biological change; geomicrobiology; paleobiology; global biogeochemical cycles; scaling of geobiological processes in space and time.

Same as: GES 208

EESS 211. Fundamentals of Modeling. 3-5 Units.

Simulation models are a powerful tool for environmental research, if used properly. The major concepts and techniques for building and evaluating models. Topics include model calibration, model selection, uncertainty and sensitivity analysis, and Monte Carlo and bootstrap methods. Emphasis is on gaining hands-on experience using the R programming language.

Prerequisite: Basic knowledge of statistics.

Same as: EARTHSYS 211

EESS 212. Measurements in Earth Systems. 3-4 Units.

Restricted to EESS first-year, graduate students. Techniques to track biological, chemical, and physical processes operating across the San Francisco Creek watershed, encompassing upland, aquatic, estuarine, and marine environments. Topics include gas and water flux measurement, assessment of microbiological communities, determination of biological productivity, isotopic analysis, soil and water chemistry determination, and identification of rock strata and weathering processes.

EESS 214. Introduction to geostatistics and modeling of spatial uncertainty. 3-4 Units.

Introduction of fundamental geostatistical tools for modeling spatial variability and uncertainty, and mapping of environmental attributes. Additional topics include sampling design and incorporation of different types of information (continuous, categorical) in prediction. Assignments consist of small problems to familiarize students with theoretical concepts, and applications dealing with the analysis and interpretation of various data sets (soil, water pollution, atmospheric constituents, remote sensing) primarily using Matlab. No prior programming experience is required. Open to graduates. Open to undergraduates with consent from the instructor. 3-credit option includes midterm/final or student-developed project. 4-credit option requires both. Prerequisite: College-level introductory statistics.

EESS 215. Earth System Dynamics. 2 Units.

This is a graduate level course that examines the dynamics of the Earth System from an integrated perspective. Lectures introduce the physical, biogeochemical, ecological, and human dimensions of the Earth System, with emphasis on feedbacks, thresholds and tipping points. Human interactions with climate and land systems are emphasized in order to enable in-depth exploration of Earth System dynamics. Lab projects focus on a region of the globe for which rich coordinated data sources exist and complex Earth System dynamics dominate the environment.

EESS 216. Terrestrial Biogeochemistry. 3 Units.

Nutrient cycling and the regulation of primary and secondary production in terrestrial, freshwater, and marine ecosystems; land-water and biosphere-atmosphere interactions; global element cycles and their regulation; human effects on biogeochemical cycles. Prerequisite: graduate standing in science or engineering; consent of instructor for undergraduates or coterminal students.

Same as: BIO 216

EESS 217. Climate of the Cenozoic. 3 Units.

For upper-division undergraduate and graduate students. The paleoclimate of the Cenozoic and how climate changes in the past link to the carbon cycle. Topics include long- and short-term records of climate on continents and oceans, evidence for and causes of hyperthermal events, how the Earth's climate has responded in increased carbon dioxide in the atmosphere. Guest speakers, student presentations.

EESS 218. Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions. 3 Units.

Integrating the science of natural hazards, methods for quantitatively estimating the risks that these hazards pose to populations and property, engineering solutions that might best ameliorate these risks and increase resilience to future events, and policy and economic decision-making studies that may increase long-term resilience to future events. Panel discussions by outside experts exploring the science, engineering, policy, and economics that underly the hazards, risks, and strategies for increasing resilience. Group assignments to evaluate the way in which natural hazards, and human population and developing interact in megacities to produce risk, and what strategies might be adopted in each area to reduce risks posted by the specific hazards faced by these urban areas.

Same as: EESS 118, GEOPHYS 118, GEOPHYS 218, GES 118, GES 218

EESS 219. Climate Variability during the Holocene: Understanding what is Natural Climate Change. 3 Units.

Many elements of the debate about attribution of modern climate change to man-made influences hinge on understanding the past history of climate as well as forcing functions such as solar output, volcanism, and "natural" trace gas variability. Interest in Holocene reconstructions of past climate and forcing functions has surged in the last 20 years providing a robust literature set for discussion and analysis. The goal of this class is to provide graduate students with a view of the archives available for Holocene paleoenvironmental analysis, the tracers that are used, and the results thus far. We will also explore the world of data-model comparisons and examine the role that paleorecords play in the IPCC reports. The class will consist of some lectures as well as many class discussions based on assigned readings.

EESS 220. Physical Hydrogeology. 4 Units.

(Formerly GES 230.) Theory of underground water occurrence and flow, analysis of field data and aquifer tests, geologic groundwater environments, solution of field problems, and groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Lab. Prerequisite: elementary calculus.

Same as: CEE 260A

EESS 221. Contaminant Hydrogeology and Reactive Transport. 4 Units.

For earth scientists and engineers. Environmental, geologic, and water resource problems involving migration of contaminated groundwater through porous media and associated biogeochemical and fluid-rock reactions. Conceptual and quantitative treatment of advective-dispersive transport with reacting solutes. Predictive models of contaminant behavior controlled by local equilibrium and kinetics. Modern methods of contaminant transport simulation and reactive transport modeling using geochemical transport software. Some Matlab programming / program modification required. Prerequisite: Physical Hydrogeology EESS 220 / CEE 260A (Gorelick) or equivalent. Recommended: course work in environmental chemistry or geochemistry (e.g., one or more of the following: EESS 155, EESS 156/256, GES 90, GES 170/279, GES 171, CEE 177 or CEE 270).

Same as: CEE 260C, GES 225

EESS 222. GIS for good: Applications of GIS for International Development and Humanitarian Assistance. 3-4 Units.

This service-learning course exposes students to geographic information systems (GIS) as a tool for exploring alternative solutions to complex environmental and humanitarian issues in the international arena. The project-based, interdisciplinary structure of this class gives primary emphasis to the use of GIS for field data collection, mapping, analysis and visualization that allows for multi-criteria assessment of community development. Those with no prior GIS experience will be required to take an introductory GIS workshop hosted by the Geospatial Center in Branner Library during the first two weeks of class.

Same as: EARTHSYS 127, EESS 122

EESS 227. Modern Turbidite Systems as Analogues for Deep-water Petroleum Plays. 3 Units.

This seminar is designed for earth science upperclassmen and graduate students. Marine geophysical and geological techniques will be used to illustrate and understand source-to-sink characteristics of modern turbidite systems. The course will examine a wide variety of small-scale base-of-apron (km) to large-scale (100's of km) sand-rich to mud-rich systems. New research on mass transport deposits, hybrid beds, and turbidite paleoseismology will be presented. Variations in turbidite system architecture, that are dependent upon tectonic setting, sediment supply, climate, sea level change, and contour currents will be discussed. The utility and pitfalls of model-driven approaches are also explored.

Same as: GES 227

EESS 240. Advanced Oceanography. 3 Units.

For upper-division undergraduates and graduate students in the earth, biologic, and environmental sciences. Topical issues in marine science/oceanography. Topics vary each year following or anticipating research trends in oceanographic research. Focus is on links between the circulation and physics of the ocean with climate in the N. Pacific region, and marine ecologic responses. Participation by marine scientists from research groups and organizations including the Monterey Bay Aquarium Research Institute.

EESS 241. Remote Sensing of the Oceans. 3-4 Units.

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

Same as: EARTHSYS 141, EARTHSYS 241, EESS 141, GEOPHYS 141

EESS 242. Antarctic Marine Geology. 3 Units.

For upper-division undergraduates and graduate students. Intermediate and advanced topics in marine geology and geophysics, focusing on examples from the Antarctic continental margin and adjacent Southern Ocean. Topics: glaciers, icebergs, and sea ice as geologic agents (glacial and glacial marine sedimentology, Southern Ocean current systems and deep ocean sedimentation), Antarctic biostratigraphy and chronostratigraphy (continental margin evolution). Students interpret seismic lines and sediment core/well log data. Examples from a recent scientific drilling expedition to Prydz Bay, Antarctica. Up to two students may have an opportunity to study at sea in Antarctica during Winter Quarter.

Same as: EARTHSYS 272

EESS 244. Marine Ecosystem Modeling. 3 Units.

This course will provide the practical background necessary to construct and implement a 2-dimensional (space and time) numerical model of a simple marine ecosystem. Instruction on computer programming, model design and parameterization, and model evaluation will be provided. Throughout the 10-week course, each student will develop and refine their own multi-component marine ecosystem model. Instructor consent required.

EESS 245. Advanced Biological Oceanography. 3-4 Units.

For upper-division undergraduates and graduate students. Themes vary annually but include topics such as marine bio-optics, marine ecological modeling, and phytoplankton primary production. May be repeated for credit. Enrollment by instructor consent only.

EESS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: EARTHSYS 146A, EARTHSYS 246A, EESS 146A, GEOPHYS 146A, GEOPHYS 246A

EESS 246B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A or EESS 246A, or CEE 164 or CEE 262D, or consent of instructor.

Same as: EARTHSYS 146B, EARTHSYS 246B, EESS 146B, GEOPHYS 146B, GEOPHYS 246B

EESS 249. Marine Stable Isotopes. 3 Units.

This course will provide an introduction to stable isotopes biogeochemistry with emphasis on applications in marine science. We will cover fundamental concepts of nuclear structure and origin of elements and isotopes, and stable isotopic fractionation. We will discuss mass spectrometry techniques, mass independent fractionation, clumped isotopes, mass balance and box models. Applications of these concepts to studies of ocean circulation, marine carbon and nitrogen cycles, primary productivity, and particle scavenging will also be discussed.

EESS 250. Elkhorn Slough Microbiology. 3 Units.

(Formerly GES 270.) The microbial ecology and biogeochemistry of Elkhorn Slough, an agriculturally-impacted coastal estuary draining into Monterey Bay. The diversity of microbial lifestyles associated with estuarine physical/chemical gradients, and the influence of microbial activity on the geochemistry of the Slough, including the cycling of carbon, nitrogen, sulfur, and metals. Labs and field work. Location: Hopkins Marine Station.

EESS 251. Biological Oceanography. 3-4 Units.

Required for Earth Systems students in the oceans track. Interdisciplinary look at how oceanic environments control the form and function of marine life. Topics include distributions of planktonic production and abundance, nutrient cycling, the role of ocean biology in the climate system, expected effects of climate changes on ocean biology. Local weekend field trips. Designed to be taken concurrently with Marine Chemistry (EESS/EARTHSYS 152/252). Prerequisites: BIO 43 and EESS 8 or equivalent. Same as: EARTHSYS 151, EARTHSYS 251, EESS 151

EESS 252. Marine Chemistry. 3-4 Units.

Introduction to the interdisciplinary knowledge and skills required to critically evaluate problems in marine chemistry and related disciplines. Physical, chemical, and biological processes that determine the chemical composition of seawater. Air-sea gas exchange, carbonate chemistry, and chemical equilibria, nutrient and trace element cycling, particle reactivity, sediment chemistry, and diagenesis. Examination of chemical tracers of mixing and circulation and feedbacks of ocean processes on atmospheric chemistry and climate. Designed to be taken concurrently with Biological Oceanography (EESS/EARTHSYS 151/251).

Same as: EARTHSYS 152, EARTHSYS 252, EESS 152

EESS 253S. Hopkins Microbiology Course. 3-12 Units.

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

Same as: BIO 274S, BIOHOPK 274, CEE 274S

EESS 255. Microbial Physiology. 3 Units.

Introduction to the physiology of microbes including cellular structure, transcription and translation, growth and metabolism, mechanisms for stress resistance and the formation of microbial communities. These topics will be covered in relation to the evolution of early life on Earth, ancient ecosystems, and the interpretation of the rock record. Recommended: introductory biology and chemistry.

EESS 256. Soil and Water Chemistry. 1-4 Unit.

(Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

Same as: EARTHSYS 156, EARTHSYS 256, EESS 156

EESS 258. Geomicrobiology. 3 Units.

How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

Same as: EARTHSYS 158, EARTHSYS 258, EESS 158

EESS 259. Environmental Microbial Genomics. 1-3 Unit.

The application of molecular and environmental genomic approaches to the study of biogeochemically-important microorganisms in the environment without the need for cultivation. Emphasis is on genomic analysis of microorganisms by direct extraction and cloning of DNA from natural microbial assemblages. Topics include microbial energy generation and nutrient cycling, genome structure, gene function, physiology, phylogenetic and functional diversity, evolution, and population dynamics of uncultured communities.

EESS 260. Advanced Statistical Methods for Earth System Analysis. 3 Units.

Introduction for graduate students to important issues in data analysis relevant to earth system studies. Emphasis on methodology, concepts and implementation (in R), rather than formal proofs. Likely topics include the bootstrap, non-parametric methods, regression in the presence of spatial and temporal correlation, extreme value analysis, time-series analysis, high-dimensional regressions and change-point models. Topics subject to change each year. Prerequisites: STATS 110 or equivalent.

Same as: STATS 360

EESS 261. Molecular Microbial Biosignatures. 1-3 Units.

Critical reading and discussion of literature on molecular biosignatures as indicators of microbial life and metabolisms in modern and ancient environments. Focus will be primarily on recalcitrant lipids that form chemical fossils and topics covered will include biosynthetic pathways of these lipids, their phylogenetic origins, their physiological roles in modern organisms, and their occurrence throughout the geological record. Recommended: microbiology and organic chemistry.

EESS 262. Remote Sensing of Land. 4 Units.

The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

Same as: EARTHSYS 142, EARTHSYS 242, EESS 162

EESS 263. Topics in Advanced Geostatistics. 3-4 Units.

Conditional expectation theory and projections in Hilbert spaces; parametric versus non-parametric geostatistics; Boolean, Gaussian, fractal, indicator, and annealing approaches to stochastic imaging; multiple point statistics inference and reproduction; neural net geostatistics; Bayesian methods for data integration; techniques for upscaling hydrodynamic properties. May be repeated for credit. Prerequisites: 240, advanced calculus, C++/Fortran. Same as: ENERGY 242

EESS 270. Analyzing land use in a globalized world. 3 Units.

This is a graduate level course that examines the dynamics of land use in relation to the multiple dimensions of globalization. The objective is to understand and analyze how the expansion of global trade, the emergence of new global actors, and public and private regulations affect land use changes. Beyond getting a better understanding of the dynamics of land use change, the course will enable students to better understand how to effectively influence land use change, from different vantage points: government, NGO, information broker, corporate actor. The main emphasis is on tropical regions. Lectures introduce various topics related to theories, practical cases, and evaluation tools to better understand and analyze contemporary land use dynamics. Data analyses will be conducted in the lab section, based on case studies.

EESS 273. Aquaculture and the Environment: Science, History, and Policy. 3 Units.

Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures. By application only - instructor consent required. Contact gerhart@stanford.edu or dhklinger@stanford.edu prior to first day of class.

Same as: EARTHSYS 173, EARTHSYS 273, EESS 173

EESS 280B. Principles and Practices of Sustainable Agriculture. 3-4 Units.

Field-based training in ecologically sound agricultural practices at the Stanford Community Farm. Weekly lessons, field work, and group projects. Field trips to educational farms in the area. Topics include: soils, composting, irrigation techniques, IPM, basic plant anatomy and physiology, weeds, greenhouse management, and marketing.

Same as: EARTHSYS 180B

EESS 281. Urban Agriculture in the Developing World. 3-4 Units.

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application.

Same as: EARTHSYS 181, EARTHSYS 281, EESS 181, URBANST 181

EESS 282. Ecological Farm Management. 1 Unit.

A project-based course emphasizing ways of doing things in sustainable agricultural systems based at the new Stanford Educational Farm. Students will work individually and in small groups on farm projects of their choice facilitated and guided by the Educational Farm Director. Potential projects include: orchards, compost systems, pastured poultry, beekeeping, medicinal herbs, mushroom cultivation, native plants, etc.

Same as: EARTHSYS 182

EESS 283. Food Matters: Agriculture in Film. 1 Unit.

Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.

Same as: EARTHSYS 183, EARTHSYS 283, EESS 183

EESS 284. Climate and Agriculture. 3-4 Units.

The effects of climate change on global agriculture and food security, and the effects of agriculture on climate change. An overview of different lines of evidence used to measure impacts and adaptations, and to quantify future impacts, risks, and adaptation needs for agro-ecosystems and society. Enrollment limited to 25; priority to juniors, seniors, and graduate students. Prerequisites: ECON 106/206 or permission of instructor.

Same as: EARTHSYS 184, EARTHSYS 284, EESS 184

EESS 292. Directed Individual Study in Environmental Earth System Science. 1-10 Unit.

Under supervision of an Environmental Earth System Science faculty member on a subject of mutual interest.

EESS 300. Climate studies of terrestrial environments. 3 Units.

This course will consist of a weekly seminar covering topics of interest in Cenozoic climate. The course examines the interactions between the biosphere, atmosphere and geosphere and how these interactions influence climate. The course will cover classic and seminal papers on the controls of the oxygen, hydrogen, and carbon isotopes of the hydrosphere, atmosphere and biosphere and how they are expressed in paleoclimate proxies. Seminar will consist of reading and discussion of these papers. Students will be responsible for presenting papers. Grades will be determined by class participation. (Chamberlain).

EESS 301. Topics in Environmental Earth System Science. 1 Unit.

Current topics, issues, and research related to interactions that link the oceans, atmosphere, land surfaces and freshwater systems. May be repeated for credit.

EESS 305. Climate Change: An Earth Systems Perspective. 2 Units.

A graduate-level, seminar-style class on climate change structured around the IPCC's AR5. Significant reading load and a weekly talks by a rotating roster of contributing and lead authors from the IPCC. The focus will be on the physical science basis, adaptation and impacts (working groups 1 and 2), with some material drawn from mitigation (working group 3).

EESS 306. From Freshwater to Oceans to Land Systems: An Earth System Perspective to Global Challenges. 2 Units.

Within this class we will have cover Earth System processes ranging from nutrient cycles to ocean circulation. We will also address global environmental challenges of the twenty-first century that include maintaining freshwater resources, land degradation, health of our oceans, and the balance between food production and environmental degradation. Weekly readings and problem sets on specific topics will be followed by presentations of EESS faculty and an in-depth class discussion. EESS first year students have priority enrollment.

EESS 307. Research Proposal Development and Delivery. 2 Units.

In this class students will learn how to write rigorous, high yield, multidisciplinary proposals targeting major funding agencies. The skills gained in this class are essential to any professional career, particularly in research science. Students will write a National Science Foundation style proposal involving testable hypotheses, pilot data or calculations, and broader impact. Restricted to EESS first-year, graduate students.

EESS 310. Climate and Energy Seminar. 3 Units.

This course examines the links between climate change policy and other regulation of the energy sector in the U.S. context. In the electricity sector, these policies are likely to be closely interconnected, yet they are often considered in isolation. We will evaluate the impacts of energy, air pollution, and water pollution regulations on US greenhouse gas emissions from the energy sector. We will also examine how state regulatory activities aimed at reducing greenhouse gas emissions in the electricity sector are likely to have co-benefits for air and water pollution.

EESS 311. Seminar in Advanced Applications of Remote Sensing. 1 Unit.

In this seminar course, we will invite the pioneering scientists from academia and leading experts from the industry to share their applications of remote sensing technology, with a focus on terrestrial use (e.g. agriculture and forestry). In each independent seminar, speakers will present the basic technology and focus on applications with case studies. Students will gain insight into a variety of remote sensing applications in both academia and industry. No prior remote sensing knowledge is required, and each seminar is independent. Attendance is required to receive credit.

EESS 318. Global Land Use Change to 2050. 2-3 Units.

An exploration of the fundamental drivers behind long term shifts in the demand for, and supply of, land for agriculture, forestry and environmental uses over the next four decades. Topics include trends in food and bioenergy demand, crop productivity on existing and potential croplands, water and climate constraints, non-extractive uses such as carbon sequestration, and the role of global trade and public policies. Students will lead discussions of weekly readings and perform simple numerical experiments to explore the role of individual drivers of long run global land use.

EESS 322A. Seminar in Hydrogeology. 1 Unit.

Current topics. May be repeated for credit. Autumn Quarter has open enrollment, For Winter Quarter, consent of instructor is required.

EESS 322B. Seminar in Hydrogeology. 1 Unit.

Current topics. May be repeated for credit. Prerequisite: consent of instructor.

EESS 323. Stanford at Sea. 16 Units.

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

Same as: BIOHOPK 182H, BIOHOPK 323H, EARTHSYS 323

EESS 330. Advanced Topics in Hydrogeology. 1-2 Unit.

Topics: questioning classic explanations of physical processes; coupled physical, chemical, and biological processes affecting heat and solute transport. May be repeated for credit.

EESS 342. Geostatistics. 1-2 Unit.

Classic results and current research. Topics based on interest and timeliness. May be repeated for credit.

EESS 342B. Geostatistics. 1-2 Unit.

Classic results and current research. Topics based on interest and timeliness. May be repeated for credit.

EESS 342C. Geostatistics. 1-2 Unit.

Classic results and current research. Topics based on interest and timeliness. May be repeated for credit.

EESS 363F. Oceanic Fluid Dynamics. 3 Units.

Dynamics of rotating stratified fluids with application to oceanic flows. Topics include: inertia-gravity waves; geostrophic and cyclogeostrophic balance; vorticity and potential vorticity dynamics; quasi-geostrophic motions; planetary and topographic Rossby waves; inertial, symmetric, barotropic and baroclinic instability; Ekman layers; and the frictional spin-down of geostrophic flows. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

Same as: CEE 363F

EESS 364F. Advanced Topics in Geophysical Fluid Dynamics. 2-3 Units.

A seminar-style class covering the classic papers on the theory of the large-scale ocean circulation. Topics include: wind-driven gyres, mesoscale eddies and geostrophic turbulence, eddy-driven recirculation gyres, homogenization of potential vorticity, the ventilated thermocline, subduction, and the abyssal circulation. Prerequisite: EESS 363F or CEE 363F. Recommended: EESS 246B.

Same as: CEE 364F

EESS 385. Practical Experience in the Geosciences. 1 Unit.

On-the-job training, that may include summer internship, in applied aspects of the geosciences, and technical, organizational, and communication dimensions. Meets USCIS requirements for F-1 curricular practical training. May be repeated for credit.

EESS 398. Current Topics in Ecosystem Modeling. 1-2 Unit.

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EESS 400. Graduate Research. 1-15 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

EESS 801. TGR Project. 0 Units.

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EESS 802. TGR Dissertation. 0 Units.

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Ethics in Society Courses

ETHICSOC 10SC. The Meaning of Life: Moral and Spiritual Inquiry through Literature. 2 Units.

Short novels and plays will provide the basis for reflection on ethical values and the purpose of life. Some of the works to be studied are F. Scott Fitzgerald's *The Great Gatsby*, George Bernard Shaw's *Major Barbara*, Hermann Hesse's *Siddhartha*, Jane Smiley's *Good Will*, Robert Bolt's *A Man for All Seasons*, John Steinbeck's *Of Mice and Men*, and Nadine Gordimer's *None to Accompany Me*. We will read for plot, setting, character, and theme using a two-text method; looking at the narrative of the literary work and students' own lives, rather than either deconstructing the literature or relating it to the author's biography and psychology. The questions we will ask have many answers. Why are we here? How do we find meaningful work? What can death teach us about life? What is the meaning of success? What is the nature of true love? How can one find balance between work and personal life? How free are we to seek our own destiny? What obligations do we have to others? We will draw from literature set in the United States and elsewhere; secular and religious world views from a variety of traditions will be considered. The authors chosen are able to hold people up as jewels to the light, turning them around to show all of their facets, both blemished and pure, while at the same time pointing to any internal glow beneath the surface. Classes will be taught in a Socratic, discussion-based style. Study questions will accompany each reading and provide a foundation for class discussion. Grading will be based 50 percent on class participation, 25 percent on one-page reflection papers on reading assignments, and 25 percent on a four-page final paper due on September 15. Field trips will include an overnight camping experience.

ETHICSOC 15R. U.S. Human Rights NGOs and International Human Rights. 1 Unit.

(Same as LAW 782) Many US human rights non-government organizations, including the US philanthropic sector, work on international human rights. The US government also engages with the private sector in "partnerships" that twins US foreign aid human rights action with corporate expertise. This weekly series will feature speakers who lead these human rights NGOs, philanthropic enterprises, and corporate partnerships, and also policy experts and scholars, to explore the pro's and con's of this scenario. Same as: IPS 271A, MED 225, POLISCI 203

ETHICSOC 20. Introduction to Moral Philosophy. 5 Units.

A survey of moral philosophy in the Western tradition. What makes right actions right and wrong actions wrong? What is it to have a virtuous rather than a vicious character? What is the basis of these distinctions? Why should we care about morality at all? Our aim is to understand how some of the most influential philosophers (including Aristotle, Kant, and Mill) have addressed these questions, and by so doing, to better formulate our own views. No prior familiarity with philosophy required. Same as: PHIL 2

ETHICSOC 102R. Ethics of Jihad. 5 Units.

Why choose jihad? An introduction to Islamic ethics. Focus on ways in which people have chosen, rejected, or redefined jihad. Evaluation of the norms in moments of ethical and political choice. Topics include jihad in the age of 1001 Nights, jihad in the Arab Renaissance, jihad in Bin Laden's sermons, and the hashtag #MyJihad. All readings and discussion in English. Same as: COMPLIT 171

ETHICSOC 131S. Modern Political Thought: Machiavelli to Marx and Mill. 5 Units.

This course offers an introduction to the history of Western political thought from the late fifteenth through the nineteenth centuries. We will consider the development of ideas like individual rights, government by consent, and the protection of private property. We will also explore the ways in which these ideas continue to animate contemporary political debates. Thinkers covered will include: Niccolò Machiavelli, Thomas Hobbes, John Locke, Jean-Jacques Rousseau, Edmund Burke, John Stuart Mill, and Karl Marx.

Same as: POLISCI 131L

ETHICSOC 133. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.]

Same as: CSRE 178, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

ETHICSOC 136R. Introduction to Global Justice. 4 Units.

Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

Same as: INTNLREL 136R, PHIL 76, POLISCI 136R, POLISCI 336

ETHICSOC 170. Ethical Theory. 4 Units.

A more challenging version of Phil 2 designed primarily for juniors and seniors (may also be appropriate for some freshmen and sophomores - contact professor). Fulfills the Ethical Reasoning requirement. Graduate section (270) will include supplemental readings and discussion, geared for graduate students new to moral philosophy, as well as those with some background who would like more.

Same as: PHIL 170, PHIL 270

ETHICSOC 171. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

ETHICSOC 174A. Moral Limits of the Market. 4 Units.

Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases.

Same as: PHIL 174A, PHIL 274A, POLISCI 135P

ETHICSOC 174L. Betrayal and Loyalty, Treason and Trust. 2 Units.

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. SAME AS LAW 520.

Same as: ETHICSOC 274L, PHIL 174L, PHIL 274L

ETHICSOC 178M. Introduction to Environmental Ethics. 4-5 Units.

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 278M, PHIL 178M, PHIL 278M, POLISCI 134L

ETHICSOC 180M. Collective Action Problems: Ethics, Politics, & Culture. 3-4 Units.

When acting on one's own, it is often easy to know what the morally right action is. But many moral problems arise from the fact that many individuals act together leading to dilemmas, in which what is individually rational is collectively irrational. For example, the collective result of our consumption decisions is to warm the planet. But individual decisions seem to have no effect on climate change. Such collective action situations give rise to moral questions: Are individuals required to take their contributions to wider systemic effects into account? Does it make a difference whether or not others are doing their share, for example with regard to fighting global poverty? In many cases, the best solution for collective action problems are institutions. But when these are deficient or non-existing, what should individuals do? Do they have a duty to assist in building institutions, and what would this duty imply in practical terms? Interdisciplinary perspective, reading authors from philosophy, politics, economics and sociology such as Elinor Ostrom, Peter Singer or Liam Murphy, relating to current questions such as global poverty and climate change. No background assumed; no mathematical work required.

Same as: PHIL 73, POLISCI 131A, PUBLPOL 304A

ETHICSOC 182M. Business Ethics. 4 Units.

What do people mean when they say, "it's just business"? Do they mean that there are no moral norms in business or do they mean that there are special moral norms in business that differ from those of personal relationships and other spheres of social activity? In this class we will examine ethical questions that arise in the domain of business. We will ask, for example: What does the market reward and what should it reward? What are the moral responsibilities of a business owner in a competitive environment? Is it acceptable to employ "sweatshop labor"? How do the moral responsibilities of a business owner differ from that of a policy maker? What information does a seller (or buyer) have a moral duty to disclose? In real estate, is a strategic default morally wrong? How much government regulation of Wall Street is morally justified? We will use the writings of Plato, Aristotle, Cicero, J. S. Mill, Marx, Jevons and Menger, Hayek, Walzer, and Sandel, among others, to help us answer these questions. We will see, for example, what Aristotle thought about day trading.

Same as: PHIL 74

ETHICSOC 183M. Family, Friends, and Groups: The Ethics of Association. 4 Units.

The practice of associating with others is a fundamental part of human existence. We cultivate friendships, we grow up in families, we work for nonprofit associations or businesses, we join social movements and sport clubs, and we participate in political associations with our fellow citizens. This seminar explores the ethical dimensions of association. What grounds a right to freedom of association? Do we have, beyond a right, also a duty to participate in associational life? Do we have special obligations towards our friends, family members, or fellow-citizens that we do not have toward strangers? To what extent should the internal life of private associations, such as families or churches, be regulated by the state? Should the state support, through tax-exemptions and subsidies, the nonprofit associations of civil society? Can a state exclude non-citizens, such as immigrants, in the same way in which a private club excludes non-members? These questions have wide-ranging implications for contemporary political and legal debates.

Same as: POLISCI 132C

ETHICSOC 185M. Contemporary Moral Problems. 4-5 Units.

This course addresses a range of important moral issues from a philosophical perspective. The primary aims of the course are to encourage students to think about difficult moral questions in the careful and systematic way characteristic of philosophical inquiry, and to help students develop the analytical skills necessary to do this. Questions to be covered include: What, and how much, are we obligated to do in order to aid the global poor? What are our obligations in cases such as the causation of climate change, in which our individual contributions (e.g. our personal greenhouse gas emissions) appear to make no difference to the badness of the outcome? How can we owe obligations to future people who do not yet exist, and what are our obligations to them? Is abortion morally wrong or morally permissible? Could it even be morally required? Can we be obligated to procreate? Or, might procreation be seriously morally problematic? What is racism, and what makes it wrong? What does it mean to be tolerant, and why might we think that tolerance is a good thing? Is there a deep tension between a commitment to feminist ideals and a commitment to multiculturalism?.

Same as: PHIL 72, POLISCI 134P

ETHICSOC 190. Ethics in Society Honors Seminar. 3 Units.

For students planning honors in Ethics in Society. Methods of research. Students present issues of public and personal morality; topics chosen with advice of instructor.

Same as: PHIL 178

ETHICSOC 199. Independent Studies in Ethics in Society. 1-15 Unit.

May be repeated for credit.

ETHICSOC 200A. Ethics in Society Honors Thesis. 1-5 Unit.

Limited to Ethics in Society honors students, who must enroll once in 200A and once in 200B. Students enrolling in 200A for less than 5 units must get approval from the faculty director.

ETHICSOC 200B. Ethics in Society Honors Thesis. 1-5 Unit.

Limited to Ethics in Society honors students, who must enroll once in 200A and once in 200B. Students enrolling in 200B for less than 5 units must get approval from the faculty director.

ETHICSOC 200C. Ethics in Society Honors Thesis. 1-5 Unit.

Limited to Ethics in Society honors students, with special approval from the program faculty director.

ETHICSOC 201R. The Ethics of Storytelling: The Autobiographical Monologue in Theory, in Practice, and in the World. 4 Units.

Recently a theatrical monologist gained notoriety when it was revealed that key aspects of one of his "autobiographical" stories had been fabricated. In this class another autobiographical monologist -- who has himself lied many times in his theater pieces, without ever getting caught -- will examine the ethics of telling our life stories onstage. Does theatrical "truth" trump factual truth? We will interrogate several autobiographical works, and then -- through autobiographical pieces created in class -- we will interrogate ourselves.

Same as: TAPS 158L, TAPS 358L

ETHICSOC 202. EMOTIONS: MORALITY AND LAW. 2 Units.

If emotions are the stuff of life, some emotions are the stuff of our moral and legal life. Emotions such as: guilt, shame, revenge, indignation, resentment, disgust, envy, jealousy and humiliation, along with forgiveness, compassion, pity, mercy and patriotism, play a central role in our moral and legal life. The course is about these emotions, their meaning and role in morality and law. Issues such as the relationship between punishment and revenge, or between envy and equality, or St. Pauliquest;s contrast between law and love, or Nietzscheiquest;s idea that resentment is what feeds morality, will be discussed alongside other intriguing topics.

Same as: ETHICSOC 302, PHIL 177B, PHIL 277B

ETHICSOC 202R. Ethics and Politics. 5 Units.

A discussion of critical ethical issues faced by American and other national leaders. Case studies of 20th- and 21st-century decisions, including those involved with violence (e.g., the use of drone missiles or torture to extract information from enemies), whistle-blowing in government (e.g., decisions to expose what was known about 9/11 in advance), disobedience of those in authority (e.g., Daniel Ellsberg's release of the Pentagon Papers), policies on distributing scarce goods in society (e.g. rationing health care), policies involving justice and equal treatment (e.g. affirmative action or gay marriage), policies regarding life and death (e.g., abortion and euthanasia laws), and others. Students will debate some of the key issues, relying on ethical principles that will be discussed each week, and develop their own case studies.

Same as: POLISCI 223F

ETHICSOC 203R. Ethics in Real Life: How Philosophy Can Make Us Better People. 4 Units.

Socrates thought that philosophy was supposed to be practical, but most of the philosophy we do today is anything but. This course will convince you that philosophy actually is useful outside of the classroom--and can have a real impact on your everyday decisions and how to live your life. We'll grapple with tough practical questions such as: 'Is it selfish if I choose to have biological children instead of adopting kids who need homes?' 'Am I behaving badly if I don't wear a helmet when I ride my bike?' 'Should I major in a subject that will help me make a lot of money so I can then donate most of it to overseas aid instead of choosing a major that will make me happy?' Throughout the course, we will discuss philosophical questions about blame, impartiality, the force of different 'shoulds,' and whether there are such things as universal moral rules that apply to everyone.

Same as: PHIL 90E

ETHICSOC 205R. JUST AND UNJUST WARS. 2 Units.

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Same as LAW 751.

Same as: ETHICSOC 305R, PHIL 205R, PHIL 305R

ETHICSOC 206R. Science, Power and Democracy. 5 Units.

This course investigates the relationship between science and democracy, and between knowledge and power, in the modern world. Topics covered include the epistemic properties of democratic institutions; the question of expertise in democratic politics; the role of values in science and public policy; the relationship between democracy and technology; and the relationship between democracy and the social sciences. We also analyze a number of concrete issues at the intersection of politics and science, including climate change and biomedical research. The course is interdisciplinary in method and content, with readings ranging across political theory, philosophy, history, and the social sciences.

Same as: POLISCI 231D

ETHICSOC 207R. Democratic Accountability and Transparency. 5 Units.

This course critically examines two related democratic values, accountability and transparency. We begin with historical perspectives on accountability, tracing its centrality to democratic politics to ancient Athens and early modern debates about the nature and function of political representation. But the bulk of the course deals with contemporary issues and problems: how should we conceive of accountability, both conceptually and normatively, and what is its relationship to other values such as transparency and publicity? What forms of accountability are appropriate for modern democratic politics? Is accountability only for elites, or should ordinary citizens be accountable to one another? In what contexts are transparency and publicity valuable, and when might we instead find their operation counter-productive and troubling? Readings draw from canonical texts as well as contemporary political theory, philosophy, and political science.

Same as: POLISCI 231T

ETHICSOC 232T. Theories of Civil Society, Philanthropy, and the Nonprofit Sector. 5 Units.

What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? How do nongovernmental organizations operate domestically and globally? The historical development and modern structure of civil society emphasizing philanthropy and the nonprofit sector. Readings in political philosophy, political sociology, and public policy. WIM for PoliSci students who enroll in PoliSci 236S.

Same as: POLISCI 236, POLISCI 236S

ETHICSOC 233R. The Ethics of Religious Politics. 5 Units.

Is it possible for a deeply committed religious person to be a good citizen in a liberal, pluralistic democracy? Is it morally inappropriate for religious citizens to appeal to the teachings of their tradition when they support and vote for laws that coerce fellow citizens? Must the religiously committed be prepared to defend their arguments by appealing to 'secular reasons' ostensibly accessible to all 'reasonable' citizens? What is so special about religious claims of conscience and expression that they warrant special protection in the constitution of most liberal democracies? Is freedom of religion an illusion when it is left to ostensibly secular courts to decide what counts as religion? Exploration of the debates surrounding the public role of religion in a religiously pluralistic American democracy through the writings of scholars on all sides of the issue from the fields of law, political science, philosophy, and religious studies.

Same as: RELIGST 233

ETHICSOC 234R. Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals. 3 Units.

The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, and the law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: Ebola; Facebook's mood manipulation research and teen suicides from social media bullying; Google's European "right to be forgotten" and driverless cars; Space X (Elon Musk's voyages to Mars); ISIS' interaction with international NGOs; sexual assault on U.S. university campuses and in the U.S. military; the ethics of corporate social responsibility (through companies such as L'Oreal, Whole Foods and Walmart); corporate and financial sector scandals; and non-profit sector ethics challenges. Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities beyond speaking in class). Strong emphasis on critical thinking and testing ideas in real-world contexts. There will be a limited number of openings above the set enrollment limit of 40 students. If the enrollment limit is reached, students wishing to take the course should contact Dr. Susan Liautaud at susan11@stanford.edu. The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with Public Policy 103E), and Science, Technology and Society and satisfies the Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. *Public Policy majors taking the course to complete the core requirements must obtain a letter grade. Other students may take the course for a letter grade or C/NC. Same as: PUBLPOL 134, PUBLPOL 234

ETHICSOC 237. Civil Society and Democracy in Comparative Perspective. 5 Units.

A cross-national approach to the study of civil societies and their role in democracy. The concept of civil society--historical, normative, and empirical. Is civil society a universal or culturally relative concept? Does civil society provide a supportive platform for democracy or defend a protected realm of private action against the state? How are the norms of individual rights, the common good, and tolerance balanced in diverse civil societies? Results of theoretical exploration applied to student-conducted empirical research projects on civil societies in eight countries. Summary comparative discussions. Prerequisite: a course on civil society or political theory. Students will conduct original research in teams of two on the selected nations. Enrollment limited to 18. Enrollment preference given to students who have taken PoliSci 236S/EthicSoc 232T. Same as: POLISCI 237S

ETHICSOC 237M. Politics and Evil. 5 Units.

In the aftermath of the Second World War, the political theorist Hannah Arendt wrote that the problem of evil will be the fundamental question of postwar intellectual life in Europe. This question remains fundamental today. The acts to which the word evil might apply: genocide, terrorism, torture, human trafficking, etc. The rhetoric of evil also remains central to American political discourse, both as a means of condemning such acts and of justifying preventive and punitive measures intended to combat them. In this advanced undergraduate seminar, we will examine the intersection of politics and evil by considering works by philosophers and political theorists, with occasional forays into film and media. The thinkers covered will include: Hannah Arendt, Immanuel Kant, Niccolò Machiavelli, Friedrich Nietzsche, and Michael Walzer.

Same as: POLISCI 237M

ETHICSOC 274L. Betrayal and Loyalty, Treason and Trust. 2 Units.

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. SAME AS LAW 520.

Same as: ETHICSOC 174L, PHIL 174L, PHIL 274L

ETHICSOC 275R. Roads Not Taken, 1880-1960. 4 Units.

This course is intended to illuminate ideas about justice, freedom, equality, democracy, peace, and social conflict, and to raise persisting questions about such topics as the role of violence in politics through looking at the ideas of America writers such as Edward Bellamy, W.E.B. DuBois, Eugene Debs, Jane Addams, Emma Goldman, John Dewey and Reinhold Niebuhr. Same as: AMSTUD 275R, PHIL 275R, POLISCI 335L

ETHICSOC 276R. Religion and Politics: a Latin American Perspective. 4 Units.

Religion has traditionally been banished from politics in some places in Latin America. Religious symbols may not be displayed in public buildings, political discourse is expected to be free from all religious content, and religious ministers are not allowed to run for public office, among other measures. This course examines the political motivation for this kind of policies towards religion taking a comparative perspective with American and French variants of secularism.

Same as: ETHICSOC 376R, PHIL 176C, PHIL 276C

ETHICSOC 278M. Introduction to Environmental Ethics. 4-5 Units.

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 178M, PHIL 178M, PHIL 278M, POLISCI 134L

ETHICSOC 280. Transitional Justice, Human Rights, and International Criminal Tribunals. 3-5 Units.

Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

Same as: INTNLREL 180A, IPS 280

ETHICSOC 301. Conflicts, Ethics, and the Academy. 1-3 Unit.

(Same as LAW 684) This experimental course looks at conflicts of interest and ethical issues as they arise within academic work. The participants will be drawn from schools and departments across the University in the hope that they will offer different examples of, and perspectives on, the issues we discuss. Topics will include the conflicts that arise from sponsored research, including choices of topics, shaping of conclusions, and nondisclosure agreements; issues of informed consent with respect to human subjects research, and the special issues raised by research conducted outside the United States; the ethics of the classroom and conflicts of interest implicating professor-student relationships. Representative readings will likely include Marcia Angell's work, *Drug Companies and Doctors: A Story of Corruption*, N.Y. Rev. Books, Jan. 15, 2009, and *Is Academic Medicine for Sale?* 342 N. Engl. J. Med. 1516 (2000) (and responses); William R. Freudenburg, *Seeding Science, Courting Conclusions: Reexamining the Intersection of Science, Corporate Cash, and the Law*, 20 *Sociological Forum* 3 (2005); Max Weber, *Science as a Vocation*; legal cases; the movie "Inside Job"; and conflict of interest policies adopted by various universities and professional organizations. The course will include an informal dinner. The goal of the course is to have students across disciplines think about the ethical issues they will confront in an academic or research career. Non-law students should enroll in ETHICSOC 301.

ETHICSOC 302. EMOTIONS: MORALITY AND LAW. 2 Units.

If emotions are the stuff of life, some emotions are the stuff of our moral and legal life. Emotions such as: guilt, shame, revenge, indignation, resentment, disgust, envy, jealousy and humiliation, along with forgiveness, compassion, pity, mercy and patriotism, play a central role in our moral and legal life. The course is about these emotions, their meaning and role in morality and law. Issues such as the relationship between punishment and revenge, or between envy and equality, or St. Paul's contrast between law and love, or Nietzsche's idea that resentment is what feeds morality, will be discussed alongside other intriguing topics.

Same as: ETHICSOC 202, PHIL 177B, PHIL 277B

ETHICSOC 303R. Ethics, Economics and the Market. 4 Units.

Economic analysis inevitably raises moral questions. Getting clear on those moral questions, and the competing answers to them, can help improve both economic analysis and our understanding of the values involved in alternative social policies. This course focuses on a central economic institution: the market. How have the benefits and costs of using markets been understood? For example, it is often claimed that markets are good for welfare, but how is welfare to be understood? What is the connection between markets and different values such as equality and autonomy? What, if anything is wrong with markets in everything? Are there moral considerations that allow us to, distinguish different markets? This course examines competing answers to these questions, drawing on historical and contemporary literature. Readings include Adam Smith, JS Mill, Karl Marx, Michael Walzer, Dan Hausman and Michael McPherson and Debra Satz among others. For graduate students only.

Same as: PHIL 375, POLISCI 434A

ETHICSOC 304. Moral Minds: What Can Moral Psychology Tell Us About Ethics. 2 Units.

SAME AS LAW744. Recent psychological advances in our understanding of the cognitive and social origins of morality cast a new light on age-old questions about ethics, such as: How did our moral sense evolve in our species? How does it develop over our lifetime? How much does our culture, religion, or politics determine our moral values? What is the role of intuition and emotion in moral judgment? How "logical" is moral judgment? How do other people's moral choices affect us? Does character matter or is behavior entirely dictated by the situations we find ourselves in? If it is purely situational, are we morally responsible for anything? How far will we go to convince ourselves that we are good and moral? Barbara Fried and Benoit Monin will review empirical answers to these questions suggested by behavioral research, and lead discussions on their implications for ethics. Students enrolled in the course will be selected through an application process. The application can be found at <http://web.stanford.edu/~arnewman/MoralMinds.fb>, and is due at 11:59 p.m. on November 14, 2014.

Same as: PSYCH 264

ETHICSOC 305R. JUST AND UNJUST WARS. 2 Units.

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Same as LAW 751.

Same as: ETHICSOC 205R, PHIL 205R, PHIL 305R

ETHICSOC 330R. Social and Political Philosophy of Hegel and Marx. 4 Units.

Same as: PHIL 330, POLISCI 330

ETHICSOC 376R. Religion and Politics: a Latin American Perspective. 4 Units.

Religion has traditionally been banished from politics in some places in Latin America. Religious symbols may not be displayed in public buildings, political discourse is expected to be free from all religious content, and religious ministers are not allowed to run for public office, among other measures. This course examines the political motivation for this kind of policies towards religion taking a comparative perspective with American and French variants of secularism.

Same as: ETHICSOC 276R, PHIL 176C, PHIL 276C

Family and Community Medicine Courses

FAMMED 199. Undergraduate Directed Reading and Research in Family and Community Medicine. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

FAMMED 210. The Healer's Art. 1 Unit.

Explores the human dimensions of medicine, creating a firm foundation for meeting the challenging demands of medical training and practice. Based on curriculum developed by Dr. Rachel Naomi Remen at UCSF. (For details/evaluations see http://ishiprograms.org/programs-medical_educators.html). Medical students and faculty participate together in an innovative discovery model process that enables an in-depth sharing of experience, beliefs, aspirations and personal truths. Topics include deep listening, presence, acceptance, loss, grief, healing, relationship, encounters with awe and mystery, finding meaning, service, and self-care practices. No papers/exams. May be repeated for credit.

FAMMED 213. Medical Tai Chi. 1 Unit.

Tai chi is a recognized form of complimentary and alternative medicine. Class is intended to promote student health and well-being and to decrease stress, depression, and anxiety through tai chi practice. Course focuses on weekly practice and analysis of the literature/research regarding health benefits of tai chi.

FAMMED 219. Mind-Body Medicine. 1 Unit.

A small group (8-10) of medical students experientially exploring of the interconnections among human capacities such as thought, emotion, belief, attitudes, and physical health. Review and practice of specific skills (including mindfulness exercises, meditation, imagery, visualization, body awareness, autogenics, and biofeedback) to enhance self-awareness, self-expression, and stress management. Readings relevant to mind-body medicine made available. Anticipated benefits to class participants include discovering and mobilizing their capacity to participate in valuable and proven methods of self knowledge and stress reduction, while dealing with the frustrations and alienation that many students experience in medical school and beyond.

FAMMED 241. Assistantship in Family and Community Medicine. 6-12 Units.

An in-depth experience with a family physician preceptor following the first year of the pre-clinical curriculum. The student applies during the first year to participate in the summer following completion. Application is through the Center for Family and Community Medicine (avjohn@stanford.edu). Placements with family physicians' practices throughout California.

FAMMED 243. Introduction to Integrative Medicine. 1 Unit.

Presentations by local, national, and international experts in various modalities of integrative medicine commonly used by patients in the US, including mind-body medicine (biofeedback, clinical hypnosis, meditation, yoga); traditional whole systems of medicine (traditional Chinese medicine, Ayurveda); biological therapies (botanical medicine, supplements, herbal medicine); manipulative therapies (chiropractic, massage); and acupuncture. Lectures focus on evidence supporting the potential value of various treatment modalities and explanations of both the traditional and proposed scientific mechanisms of actions. Most classes include an experiential portion.

Same as: ANES 243

FAMMED 244. Ethnicity and Medicine. 1-3 Unit.

Weekly lecture series. Examines the linguistic, social class, and cultural factors that impact patient care. Presentations promote culturally sensitive health care services and review contemporary research issues involving minority and underserved populations. Topics include health care inequities and medical practices of African Americans, Asians, Latinos, Native Americans, immigrants, and refugees in both urban and rural settings. 1 unit requires weekly lecture attendance, completion of required readings, completion of response questions; 2 units requires weekly lecture attendance and discussion session, completion of required readings and weekly response questions; additional requirement for 3 units (HUMBIO only) is completion of a significant term paper Only students taking the course for 3 units may request a letter grade.

Same as: HUMBIO 121E

FAMMED 245. Women and Health Care. 1 Unit.

Lecture series. Topics of interest to women as health care consumers and providers. The historical role of women in health care; current and future changes.

FAMMED 250. Interprofessional Management of Population Health with Advanced Computer Technology. 3 Units.

For MD students who wish to have sustained early clinical experience throughout pre-clerkship years. Focuses on providing students with foundational health coaching and population health management training skills necessary to join an interprofessional care team. Students integrate into and contribute to the learning health system, helping to improve the health of patients on a population level and learning iteratively the processes of quality improvement. It is preferred that students enroll continuously for one year minimum and subsequently enroll in a reinforcing complimentary continuity clerkship experience. Prerequisite: instructor consent; brief application required.

FAMMED 252. Medicine & Horsemanship: An Outdoor, Equine Assisted Learning Course for Doctor-Patient Relationship. 1 Unit.

An outdoor experience working with horses to develop interpersonal skills for the clinician-patient and peer-peer relationship. A challenge throughout a clinical career is to conduct relationships with patients and colleagues in a manner that is professional, perceptive, confident, and authentic. Horses mirror and magnify our intentions and behaviors. Working with horses requires sensitivity to nonverbal cues, discrimination in the quality and amount of physical contact, and an awareness of one's emotional state, all important skills for relating to patients. Horses give non-judgmental feedback about our personal communication and leadership styles and our ability to operate from a place of empathy and kindness. The course also teaches how to recognize subjectivity in judgment and how to overcome fear and immobility in the face of uncertainty. No riding is required and no previous horse experience is assumed. Open to anyone with direct patient care responsibility, space permitting. Limit 12 students.

FAMMED 280. Early Clinical Experience in Family and Community Medicine. 1-3 Unit.

Provides an observational experience for pre-clinical students as determined by the instructor and student. Prerequisite: consent of instructor.

FAMMED 281. L-CHAMP Longitudinal Community Health Advocacy Medical Partnership. 3 Units.

Collaborative course between the Office of Community Health, Family and Community Medicine, Practice of Medicine, student-led Primary Care Progress group, and community partners. Focus on creating and expanding authentic community-based clinical experiences for medical students across their four years of medical education. Topics include health coaching/clinical skills development, service-learning, pre-clerkship education integration, community-based clerkship integration.

FAMMED 292. Clinical Skills Maintenance Experience. 3 Units.

(Formerly FAMMED 311) For MSTP students and other Stanford Medical students obtaining combined M.D./Ph.D. degrees through non-MSTP programs only. Students are assigned to a primary care clinic within medicine, family medicine or pediatrics, or a specialty clinic that can offer similar experiences. Continuity of mentorship is the first priority and is desired for reinforcement of basic medical skills; continuity of patients is also desirable, but second priority. Students attend clinic one morning or afternoon per week for two contiguous quarters of the year in which they defend their Ph.D.theses (minimum 10 clinics per quarter). Each four hour clinic session the student: (1) obtains the history of a clinic patient; (2) conducts a physical exam; (3) formulates a differential diagnosis or problem list; (4) presents the patient to her/his clinic preceptor; and (5) prepares a write-up of the case. The clinic preceptor observes and provides guidance for the student's history taking and physical examination skills and critiques the differential diagnosis, verbal presentation, and write-up. The student is guided in the use of the computerized medical record and is asked to progressively integrate this information into the review of the patient history. The clinical preceptor reviews the results of the student's Micro-CPX, Mini-CPX, POM course evaluations, and E4C Mentor evaluations and uses this information to address any perceived weaknesses. The preceptor provides verbal and written performance evaluations to the student and a standardized evaluation becomes part of the student's record. The director of the E4C-MSTP program reviews, on a regular basis, the written performance evaluations of each student taking this course.. Deficits are to be identified and addressed before the student enters clinical training.

FAMMED 299. Directed Reading in Family and Community Medicine. 1-18 Unit.

Students organize an individualized study program in family and community medicine. Prerequisite: consent of instructor.

FAMMED 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

FAMMED 399. Graduate Research. 1-18 Unit.

Students interested in conducting research in a specific area of family and community medicine undertake investigations sponsored by the faculty instructor. Prerequisite: consent of instructor.

Feminist, Gender, and Sexuality Studies Courses

FEMGEN 5C. Human Trafficking: Historical, Legal, and Medical Perspectives. 3 Units.

(Same as History 105C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.

Same as: HISTORY 5C, HUMBIO 178T, SOMGEN 205

FEMGEN 6W. Service-Learning Workshop on Human Trafficking Part I. 3-4 Units.

Two-quarter service-learning workshop to accompany course, "Human Trafficking: Historical, Legal, and Medical Perspectives." Considers purpose and practice of service learning. Provides training for students' work in community. Examines current scope of human trafficking in Bay Area, pressing concerns, capacity and obstacles to effectively address them. Students work with community partners dedicated to confronting human trafficking and problems it entails on a daily basis. Must currently be enrolled in or have previously taken History 5C/105C (FEMGEN 5C/105C, HUMBIO 178T, SOMGEN 205, INTNLREL 105C). Same as: HISTORY 6W

FEMGEN 7W. Service-Learning Workshop on Human Trafficking Part II. 3 Units.

Prerequisite: History 6W. Two-quarter service-learning workshop to accompany course, "Human Trafficking: Historical, Legal, and Medical Perspectives." Considers purpose and practice of service learning. Provides training for students' work in community. Examines current scope of human trafficking in Bay Area, pressing concerns, capacity and obstacles to effectively address them. Students work with community partners dedicated to confronting human trafficking and problems it entails on a daily basis. Must currently be enrolled in or have previously taken History 5C/105C ((FEMGEN 5C/105C, HUMBIO 178T, SOMGEN 205, INTNLREL 105C). Same as: HISTORY 7W

FEMGEN 9SI. A Road to Diversity inclusion: Learning to Embrace the Intersection of Identities within Athletics. 1 Unit.

This course explores the interaction of one's identities within the context of athletics. With an emphasis on the importance of self-awareness and story telling, we will navigate how all identities intersect and affect the privilege we receive within current society. We will specifically look at how race, ethnicity, sexual orientation, religion, socioeconomic status, mental health, and disabilities interact with our identity as athletes. A Road to Diversity Inclusion: Learning to Embrace the Intersection of Identities within Athletics will help athletes find their voice and use it for positive social change within their communities.

FEMGEN 10A. BAY AREA DOMESTIC WORKERS: RIGHTS: A GRASSROOTS CAMPAIGN FOR SOCIAL JUSTICE. 1 Unit.

In this Alternative Spring Break course and trip, we will examine how our society and institutions allow for and perpetuate the exploitation and oppression of domestic workers. Historically, domestic workers have largely been excluded from basic labor protections. We cannot think critically about the issues domestic workers face without considering the roles of gender, race and ethnicity, immigration status, and language play in the industry. We will use a conceptual framework based on citizenship and reproductive labor theory to address themes in the context of Bay Area migrant women of color who are vehemently campaigning for equal labor rights. Through collaborations with domestic worker organizations based in San Francisco and Oakland, ASB participants will learn how this movement seeks to transform the domestic work industry through multilingual and multicultural alliances.

FEMGEN 14N. Imagining India: Art, Culture, Politics in Modern India. 3 Units.

This course explores history via cultural responses in modern India. We will examine a range of fiction, film and drama to consider the ways in which India emerges through its cultural productions. The course will consider key historical events such as the partition of the subcontinent, independence from British rule, Green Revolution, Emergency, liberalization of the Indian economy, among others. We will reflect on epochal historical moments by means of artistic responses to these events. For example, Ritwik Ghatak's experimental cinema intervenes into debates around the Bengal partition; Rohinton Mistry's novel, *A Fine Balance* grapples with the suspension of civil liberties during the emergency between 1975-77; Rahul Varma's play *Bhopal* reflects on the Bhopal gas tragedy, considered the world's worst industrial disaster. Students will read, view and reflect on the aesthetic and historical texts through their thoughtful engagement in class discussions and written essays. They will also have opportunities to imaginatively respond to these texts via short creative projects, which could range from poems, monologues, solo pieces, web installations, etc. Readings will also include Mahashweta Devi, Amitav Ghosh, Girish Karnad, Jhumpa Lahiri, Manjula Padmanabhan, Salman Rushdie, Aparna Sen, among others.

Same as: TAPS 14N

FEMGEN 17. Gender and Power in Ancient Greece. 4 Units.

(Formerly CLASSGEN 17.) Introduction to the sex-gender system of ancient Greece, with comparative material from modern America. How myths, religious rituals, athletics, politics and theater reinforced gender stereotypes and sometimes undermined them. Skills: finding clues, identifying patterns and making connections amongst the components of a strange and beautiful culture very different from our own. Weekly participation in a discussion section is required.

Same as: CLASSICS 32

FEMGEN 24. Sexuality, Gender, and Religion. 2 Units.

From ancient times to the present, religious texts, authority figures, adherents, and critics have had a great deal to say about sexuality and gender, with powerful impacts in personal, social and political spheres. Today these debates are more wide ranging and public than ever. In this lecture and discussion series, distinguished scholars from within and beyond Stanford will consider how sexuality and gender become issues; religious issues; in Judaism, Islam, Christianity, Hinduism, and Buddhism.

Same as: RELIGST 24

FEMGEN 24N. Sappho: Erotic Poetess of Lesbos. 4-5 Units.

(Formerly CLASSGEN 24N.) Preference to freshmen. Sappho's surviving fragments in English; traditions referring to or fantasizing about her disputed life. How her poetry and legend inspired women authors and male poets such as Swinburne, Baudelaire, and Pound. Paintings inspired by Sappho in ancient and modern times, and composers who put her poetry to music.

Same as: CLASSICS 16N

FEMGEN 29S. The Animal Other: Humans and Animals in Western History. 5 Units.

Enter a world in which war was waged not by tanks but on horseback and oceans brimmed with fantastic monsters. This class explores the animal-human divide in Western cultural history through topics including: the rise of natural history; the centralized state and its relationship to nature; monstrosity and witchcraft; the ethics of metaphor; scapegoating, sexism, racism; history of animal-rights. Students will have the opportunity to help curate a Green Library exhibition on this subject. The course fulfills the departmental Sources and Methods requirement.

Same as: HISTORY 29S

FEMGEN 36N. Gay Autobiography. 4 Units.

Preference to freshmen. Gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Louganis, Barbin, Cammermeyer, Gingrich, and Lorde. To what degree do these writers view sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view identity? What politics follow from these writers' experiences?

Same as: HISTORY 36N

FEMGEN 52N. Spoken Sexuality: Language and the Social Construction of Sexuality. 3 Units.

The many ways language is used in the construction of sexuality and sexual identity. How language is used as a resource for performing and perceiving sexual identity. Drawing on linguistic analyses of pronunciation, word choice, and grammar, questions such as: Is there a gay accent? Why isn't there a lesbian accent? How do transgendered people modify their linguistic behavior when transitioning? How are unmarked (heterosexual) identities linguistically constructed? Sexuality as an issue of identity, as well as of desire. Iconic relations between elements of language such as breathy voice quality and high pitch, and aspects of desire such as arousal and excitement. How language encodes ideologies about sexuality; how language is used to talk about sexuality in public discourses about gay marriage and bullying, as well as in personal narratives of coming out. How language encodes dominant ideologies about sexuality, evident in labels for sexual minorities as well as terminology for sex acts. Discussions of readings, explorations of how sexuality is portrayed in popular media, and analyses of primary data. Final research paper on a topic of student choice.

Same as: LINGUIST 52N

FEMGEN 54N. African American Women's Lives. 3-4 Units.

Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality.

Same as: AFRICAAM 54N, AMSTUD 54N, CSRE 54N, HISTORY 54N

FEMGEN 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.

This course explores the emergence of concepts of gender equality in world history. It asks how gender inequality relates to racial, ethnicity, and sexual identities, how men engage with feminism, whether gender equality is purely a western cultural tradition, and much more. We approach the long history of ideas about gender and equality by reading primary historical documents from around the world, moving from the 15th century to the present. Topics include education, the body, sexuality, violence, labor, and politics.

Same as: AMSTUD 63N, CSRE 63N, HISTORY 63N

FEMGEN 65S. Intimate Frontiers: Race, Gender, and Colonialism in the American West. 5 Units.

Historians have increasingly recognized the American West as a place of empire and settler colonialism. This course will explore the colonial dimensions of the 19th century American West through a variety of sources produced in the most "intimate" spaces on North America's multicultural frontier: in homes, missions, boardinghouses, schools, mining camps, courtrooms, and more. By examining how the intimate shaped everyday lives, we will pay special attention to how ambiguous concepts like race, gender, class, sexuality, and national identity coalesced. The course fulfills the departmental Sources and Methods requirement.

Same as: CSRE 65M, HISTORY 65S

FEMGEN 86Q. Love as a Force for Social Justice. 3 Units.

Preference to sophomores. Biological, psychological, religious, social and cultural perspectives on the concept of agape love. How love is conceptualized across cultures; agape love as the basis of many religions; different kinds of love; the biology of love; love in action for social justice; the languages of love, including art, literature, music, and poetry. Emphasis is on blog writing, participation, and oral presentation.

Same as: HUMBIO 86Q

FEMGEN 93. Late Imperial China. 3 Units.

(Same as HISTORY 193. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINLIT 93, HISTORY 93

FEMGEN 94S. Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History. 5 Units.

How is masculinity represented and experienced in different cultural contexts? How do gender, sexuality, race, and class inform the construction of American and Chinese masculinities? How do historians use primary sources to make arguments? Examines visual and textual sources including magazines, photographs, propaganda posters, legal cases and film. Analyzes transnational history of masculinity in China and the United States from the late 1800s to the present. Topics include bodybuilding, martial arts, female masculinity, homosexuality, Cold War, and 1960s social movements. The course fulfills the departmental Sources and Methods requirement.

Same as: HISTORY 94S

FEMGEN 101. Introduction to Feminist Studies. 4-5 Units.

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives.

Same as: AMSTUD 107, CSRE 108, TAPS 108

FEMGEN 103. Feminist Theories and Methods Across the Disciplines. 2-5 Units.

(Graduate Students register for PHIL 253 or FEMGEN 203) Concepts and questions distinctive of feminist and LGBT scholarship and how they shape research: gender, intersectionality, disciplinarity and interdisciplinarity, standpoint, "queering," postmodern critiques, postcolonial critiques. Prerequisites: Feminist Studies 101 or equivalent with consent of instructor.

Same as: FEMGEN 203, PHIL 153, PHIL 253

FEMGEN 103S. Native American Women, Gender Roles, and Status. 5 Units.

Historical and cultural forces at work in traditional and contemporary Native American women's lives through life stories and literature. How women are fashioning gendered indigenous selves. Focus is on the diversity of Native American communities and cultures.

Same as: CSRE 103S, NATIVEAM 103S

FEMGEN 104A. Junior Seminar and Practicum. 1 Unit.

Preference to and required of Feminist Studies majors; others require consent of instructor. Feminist experiential learning projects related to critical studies in gender and sexuality. Identifying goals, grant proposal writing, and negotiating ethical issues in feminist praxis. Developing the relationship between potential projects and their academic focus in the major.

FEMGEN 104B. Senior Seminar and Practicum. 2 Units.

Required for Feminist Studies majors. Non-majors enrolled with consent of instructor. Students develop oral reports on their practicum and its relationship to their academic work, submit a report draft and revised written analysis of the practicum, and discuss applications of feminist scholarship. May be repeated once for credit.

FEMGEN 105. Honors Work. 1-15 Unit.

(Staff).

FEMGEN 105C. Human Trafficking: Historical, Legal, and Medical Perspectives. 5 Units.

(Same as HISTORY 5C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.

Same as: HISTORY 105C, INTNLREL 105C

FEMGEN 107A. Ripped from the Headlines: Current Feminist, Gender, and Sexuality Issues and Questions. 1-2 Unit.

Discussion of current issues and questions related to Feminist, Gender, and Sexuality Studies.

FEMGEN 107B. EAST House Seminar: Current Issues and Debates in Education. 1 Unit.

Education and Society Theme (EAST) House seminar. In autumn quarter, faculty and other scholars from around the University discuss the latest issues, debates, and research in the field of Education. In winter quarter, research and practice pertaining to sex, gender, and education are presented by professionals and scholars. In the spring, the seminar revolves around race, ethnicity, and higher education with a particular emphasis on Asian American issues. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice. Notes: Attendance at first class required. Seminar meets in the EAST House Dining Hall located at 554 Governor's Ave. The seminar is open to all students at Stanford with first-priority given to pre-assign residents of EAST House followed by other residents of EAST and all other undergraduates. Graduate students are allowed to enroll on a space-available basis. Visitors/auditors are not allowed. The seminar is required for all pre-assigned residents of EAST House and is repeatable for credit.

Same as: EDUC 100B

FEMGEN 107C. You're Majoring in What?! Why Feminism is Still Relevant. 1-2 Unit.

Stanford Feminist Study alum and community activists will join this weekly seminar to share how studying feminism has helped them professionally. Together speakers and students will explore answers to questions such as: iquest;Why study feminism, sexuality, or gender studies?iqu; iquest;Why is feminism still relevant?iqu;.

FEMGEN 107G. Sisterhood, Brotherhood, & Gender Identity: The Histories, Stories, and Constructs of Greek Life. 1 Unit.

In this course, we will explore the history, the development, the critiques and praise of sororities and fraternities. We will pay particular attention to how gender and sexuality are framed in those discussions; ones by outsiders as well as ones by insiders. How do Greek organizations present their activities and goals? What values and roles do they highlight during recruitment? Who joins them? What expectations are there for participants? What are the perceived benefits that come with joining? What does it mean to be a fraternity brother; or a sorority sister; in modern Greek organizations? How are sorority women and fraternity men discussed by outsiders? How do the stereotypes of Greek life impact perceptions of individuals as well as particular sororities and fraternities? To consider these questions, we will look at historical documents and analyze how groups described themselves as they were establishing; we will also analyze recent documents (websites, books, etc.) to consider current ways organizations describe themselves, their activities, and their values. We will use both to consider how the messages created by and about Greek organizations shape public perceptions as well as individuals' experiences of gender and sexuality identity.

FEMGEN 108. Internship in Feminist Studies. 1-5 Unit.

Supervised field, community, or lab experience in law offices, medical research and labs, social service agencies, legislative and other public offices, or local and national organizations that address issues related to gender and/or sexuality. One unit represents approximately three hours work per week. Required paper. May be repeated for credit. Service Learning Course (certified by Haas Center). Feminist, Gender, and Sexuality Majors may not receive 108 credit for their required practicum, as they are to sign up for FEMGEN 104 A & B instead. Prerequisites: Course work in Feminist, Gender, and Sexuality Studies, written proposal and application form submitted for approval by program office, written consent of faculty sponsor. Course may be taken 3 times total, for a max of 15 units.

FEMGEN 109. Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports. 3 Units.

In 1972, Title IX legislation opened up a vast range of opportunities for women in sports. Since then, women's sports have continued to grow yet the fight for recognition and equality persists. Simply put, men's sports are more popular than women's--so much so, in fact, that people often make the hierarchical distinction between "sports" and "women's sports." But what would it take to get more women's sports featured on ESPN or more female athletes on the cover of Sports Illustrated? And, given the well-documented corruption at the highest levels of men's sports, should such an ascent in popularity be the goal for women's sports? This course will map out and respond to the multifaceted issues that emerge when women enter the sports world. Throughout the quarter, we will explore the fight for gender equality in sports through historical, cultural, and rhetorical lenses.

Same as: FEMGEN 209

FEMGEN 110X. Introduction to Comparative Queer Literary Studies. 3-5 Units.

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 110, COMPLIT 310, FEMGEN 310X

FEMGEN 111. Transnational Reproductive Politics. 3-5 Units.

This course examines the issues and debates surrounding women's reproduction in a transnational framework, including birth control, abortion, surrogacy, prenatal diagnosis, labor and delivery, menstruation, sex trafficking, and the reproductive justice movement. It pays special attention to how knowledge and technology travel across national/cultural borders and how women's reproductive functions are deeply connected to international politics and events abroad.

Same as: AMSTUD 111

FEMGEN 112. "When We Dead Awaken": Breakthroughs in Conceptions of the Gendered Self in Literature and the Arts. 4-5 Units.

Remarkable breakthroughs in conceptions of the gendered self are everywhere evident in literature and the arts, beginning primarily with the Early Modern world and continuing into today. Many of these works inhere in innovations in literary and artistic forms in order to capture and even evoke the strong cognitive, or psychological, dimension of such awakenings. The reader, or viewer, is often challenged to adapt her or his mind to new forms of thought, such as John Donne's seventeenth century creation of the Dramatic Monologue, a form popular with modern writers, which requires the reader's cognitive presence in order to fill out the dramatic scene. In so doing, the reader often supplies the presence of the female voice and thereby enters into her self-consciousness and inner thoughts. Adrienne Rich, for example, specifically rewrites one of Donne's major poems from the female perspective. This can be, in Rich's words, an awakening; for the active reader, as he or she assumes that often-unspoken female perspective. The course will also explore male conceptions of the self and how such conceptions are often grounded in cultural attitudes imposed on male subjects, which can contribute to gender-bias toward women, a subject often neglected in exploring gendered attitudes, but which is now gaining more study, for example, in Shakespeare's Othello. Readings from recent developments in the neurosciences and cognitive studies will be included in our study of artistic forms and how such forms can activate particular mindsets. Writers and artists will include Shakespeare, Michelangelo, John Donne, Virginia Woolf, Adrienne Rich, Gertrude Stein, Picasso, June Wayne, and Edward Albee's 1960 play, *Who's Afraid of Virginia Woolf?*

Same as: ENGLISH 182J, FEMGEN 212

FEMGEN 115. Queer Reading and Queer Writing in Early Modern England. 5 Units.

Considers the possibility of identifying queer reading and writing practices in early modern England as well the theoretical and historical obstacles such a project necessarily encounters. Focus on the role which Renaissance discourses of desire continue to play in our negotiations of homo/erotic subjectivity, identity politics, and sexual and gender difference. Study of Renaissance queerness in relation to the classical tradition on the one hand and the contemporary discourses of religion, law, and politics on the other. Readings include plays, poems, and prose narratives as well as letters, pamphlets, and ephemeral literature. Both major and minor authors will be represented.

FEMGEN 120. Queer Raza. 3-5 Units.

Examination of cultural representations by U.S. Latin@s that explore the following questions: How is the mutual constitution of race/sex/class/gender theorized and represented? How is desire racialized? How is racial difference produced through sex acts and what is the function of sex in racial (self)formation? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and other structures of power? How do these texts reinforce or contest stereotypes and the "ideal" bodies of national identity? How do these texts produce queerness as a web of social relations?.

Same as: CHILATST 120, ILAC 287

FEMGEN 123. Sex and Love in Modern U.S. Society. 3 Units.

Social influences on private intimate relations involving romantic love and sexuality. Topics include the sexual revolution, contraception, dating, hook-ups, cohabitation, sexual orientation, and changing cultural meanings of marriage, gender, and romantic love.

Same as: SOC 123, SOC 223

FEMGEN 124. Challenging Sex and Gender Dichotomies in Medicine. 1 Unit.

Explores and challenges the traditional physiological bases for distinguishing human males from females, as well as the psychosocial factors that play a role in experiencing and expressing gender and sexuality. Topics include the influence of sociocultural (gender) norms and behaviors on human biology, the interactions of sex and gender on medical outcomes, the importance of understanding the spectrum of sex, gender, and sexuality in clinical practice.

Same as: FEMGEN 224, SOMGEN 257

FEMGEN 126D. Victorian Sex. 5 Units.

How can we make sense of a culture of extraordinary sexual repression that nevertheless seemed fully preoccupied with sex? Examination of the depictions of sex in Victorian literary and cultural texts. Authors include: Collins, Braddon, the Brownings, Swinburne, Stoker and Wilde.

Same as: ENGLISH 126D

FEMGEN 129. Critical Issues in International Women's Health. 4 Units.

Women's lives, from childhood through adolescence, reproductive years, and aging. Economic, social, and human rights factors, and the importance of women's capacities to have good health and manage their lives in the face of societal pressures and obstacles. Emphasis is on life or death issues of women's health that depend on women's capacity to exercise their human rights including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. A requirement of this class is participation in public blogs. Prerequisites: Human Biology core or equivalent or consent of instructor.

Same as: HUMBIO 129

FEMGEN 130. Sex and Gender in Judaism and Christianity. 3 Units.

What role do Jewish and Christian traditions play in shaping understandings of gender differences? Is gender always imagined as dual, male and female? This course explores the variety of ways in which Jewish and Christian traditions - often in conversation with and against each other - have shaped gender identities and sexual politics. We will explore the central role that issues around marriage and reproduction played in this conversation. Perhaps surprisingly, early Jews and Christian also espoused deep interest in writing about 'eunuchs' and 'androgynes,' as they thought about Jewish and Christian ways of being a man or a woman. We will examine the variety of these early conversations, and the contemporary Jewish and Christian discussions of feminist, queer, trans- and intersex based on them.

Same as: JEWISHST 120, RELIGST 130

FEMGEN 138. Violence Against Women: Theory, Issues, and Prevention. 3-4 Units.

[Technical error is capping enrollment prematurely; come to first day of class] Course offers an interdisciplinary feminist perspective on the causes of gender violence, addresses the multi-leveled approaches to ending gender violence, and explores the relationship between violence against women and other forms of oppression: racism, economic exploitation, heterosexism and social class. Framework examines institutional barriers maintaining gender violence in our culture and considers multi-dimensional solutions. Students from every discipline, women and men, apply theoretical perspectives to professional goals and an optional service-learning project. Service Learning Course (certified by Haas Center).

Same as: FEMGEN 238

FEMGEN 139. Rereading Judaism in Light of Feminism. 4 Units.

During the past three decades, Jewish feminists have asked new questions of traditional rabbinic texts, Jewish law, history, and religious life and thought. Analysis of the legal and narrative texts, rituals, theology, and community to better understand contemporary Jewish life as influenced by feminism.

Same as: JEWISHST 139

FEMGEN 140A. Destroying Dichotomies: Exploring Multiple Sex, Gender, and Sexual Identities. 3-5 Units.

This course is designed to broaden the student's awareness of the human experience by introducing scholarly debates about sex, gender and sexual identities and expressions. We will consider the socially constructed nature of sex, gender and sexuality and examine the history and community of those who identify as intersexual, transgender, homosexual, bisexual, asexual, pansexual and/or queer through texts, discussion, films, and class presentations.

FEMGEN 140D. LGBT/Queer Life in the United States. 4-5 Units.

An introductory course on LGBT social, cultural, and political history in the United States. This course explores how categories of sexuality have changed over time, with particular emphasis on the relationship among homosexuality, heterosexuality, and transgenderism. Students will analyze how the intersections of race, class, and sexuality influenced the constitution of these categories and the politics of social relations. Historical and literary sources will be used to examine changes in LGBT experiences and identities, primarily in the twentieth century.

Same as: FEMGEN 240D, HISTORY 257C

FEMGEN 140H. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: ANTHRO 169A, CHILATST 168, CSRE 168

FEMGEN 140P. Queer Art and Performance. 4-5 Units.

Examines the late 19th, 20th and 21st century forms of performance--including examples from drama, theater, cabaret, and performance art -- through the perspectives of contemporary critical gender and queer theories. Texts and movements range from early avant-garde (Dada, Futurism) to gay and lesbian drama (Lillian Hellmann, Joe Orton, Tony Kushner) to post-liberation Queer performance and video (Split Britches, Carmelita Tropicana, Kalup Linzy). Theorists include Judith Butler, Michel Foucault, and Eve Kosofsky Sedgwick.

Same as: TAPS 164T, TAPS 364T

FEMGEN 142. Sociology of Gender. 5 Units.

(Graduate students register for 242.) Gender inequality in contemporary American society and how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes; arguments and evidence for each approach. The social consequences of gender inequality such as the feminization of poverty, and problems of interpersonal relations.

Same as: FEMGEN 242, SOC 142, SOC 242

FEMGEN 144. History of Women and Gender in Science, Medicine and Engineering. 5 Units.

(Same as HISTORY 44. Majors and others taking 5 units, enroll in HISTORY 144.) Men's and women's roles in science, medicine, and engineering over the past 200 years with a focus on the present. What efforts are underway globally to transform research institutions so that both men's and women's careers can flourish? How have science and medicine studied and defined males and females? How can we harness the creative power of gender analysis to enhance knowledge and spark innovation?. Same as: HISTORY 144

FEMGEN 144X. Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class. 5 Units.

Exploration of crossing borders within ourselves, and between us and them, based on a belief that understanding the self leads to understanding others. How personal identity struggles have meaning beyond the individual, how self healing can lead to community healing, how the personal is political, and how artistic self expression based in self understanding can address social issues. The tensions of victimization and agency, contemplation and action, humanities and science, embracing knowledge that comes from the heart as well as the mind. Studies are founded in synergistic consciousness as movement toward meaning, balance, connectedness, and wholeness. Engaging these questions through group process, journaling, reading, drama, creative writing, and storytelling. Study is academic and self-reflective, with an emphasis on developing and presenting creative works in various media that express identity development across borders. Same as: ASNAMST 144, CSRE 144

FEMGEN 145. Culture Wars: Art and Social Conflict in the USA, 1890-1950. 4 Units.

This course examines social conflicts and political controversies in American culture through the lens of visual art and photography. We consider how visual images both reflect and participate in the social and political life of the nation and how the terms of citizenship have been represented; and, at times, contested; by artists throughout the first half of the 20th century. The class explores the relation between American art and the body politic by focusing on issues of poverty, war, censorship, consumerism, class identity, and racial division. Same as: AMSTUD 145M, ARTHIST 145, ARTHIST 345

FEMGEN 150. Sex, Gender, and Power in Modern China. 3-5 Units.

Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English. Same as: CHINGEN 150, CHINGEN 250, FEMGEN 250

FEMGEN 150A. Minaret and Mahallah: Women and Islam in Central Asia. 3-5 Units.

Introduction to women's culture and art in Muslim countries of Central Asia. Women, bearers of family rites and folklore, are the key figures in transmission of traditional culture and guardians of folk Islam. Women helped to keep the continuity of Islamic education in Central Asia during the harsh times of Communist dominance. The whole wealth of women's oral tradition will be demonstrated and examined to the extent possible. The course will make broad use of audio-visual materials. Same as: ANTHRO 150A, REES 250A

FEMGEN 150D. Women Poets. 5 Units.

The development of women's poetry from the 17th to the 20th century. How these poets challenge and enhance the canon, amending and expanding ideas of tone, voice and craft, while revising societal expectations of the poet's identity. Poets include Katharine Philips, Letitia Barbauld, Elizabeth Barrett Browning, Charlotte Mew, Sylvia Plath, and Adrienne Rich. Same as: ENGLISH 150D

FEMGEN 152. 'Tis all in pieces: Space and Gender on the Threshold of the Modern World. 5 Units.

These dramatic words, spoken by the British poet John Donne, signal the onset of the Early Modern world and the profound reconfigurations of space and related structures of thought, including conceptions of the self and the encoding of gender roles. We will explore the vibrant Early Modern world in the context of space and representations of gender, sexuality, and race as manifest in unprecedented literary and artistic forms, such as Shakespeare's *Othello*; Marlowe's *Doctor Faustus*; the poetry of John Donne, the art of Michelangelo and Caravaggio as well as key historical and cultural texts. And we will visit the Cantor Arts Center (on campus) for a guided tour and lecture on art and perspective. We also will read and discuss selected texts from the modern world, such as Samuel Beckett's *Waiting for Godot*; and poetry and commentary by Adrienne Rich, to study both changes and continuities with the Early Modern period. We will consider the vital cognitive role of the reader or viewer in the formation of particular instances of artistic form, including recent--and highly thought-provoking--material from the neurosciences and cognitive studies. Note: Instructor will consider changes in meeting times/days to accommodate student schedules if feasible. Please send request to: hbrooks@stanford.edu. Same as: FEMGEN 252

FEMGEN 153Q. Creating the Gendered Story. 4-5 Units.

Exploration of novels, stories, memoirs and micro-narratives in which gender plays a major role. The texts are by writers of varied genders and sexual orientations as well as varied class, racial and national backgrounds. Written assignments present a mixture of academic and creative options.

FEMGEN 154. Black Feminist Theory. 5 Units.

This course will examine black feminist theoretical traditions, marking black women's analytic interventions into sexual and pleasure politics and reproduction, critical culture and race theory, citizenship, identity, power and agency, representation, and questions of the body. Exploring concepts such as intersectionality, controlling images, the politics of respectability and the particularities of a black feminist liberation politics, we will look to black feminist scholars, activists, and artists from the 19th century to today. Same as: AFRICAAM 154

FEMGEN 155. The Changing American Family. 4 Units.

Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change. Same as: FEMGEN 255, SOC 155, SOC 255

FEMGEN 156. Happiness, Well-Being, Gender. 1-3 Unit.

Exploring the meaning and attainment of psychological well-being and happiness, this course will address gender differences in well-being and approaches that can be used by all individuals to improve their state of happiness and well-being. Course literature will be drawn primarily from social, clinical, and positive psychology, but will be drawn from other disciplines as well. Students will actively engage with course material by critiquing studies, discussing research, and applying methods for improving well-being to their daily lives. Same as: PSYCH 129

FEMGEN 156H. Women and Medicine in US History: Women as Patients, Healers and Doctors. 5 Units.

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing. Same as: AMSTUD 156H, HISTORY 156G

FEMGEN 156X. Language and Gender. 4 Units.

The role of language in the construction of gender, the maintenance of the gender order, and social change. Field projects explore hypotheses about the interaction of language and gender. No knowledge of linguistics required. Same as: LINGUIST 156

FEMGEN 157. Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements. 3-5 Units.

How does a social or political movement gain traction? For example, how did 20th-century movements of the disenfranchised, such as the Civil Rights movement or Women's Suffrage, gain a voice and eventually enact change? In the mediascape of today, where everyone with access to a computer has voice, how does a movement like Occupy Wall Street change the national conversation? How do written and verbal choices of the movements impact their success? In this course, students will write and revise their own arguments in order to best understand the writing in these movements and to best produce future work for social change. We will examine the role of rhetoric; the use of argument to persuade; and social movements working toward social justice.

Same as: AMSTUD 157X, FEMGEN 257

FEMGEN 157P. Allyship: Challenging Privilege and Doing Solidarity in Movements for Collective Liberation. 2-4 Units.

Many activists in the racial justice, immigrant, indigenous, feminist, and LGBTQ movements, are committed to principles of leadership by frontline communities - their goal is to build power in communities that are disempowered by dominant institutions and practices. This makes for complicated relationships with those that are not part of those frontline communities but recognize that their own silence makes them complicit in systems of oppression. In this course, we will examine how power and privilege can undermine attempts to collaborate in social justice work, and then explore principles and practices of solidarity and allyship that attempt to overcome these challenges. We will discuss texts on white privilege and anti-racism as our primary point of reference, but will connect to other kinds of ally work and movements for collective liberation. As a community-engaged learning course, students will work with community partners to establish long-term relationships based in solidarity. Students are encouraged to work with movements and organizations with whom they already have relationships (e.g., through student-activism). Throughout the quarter, we will have guest lectures and workshops with community partners and movement strategy organizations.

Same as: AFRICAAM 157P, AMSTUD 157P, CSRE 157P

FEMGEN 158. Black Queer Theory. 5 Units.

This course takes a multifaceted approach to black queer theory, not only taking up black theories of gender and queer sexuality, but queer theoretical interrogations of blackness and race. The course will also examine some of the important ways that black queer theory reads and is intersected with issues like affect, epistemology, space and geography, power and subjectivity, religion, economy, the body, and the law, asking questions like: How have scholars critiqued the very language of queer and the ways it works as a signifier of white marginality? What are the different spaces we can find queer black relationality, eroticism, and kinship? How do we negotiate issues like trans*misogyny or tensions around gender and sexuality in the context of race? Throughout the course, students will become versed in foundational and emerging black queer theory as we engage scholars like Sharon Holland, Cathy Cohen, Hortense Spillers, Marlon B. Ross, Aliyyah Abdur-Rahman, Barbara Smith, Roderick Ferguson, Robert Reid-Pharr, E. Patrick Johnson, and many others. Students will also gain practice applying black queer theory as an interpretive lens for contemporary social issues and cultural production including film, music, art, and performance.

Same as: AFRICAAM 158

FEMGEN 160. Rethinking the Ballerina. 4 Units.

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries.

Same as: DANCE 160, TAPS 160, TAPS 260

FEMGEN 161. Women in Modern America. 4-5 Units.

This course explores the transition from Victorian to modern womanhood in the U.S. from the 1890s to the end of the 20th century, including the experiences of Native, European, African, Mexican, and Asian American women. It asks how, when, and why the majority of American women become wage earners, gained full citizenship, and enacted political opportunities; how race- and class-specific ideals of womanhood changed in popular culture; and how women have redefined their reproductive and sexual relations.

Same as: AMSTUD 161, CSRE 162, HISTORY 161

FEMGEN 168. Writing for the Stage and Screen. 4 Units.

This is a script analysis and film criticism course from the vantage point of the scriptwriter -- both playwrights and screenplay writers. We will do comparative analysis of films that were adapted from plays and use published plays and/or student-authored plays to write original script adaptations. Students will also develop short video films based on a segment of such adaptations. May be repeated for credit.

Same as: TAPS 168

FEMGEN 177. Writing for Performance: The Fundamentals. 5 Units.

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: CSRE 177, TAPS 177, TAPS 277

FEMGEN 179C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what facts can offer.

Same as: CSRE 179C, CSRE 279C, TAPS 179C, TAPS 279C

FEMGEN 179G. Indigenous Identity in Diaspora: People of Color Art Practice in North America. 3-5 Units.

This "gateway" core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

Same as: CSRE 179G, CSRE 279G, TAPS 279G

FEMGEN 181A. Gender in the Middle East: Iran, Turkey, and Egypt. 4 Units.

This course explores the construction of gender in the Middle East. Drawing on the historical, sociological and anthropological research in the region, the course aims to question the stereotypes about the subordination of Muslim women and to offer students a systematic reading and analytical discussion of the political, economic and cultural structures that inform gender relations and practices in the region. The course starts with an examination of early Islam and religious sources with regard to women's status, then moves on to nationalist and modernization movements in the 19th and 20th centuries, and finally explores women's lives in contemporary Egypt, Turkey and Iran. In this framework, we will pay special attention to Islamist mobilizations, family and sexual relations, as well as women's changing livelihoods and labor.

Same as: ANTHRO 181A

FEMGEN 183. Re-Imagining American Borders. 5 Units.

How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual preference, and class borders in the context of a national discussion about the place of Americans in the world. How Anna Deavere Smith, Sherman Alexie, or Michael Moore consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these American narratives? Course includes examining one's own identity.

Same as: AMSTUD 183, CSRE 183

FEMGEN 187. Romance, Desire, and Sexuality in Modern Japanese Literature. 3-4 Units.

This class is structured around three motifs: love suicide (as a romantic ideal), female desire, and same-sex sexuality. Over the course of the quarter we will look at how these motifs are treated in the art and entertainment from three different moments of Japanese history: the Edo period (1615-1868), the modern period (1920-65), and the contemporary period (1965-present). We will start by focusing on the most traditional representations of these topics. Subsequently, we will consider how later artists and entertainers revisited the conventional treatments of these motifs, informing them with new meanings and social significance. We will devote particular attention to how this material comments upon issues of gender, sexuality, and human relationships in the context of Japan. Informing our perspective will be feminist and queer theories of reading and interpretation.

Same as: JAPANGEN 187, JAPANGEN 287

FEMGEN 188Q. Imagining Women: Writers in Print and in Person. 4-5 Units.

Gender roles, gender relations and sexual identity explored in contemporary literature and conversation with guest authors. Weekly meetings designated for book discussion and meeting with authors. Interest in writing and a curiosity about diverse women's lives would be helpful to students. Students will use such tools as close reading, research, analysis and imagination. Seminar requires strong voice of all participants. Oral presentations, discussion papers, final projects.

Same as: CSRE 188Q

FEMGEN 191Q. Writing Women's Lives. 2 Units.

Creative writing through dialogue focusing on prose about the lives of women in different cultures and generations. Novels, short stories, and micro-narrative including fiction and memoir. Students produce work using research, memory, imagination, and metaphor.

FEMGEN 193. Late Imperial China. 5 Units.

(Same as HISTORY 93. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: HISTORY 193

FEMGEN 193G. Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities. 1 Unit.

This course examines mental health and psychological well-being across the spectrum of gender and sexual identities. It addresses the unique challenges that face LGBTQ-identified students, and provides tools for supporting peers as they navigate these challenges. Discussion topics include current conceptualizations of gender identity and sexual orientation, including sexual and gender fluidity; the intersection of queer identities with multiple identities such as ethnic/racial identity and faith/spirituality; unpacking stereotypes; queer relationships and sexuality, coming out and disclosure, and mental health issues.

Same as: EDUC 193G

FEMGEN 195. Directed Reading. 1-15 Unit.

May be repeated for credit. (Staff).

FEMGEN 199A. Feminist, Gender, and Sexuality Studies Honors Workshop. 2-3 Units.

Required of seniors in the Feminist, Gender, and Sexuality Studies honors program. Participants share ongoing work on their honors theses. Prerequisite: consent of Instructor.

FEMGEN 199B. Feminist, Gender, and Sexuality Studies Honors Workshop. 2-3 Units.

Required of seniors in the Feminist, Gender, and Sexuality Studies honors program. Participants share ongoing work on their honors theses. Prerequisite: consent of instructor.

FEMGEN 199C. Feminist, Gender, and Sexuality Studies Honors Workshop. 2-3 Units.

Required of seniors in the Feminist, Gender, and Sexuality Studies honors program. Participants share ongoing work on their honors theses. Prerequisite: consent of instructor.

FEMGEN 203. Feminist Theories and Methods Across the Disciplines. 2-5 Units.

(Graduate Students register for PHIL 253 or FEMGEN 203) Concepts and questions distinctive of feminist and LGBT scholarship and how they shape research: gender, intersectionality, disciplinarity and interdisciplinarity, standpoint, "queering," postmodern critiques, postcolonial critiques. Prerequisites: Feminist Studies 101 or equivalent with consent of instructor.

Same as: FEMGEN 103, PHIL 153, PHIL 253

FEMGEN 205. Songs of Love and War: Gender, Crusade, Politics. 3-5 Units.

Analysis of medieval love, satirical and Crusade lyrics of the troubadours. Study of deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Course readings include medieval treatises on lyric and modern translations of the troubadour tradition. Works by Ovid, Bernart de Ventadorn, Bertran de Born, La Comtessa de Dia, Thibaut de Champagne, Raimon Vidal, Dante, and Pound. Taught in English. Course includes a lab component for creation of multi-media translation projects: trobar. stanford.edu.

Same as: FRENCH 205

FEMGEN 206. Global Medical Issues Affecting Women. 1 Unit.

This course probes the principal issues affecting women and girls medically around the world. Through interactive discussions, guest lectures, case studies, and academic readings, students become acquainted with the most critical challenges to women's health globally, and use selected analytical tools to assess how these may be addressed efficiently, cost-effectively, and sustainably. Topics include women's cancer, birth control, infertility, female genital mutilation, midwifery, obstetric fistula, breastfeeding, violence against women, and women's representation in biomedical research. The aim is to cultivate in students a nuanced appreciation of women's unique needs, roles, and challenges in the contemporary global health landscape.

Same as: SOMGEN 206

FEMGEN 208B. Women Activists' Response to War. 4-5 Units.

Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.

Same as: HISTORY 208B, HISTORY 308B

FEMGEN 209. Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports. 3 Units.

In 1972, Title IX legislation opened up a vast range of opportunities for women in sports. Since then, women's sports have continued to grow yet the fight for recognition and equality persists. Simply put, men's sports are more popular than women's--so much so, in fact, that people often make the hierarchical distinction between "sports" and "women's sports." But what would it take to get more women's sports featured on ESPN or more female athletes on the cover of *Sports Illustrated*? And, given the well-documented corruption at the highest levels of men's sports, should such an ascent in popularity be the goal for women's sports? This course will map out and respond to the multifaceted issues that emerge when women enter the sports world. Throughout the quarter, we will explore the fight for gender equality in sports through historical, cultural, and rhetorical lenses.

Same as: FEMGEN 109

FEMGEN 212. "When We Dead Awaken": Breakthroughs in Conceptions of the Gendered Self in Literature and the Arts. 4-5 Units.

Remarkable breakthroughs in conceptions of the gendered self are everywhere evident in literature and the arts, beginning primarily with the Early Modern world and continuing into today. Many of these works inhere in innovations in literary and artistic forms in order to capture and even evoke the strong cognitive, or psychological, dimension of such awakenings. The reader, or viewer, is often challenged to adapt her or his mind to new forms of thought, such as John Donne's seventeenth century creation of the Dramatic Monologue, a form popular with modern writers, which requires the reader's cognitive presence in order to fill out the dramatic scene. In so doing, the reader often supplies the presence of the female voice and thereby enters into her self-consciousness and inner thoughts. Adrienne Rich, for example, specifically rewrites one of Donne's major poems from the female perspective. This can be, in Rich's words, an awakening for the active reader, as he or she assumes that often-unspoken female perspective. The course will also explore male conceptions of the self and how such conceptions are often grounded in cultural attitudes imposed on male subjects, which can contribute to gender-bias toward women, a subject often neglected in exploring gendered attitudes, but which is now gaining more study, for example, in Shakespeare's *Othello*. Readings from recent developments in the neurosciences and cognitive studies will be included in our study of artistic forms and how such forms can activate particular mindsets. Writers and artists will include Shakespeare, Michelangelo, John Donne, Virginia Woolf, Adrienne Rich, Gertrude Stein, Picasso, June Wayne, and Edward Albee's 1960 play, *Who's Afraid of Virginia Woolf?*

Same as: ENGLISH 182J, FEMGEN 112

FEMGEN 216. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation.

Same as: ARTHIST 206H, HISTORY 216, HISTORY 316

FEMGEN 221B. The 'Woman Question' in Modern Russia. 5 Units.

Russian radicals believed that the status of women provided the measure of freedom in a society and argued for the extension of rights to women as a basic principle of social progress. The social status and cultural representations of Russian women from the mid-19th century to the present. The arguments and actions of those who fought for women's emancipation in the 19th century, theories and policies of the Bolsheviks, and the reality of women's lives under them. How the status of women today reflects on the measure of freedom in post-Communist Russia.

Same as: HISTORY 221B

FEMGEN 223X. The Politics of Gender in the United States. 5 Units.

Gender is one of the most recognizable and important identities in daily life. Yet it has been paid scant attention by political scientists in terms of its role on access to political power, opinion formation, group identity politics, election outcomes, and political representation. This class provides a survey of the literature on gender in American politics. We begin with the interdisciplinary research on the social construction of gender to understand what gender is and is not. Throughout the course we will use these theories to analyze and critique the approaches of quantitative research on gender politics.

Same as: POLISCI 223

FEMGEN 224. Challenging Sex and Gender Dichotomies in Medicine. 1 Unit.

Explores and challenges the traditional physiological bases for distinguishing human males from females, as well as the psychosocial factors that play a role in experiencing and expressing gender and sexuality. Topics include the influence of sociocultural (gender) norms and behaviors on human biology, the interactions of sex and gender on medical outcomes, the importance of understanding the spectrum of sex, gender, and sexuality in clinical practice.

Same as: FEMGEN 124, SOMGEN 257

FEMGEN 226A. Queer Literature and Film. 3-5 Units.

Close analysis of major works of LGBTQ literature, film, and visual art from the 1890s to today. Students will gain deeper knowledge and appreciation of historical and contemporary forms of queer representation in various national literatures, film, and visual art; understand relevant social and political debates; and gain a basic knowledge of feminist and queer theory. Course will include an optional online component to reach out to the public (class website queerlitfilm.wordpress.com, social media).

Same as: COMPLIT 226A

FEMGEN 230. Human Sexual Diversity in Medical Practice. 1-3 Unit.

(Same as SOMGEN 130/FEMGEN 230X; undergraduates who wish to fulfill the GER requirement should enroll in SOMGEN 130/FEMGEN 230X.) Goal is the development of personal and professional skills to interact with people across the diverse range of human sexuality, including sexual orientation and gender identity, age (pediatric to geriatric), sociocultural & religious values, medical issues (e.g. hormonal therapy, disabilities, such as spinal cord injury, etc). Features guest speakers representing a range of sexualities, including asexuality, polyamory and kink, as well as medical professionals and researchers specializing in a diversity of sexuality topics. Attendance (in-class feedback) requirements. Enrollment for 3 units requires attendance at two sessions per week and in-class presentation requirements; enrollment for 2 units requires attendance at two sessions per week.

Same as: SOMGEN 230

FEMGEN 230X. Human Sexual Diversity in Medical Practice. 3 Units.

(Same as SOMGEN 230/FEMGEN 230). Goal is the development of personal and professional skills to interact with people across the diverse range of human sexuality, including sexual orientation and gender identity, age (pediatric to geriatric), sociocultural & religious values, medical issues (e.g. hormonal therapy, disabilities, such as spinal cord injury, etc). Features guest speakers representing a range of sexualities, including asexuality, polyamory and kink, as well as medical professionals and researchers specializing in a diversity of sexuality topics. Attendance (in-class feedback) requirements.

Same as: SOMGEN 130

FEMGEN 236. Literature and Transgression. 3-5 Units.

Close reading and analysis of erotic-sexual and aesthetic-stylistic transgression in selected works by such authors as Baudelaire, Wilde, Flaubert, Rachilde, Schnitzler, Kafka, Joyce, Barnes, Eliot, Bataille, Burroughs, Thomas Mann, Kathy Acker, as well as in recent digital literature and online communities. Along with understanding the changing cultural, social, and political contexts of what constitutes "transgression" or censorship, students will gain knowledge of influential theories of transgression and conceptual limits by Foucault, Blanchot, and contemporary queer and feminist writers.

Same as: COMPLIT 236

FEMGEN 237. Medical Impact of Sexual and Relationship Abuse Throughout the Life Course. 1 Unit.

Provides an overview of the acute and chronic physical, mental, and emotional trauma from sexual abuse through the perspective of the survivor and the offender. The experience of sexual abuse varies for each individual with respect to age, gender, sexual identity, ethnicity, and many other societal factors. Focuses on investigating sexual abuse within various populations from a medical perspective. Discusses the physical, psychological, behavioral, and medical implications of sexual abuse for each demographic explored in the course, along with prevention efforts that would be most effective in these populations.

Same as: SOMGEN 237

FEMGEN 238. Violence Against Women: Theory, Issues, and Prevention. 3-4 Units.

[Technical error is capping enrollment prematurely; come to first day of class] Course offers an interdisciplinary feminist perspective on the causes of gender violence, addresses the multi-leveled approaches to ending gender violence, and explores the relationship between violence against women and other forms of oppression: racism, economic exploitation, heterosexism and social class. Framework examines institutional barriers maintaining gender violence in our culture and considers multi-dimensional solutions. Students from every discipline, women and men, apply theoretical perspectives to professional goals and an optional service-learning project. Service Learning Course (certified by Haas Center).

Same as: FEMGEN 138

FEMGEN 240D. LGBT/Queer Life in the United States. 4-5 Units.

An introductory course on LGBT social, cultural, and political history in the United States. This course explores how categories of sexuality have changed over time, with particular emphasis on the relationship among homosexuality, heterosexuality, and transgenderism. Students will analyze how the intersections of race, class, and sexuality influenced the constitution of these categories and the politics of social relations. Historical and literary sources will be used to examine changes in LGBT experiences and identities, primarily in the twentieth century.

Same as: FEMGEN 140D, HISTORY 257C

FEMGEN 241. Sex and Gender in Human Physiology and Disease. 2-3 Units.

Chromosomal, hormonal and environmental influences that lead to male and female reproductive systems and neuroendocrine regulation and intersex variants. Masculinizing and feminizing effects of endogenous and exogenous sex hormones and other factors, in particular gender, on the musculoskeletal, neurological, cardiovascular, immunological and other systems and tissues, e.g. adipose, skin, etc. over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women, and with aging in both sexes). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor. Undergraduate students must enroll for 3 units.

Same as: HUMBIO 140, MED 240

FEMGEN 242. Sociology of Gender. 5 Units.

(Graduate students register for 242.) Gender inequality in contemporary American society and how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes; arguments and evidence for each approach. The social consequences of gender inequality such as the feminization of poverty, and problems of interpersonal relations.

Same as: FEMGEN 142, SOC 142, SOC 242

FEMGEN 250. Sex, Gender, and Power in Modern China. 3-5 Units.

Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English.

Same as: CHINGEN 150, CHINGEN 250, FEMGEN 150

FEMGEN 252. 'Tis all in pieces: Space and Gender on the Threshold of the Modern World. 5 Units.

These dramatic words, spoken by the British poet John Donne, signal the onset of the Early Modern world and the profound reconfigurations of space and related structures of thought, including conceptions of the self and the encoding of gender roles. We will explore the vibrant Early Modern world in the context of space and representations of gender, sexuality, and race as manifest in unprecedented literary and artistic forms, such as Shakespeare's *Othello*; Marlowe's *Doctor Faustus*; the poetry of John Donne, the art of Michelangelo and Caravaggio as well as key historical and cultural texts. And we will visit the Cantor Arts Center (on campus) for a guided tour and lecture on art and perspective. We also will read and discuss selected texts from the modern world, such as Samuel Beckett's *Waiting for Godot*; and poetry and commentary by Adrienne Rich, to study both changes and continuities with the Early Modern period. We will consider the vital cognitive role of the reader or viewer in the formation of particular instances of artistic form, including recent—and highly thought-provoking—material from the neurosciences and cognitive studies. Note: Instructor will consider changes in meeting times/days to accommodate student schedules if feasible. Please send request to: hbrooks@stanford.edu. Same as: FEMGEN 152

FEMGEN 255. The Changing American Family. 4 Units.

Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change.

Same as: FEMGEN 155, SOC 155, SOC 255

FEMGEN 256. Current Controversies in Women's Health. 2-3 Units.

Interdisciplinary. Focus is primarily on the U.S., with selected global women's health topics. Topics include: leading causes of morbidity and mortality across the life course; reproductive (e.g. gynecologic & obstetric) health issues; sexual function; importance of lifestyle (e.g. diet, exercise, weight control), including eating disorders; mental health; sexual and relationship abuse; issues for special populations. In-class Student Debates on key controversies in women's health. Guest lecturers. Undergraduates must enroll in HumBio 125 for 3 units. PhD minor in FGSS, enroll in FEMGEN 256 for 3 units and for a letter grade. Med students enroll in OBGYN 256 for 2 units. Spring.

Same as: HUMBIO 125, OBGYN 256

FEMGEN 257. Language as Social and Political Activism: Feminist and LGBTQ Social and Political Movements. 3-5 Units.

How does a social or political movement gain traction? For example, how did 20th-century movements of the disenfranchised, such as the Civil Rights movement or Women's Suffrage, gain a voice an eventually enact change? In the mediascape of today, where everyone with access to a computer has voice, how does a movement like Occupy Wall Street change the national conversation? How do written and verbal choices of the movements impact their success? In this course, students will write and revise their own arguments in order to best understand the writing in these movements and to best produce future work for social change. We will examine the role of rhetoric; the use of argument to persuade; in social movements working toward social justice.

Same as: AMSTUD 157X, FEMGEN 157

FEMGEN 258. Topics in the History of Sexuality: Sexual Violence in America. 4-5 Units.

This undergraduate/graduate colloquium explores recent historical interpretations of the history of sexuality, with a focus on sexual violence. The readings cover changing definitions and laws, cultural representations, and the role of gender, race, and age in the construction of rape and other forms of sexual violence. Topics include slavery; incest, seduction, and statutory rape reform; the racialization of rape and the anti-lynching movement; street harassment; men and boys as victims; war and conquest; and feminist responses to rape.

Same as: AMSTUD 258, CSRE 192E, FEMGEN 358, HISTORY 258, HISTORY 358

FEMGEN 260. Disability, Gender, & Identity. 5 Units.

Course explores visible and invisible disabilities, focusing on issues of gender and identity. The course emphasizes psychological as well as physical health, cross-cultural variables, diversity of disability experiences, legal and political aspects, work and home accommodations, self-labeling, caretaking, stigma and passing, and the difference gender makes to how disabilities are experienced. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of physical assistance.

Same as: AMSTUD 260, FEMGEN 360, HUMBIO 141

FEMGEN 260X. Journeys in Women's Health and Sex and Gender in Medicine. 1 Unit.

Sponsored by the Stanford WSDM Center. Course focuses on health research on women and sex differences in medicine, acknowledges the "wisdom" of research and education on sex (e.g. chromosomes, gonads, gonadal hormones) and gender (sociocultural) factors influencing health. Brings alumni to share their professional journeys in the world of Women and Sex Differences in Medicine. Meets Women's Health Scholarly Concentration Requirement.

Same as: INDE 260

FEMGEN 272E. Theories of Citizenship and Sovereignty in a Transnational Context. 4-5 Units.

This course explores the multiple meanings of citizenship and the ways in which they change when examined using different geographic scales (from the local to the transnational). The course will pair theoretical readings on citizenship with case studies that focus on North America. Topics include: definitions of citizenship; the interrelation of ideas of citizenship with those of race, ethnicity, gender, and sexuality; the relationship between sovereignty and territoriality; human and civil rights; and immigration.

Same as: AMSTUD 272E, CHILATST 172, CSRE 172H, HISTORY 272E, HISTORY 372E

FEMGEN 293B. Queer History in Comparative Perspective. 4-5 Units.

Comparative history of homoerotic desire, relations, and identity through scholarship on different historical periods and parts of the world: the classical Mediterranean, early modern European cities, late imperial and modern China, Tokugawa and modern Japan, and the U.S.

Same as: FEMGEN 393B, HISTORY 293B, HISTORY 393B

FEMGEN 297. Education, Gender, and Development. 4 Units.

Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes.

Same as: EDUC 197, SOC 134

FEMGEN 299. Graduate Workshop: Feminist, Gender, and Sexuality Studies. 1-3 Unit.

Theory, methods, and research in feminist, gender, and sexuality studies, through presentations of ongoing work by students, faculty, and guest speakers, and discussion of recent literature and controversies, feminist pedagogy and career development issues. Restricted to doctoral students. Repeatable for credit. Required for PhD Minors in Feminist, Gender, and Sexuality Studies (3 quarters min.).

Same as: EDUC 370X

FEMGEN 310X. Introduction to Comparative Queer Literary Studies. 3-5 Units.

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 110, COMPLIT 310, FEMGEN 110X

FEMGEN 313. Performance and Performativity. 1-4 Unit.

Performance theory through topics including: affect/trauma, embodiment, empathy, theatricality/performativity, specularity/visibility, liveness/disappearance, belonging/abjection, and utopias and dystopias. Readings from Schechner, Phelan, Austin, Butler, Conquergood, Roach, Schneider, Silverman, Caruth, Fanon, Moten, Anzaldúa, Agamben, Freud, and Lacan. May be repeated for credit.

Same as: TAPS 313

FEMGEN 314. Performing Identities. 4 Units.

This course focuses on "the performance of identities" as the concept pertains to U.S. women of color. The foundational text, *This Bridge Called My Back* (Moraga, Anzaldúa, eds.), in its 4th and 2015 edition, will serve as the basis for an intergenerational conversation on U.S. Third World and Transnational and Queer Feminisms with an emphasis on lived experience and the performance of everyday life. Theoretical work will revolve around the concept of *queer theory in the flesh*; initially introduced in *Bridge* in 1981 and its significance to performance theory, queer and feminist theory and political practice. In addition to *Bridge*, texts may include recent anthologies on women of color feminisms and the writings by a variety of scholars, e.g. Norma Alarcón, Jacqui Alexander, Alicia Arraza, Anne Cheng, E. Patrick Johnson, Chandra Mohanty, Ann Pellegrini, Ramona Rivera-Severa, Chela Sandoval & Hortense Spillers. A final project *performing identity*; as *theory in the flesh*; is required, along with a written *metacommentary*. As part of the class project students will help organize a campus-wide event, featuring local original contributors to *Bridge* and offering students the opportunity to exchange *in the flesh*; with women of color performers, artists, activists and scholars. Same as: TAPS 314

FEMGEN 358. Topics in the History of Sexuality: Sexual Violence in America. 4-5 Units.

This undergraduate/graduate colloquium explores recent historical interpretations of the history of sexuality, with a focus on sexual violence. The readings cover changing definitions and laws, cultural representations, and the role of gender, race, and age in the construction of rape and other forms of sexual violence. Topics include slavery; incest, seduction, and statutory rape reform; the racialization of rape and the anti-lynching movement; street harassment; men and boys as victims; war and conquest; and feminist responses to rape.

Same as: AMSTUD 258, CSRE 192E, FEMGEN 258, HISTORY 258, HISTORY 358

FEMGEN 360. Disability, Gender, & Identity. 5 Units.

Course explores visible and invisible disabilities, focusing on issues of gender and identity. The course emphasizes psychological as well as physical health, cross-cultural variables, diversity of disability experiences, legal and political aspects, work and home accommodations, self-labeling, caretaking, stigma and passing, and the difference gender makes to how disabilities are experienced. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of physical assistance.

Same as: AMSTUD 260, FEMGEN 260, HUMBIO 141

FEMGEN 363D. Feminist Theory: Thinking Through/With/About the Gendered Body. 5 Units.

Organized around a series of case studies, this graduate feminist theory course will consider issues related to the complex relationship between sex, gender, sexuality, biological reproduction, violence, and social power. It is a core course for the PhD minor in Feminist, Gender, and Sexuality Studies. Enrollment is limited to PhD-level students.

Same as: ENGLISH 363D

FEMGEN 389E. Queer of Color Critique: Race, Sex, Gender in Cultural Representations. 3-5 Units.

Examines major questions and issues that arise in considering race, sex, and gender together. Focus on critical and theoretical texts queering ethnic and diaspora studies and bringing race and ethnicity into queer studies. Close reading of texts in a variety of media negotiating racialized sexualities and sexualized identities. How is desire racialized? How is racial difference produced through sex acts? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and structures of power?.

Same as: CSRE 289E, ILAC 389E

FEMGEN 393B. Queer History in Comparative Perspective. 4-5 Units.

Comparative history of homoerotic desire, relations, and identity through scholarship on different historical periods and parts of the world: the classical Mediterranean, early modern European cities, late imperial and modern China, Tokugawa and modern Japan, and the U.S.

Same as: FEMGEN 293B, HISTORY 293B, HISTORY 393B

FEMGEN 395. Graduate Independent Study. 1-15 Unit.

Students pursue a special subject of investigation under supervision of an affiliated faculty member. May be repeated for credit.

FEMGEN 444. Graduate Research Seminar: Gender in Science, Medicine, and Engineering. 5 Units.

Theory and practice of gender in STEM. 1. "Fix the Numbers of Women" focuses on increasing women's participation; 2. "Fix the Institutions" promotes gender equality in careers through structural change in research organizations; 3. "Fix the Knowledge" or "gendered innovations" stimulates excellence in science and technology by integrating gender analysis into research. Seminar explores harnessing the creative power of gender analysis to enhance knowledge and spark innovation.

Same as: HISTORY 444

Film Production Courses

FILMPROD 12AX. Write and Shoot: Narrative Filmmaking. 2 Units.

Write and Shoot: Narrative Filmmaking is a hybrid writing/production course that guides students through the process of completing a 2-3 minute narrative film. Students will write scripts for short fiction films, and then, by filming them, learn to apply the fundamentals of digital video production. Initial classwork will include visual writing exercises, DSLR cinematography instruction, script work, and basic fiction film production. Students will continue on in groups of three to develop, film, edit, and critique 2-3 minute narrative films based on a shared class theme or narrative premise. This course is truly INTENSIVE and requires a significant amount of work (including nights and weekends) outside of class and daily deadlines for submission of creative work.

FILMPROD 101. Screenwriting. 5 Units.

Priority to Film and Media Studies majors. Craft, form, and approaches to writing for the screen. Prerequisites: 1) ENGLISH 90, 2) ENGLISH 190F or FILMPROD 104, and 3) consent of instructor.

Same as: FILMPROD 301

FILMPROD 103. Adaptation. 4 Units.

A close analysis of film adaptation, using various source materials to examine the demands form makes on content and the creative choices made in adaptation to film. Source materials will include plays, fiction, biography, history, graphic novels, and reference to video games and amusement park rides. A weekly film screening is a requirement of the course.

FILMPROD 104. Visual Writing. 4 Units.

A writing workshop that is an exploration of visual storytelling. Beginning with visual literacy, the class progresses from basic cinematic techniques through scene exercises to revisions and ultimately to connecting scenes in order to build sequences of script pages. Open to all majors; may substitute for ENGL 190F prerequisite for FP101.

FILMPROD 105. Script Analysis. 4 Units.

Analysis of screenplay and film from the writer's perspective, with focus on ideation, structure, and dramatic tension in narrative features. Sources include screenplays and screenings.

Same as: FILMPROD 305

FILMPROD 106. Image and Sound: Filmmaking for the Digital Age. 3 Units.

Despite the rise of emerging forms like two-minute YouTube videos, six second Vines, or interactive storytelling modules, many core principles of visual storytelling remain unchanged. In this hands-on film production class students will learn a broad set of filmmaking fundamentals (basic history, theory, and practice) and will apply them creating film projects using tools such as iPhones, consumer cameras and FCPX.

FILMPROD 110. Advanced Screenwriting. 5 Units.

Advanced writing workshop in which students develop and complete a feature-length screenplay. Prerequisites: FP101 Screenwriting and approval of the instructor. Enrollment is limited.

FILMPROD 114. Introduction to Film and Video Production. 5 Units.

Hands-on. Techniques of film and video making including conceptualization, visualization, story structure, cinematography, sound recording, and editing. Enrollment limited to 12 students. Priority to junior/senior Film & Media Studies majors.

FILMPROD 117. ADVANCED VIDEO PRODUCTION. 5 Units.

This course introduces the fundamentals of digital video production. Special emphasis is placed on the development of interview and observational sync-sound filming techniques. Students acquire hands-on experience in shooting, sound recording, lighting, and editing. Critiques of creative work emphasizes the conceptual, aesthetic, and technical aspects of digital video production. Prerequisite: Filmprod 114 or Filmprod 10AX.

FILMPROD 301. Screenwriting. 5 Units.

Priority to Film and Media Studies majors. Craft, form, and approaches to writing for the screen. Prerequisites: 1) ENGLISH 90, 2) ENGLISH 190F or FILMPROD 104, and 3) consent of instructor.

Same as: FILMPROD 101

FILMPROD 305. Script Analysis. 4 Units.

Analysis of screenplay and film from the writer's perspective, with focus on ideation, structure, and dramatic tension in narrative features. Sources include screenplays and screenings.

Same as: FILMPROD 105

FILMPROD 400. Film/Video Writing and Directing. 4 Units.

Restricted to M.F.A. documentary students. Emphasis is on the development of the research, conceptualization, visualization, and preproduction skills required for nonfiction filmmaking. Prerequisite: consent of instructor.

FILMPROD 401. Nonfiction Film Production. 4 Units.

Restricted to M.F.A. documentary students. 16mm production techniques and concepts. Final project is a short black-and-white film with multitrack sound design. Prerequisite: consent of instructor.

FILMPROD 402. Digital Video. 4 Units.

Restricted to M.F.A. documentary students. Fundamentals of digital storytelling. Working with small format cameras, interviewing techniques, and nonlinear editing skills. Prerequisite: consent of instructor.

FILMPROD 403. Advanced Documentary Directing. 4 Units.

Restricted to M.F.A. documentary students. Further examination of structure, emphasizing writing and directing nonfiction film. Prerequisite: consent of instructor.

FILMPROD 404. Advanced Video Production. 4 Units.

Restricted to M.F.A. documentary students. Techniques of visual storytelling and observational shooting. Final quarter of professional training in documentary video production. Prerequisite: consent of instructor.

FILMPROD 405. Producing Practicum. 4 Units.

Restricted to M.F.A. documentary students. Advanced producing principles through the preproduction of the M.F.A. thesis project, including development of a professional film proposal. Practical training in fundraising. Prerequisite: consent of instructor.

FILMPROD 406A. Documentary M.F.A. Thesis Seminar I. 4 Units.

Restricted to M.F.A. documentary students. Production of film or video project. Focus is on shooting strategies, ethical challenges, and practical production issues. Prerequisite: consent of instructor.

FILMPROD 406B. Documentary M.F.A. Thesis Seminar II. 4 Units.

Restricted to M.F.A. documentary students. Editing and post-production of film or video project. Emphasis is on aesthetic choices (structure, narration, music), distribution, contracts, and audience. Prerequisite: consent of instructor.

FILMPROD 408. CULTURE/CINEMA/SENSATION. 5 Units.

This course brings together a critical introduction to works of ethnographic film (i.e. films concerned primarily with the representation of culture) and a selective exploration of works of avant-garde film (i.e. films concerned with, among other dimensions, the possibilities of cinema) in order to consider the conceptual and aesthetic foundations/provocations of sensory ethnography, a neologism for an approach to cinema that seeks the new, the open-ended, the corporeal, the sensorial, and the affective.

FILMPROD 801. TGR Project. 0 Units.

Film Studies Courses

FILMSTUD 4. Introduction to Film Study. 5 Units.

Formal, historical, and cultural issues in the study of film. Classical narrative cinema compared with alternative narrative structures, documentary films, and experimental cinematic forms. Issues of cinematic language and visual perception, and representations of gender, ethnicity, and sexuality. Aesthetic and conceptual analytic skills with relevance to cinema.

FILMSTUD 4S. Language of Film. 3 Units.

This course familiarizes students with various elements of film language (cinematography, editing, sound, etc.) and introduces them to a range of approaches to cinematic analysis (authorship, genre, close formal reading, socio-historical considerations). Different types of films (narrative, documentary, and experimental) will be surveyed. Classical narrative cinema will be compared with alternative modes of story-telling.

FILMSTUD 6. Introduction to Digital Media. 5 Units.

Media beyond the horizon of cinema and television present unique problems of definition and analysis. Taking the digital - information represented as discrete values - as a reasonable approximation of the mechanics and fantasies of computation, course surveys theoretical approaches to code, networks, and cyberculture. Taking familiar formations like web sites and video games as objects by which to learn how thinkers have understood and envisioned emerging media from the mid-20th century to the present. Students to develop own methodological tools for becoming more critical users of digital media. COMM 1B can be taken in substitution of FILMSTUD 6 when the course is not being offered.

FILMSTUD 7. Introduction to Television Studies. 5 Units.

Television is arguably the most influential and ubiquitous mass medium of the last half century. Because of its familiarity and popularity, it is also often the medium most overlooked, dismissed, and maligned. Drawing from the history of television and of television scholarship, this course builds a theoretical framework for understanding this pivotal cultural form. Course covers interdisciplinary approaches to studying TV texts, TV audiences, and TV industries, including questions of the boundaries of television (from independent and avant-garde video to convergence). In the process students develop methodological tools as critical television viewers.

FILMSTUD 100A. History of World Cinema I, 1895-1929. 4 Units.

From cinema's precursors to the advent of synchronized sound.
Same as: FILMSTUD 300A

FILMSTUD 100B. History of World Cinema II, 1930-1959. 4 Units.

The impact of sound to the dissolution of Hollywood's studio system.
Same as: FILMSTUD 300B

FILMSTUD 100C. History of World Cinema III, 1960-Present. 4 Units.

From the rise of the French New Wave to the present.
Same as: FILMSTUD 300C

FILMSTUD 101. Fundamentals of Cinematic Analysis. 4 Units.

The close analysis of film. Emphasis is on formal and narrative techniques in structure and style, and detailed readings of brief sequences. Elements such as cinematography, mise-en-scène, composition, sound, and performance. Films from various historical periods, national cinemas, directors, and genres. Prerequisite: FILMSTUD 4 or equivalent. Recommended: ARTHIST 1 or FILMSTUD 102. Course can be repeated twice for a max of 8 units.
Same as: FILMSTUD 301

FILMSTUD 102. Theories of the Moving Image. 4 Units.

Major theoretical arguments and debates about cinema: realism, formalism, poststructuralism, feminism, postmodernism, and phenomenology.
Prerequisites: FILMSTUD 4.
Same as: FILMSTUD 302

FILMSTUD 104. Introduction to the Movies- How Movies Are Developed, Produced, Marketed and Exhibited. 4 Units.

How are movies created? How are scripts developed and selected for production? How are films actually made and marketed? How are they shown in various media? Who decides what in all of these processes and what information do the decision-makers rely on? This course will follow the life cycle of a movie, from its inception as an idea, article, book, etc., to its release in theaters and other media as a finished product. Guest speakers will discuss the evolution of the film industry, creative development of scripts, how deals are structured to acquire intellectual property, film finance, and how movies are physically produced and then marketed, distributed and exhibited in theaters and in other media. We will use two films as case studies: *The Chronicles of Narnia*; *Voyage of the Dawn Treader* and *Chasing Mavericks*.
Same as: FILMSTUD 304

FILMSTUD 110. Science Fiction Cinema. 4 Units.

Science fiction film's sense of wonder depends upon the development and revelation of new ways of seeing. The American science fiction film emphasizes the fundamental activity of human perception, its relation to bodily experience and the exploration of other worlds, new cities, and other modes of being, in such new technological spaces as the cyberspaces of the information age. It is perhaps the Hollywood genre most directly concerned with the essence of cinema itself.
Same as: FILMSTUD 310

FILMSTUD 110N. Darkness in Light: The Filmic Imagination of Horror. 3 Units.

Preference to freshmen. From its beginnings, the cinema evinced an affinity with the phantom realm of specters, ghosts, and supernatural beings. Not only does horror have deep and diverse roots in the international history of film; it emerges as a trope of film itself, as a medium of shadows, dematerialized presence, life drained of substance. Overview of filmic imaginations of horror with a focus on the U.S., Europe, and Japan. Theories of horror, from the fantastic to the uncanny; unpacking these in light of key moments in the genre's development. The merits of vampires versus zombies. Ongoing debates through the lens of horror about cinematic representation, from Andre Bazin's idea of the mummy complex to Linda Williams' thesis of body genres to Jeffrey Sconce's notion of haunted media. Introduction to film analysis and interpretation; no prior experience in film studies required. Required weekly screening.

FILMSTUD 114. Introduction to Comics. 4 Units.

The modern medium of comics, a history that spans 150 years. The flexibility of the medium encountered through the genres of humorous and dramatic comic strips, superheroes, undergrounds, independents, journalism, and autobiography. Innovative creators including McCay, Kirby, Barry, Ware, and critical writings including McCloud, Eisner, Groensteen. Topics include text/image relations, panel-to-panel relations, the page, caricature, sequence, seriality, comics in the context of the fine arts, and relations to other media.
Same as: FILMSTUD 314

FILMSTUD 115. Documentary Issues and Traditions. 4 Units.

Issues include objectivity/subjectivity, ethics, censorship, representation, reflexivity, responsibility to the audience, and authorial voice. Parallel focus on form and content.
Same as: FILMSTUD 315

FILMSTUD 116. International Documentary. 4 Units.

Historical, aesthetic, and formal developments of documentary through nonfiction films in Europe, Asia, Latin America, and Africa.
Same as: FILMSTUD 316

FILMSTUD 133. Contemporary Chinese Auteurs. 4 Units.

New film cultures and movements in Taiwan, Hong Kong, and mainland China in the 80s. Key directors including Jia Zhangke, Wu Wenguang, Tsai Ming-liang, Hou Hsiao-hsien, Wong Kar-wai, Ann Hui. Topics include national cinema in the age of globalization, the evolving parameters of art cinema, and authorship.
Same as: FILMSTUD 333

FILMSTUD 136. Gender and Sexuality in Chinese Cinema. 4 Units.

Representations of gender and sexuality in the cinemas of China, Taiwan, and Hong Kong, covering key periods and genres such as the golden age of Shanghai film, Hong Kong action pictures, opera films, post-socialist art films, and new queer cinema. Historical and contemporary perspectives on cinematic constructions of femininity, masculinity, and sexuality as they relate to issues of nationalism, modernity, globalization, and feminist and queer politics. Weekly screening required.
Same as: FILMSTUD 336

FILMSTUD 140. Film Aesthetics: Editing. 4 Units.

Practical and theoretical approaches to editing and montage. The role of editing in film meaning, and cognitive and emotional impact on the viewer. Developments in the history and theory of cinema including continuity system, Soviet montage, French new wave, postwar and American avant garde. Aesthetic functions, spectatorial effects, and ideological implications of montage. Film makers include Eisenstein, Godard, and Conner.
Same as: FILMSTUD 340

FILMSTUD 141. Music Across Media: Music Video to Postclassical Cinema. 4 Units.

What makes music videos, YouTube clips and musical numbers in today's films engaging? What makes them tick? Emphasis is on aesthetics and close reading. How music videos and its related forms work. Uses of the body, how visual iconography operates, what lyrics and dialogue can do, how and what music can say, and how it can work with other media. Questions of representation such as how class, ethnicity, gender, race, and nationality function. Viewership and industry practices.

Same as: FILMSTUD 341, MUSIC 185, MUSIC 385

FILMSTUD 145. Politics and Aesthetics in East European Cinema. 4 Units.

From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film.

Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica.

Same as: FILMSTUD 345

FILMSTUD 146. Art Animation. 2-4 Units.

While anime has spread around the world, Japanese art animators have been busy developing a parallel tradition, built from a more personal, experimental, and idiosyncratic approach to the medium. Looking closely at key works from major artists in the field, this course explores art animation from a variety of perspectives: animation scene; philosophical attempts to account for animated movement; and art animation's unique perspective on Japanese culture.

Same as: JAPANGEN 152, JAPANGEN 252

FILMSTUD 150. Cinema and the City. 4 Units.

Utopian built environments of vast perceptual and experiential richness in the cinema and city. Changing understandings of urban space in film. The cinematic city as an arena of social control, social liberation, collective memory, and complex experience. Films from international narrative traditions, industrial films, experimental cinema, documentaries, and musical sequences. Recommended: 4 or equivalent.

Same as: FILMSTUD 350

FILMSTUD 157. Film Noir from Bogart to Mulholland Drive. 4 Units.

Why did prosperous mid-20th-century America produce a dark cinema of hard-boiled characters, gritty urban settings, stark high-contrast lighting, and convoluted plots? Key examples and the recent legacy of film noir: 40s and 50s Hollywood movies featuring anti-heroes, femmes fatales, shattered dreams, violence, and a heaviness of mood. Film noir's influences included pulp fiction; B-movie production-budgets; changes in Hollywood genres; left-populist aesthetic movements; a visual style imported by European eacute;migreacute; directors; innovations in camera and film technology; changes in gender roles; combat fatigue; and anxieties about the economy, communism and crime. Directors, writers, cinematographers and actors. Film viewings, readings and analyses.

Same as: FILMSTUD 357

FILMSTUD 164A. Technology and the Visual Imagination. 4 Units.

An exploration of the dynamic relationship between technology and the ways we see and represent the world. The course examines technologies from the Renaissance through the present day, from telescopes and microscopes to digital detectors, that have changed and enhanced our visual capabilities as well as shaped how we imagine the world. We also consider how these technologies influenced and inspired the work of artists. Special attention is paid to how different technologies such as linear perspective, photography, cinema, and computer screens translate the visual experience into a representation; the automation of vision; and the intersection of technology with conceptions of time and space.

Same as: ARTHIST 164A, ARTHIST 364A, FILMSTUD 364A

FILMSTUD 165A. Fashion Shows: From Lady Godiva to Lady Gaga. 4 Units.

The complex and interdependent relationship between fashion and art. Topics include: the ways in which artists have used fashion in different art forms as a means to convey social status, identity, and other attributes of the wearer; the interplay between fashion designers and various art movements, especially in the 20th century; the place of prints, photography, and the Internet in fashion, in particular how different media shape how clothes are seen and perceived. Texts by Thorstein Veblen, Roland Barthes, Dick Hebdige, and other theorists of fashion.

Same as: ARTHIST 165A, ARTHIST 365A, FILMSTUD 365A

FILMSTUD 167B. Beyond the Fuzzy-Techie Divide: Art, Science, Technology. 4 Units.

Although art and science are often characterized as "two cultures" with limited common interests or language, they share an endeavor: gaining insight into our world. They even rely on common tools to make discoveries and visually represent their conclusions. To clarify and interrogate points of similarity and difference, each weekquest;s theme (time, earth, cosmos, body) explores the efforts of artists and scientists to understand and represent it and the role of technology in these efforts. Focus on contemporary examples.

Same as: ARTHIST 167, ARTHIST 367, FILMSTUD 367B

FILMSTUD 181Q. Alternative Viewpoints: Black Independent Film. 4 Units.

Preference to sophomores. Do you want to learn more about independent film as it was practiced in major urban centers by young filmmakers?

This class focuses on major movements by groups such as the Sankofa Film Collective and the L.A. Rebellion. Learn how to analyze film and to discuss the politics of production as you watch films by Spike Lee, Julie Dash, Melvin Van Peebles, Ngozi Onwurah and more. We will discuss representation, lighting, press material, and of course the films themselves. This course includes a workshop on production, trips to local film festivals and time to critique films frame-by-frame. It matters who makes film and how they do so. When you have completed this class you will be able to think critically about "alternative viewpoints" to Hollywood cinema. You will understand how independent films are made and you will be inspired to seek out and perhaps produce or promote new visions.

Same as: AFRICAAM 181Q, TAPS 181Q

FILMSTUD 245B. History and Politics in Russian and Eastern European Cinema. 5 Units.

From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film. Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica.

Same as: FILMSTUD 445B, REES 301B

FILMSTUD 250B. Bollywood and Beyond: An Introduction to Indian Film. 3-4 Units.

A broad engagement with Indian cinema: its relationship with Indian politics, history, and economics; its key thematic concerns and forms; and its adaptation of and response to global cinematic themes, genres, and audiences. Locating the films within key critical and theoretical debates and scholarship on Indian and world cinemas. Goal is to open up what is often seen as a dauntingly complex region, especially for those who are interested in but unfamiliar with its histories and cultural forms.

Same as: COMPLIT 247, GLOBAL 250

FILMSTUD 251. Media in Transition. 5 Units.

In a culture obsessed with new media, we are bombarded with hype about the present as a revolutionary phase of convergence. But everything old was once new, and pioneering media of the past also had to negotiate existing technologies, ideologies, and fantasies. This seminar is organized around case studies of transitional media moments from the long 20th century, including proto-cinema, ham radio, early television, hypertext, and digital film. In exploring the material and discursive aspects of remediation through theoretical, historical, and media archaeological readings, we will ask: what is a medium and how do they emerge and evolve.

FILMSTUD 290. Movies and Methods: Films of Stanley Kubrick. 5 Units.

Open to graduate students and advanced undergraduates with permission of the instructor; capstone course for majors (senior seminar). Topics vary year to year. Focus is on historiography and theory. Limited enrollment. Permission code needed in order to enroll.

Same as: FILMSTUD 490

FILMSTUD 297. Honors Thesis Writing. 1-5 Unit.

May be repeated for credit.

FILMSTUD 299. Independent Study: Film and Media Studies. 1-15 Unit.

May be repeated for credit.

FILMSTUD 300A. History of World Cinema I, 1895-1929. 4 Units.

From cinema's precursors to the advent of synchronized sound.

Same as: FILMSTUD 100A

FILMSTUD 300B. History of World Cinema II, 1930-1959. 4 Units.

The impact of sound to the dissolution of Hollywood's studio system.

Same as: FILMSTUD 100B

FILMSTUD 300C. History of World Cinema III, 1960-Present. 4 Units.

From the rise of the French New Wave to the present.

Same as: FILMSTUD 100C

FILMSTUD 301. Fundamentals of Cinematic Analysis. 4 Units.

The close analysis of film. Emphasis is on formal and narrative techniques in structure and style, and detailed readings of brief sequences. Elements such as cinematography, mise-en-scène, composition, sound, and performance. Films from various historical periods, national cinemas, directors, and genres. Prerequisite: FILMSTUD 4 or equivalent. Recommended: ARTHIST 1 or FILMSTUD 102. Course can be repeated twice for a max of 8 units.

Same as: FILMSTUD 101

FILMSTUD 302. Theories of the Moving Image. 4 Units.

Major theoretical arguments and debates about cinema: realism, formalism, poststructuralism, feminism, postmodernism, and phenomenology.

Prerequisites: FILMSTUD 4.

Same as: FILMSTUD 102

FILMSTUD 304. Introduction to the Movies- How Movies Are Developed, Produced, Marketed and Exhibited. 4 Units.

How are movies created? How are scripts developed and selected for production? How are films actually made and marketed? How are they shown in various media? Who decides what in all of these processes and what information do the decision-makers rely on? This course will follow the life cycle of a movie, from its inception as an idea, article, book, etc., to its release in theaters and other media as a finished product. Guest speakers will discuss the evolution of the film industry, creative development of scripts, how deals are structured to acquire intellectual property, film finance, and how movies are physically produced and then marketed, distributed and exhibited in theaters and in other media. We will use two films as case studies: *The Chronicles of Narnia* and *Voyage of the Dawn Treader* and *Chasing Mavericks*.

Same as: FILMSTUD 104

FILMSTUD 310. Science Fiction Cinema. 4 Units.

Science fiction film's sense of wonder depends upon the development and revelation of new ways of seeing. The American science fiction film emphasizes the fundamental activity of human perception, its relation to bodily experience and the exploration of other worlds, new cities, and other modes of being, in such new technological spaces as the cyberspaces of the information age. It is perhaps the Hollywood genre most directly concerned with the essence of cinema itself.

Same as: FILMSTUD 110

FILMSTUD 314. Introduction to Comics. 4 Units.

The modern medium of comics, a history that spans 150 years. The flexibility of the medium encountered through the genres of humorous and dramatic comic strips, superheroes, undergrounds, independents, journalism, and autobiography. Innovative creators including McCay, Kirby, Barry, Ware, and critical writings including McCloud, Eisner, Groensteen. Topics include text/image relations, panel-to-panel relations, the page, caricature, sequence, seriality, comics in the context of the fine arts, and relations to other media.

Same as: FILMSTUD 114

FILMSTUD 315. Documentary Issues and Traditions. 4 Units.

Issues include objectivity/subjectivity, ethics, censorship, representation, reflexivity, responsibility to the audience, and authorial voice. Parallel focus on form and content.

Same as: FILMSTUD 115

FILMSTUD 316. International Documentary. 4 Units.

Historical, aesthetic, and formal developments of documentary through nonfiction films in Europe, Asia, Latin America, and Africa.

Same as: FILMSTUD 116

FILMSTUD 332. East Asian Cinema. 4 Units.

Social, historical, and aesthetic dimensions of the cinemas of Japan, Hong Kong, Taiwan, mainland China, and Korea. Topics such as nation and gender, form and genre, and local and transnational conditions of practice and reception. Screenings include popular and art films from the silent to contemporary eras, including, Zhang Yimou, Wong Kar-wai, Hou Hsiao-hsien, Ozu Yasujiro, Kurosawa Akira, and Im Kwon-taek.

FILMSTUD 333. Contemporary Chinese Auteurs. 4 Units.

New film cultures and movements in Taiwan, Hong Kong, and mainland China in the 80s. Key directors including Jia Zhangke, Wu Wenguang, Tsai Ming-liang, Hou Hsiao-hsien, Wong Kar-wai, Ann Hui. Topics include national cinema in the age of globalization, the evolving parameters of art cinema, and authorship.

Same as: FILMSTUD 133

FILMSTUD 336. Gender and Sexuality in Chinese Cinema. 4 Units.

Representations of gender and sexuality in the cinemas of China, Taiwan, and Hong Kong, covering key periods and genres such as the golden age of Shanghai film, Hong Kong action pictures, opera films, post-socialist art films, and new queer cinema. Historical and contemporary perspectives on cinematic constructions of femininity, masculinity, and sexuality as they relate to issues of nationalism, modernity, globalization, and feminist and queer politics. Weekly screening required.

Same as: FILMSTUD 136

FILMSTUD 340. Film Aesthetics: Editing. 4 Units.

Practical and theoretical approaches to editing and montage. The role of editing in film meaning, and cognitive and emotional impact on the viewer. Developments in the history and theory of cinema including continuity system, Soviet montage, French new wave, postwar and American avant garde. Aesthetic functions, spectatorial effects, and ideological implications of montage. Film makers include Eisenstein, Godard, and Conner.

Same as: FILMSTUD 140

FILMSTUD 341. Music Across Media: Music Video to Postclassical Cinema. 4 Units.

What makes music videos, YouTube clips and musical numbers in today's films engaging? What makes them tick? Emphasis is on aesthetics and close reading. How music videos and its related forms work. Uses of the body, how visual iconography operates, what lyrics and dialogue can do, how and what music can say, and how it can work with other media. Questions of representation such as how class, ethnicity, gender, race, and nationality function. Viewership and industry practices.

Same as: FILMSTUD 141, MUSIC 185, MUSIC 385

FILMSTUD 345. Politics and Aesthetics in East European Cinema. 4 Units.

From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film.

Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica.

Same as: FILMSTUD 145

FILMSTUD 350. Cinema and the City. 4 Units.

Utopian built environments of vast perceptual and experiential richness in the cinema and city. Changing understandings of urban space in film.

The cinematic city as an arena of social control, social liberation, collective memory, and complex experience. Films from international narrative traditions, industrial films, experimental cinema, documentaries, and musical sequences. Recommended: 4 or equivalent.

Same as: FILMSTUD 150

FILMSTUD 355. Comics and the City. 4 Units.

Urban history and life informs the history, stories, structures and aesthetics of the comics, coinciding with the emergence of the modern metropolis in America and Europe and is rooted in the same industrial, commercial, and social transformations. Comics and cartoons were fixtures of urbane humor publications of the 19th century and became a valued fixture of the American newspaper in the very earliest part of the 20th. The characters in early comic strips were often denizens of the urban world, whether immigrants fresh off the boat or the nouveau riche. Many strips were grounded in quotidian urban experience. Later comics use the city as setting, aesthetic, and metaphor. The mean streets of Jacques Tardi's noirish cities about the rather sunnier and shinier example of Superman's Metropolis. Science fiction comics and manga give us the impacted and often destructed cities of the future. The graphic novel adaptation of Paul Auster's *City of Glass* maps the grid pattern of the comics page onto the gridded streets of Manhattan. Chris Ware's *Building Stories* series uses one apartment building to follow the myriad and sometimes intersecting lines found therein. Assigned readings include many comics alongside urban and comics scholarship. Artists to be considered include Outcault, Swinnerton, McCay, Eisner, Katchor, Tatsumi, Doucet, Tardi, Otomo, Hergeacute;, Mazzuchelli, Chaykin, Miller, Ware, Pekar, Crumb, Gloeckner.

FILMSTUD 357. Film Noir from Bogart to Mulholland Drive. 4 Units.

Why did prosperous mid-20th-century America produce a dark cinema of hard-boiled characters, gritty urban settings, stark high-contrast lighting, and convoluted plots? Key examples and the recent legacy of film noir: 40s and 50s Hollywood movies featuring anti-heroes, femmes fatales, shattered dreams, violence, and a heaviness of mood. Film noir's influences included pulp fiction; B-movie production-budgets; changes in Hollywood genres; left-populist aesthetic movements; a visual style imported by European eacute;migreacute; directors; innovations in camera and film technology; changes in gender roles; combat fatigue; and anxieties about the economy, communism and crime. Directors, writers, cinematographers and actors. Film viewings, readings and analyses.

Same as: FILMSTUD 157

FILMSTUD 364A. Technology and the Visual Imagination. 4 Units.

An exploration of the dynamic relationship between technology and the ways we see and represent the world. The course examines technologies from the Renaissance through the present day, from telescopes and microscopes to digital detectors, that have changed and enhanced our visual capabilities as well as shaped how we imagine the world. We also consider how these technologies influenced and inspired the work of artists. Special attention is paid to how different technologies such as linear perspective, photography, cinema, and computer screens translate the visual experience into a representation; the automation of vision; and the intersection of technology with conceptions of time and space.

Same as: ARTHIST 164A, ARTHIST 364A, FILMSTUD 164A

FILMSTUD 365A. Fashion Shows: From Lady Godiva to Lady Gaga. 4 Units.

The complex and interdependent relationship between fashion and art.

Topics include: the ways in which artists have used fashion in different art forms as a means to convey social status, identity, and other attributes of the wearer; the interplay between fashion designers and various art movements, especially in the 20th century; the place of prints, photography, and the Internet in fashion, in particular how different media shape how clothes are seen and perceived. Texts by Thorstein Veblen, Roland Barthes, Dick Hebdige, and other theorists of fashion.

Same as: ARTHIST 165A, ARTHIST 365A, FILMSTUD 165A

FILMSTUD 367B. Beyond the Fuzzy-Techie Divide: Art, Science, Technology. 4 Units.

Although art and science are often characterized as "two cultures" with limited common interests or language, they share an endeavor: gaining insight into our world. They even rely on common tools to make discoveries and visually represent their conclusions. To clarify and interrogate points of similarity and difference, each week's theme (time, earth, cosmos, body) explores the efforts of artists and scientists to understand and represent it and the role of technology in these efforts. Focus on contemporary examples.

Same as: ARTHIST 167, ARTHIST 367, FILMSTUD 167B

FILMSTUD 402. Frankfurt School & Film Theory. 5 Units.

Formal, historical, and cultural issues in the study of film. Classical narrative cinema compared with alternative narrative structures, documentary films, and experimental cinematic forms. Issues of cinematic language and visual perception, and representations of gender, ethnicity, and sexuality. Aesthetic and conceptual analytic skills with relevance to cinema.

FILMSTUD 404. Postwar American Avant Garde Cinema. 5 Units.

History and theory of post-WW II American independent and experimental film. Emphasis is on issues of audiovisual form, structure, and medium specificity. Films and writings include Maya Deren, Stan Brakhage, Michael Snow, and Hollis Frampton.

FILMSTUD 406. Montage. 5 Units.

Graduate seminar in film aesthetics. Theoretical and practical approaches to editing/montage. Stylistic, semiotic, epistemological, and ideological functions of montage considered in film-historical contexts including: development of the continuity system of editing; flourishing of the Soviet montage school; and achievements of the post-war new waves. Filmmakers include D. W. Griffith, Sergei Eisenstein, Jean-Luc Godard, and Dusan Makavejev.

FILMSTUD 410A. Documentary Perspectives I. 4 Units.

Restricted to M.F.A. documentary film students. Topics in nonfiction media. Presentations and screenings by guest filmmakers. Prerequisite: consent of instructor.

FILMSTUD 410B. Documentary Perspectives II. 4 Units.

Restricted to M.F.A. documentary film students. Continuation of 410A. Topics in nonfiction media. Presentations and screenings by guest filmmakers. Prerequisite: consent of instructor.

FILMSTUD 414. Comics. 5 Units.

Long derided as neither literature nor art, the medium of comics, with its complex juxtapositions of word and image and of images with one another, is increasingly understood as a supple and sophisticated mode of communication and expression. Dynamic new work is appearing on a weekly basis, and lavish reprint projects have made comics history more available for study and pleasure. This seminar simultaneously explores the aesthetic and historical parameters of the medium as well as the shape of comics scholarship. As comics are something of a hybrid form, the seminar will necessarily be interdisciplinary in approach. The treatment of time, rhythm, and tempo will be considered alongside explorations of line, panel, sequence, page, story, and seriality. The flexibility of the medium will be encountered by reading broadly in comic strips (humorous and dramatic), superheroes, undergrounds and independents, political satire and pedagogy, autobiography, experimental works, and children's comics, as well as recent iterations of the graphic novel.

FILMSTUD 436. Chinese Cinema. 5 Units.

Course surveys a range of critical perspectives and debates on Chinese cinema. It is organized on the basis of weekly topics, such as genre, historiography, gender, modernity, and the idea of national cinema. Consent of instructor required.

FILMSTUD 442. Hollywood Musical. 5 Units.

Physical, emotional, aesthetic, and social liberation mark this most colorful of film genres. Musicals are a place for staging issues of identity, including the impact of African American and Jewish culture, and issues of gay reception and interpretation. Attention to technologies of sound and color, the relation to vaudeville and Broadway, and ethnic and aesthetic diversity. Musicals as the epitome of filmic illusionism and the Hollywood studio system; the implications of their seduction of audiences; the meaning of spectacle, the centrality of performance. Busby Berkeley, Fred Astaire, Judy Garland, Bob Fosse, Stanley Donen, Gene Kelly, Vincente Minnelli.

FILMSTUD 445B. History and Politics in Russian and Eastern European Cinema. 5 Units.

From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film. Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica. Same as: FILMSTUD 245B, REES 301B

FILMSTUD 458. The Face on Film. 5 Units.

The seminar will discuss the workings of the face: as privileged object of representation, as figure of subjectivity, as mode and ethic of address, through film theory and practice. How has the cinema responded to the mythic and iconic charge of the face, to the portrait's exploration of model and likeness, identity and identification, the revelatory and masking play of expression, the symbolic and social registers informing the human countenance? At this intersection of archaic desires and contemporary anxieties, the face will serve as our medium by which to reconsider, in the cinematic arena, some of the oldest questions on the image. Among the filmmakers and writers who will inform our discussion are Aumont, Balaacutis, Barthes, Bazin, Bresson, Doane, Dreyer, Epstein, Hitchcock, Koerner, Kuleshov, Warhol, and others.

FILMSTUD 465. American Avant-Garde. 5 Units.

TBD.

FILMSTUD 490. Movies and Methods: Films of Stanley Kubrick. 5 Units.

Open to graduate students and advanced undergraduates with permission of the instructor; capstone course for majors (senior seminar). Topics vary year to year. Focus is on historiography and theory. Limited enrollment. Permission code needed in order to enroll. Same as: FILMSTUD 290

FILMSTUD 620. Area Core Examination Preparation. 5 Units.

For Art History Ph.D. candidates. Prerequisite: consent of instructor.

FILMSTUD 660. Independent Study. 1-15 Unit.

For graduate students only. Approved independent research projects with individual faculty members.

FILMSTUD 660E. Extended Seminar. 4 Units.

May be repeated for credit. (Staff).

Finance Courses

FINANCE 121. Undergraduate Finance Research and Discussion Seminar. 1 Unit.

This seminar is designed to provide some experience with research methods and topics in finance, and to assist undergraduates with career interests in financial research, whether academic or not, with preparation for those careers. The seminar meetings are weekly and discussion based, covering a range of issues and methods in financial economics. Students are expected to prepare a 30-minute research presentation once during the quarter.

FINANCE 201. Managerial Finance. 4 Units.

This course covers the foundations of finance with an emphasis on applications that are vital for corporate managers. We will discuss many of the major financial decisions made by corporate managers, both within the firm and in their interactions with investors. Essential in most of these decisions is the process of valuation, which will be an important emphasis of the course. Topics include criteria for making investment decisions, valuation of financial assets and liabilities, relationships between risk and return, capital structure choice, payout policy, the use and valuation of derivative securities, and risk management. This course is targeted to those students who are new to finance and for those with little quantitative background.

FINANCE 204. Managerial Finance - Accelerated. 4 Units.

This course covers the foundations of finance with an emphasis on applications that are vital for corporate managers. We will discuss many of the major financial decisions made by corporate managers, both within the firm and in their interactions with investors. Essential in most of these decisions is the process of valuation, which will be an important emphasis of the course. Topics include criteria for making investment decisions, valuation of financial assets and liabilities, relationships between risk and return, capital structure choice, the use and valuation of derivative securities (e.g., options and convertible securities), and risk management. This accelerated course is designed for those students who are relatively new to finance but who possess solid quantitative skills.

FINANCE 211. Corporate Finance: Applications, Techniques, and Models. 3 Units.

The focus of this basic course is on the corporate financial manager and how he/she reaches decisions. Topics include: financial modelling; financing methods of various sorts; capital investment; exchange-rate risk management; acquisitions; buyouts; and dealing with financial distress. In addition to corporations, both domestic and foreign, one session will be devoted to financing a non-profit. The course is designed as a natural follow-up to the Winter Quarter Managerial Finance course, and will draw on things learned in that course. F-211 embraces both the big picture and rigorous financial analysis. It is applied, but within a conceptual valuation-oriented framework. The primary vehicle of instruction is the case method, supplemented with lectures. The emphasis throughout is on making a decision on the basis of well supported analyses. Class participation is important, and cold calls will occur with regularity.

FINANCE 214. Accelerated Corporate Finance: Applications, Techniques, and Models. 3 Units.

The focus of this course is to apply the fundamental ideas and tools of corporate finance to real-world corporate decisions. This course (in either its basic or accelerated format) is designed to be the second course in a standard finance sequence; that is, it is designed to be the natural follow-up to the Winter Managerial Finance course. This course will develop and extend standard tools and techniques of financial analysis, valuation, and model-building, and apply these methods to a wide range of cases. Case topics will include capital structure, valuation, mergers and acquisitions, private equity and venture capital, international finance, hostile takeovers and leveraged buyouts, financial distress and bankruptcy. Students will be expected to develop detailed model-based analyses for the cases using the tools and techniques we develop in this course, and to employ their analyses to reach and defend specific recommendations for these cases.

FINANCE 221. Finance for Non-MBAs. 3 Units.

This course, intended for graduate students and advanced undergraduates, covers the foundations of finance with applications in corporate finance and investment management. It discusses many of the major financial decisions made by managers and investors, emphasizing the process of valuation. Topics include criteria for making investment decisions, risk and return, market efficiency, capital structure, and the valuation of derivative securities (e.g., options). The course also provides coverage of the major financial instruments issued by corporations. Prerequisite: ability to use spreadsheets, knowledge of basic probability and statistics concepts, including random variables, expected value, variance, covariance, and simple estimation and regression. For registration questions about this course, please contact the Graduate School of Business at academic_operations@gsb.stanford.edu.

FINANCE 229. MSx: Finance. 4 Units.

This course covers the foundations of corporate finance including the management of liquidity, capital structure, financial forecasting, dividend policy, financial distress, cost of capital and capital budgeting. It discusses the major financial decisions made by corporate managers and the impact of those decisions on investors and the value of the firm. Topics include criteria for understanding the valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the role of derivative securities including options. The course also provides coverage of the role of financial markets in the operations of the firm.

FINANCE 310. Managerial Finance - Advanced. 4 Units.

This course covers the foundations of finance with an emphasis on applications that are vital for corporate managers. We will tackle most of the important financial decisions made by corporate managers, both within the firm and in their interactions with investors. Essential in most of these decisions is the process of valuation, which will be an important emphasis of the course. Topics include criteria for making investment decisions, valuation of financial assets and liabilities, relationships between risk and return, capital structure choice, payout policy, the use and valuation of derivative securities (e.g., options and convertible securities), and risk management. This advanced course is targeted to those with a strong background in finance and (at least) solid quantitative skills.

FINANCE 319. Private Equity Investing Seminar. 4 Units.

This seminar focuses on private equity investing, including investments with control, buyouts, and minority investments at various stages in a company's life. Private equity investing activity has grown significantly over the past decade. This seminar explores selected topics in private equity investing for those MBA students who take the corequisite course FINANCE 321, Investment Management and Entrepreneurial Finance. Private equity includes both established and early stage companies. The course extends and deepens the entrepreneurial finance area for those with an interest in private equity, venture capital and principal investing, taking a global view. Utilization will be made of original case studies and lecture-discussions, building on the framework of FINANCE 321. The Seminar meets with outstanding investors. All those registered in F321.1 will also be registered in F319. See yellow Term Sheet put in MBA Boxes in early May. All those registered in F321.2 will also be registered in F329. See yellow Term Sheet.

FINANCE 320. Debt Markets. 4 Units.

This course is intended for those who plan careers that may involve debt financing for their businesses or other investments, or involve trading or investing in debt instruments and their derivatives, including money-market instruments including central bank deposits, government bonds, repurchase agreements, interest-rate swaps, mortgage-backed securities (MBS), corporate bonds, structured credit products, and credit derivatives. We will emphasize institutional features of the markets, including trading, pricing, and hedging. There is a special focus on distressed debt. Most lectures will start with a cold-called student presentation of an un-graded short homework calculation. There will also be a series of graded homework, an in-class mid-term, and about six graded 'pop quizzes' of 10 minutes or less.

FINANCE 321. Investment Management and Entrepreneurial Finance. 3 Units.

Equity investment in companies, common stocks, early/growth stage ventures, deals, partnerships, hedge funds, or other entrepreneurial opportunities will be immediately or eventually important for most MBAs—either on the investing side or on the fund-raising financing side. This investment course discusses many practical and conceptual factors influencing the analysis and value of companies and deals, including publicly listed and private equity investments, and on success of investment approaches. The focus of this course is on quoted and private equity investments and on entrepreneurial finance. The format of the class is primarily case discussions and lecture discussions led by the professor and investors/principals who were involved in the case. This course enables MBA students to learn a broad investing skill-set and to study outstanding investors. See yellow Term Sheet put in MBA Boxes in early May.

FINANCE 322. Financial Intermediaries and Capital Markets. 4 Units.

This course focuses on financial markets, institutions, and instruments. We consider when and how firms raise capital through the life cycle, beginning with the capital-raising decisions and transactions for young firms and then discussing the decisions facing older, listed firms. We concentrate mainly on the firm's perspective while also considering the perspective of financial intermediaries. Issues to be considered in this course include the role of financial intermediaries like banks, the decision to go public, the pricing and role of investment banks in IPOs, bank debt, project finance, public debt, private placements, securitizations, convertibles, and markets for junk bonds.

FINANCE 324. Practical Corporate Finance. 4 Units.

The focus of this course is to apply the fundamental ideas of corporate finance to real-world problems. This course is a follow-up to the Fall course in Managerial Finance in which the basics of finance and valuation were covered. We will explore both how to make the acquired knowledge practical as well as to deepen our understanding of the core principles of finance. During the course we will analyze cases covering a wide range of topics such as capital structure, private equity and venture capital, mergers and acquisitions, hostile takeovers and leveraged buyouts, as well as bankruptcy and financial distress. These cases provide an opportunity to bridge the gap between theory and real-life situations. Students are expected to develop their own spreadsheets and provide recommendations based on their analysis of the case material. This course was formerly known as FINANCE 224. An accelerated version of this course is offered as FINANCE 331.

FINANCE 326. Derivative Securities. 4 Units.

This course is an introduction to options, futures and other derivative securities. The goal is to learn a core set of principles that underlie the pricing and use of derivatives. In particular, we will cover the valuation and use, both for risk management and for speculation, of forwards, futures, swaps, and options; the Black-Scholes option-pricing formula; delta-hedging; credit derivatives; financial risk management; and the role of derivatives in the recent financial crisis.

FINANCE 327. Financial Markets. 4 Units.

The aim of this course is to develop a thorough understanding of financial markets. We explore how investors make decisions about risk and return, how financial markets price risky assets in equilibrium, and how financial markets can sometimes malfunction. The course puts particular emphasis on the role of real-world imperfections that are absent from the standard textbook view of financial markets. For example, we explore the role of illiquidity: Why are there liquid markets for some types of assets but not for others? Why does liquidity often disappear in times of market turmoil? We will also study recent insights from behavioral finance about investor psychology and market inefficiencies. Moreover, we will look at financial innovations such as credit-default swaps, securitization, and hedge funds that play important roles in financial markets these days. We use cases to develop these topics in the context of practical decision-problems in the areas of asset allocation, risk management, and financing.

FINANCE 329. Investment Seminar. 4 Units.

"Global Principal Investing/Hedge Funds" is a seminar on selected topics in masterful investing in publicly traded and private equity/venture capital investments, with focus on the principal's point of view. We study hedge funds and mutual funds and meet with outstanding investors. The scope and context is global including emerging markets. The Seminar is taught by a founding director of one of the largest international investment funds. All those registered in F321.1 will also be registered in F319. See yellow Term Sheet put in MBA Boxes in early May. All those registered in F321.2 will also be registered in F329. See yellow Term Sheet.

FINANCE 330. Investment Management: Asset Allocation and Asset/Manager Selection. 4 Units.

This course covers strategic and tactical asset allocation in investment portfolios as well as specific asset and manager selection issues. We consider challenges that are unique to the various asset classes that comprise broad-based portfolios, including: public equities, fixed income securities, private equity (both buyout and venture capital), hedge funds, and real assets (real estate, energy, timber, and commodities). We also consider challenges that are specific to various geographies (e.g., domestic, developed international and emerging markets) across the various asset classes. The portfolio optimization framework employed considers the perspective of different types of investors that vary along such dimensions as risk preference, investment horizon, tolerance for illiquidity, tax status, social objectives, and special asset-specific relationship, information or skill advantages. More specifically, our framework considers: tradeoffs between seeking diversification to control risks, and making concentrated bets where there appears to be outsized return prospects (whether due to one-off proprietary investment opportunities or the market appearing to value certain sectors improperly); tradeoffs between passive investment (at low administrative cost and complexity) and active investment designed to produce premium returns (despite the incremental cost and complexity); distinctions between investing as principals and delegating to managers, and the importance of aligning incentives among all parties; the importance of liquidity in driving the pricing, risk and expected returns to various asset classes and the importance of identifying which parties are natural suppliers of liquidity and which the natural demanders; the importance of effective underwriting and ongoing monitoring of investment opportunities; the importance of tax considerations in the pricing and expected returns to various asset classes; and the importance of identifying which parties form the natural clientele in each asset class. For a number of the sessions, we will invite domain experts to add spice and depth to a portion of the class discussion.

FINANCE 331. Practical Corporate Finance. 4 Units.

(Note: this course was formerly known as FIN 230) The main aim of this course is to enable students to apply the fundamental ideas of finance to problems in the area of corporate finance with all the complexities the real world entails. The course is a follow-up to the Fall Managerial Finance course where students learnt basics of valuation techniques and various finance applications. We will explore both how to make all this knowledge practical as well as how to deepen our knowledge of fundamental finance ideas. The main focus of this course is on the corporate financial manager and how he/she reaches decisions as to investments, dividends and financing of all sorts. Topics include leveraged buyouts, hostile takeovers, private equity financing and venture capital, financial distress and bankruptcy, mergers and acquisitions, managing working capital. The cases will be used to motivate our discussion of how to bridge the gap between rigorous finance theory and its application to practical problems in corporate finance. The course is case-based and more advanced than FINANCE 324. "Advanced" means that we will discuss a lot of subtle qualitative issues as well as explore deeper fundamental applications of core finance ideas. The course is intensive and will require students to prepare carefully all cases, read and understand a lot of materials, and actively participate in the class discussion. The main teaching method is cold calling.

Same as: Accelerated

FINANCE 332. Finance and Society. 3 Units.

This interdisciplinary course will discuss the role of the financial system within the broader economy and the interactions between the financial industry and the rest of society. The course will provide an overview of the financial system, cover the basic economic principles essential for understanding the role of finance in the economy, and discuss of policy issues around financial regulation. It seeks to mix students from GSB, Law School, Public Policy, Economics, Political Science, and other departments. Topics to be discussed include: * The financial system, from microfinance to global megabanks: how and why finance can benefit society as well as endanger and harm. * Financial regulation: why and how? * Other people's money: the challenge of effective control, governance, and trust. * The politics of banking and finance. * Ethical issues in finance.

FINANCE 335. Corporate Valuation, Governance and Behavior. 4 Units.

This course will develop a detailed knowledge of corporate valuation techniques, together with an understanding of the role such valuations play in a wide range of corporate financing decisions. First, the course will carefully consider different valuation techniques, the assumptions that underlie each of these methods, how they are applied in practice, how they are related to one another, and how to decide which method of valuation is appropriate for a given application. After developing these tools, they will then be applied to a wide range of corporate finance settings. Among the applications to be considered are mergers and acquisitions, international valuation, corporate governance, financial distress, agency conflicts, asymmetric information, and overvaluation. For all of these applications, this course will emphasize the central importance of valuation to understanding observed phenomena and to guiding optimal decision making, as well as the unique challenges to valuation posed by the particular application.

FINANCE 336. The Finance of Retirement and Pensions. 4 Units.

The financial economics of how retirement is financed, particularly in the US. Topics: basic finance concepts necessary for understanding individual retirement savings. Properties of financial instruments such as bonds and stocks. Optimization of individual retirement account or 401(k) portfolios. Defined benefit pensions. Measuring defined benefit pension liabilities. Impact of defined benefit pension liabilities on corporate, state, and local budgeting. The economics of national retirement policy including Social Security and government treatment of private retirement savings.

FINANCE 341. Modeling for Investment Management. 3 Units.

This course will combine practical and up-to-date investment theory with modeling applications. Understanding beautiful theory, without the ability to apply it, is essentially useless. Conversely, creating state-of-the-art spreadsheets that apply incorrect theory is a waste of time. Here, we try to explicitly combine theory and application. The course will be divided into 6 modules, or topics. The first day of each module will be a lecture on an investment topic. Also provided is a team modeling project on the topic. The second day of each module will be a lab. The lab day will begin with modeling concepts (tips) designed to help you use Excel to implement the module's investment topic. After the tips are provided, the remainder of the lab day is devoted to teams working on their modeling project and allowing for Q&A. On the third day of each module will be presentations and wrap-up.

FINANCE 345. History of Financial Crises. 4 Units.

Financial crises are as old as financial markets themselves. There are many similarities between historical events. The recent credit crisis, for example, is far from unique. More often than not financial crises are the result of bubbles in certain asset classes or can be linked to a specific form of financial innovation. This course gives an overview of the history of financial crises, asset price bubbles, banking collapses and debt crises. We start with the Tulip mania in 1636 and end with the recent credit and debt crises. The purpose of the course is to understand the causes of past crises and to develop a conceptual framework that ties common elements together. We will discuss the lessons that we can draw for financial markets today.

FINANCE 346. Institutional Money Management. 3 Units.

The object of this course is to study the money management industry from the perspective of the user --- an investor who wants to invest money. This course will study the main components of the money management industry: mutual funds, hedge funds, private equity funds and venture capital funds. It will also examine important users of the industry such as non profits, endowments and defined benefit pension funds. The emphasis of the course will not be on how fund managers make money, but rather on how the industry is organized, how managerial skill is assessed, how compensation is determined, and how economic rents are divided between managers and investors. The course will explore how competitive market forces interact with managerial skill and other market frictions to give rise to the observed organization of the industry.

FINANCE 347. Money and Banking. 3 Units.

This course is designed to help students understand the connections between money (the Federal Reserve), financial markets, and the macroeconomy. How are interest rates determined, and how does the Federal Reserve conduct monetary policy? What economic factors drive the yield curves in different bond markets? We will pay particular attention to the banking system, with an eye toward understanding the function and importance of banks. Topics will include the role of the Federal Reserve as a lender of last resort during the recent, and prior, financial crises, unconventional monetary policy tools such as quantitative easing and forward guidance. We discuss the role of the government in regulating the financial sector, paying particular attention to capital requirements for banks. We will often begin class with a discussion of current macro-financial market events in the context of our course coverage. The course is appropriate for anyone trying to gain a macroeconomic perspective on capital markets, from investors to bankers, or those simply interested in the linkages between interest rates, banks and the economy. Given the topics we cover, the course will also be interesting to those who want a better understanding of the 2007-2009 financial crisis and the ongoing Federal Reserve experiment in unconventional monetary policy.

FINANCE 350. Corporate Financial Modeling. 4 Units.

The course will take the perspective of a mid-level manager or decision-maker who is responsible for collecting, analyzing, and utilizing financial information in the context of a major transaction. We will integrate theories presented throughout courses in the core, particularly accounting and finance, and take a hands-on approach to understand how the theory is implemented in practice. The focus of the course will be on developing critical financial modeling skills, understanding best practices, and recognizing common pitfalls. Students will work on a series of cases and build models that can be used for earnings and pro-forma financial statement forecasts, valuation, the assessment of financing needs, merger analysis, and LBO evaluation. Students will also gain experience presenting financial models and critically assessing them. By the conclusion of the course, students will develop the skills to construct complex financial models and the logical frameworks to utilize them for various organizational applications. [Note: This course is geared toward students relatively new to financial modeling; those with extensive financial modeling backgrounds may be better served by an alternative course.].

FINANCE 351. Advanced Corporate Financial Modeling. 4 Units.

Students will engage in the development of corporate financial modeling cases and solutions. Students will also develop materials to aid others in building financial models, and serve as case leaders during lab workshops. Extensive background in financial modeling and experience with Excel is required.

FINANCE 361. Behavioral Finance. 4 Units.

This course provides an introduction to behavioral finance, a discipline which integrates insights from psychology into the study of financial decisions and markets. There will be a focus on understanding the psychological underpinnings of financial decision-making as well as the institutional frictions that may allow these psychological mechanisms to influence economic outcomes. Applications include the pricing of assets relative to fundamental value, trading strategies, managerial behavior, and household savings and investment decisions. Conceptual issues will be emphasized through a mix of case discussions and lectures, and quantitative exercises will serve to develop analytical tools for making financial choices.

FINANCE 373. Entrepreneurial Finance. 4 Units.

This is a course about the financial decision-making process for start-up firms. The course takes a two-pronged approach: First, we develop tools and concepts of corporate finance related to modeling, valuation, control, and investment decisions within an entrepreneurial context. Second, we use cases with firms at different stages of their life cycle from initial angel or venture capital investments through exit decisions, to see the issues that arise when these principles are applied in practice. In some cases we take the viewpoint of the entrepreneur and in others the viewpoint of the investor. After all, as an entrepreneur, you cannot negotiate effectively without understanding the investor's motivations. Conversely, you cannot evaluate a potential investment opportunity without appreciating the entrepreneur's perspective and incentives. Finally, we explore new developments in entrepreneurial finance such as crowdfunding and early liquidity provision.

FINANCE 377. China's Financial System. 4 Units.

This course is a survey of China's financial system, including its banking industry, monetary policy structure, and financial markets (bonds, derivatives, equities, foreign exchange, and related markets). The goal is an integrated view of how capital, risk, and liquidity are intermediated within China and cross-border, by comparison with more developed financial systems. Recent history and current trends (including liberalization of markets) will be emphasized. Coverage will be through lectures, reading of both primary source documents and secondary (journalistic and analyst) commentary, as well as a range of speakers who are subject matter experts. Students will participate actively in class discussion, make a 5-minute topical presentation, and submit a short (10-page) paper.nn.

FINANCE 381. Private Equity in Frontier Markets: Creating a New Investible Asset Class. 4 Units.

In 2001, Jim O'Neil of Goldman Sachs wrote a research note which underscored the importance of so-called Emerging Markets to a well-balanced investment portfolio. Still today, most investors have little or no investment exposure beyond North America, Europe, Japan and more recently India, China and Brazil. All of this is just beginning to change. The not yet fully formed investment category called frontier market private equity is emerging and within the next decade is likely to be an asset class of its own. Private equity investments are being made in southeast Asia, in MENA (Middle East/ North Africa), in sub-Saharan countries beyond South Africa and in Latin America. Even fund of funds are appearing across these markets. At the same time, investors face a world of diminished returns expectations in developed economies just as aging demographics and the need for continued growth, innovation and infrastructure renewal places increasing demands for payout. Suffice it to say, investors will be looking beyond traditional asset classes and geographies for sources of return. This new course is designed to expose you to the still emerging, not yet fully formed world of frontier market private equity. To set the context we will start by reviewing the fundamentals of economic growth and development globally. In addition we will discuss the fundamental concepts involved in constructing and evaluating the performance of a large scale investment portfolio. We will then review cases on the elements of the private equity cycle/process and specifically address the special demands of frontier markets in general. We will also focus on issues that are specific to various markets (e.g. Nigeria, Vietnam, etc.). Students taking the course will be given the opportunity to make important contributions to the knowledge base of this still very young field by working in small teams to research topics of personal and general interest, the results of which will be reported to the rest of the class.

FINANCE 385. Angel and Venture Capital Financing for Entrepreneurs and Investors. 4 Units.

This course covers all the stages of funding for early stage high-growth companies, from seed funding to venture capital rounds to a successful exit. We will concentrate on how entrepreneurs and investors make and should make important decisions. Examples of issues that we will cover are: How can entrepreneurs raise funding successfully? What are typical mistakes entrepreneurs make in raising capital and negotiating with investors? How to choose your investor? How to pitch to an investor? How do angels and VCs generate and process their deal flow and select companies? How are VCs involved in business decisions such as recruiting talent and replacing CEOs? What are the important provisions of financial contracts between VCs and founders? How to value early-stage companies? The course is very applied and mostly case-based. We will discuss a lot of nitty-gritty details that is a must for founders and investors. As a part of the course, students will work on their business ideas, pitch to classmates and a group of top VCs in the Valley. This VCs will work with student groups as VC advisors and we will simulate the VC partner meetings. We will have a lot of speakers and case protagonists, founders, angels, and VCs. No prior knowledge of the VC industry is needed.

FINANCE 555. Private Wealth Management and Private Investing. 2 Units.

The Private Wealth Management and Private Investing course will address issues that relate to the management of personal assets as opposed to institutional investing. It will cover the historical origins and growth of private wealth management, investment planning, risk management, inter-generational transfers of wealth, philanthropy and tax planning. Classes will focus on case studies and various readings. Two instructors will lead the class, one from the GSB and one from the private wealth management industry. Most classes will be augmented by visits from professionals in the wealth management and private banking business. Active class participation and a group project are required.

FINANCE 559. The World of Investing. 1 Unit.

This is a 9-week speaker series, exposing students to the world of first-class public market investors. Each week will have a different visitor describing their investment philosophy, strategy and experience. Full attendance is a requirement to pass the course. Absences must be explicitly excused.

FINANCE 562. Financial Trading Strategies. 2 Units.

The purpose of this course is to familiarize students with the different types of trading strategies employed by various money management institutions. These financial trading strategies are used to manage the risk and return profiles of specific portfolios. Throughout the sessions, students will be challenged to understand and explore the application and implementation of these different strategies. Trading simulations employed on the Rotman Interactive Trader and Rotman Portfolio Manager (using real market data and computer generated data) will be used extensively in this course as a way to learn and test different strategies. All classes will be held in the new Real-time Analytics and Investment Lab (RAIL), located on the third floor of the Bass Building (B312). Students are expected to attend all sessions. Graded are based on in-class simulation results, class participation, and two written assignments. This course is designed to have a fast learning curve and is a pre-requisite for FIN563, the advanced extension of this course.

FINANCE 563. Financial Trading Strategies 2. 2 Units.

This course is an extension of FIN562, Financial Trading Strategies. Students will expand on introductory topics from the Financial Trading Strategies Course and be required to build extensive live-market models and risk management models. Class discussions will closely link current market events and pricing anomalies to theoretical and simulated markets and we will closely study the deviations between them.

FINANCE 587. Private Equity - An Overview of the Industry. 2 Units.

This 2-unit elective at the GSB is an analytical review and overview of private equity partnerships. The course looks at all aspects of private equity investing and may be of interest to five groups of students: (i) students who aspire to be employed in private equity as a career; (ii) students who plan to be employed by operating companies that are owned by private equity firms; (iii) students who may invest in private equity partnerships as a limited partner; (iv) students who find private equity to be an interesting part of the financial community in general (v) students who expect to participate in corporate business development or mergers and acquisitions. The course will meet for nine classes, most for a duration of 90 minutes. One class will be a mock investment review committee presentation as a final project.

FINANCE 620. Financial Markets I. 3 Units.

This course is an introductory PhD level course in financial economics. We begin with individual choice under uncertainty, then move on to equilibrium models, the stochastic discount factor methodology, and no-arbitrage pricing. We will also address some empirical puzzles relating to asset markets, and explore the models that have been developed to try to explain them.

FINANCE 621. Financial Markets II. 4 Units.

This course continues F620 and covers a number of main concepts in market microstructure. Among the topics that are covered are (i) Rational Expectations models and their foundations (ii) strategic trading models (iii) models of market and funding liquidity. In addition to the discussion of theoretic models time will be allotted to empirical applications.

FINANCE 622. Dynamic Asset Pricing Theory. 4 Units.

This course is an introduction to multiperiod models in finance, mainly pertaining to optimal portfolio choice and asset pricing. The course begins with discrete-time models for portfolio choice and security prices, and then moves to a continuous-time setting. The topics then covered include advanced derivative pricing models, models of the term structure of interest rates, the valuation of corporate securities, portfolio choice in continuous-time settings, and general-equilibrium and over-the-counter asset pricing models. Students should have had some previous exposure to general equilibrium theory and some basic courses in investments. Strong backgrounds in calculus, linear algebra, and probability theory are recommended. Problem assignments are frequent and, for most students, demanding. Prerequisite: F620 or permission of instructor.

FINANCE 624. Corporate Finance Theory. 4 Units.

This course considers a wide range of topics in theoretical corporate finance (broadly interpreted). Topics include capital structure decisions, agency conflicts in the firm, dividend policy, security design, optimal financial contracting, the theory of the firm, the market for corporate control, and banking and financial intermediation, among others. The primary focus is on how asymmetric information, agency conflicts, strategic interactions, and incomplete contracting affect corporate financial decision-making. The course aims both to familiarize students with influential papers and current research, and to promote new research ideas in the area.

FINANCE 625. Empirical Asset Pricing. 4 Units.

This course is an introduction to empirical research in asset pricing. The focus of the course is on the interplay between financial economic theory, econometric method, and that analysis of financial market data. Topics include tests of asset pricing models, return predictability in time-series and cross-section, empirical studies of asset market imperfections, and studies of individual and professional investor behavior. Class discussions will draw on textbooks/monographs and original articles and working papers.

FINANCE 626. Advanced Corporate Finance. 3 Units.

This is a course on contemporary theoretical and empirical issues in corporate finance. Building upon the first-year courses in corporate finance theory and empirical methods in finance, we will examine issues in asset pricing applications to corporate finance, dynamic capital structure (dynamic financing decisions), financial distress, financing and investment interactions, and behavioral corporate finance. Both conceptual economic frameworks and econometric methods will be developed as needed. A requirement for this course is that students complete two written projects, one theoretical and one empirical, and at least one of these projects will be presented to the class.

FINANCE 628. Finance Pre-Seminar Reading Course. 1 Unit.

Finance Pre-Seminar Reading.

FINANCE 630. Empirical Corporate Finance. 3 Units.

This course provides an introduction to empirical research in corporate finance, with an emphasis on the application of cross-sectional and panel data econometric techniques for causal inference. Topics include investment policy, entrepreneurship and innovation, financing decisions, firm ownership, corporate governance, managerial incentives, financial contracting, and the structure and internal organization of firms. The course assumes knowledge of econometrics at the level of MGTECON 603.

FINANCE 632. Empirical Dynamic Asset Pricing. 4 Units.

This course explores the interplay between dynamic asset pricing theory, statistical assumptions about sources of risk, and the choice of econometric methods for analysis of asset return data. Therefore, the lectures will be a blend of theory, econometric method, and critical review of empirical studies. Both arbitrage-free and equilibrium preference-based pricing models will be discussed, with particular emphasis given to recent developments and outstanding puzzles in the literature. The prerequisites for F632 are MGTECON 603 - 604, Finance 620, Finance 622, and Finance 625. In particular, I will assume familiarity with dynamic asset pricing theory, at the level of F622; and large-sample theory for least-squares, generalized method-of-moments, and maximum likelihood estimation methods. We will review these methods in the context of specific applications, but this material will not be developed in depth.

FINANCE 633. Advanced Empirical Corporate Finance. 4 Units.

This class is devoted to recent developments in the empirical corporate finance literature. Topics include: financial contracting, liquidation and renegotiation, taxation and capital structure, the role of labor markets, leveraged buyouts, executive compensation, the causes and consequences of the financial crisis, and implications of finance for the public sector. The class is very interactive. Many of the sessions will consist of student presentations about the papers from the reading list. We will also further explore empirical methods relevant for applied research in corporate finance, with a focus on identification and panel data issues.

FINANCE 635. Advanced Topics in Empirical Asset Pricing. 3 Units.

This course will survey current research topics in empirical asset pricing. The emphasis will be on giving students exposure to active research areas and open questions rather than well-established areas and empirical techniques. Topics may include liquidity, capital market frictions, money management, volatility, investment-based asset pricing, return predictability, bubbles, and consumption-macro asset pricing models.

FINANCE 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

FINANCE 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

FINANCE 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

French General Courses

French Language Courses

FRENLANG 1. First-Year French, First Quarter. 5 Units.

Proficiency-based. Development of discourse appropriate in French and Francophone contexts.

FRENLANG 1A. Accelerated First-Year French, Part 1. 5 Units.

Completes first-year language sequence in two rather than three quarters. Recommended for students with previous knowledge of French who place into FRENLANG 1A on the placement test or who are familiar with another Romance language. FRENLANG 2A fulfills the University foreign language requirement. Prerequisite: Placement Test.

FRENLANG 1G. Accelerated First-Year Business French, Part 1. 4 Units.

For GSB students only. Limited enrollment.

FRENLANG 2. First-Year French, Second Quarter. 5 Units.

Continuation of FRENLANG 1. Proficiency-based. Development of discourse appropriate in French and Francophone contexts. Prerequisite: Placement Test, FRENLANG 1 or equivalent.

FRENLANG 2A. Accelerated First-Year French, Part 2. 5 Units.

Continuation of FRENLANG 1A. Completes first-year language sequence in two rather than three quarters. Recommended for students with previous knowledge of French who place into FRENLANG 1A on the placement test or who are familiar with another Romance language. Fulfills the University foreign language requirement. Prerequisite: FRENLANG 1A, Placement Test.

FRENLANG 2G. Accelerated First-Year Business French, Part 2. 4 Units.

For GSB students only. Limited enrollment.

FRENLANG 3. First-Year French, Third Quarter. 5 Units.

Continuation of FRENLANG 2. Proficiency-based. Development of discourse appropriate in French and Francophone contexts. Prerequisite: Placement Test, FRENLANG 2 or equivalent. Fulfills the language requirement.

FRENLANG 3G. Accelerated First-Year Business French, Part 3. 4 Units.

For GSB students only. Limited enrollment.

FRENLANG 5A. Intensive First-Year French, Part A. 5 Units.

Same as FRENLANG 1. Accelerated. Written exercises, compositions, conversational practice, and daily work. Only Stanford graduate students restricted to 9 units may register for 205A,B,C.

FRENLANG 5B. Intensive First-Year French, Part B. 5 Units.

Same as FRENLANG 2. Continuation of 5A. Written exercises, compositions, conversational practice, and daily work. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

FRENLANG 5C. Intensive First-Year French, Part C. 5 Units.

Same as FRENLANG 3. Continuation of 5B. Written exercises, compositions, conversational practice, and daily work. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Fulfills the University language requirement. Prerequisite 2 or 5B.

FRENLANG 10. Beginning French Oral Communication. 2 Units.

For students who have completed FRENLANG 2 or equivalent. Emphasis is on speaking skills, vocabulary, and pronunciation. May be repeated once for credit.

FRENLANG 15. Intermediate French Oral Communication. 2 Units.

For students who have completed the first-year language requirement. May be repeated once for credit.

FRENLANG 15S. Intermediate Conversation: French in Everyday Life. 3 Units.

Same content as 15. May be repeated once for credit. Prerequisite: one year of college French or equivalent.

FRENLANG 20A. France and Francophonie. 2 Units.

Second-year French conversation based on themes from the regions of France and the Francophone world. Intermediate-level speaking skills and advanced-level functions. Topics include travel, food, and crosscultural comparisons. Students returning from study abroad programs are encouraged to enroll. May be repeated once for credit. Prerequisite: FRENLANG 21C or equivalent.

FRENLANG 20B. French Cinema. 2 Units.

Second-year French conversation based on films. Intermediate-level speaking skills and advanced-level functions. Themes include: French filmmakers, stars, and trends. Required film viewing in and outside class in French. May be repeated once for credit. Prerequisite: FRENLANG 21C or equivalent.

FRENLANG 20C. Contemporary French Language. 2 Units.

Second-year French conversation. Intermediate-level speaking skills and advanced-level functions for formal and informal situations. Useful for students planning to travel or study abroad. May be repeated once for credit. Prerequisite: FRENLANG 21C or equivalent.

FRENLANG 21C. Second-Year French: Cultural Emphasis, First Quarter. 4-5 Units.

Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socio culturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: Placement Test, one year of college French.

FRENLANG 22C. Second-Year French: Cultural Emphasis, Second Quarter. 4-5 Units.

Continuation of FRENLANG 21C. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socio culturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: Placement Test, FRENLANG 21C.

FRENLANG 23C. Second-Year French: Cultural Emphasis, Third Quarter. 4-5 Units.

Continuation of FRENLANG 22C. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socio culturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: placement Test, FRENLANG 22C.

FRENLANG 24C. Second-Year French: Literary Texts. 3-4 Units.

Proficiency oriented. Discussion, writing, reading, and listening comprehension based on literary texts. Prerequisite: 23.

FRENLANG 24R. Second-Year French: International Relations, Political Science, and Economics Emphasis. 3-4 Units.

Proficiency-based. Discussion, writing, reading, and listening comprehension based on political, economic, and social topics. Prerequisite: 23.

FRENLANG 50S. Reading French. 2-4 Units.

Same content as 50.

FRENLANG 60A. Beginning French Conversation. 1 Unit. (AU).**FRENLANG 60B. Intermediate French Conversation. 1 Unit. (AU) (Staff).****FRENLANG 60C. Advanced French Conversation. 1 Unit.****FRENLANG 60D. French Viticulture. 1 Unit.**

See <http://stanfordmaisonfrancaise.wordpress.com> Prerequisite: 21 or older. (AU).

FRENLANG 60E. French Cooking. 1 Unit. (AU).**FRENLANG 60F. French Cinema. 1 Unit.**
May be repeated for credit. (AU).**FRENLANG 60N. French cheese. 1 Unit.****FRENLANG 60P. Advanced Viticulture. 1 Unit.**

Prerequisite: Completion of 60D. (AU).

FRENLANG 60T. Teaching French Conversation. 1 Unit. (AU).

FRENLANG 120. Advanced French Oral Communication. 3 Units. Speaking skills and functions including narration, description, supporting opinions, and hypothesizing about current events and issues in France. May be repeated once for credit. Prerequisites: FRENLANG 23C or equivalent.

FRENLANG 121. Introduction to French Texts. 3-4 Units.

Readings of major literary figures and themes from medieval times to the present. Prerequisite: 23. Recommended: 124.

FRENLANG 122. Introduction to French Culture and Civilization. 3-4 Units.

Discussion of French art, geography, history, political change, and social institutions. Prerequisite: 23 or equivalent.

FRENLANG 123. French Creative Writing. 3-4 Units.

Advanced. Model texts introduce students to genres and styles; review of grammar and vocabulary. Discussion of original writing by students. Prerequisite: 23 or equivalent.

FRENLANG 124. Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture. 4-5 Units.

Required for students majoring or minoring in French; recommended for students planning to take literature courses. Review of difficulties in French. Grammatical and logical analysis. Prerequisite: FRENLANG 23C or equivalent.

FRENLANG 125. French Phonetics. 3-4 Units.

For majors and other students who plan to enroll in advanced courses. Study and practice of the French language sound system. Language lab. Prerequisite: 23 or equivalent.

FRENLANG 199. Language Specials. 1-5 Unit.

Prerequisite: consent of instructor.

FRENLANG 205A. Intensive First-Year French for Stanford Grads, Part A. 3-5 Units.

Equivalent to FRENLANG 5A. For Stanford graduate students only. Accelerated. Written exercises, compositions, conversational practice, and daily work. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units.

FRENLANG 205B. Intensive First-Year French for Stanford Grads, Part B. 3-5 Units.

Equivalent to FRENLANG 5B. For Stanford graduate students only. Continuation of 205A. Accelerated. Written exercises, compositions, conversational practice, and daily work. Prerequisite 205B or equivalent. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205A or equivalent.

FRENLANG 205C. Intensive First-Year French for Stanford Grads - Part C. 3-5 Units.

Equivalent to FRENLANG 5B. For Stanford graduate students only. Continuation of 205B. Accelerated. Written exercises, compositions, conversational practice, and daily work. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205B or equivalent.

FRENLANG 250. Reading French. 4 Units.

For seniors or graduate students seeking to meet the University reading requirement for advanced degrees. Reading strategies for comprehension of secondary literature for academic research. Fulfills the University foreign language requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year or reading proficiency in another Romance language.

FRENLANG 250S. Reading French. 2-4 Units.

For seniors or graduate students seeking to meet the University reading requirement for advanced degrees. Reading strategies for comprehension of secondary literature for academic research. Fulfills the University foreign language requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year or reading proficiency in another Romance language.

FRELANG 394. Graduate Studies in French Conversation. 1-3 Units.
Prerequisite: consent of the instructor.

FRELANG 395. Graduate Studies in French. 1-5 Unit.
Prerequisite: consent of instructor.

French Literature Courses

French Literature Courses

FRENCH 60S. Advanced Conversation Salon. 1 Unit.

This course provides students with the opportunity to practice speaking French at the advanced level. Recreating the atmosphere of a French salon, participants will develop greater oral proficiency through discussions of literature, film, politics, and contemporary culture. Please note that all Maison Franccedil;aise courses take place at the Maison Franccedil;aise and begin during Week 2 of the quarter. Prerequisite: FRELANG 23C or equivalent.

FRENCH 75N. Narrative Medicine and Near-Death Experiences. 3 Units.

Even if many of us don't fully believe in an afterlife, we remain fascinated by visions of it. This course focuses on Near-Death Experiences and the stories around them, investigating them from the many perspectives pertinent to the growing field of narrative medicine: medical, neurological, cognitive, psychological, sociological, literary, and filmic. The goal is not to understand whether the stories are veridical but what they do for us, as individuals, and as a culture, and in particular how they seek to reshape the patient-doctor relationship. Materials will span the 20th century and come into the present. Taught in English.

Same as: ITALIAN 75N

FRENCH 112. Oscar Wilde and the French Decadents. 3-5 Units.

Close reading of Oscar Wilde's work together with major texts and authors of 19th-century French Decadence, including Symbolism, l'art pour l'art, and early Modernism. Points of contact between Wilde and avant-garde Paris salons; provocative, creative intersections between (homo)erotic and aesthetic styles, transgression; literary and cultural developments from Baudelaire to Mallarmeacute;, Huysmans, Flaubert, Rachilde, Lorrain, and Proust compared with Wildeiquest;s Salomeacute;, Picture of Dorian Gray, and critical writings; relevant historical and philosophical contexts. All readings in English; all student levels welcome.

Same as: COMPLIT 112, COMPLIT 312, FRENCH 312

FRENCH 118. Literature and the Brain. 5 Units.

Recent developments in and neuroscience and experimental psychology have transformed the way we think about the operations of the brain. What can we learn from this about the nature and function of literary texts? Can innovative ways of speaking affect ways of thinking? Do creative metaphors draw on embodied cognition? Can fictions strengthen our "theory of mind" capabilities? What role does mental imagery play in the appreciation of descriptions? Does (weak) modularity help explain the mechanism and purpose of self-reflexivity? Can the distinctions among types of memory shed light on what narrative works have to offer?.

Same as: ENGLISH 118, ENGLISH 218, FRENCH 318, PSYCH 118F

FRENCH 120. Coffee and Cigarettes: The Making of French Intellectual Culture. 4-5 Units.

Examines a quintessential French figure "l'intellectuel" from a long-term historical perspective. We will observe how this figure was shaped over time by such other cultural types as the writer, the artist, the historian, the philosopher, and the moralist. Proceeding in counter-chronological order, from the late 20th to the 16th century, we will read a collection of classic French works. As this course is a gateway for French studies, special emphasis will be placed on oral proficiency. Taught in French; readings in French.

FRENCH 122. Nation in Motion: Film, Race and Immigration in Contemporary French Cinema. 3-5 Units.

An examination of the current debates in France regarding national identity, secularism, and the integration of immigrants, notably from the former colonies. Confronts films' and other media's visual and discursive rhetorical strategies used to represent ethnic or religious minorities, discrimination, citizens' resistance to government policies, inter-racial marriages, or women's rights within immigrant communities. By embodying such themes in stories of love, hardships, or solidarity, the motion pictures make the movements and emotions inherent to immigration tangible: to what effect? Taught in French. Films in French with English subtitles. Additional paper for students enrolled in 235.

Same as: CSRE 65

FRENCH 123. Word and Image: Collaboration through the Ages. 3-5 Units.

This course examines how verbal descriptions of objects change over time, and represent how the individual relates to the world. How do they embody common ideals, individual desires, or social anxieties? We will study descriptions of various animate and inanimate objects in texts that reflect key cultural and literary values in French literary history, such as medieval objects of war and love, the description of the Renaissance woman, and the nineteenth-century Gothic cathedral. Taught in French.

FRENCH 124. The View from Paris: Key Moments in French Culture. 4 Units.

An intellectually intense, document-based approach to the identity of French culture, made palpable through five moments in the history of Paris (which, more perhaps than any other capital in the western world, has been the center and focus of that nation's productivity. Readings and subsequent discussions will focus on the following contexts in Paris's past: 12th/13th century: the University of Paris as a center of Christian spirituality, intellect, and passion; 17th century: the performance of tragedy on the stages of the city; comedies at the Court of Versailles; 1794: the moment of Terror in the French Revolution and a turning point towards a new form of political life; 1889: Eiffel Tower and World Expo, Paris as the first City of Modernity; 1958: Geacute;neacute;ral de Gaulle assumes power: de-colonization, Existentialism, and France's new identity within Europe. Offered as a part of the Gateways to the World program. Taught in English.

FRENCH 125. Religion, The Self, and Society in 20th-Century French Novels and Film. 3-5 Units.

Survey course on religion, the self, and society in 20th-century French novels and film. Readings may include: Gide, Camus, and Bernanos for the novels, and films by Robert Bresson and others. Taught in French.

FRENCH 126. Fiction, Economics and the Postcolonial. 3-5 Units.

This course applies a humanistic and social scientific approach to economic processes. We will study works of fiction from Francophone Africa: novels, films and comics, which show how fiction provides socio-cultural interpretations of economic phenomena. We will also look at the economy as an elaborate fictional construct that has a direct impact on the real world. Finally, we will look at the conflict between economic development and social justice in postcolonial societies. nThemes include: postcolonialism, modernity, African socialism, capitalism, neoliberalism, globalization, the sacred, immigration, hip hop, social justice etc. Selected texts and films from: Ousmane Sembgrave;ne, Frantz Fanon, Djibril D. Mambety, Aminata Sow Fall, Fatou Diome, Alphonse Mendy, Jean Joseph Goux, Gayatri Spivak, Jean-Pierre Dupuy, Jean and John Comaroff, Zein-Elabdin and Charuscheela etc. Taught in French.

FRENCH 127. Fatal Attractions: A Brief History of Passion in the French Tradition. 4 Units.

Why is French culture so often associated with love and romance? This course examines romantic love—from the earliest romances written in French in the Middle Ages to its cinematic representations in the 21st century. We'll focus on the most passionate and controversial stories, exploring the problems posed by religion, class, race, and sexual orientation. We'll also look at the ways in which romantic love can be a trope in French culture, or a rhetorical instrument used to re-imagine personal awakenings, political situations, or one's relationship to the spiritual or to art. The approach is inter disciplinary, and students will study novels, theater, opera, and cinema. As this course is a gateway for French studies, special emphasis will be placed on oral proficiency. Taught in French.

FRENCH 128. Revolutionary Moments in French Thought. 3-5 Units.

French intellectual and political culture has often been associated with revolutionary attempts to break free from the hold of tradition. Indeed, the concept of "revolution" has itself become a French tradition of sorts. Over the last 500 years, these revolutions have taken place in a number of arenas. In philosophy, Reneacute; Descartes challenged all traditional learning and defined new principles that were central to the so-called iquest; Revolution of the Mind. iquest; In religion, Enlightenment thinkers not only advocated the toleration of different faiths but also questioned the veracity of Christianity and of all theistic worldviews. In politics, the French Revolution redefined the very concept of a political revolution and set the stage for modern conceptions of sovereignty. French socialist thinkers of the 19th century, in turn, reshaped the ways their contemporaries thought about socio-economic arrangements. Finally, 20th-century existentialists have attempted to rethink the very purpose of human existence. In this course, we will explore these and other seminal revolutionary moments that not only transformed French society, but that also had implications for European and, indeed, global culture. Taught in English, readings in English.

Same as: HISTORY 239K

FRENCH 130. Introduction to Medieval and Renaissance French Literature. 4 Units.

Introduction to the Middle Ages and the Renaissance. The birth of a national literature and its evolution. Literature as addressing cultural, philosophical, and artistic issues which question assumptions on love, ethics, art, and the nature of the self. Readings: epics (*La Chanson de Roland*), medieval romances (*Tristan, Chreacute;tien de Troyes' Yvain*), post-Petrarchan poetics (*Du Bellay, Ronsard, Labeacute;*), and prose humanists (*Rabelais, Montaigne*). Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

FRENCH 131. Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France. 4 Units.

The literature, culture, and politics of France from Louis XIV to Olympe de Gouges. How this period produced the political and philosophical foundations of modernity. Readings include *Corneille, Moligrave;re, Racine, Lafayette, Voltaire, Diderot, Rousseau, Beaumarchais, and Gouges*. Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

FRENCH 132. Literature, Revolutions, and Changes in 19th- and 20th-Century France. 4 Units.

This course will explore several of the most important texts of 19th- and 20th-century French literature. The aim of the course will be understanding stylistic and thematic experimentation in its historical/cultural context, with a focus on the theme of transgression : moral, political, and social. We will read works in all major literary genres (poetry, prose, and drama) and will discuss prominent movements such as Realism, Romanticism, Symbolism, Decadentism, and Existentialism through the works that best define them. Readings include *Constant, Balzac, Baudelaire, Mallarmeacute;*, Rimbaud, Flaubert, Maupassant, Jarry, Gide, Apollinaire, Breton, Yourcenar, Sartre. All readings, discussion, and assignments are in French.

FRENCH 133. Literature and Society in Africa and the Caribbean. 4 Units.

This course aims to equip students with an understanding of the cultural, political and literary aspects at play in the literatures of Francophone Africa and the Caribbean. Our primary readings will be Francophone novels and poetry, though we will also read some theoretical texts, as well as excerpts of Francophone theater. The assigned readings will expose students to literature from diverse French-speaking regions of the African/Caribbean world. This course will also serve as a "literary toolbox," with the intention of facilitating an understanding of literary forms, terms and practices. Students can expect to work on their production of written and spoken French (in addition to reading comprehension) both in and outside of class. Required readings include: Aimeacute; Ceacute;saire, "Cahier d'un retour au pays natal," Albert Memmi, "La Statue de Sel," Kaouther Adimi, "L'envers des autres", Maryse Condeacute;," "La Vie sans fards". Movies include "Goodbye Morocco", "Aya de Yopougon", "Rome plutocirc;t sue Vous". Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

Same as: AFRICAAM 133, JEWISHST 143

FRENCH 145. French Theatromania: From Great Classics to Private Theater in 17th & 18th Century France. 3-5 Units.

For French majors and minors. Explore the French passion for theater in the 17th and 18th centuries, from the great classics to private theater. A selection of plays from the official and the private repertory will be used to illustrate the evolution of French theater as a genre and to discuss its role in the sociopolitical shifts of the period. All readings, discussions, and assignments will be in French.

FRENCH 145B. Africa in Atlantic Writing, 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (*Adichie, Condeacute;*, *Olinto*), prose poetry (*Ceacute;saire, Neto, Walcott*), theoretical reflection (*Fanon, Glissant*), reportage (*Gide, Gourevitch*), ethnography (*Leiris, Ouologuem*) and autobiography (*Barack Obama*).

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 345B

FRENCH 150. Season and Off-Season of North-African Cinema and Literature. 3-5 Units.

This course explores the emergence of Francophone cinema and literature from North Africa (Algeria, Tunisia, Morocco) in the post-independence era: aesthetics, language metissage and hybridization, ethnic interactions, gender relations, collective imagination and collective memory, nationalism, popular culture, religion, urbanism, post-colonialism, migration, and the Arab Spring will be covered. Special attention will be given to Moroccan cinema, and to the notions of francophone/ maghrebi/"beur"/diasporic cinema and literature. Readings from *Franz Fanon, Albert Memmi, Kateb Yacine, Albert Camus, Reda Bensaïma, Assia Djebar, Colette Fellous, Abdelkebir Khatibi, Michel de Certeau, Benjamin Stora, Lucette Valensi, Abdelwahab Meddeb*. Movies include *Viva Laldjeacute;rie, Rome plutot que vous, Les Sabots en or, Les Silence des Palais, Halfaouine, Satin Rouge, Le Chant des Marieacute;es, and Mort agrave; Vendre*. Taught in French. Films in French and Arabic with English subtitles.

Same as: FRENCH 350

FRENCH 151. Performing the Middle Ages. 3-5 Units.

Through an analysis of medieval love, satirical and Crusade lyrics in the Old Occitan, Old French, and Galician-Portuguese traditions, we will study deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Special attention will be given to the transmission of vernacular song from live performance to manuscripts. Authors include Ovid, Bernart de Ventadorn, Bertran de Born, La Comtessa de Dia, Thibaut de Champagne, Dante, and Pound. Taught in English. Same as: DLCL 121

FRENCH 154. Film & Philosophy. 4 Units.

Issues of freedom, morality, faith, knowledge, personal identity, and the value of truth explored through film; philosophical investigation of the filmic medium itself. Screenings to include *Twelve Monkeys* (Gilliam), *Ordet* (Dreyer), *The Dark Knight* (Nolan), *Vicky Cristina Barcelona* (Allen), and *Eternal Sunshine of the Spotless Mind* (Kaufman). Taught in English.

Same as: COMPLIT 154A, ITALIAN 154, PHIL 193C, PHIL 293C

FRENCH 168. Imagining the Oceans. 5 Units.

How has Western culture constructed the world's oceans since the beginning of global ocean exploration? How have imaginative visions of the ocean been shaped by marine science, technology, exploration, commerce and leisure? Authors read might include Cook, Equiano, and Steinbeck; Defoe, Verne, Stevenson, Conrad, Woolf and Hemingway; Coleridge, Baudelaire, Moore, Bishop and Walcott. Films by Painleveacute; and Bigelow. Seminar co-ordinated with a spring 2015 Cantor Arts Center public exhibition. Visits to Cantor; other possible field trips include Hopkins Marine Station and SF Maritime Historical Park.

Same as: COMPLIT 168, ENGLISH 168

FRENCH 181. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English.

Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

FRENCH 190Q. Parisian Cultures of the 19th and Early 20th Centuries. 4 Units.

Preference to sophomores. Political, social, and cultural events in Paris from the Napoleonic era and the Romantic revolution to the 30s. The arts and letters of bourgeois, popular, and avant garde cultures. Illustrated with slides. Taught in English.

FRENCH 199. Individual Work. 1-12 Unit.

Restricted to French majors with consent of department. Normally limited to 4-unit credit toward the major. May be repeated for credit.

FRENCH 204. Revolutions in Prose: The 19th-Century French Novel. 3-5 Units.

The French Revolution was not just a haunting memory in nineteenth-century France: it was the decisive structure around which French politics, but also French culture and the arts more generally, were centered. As some historians have argued, the French Revolution might not even have really "ended" until 1880. In this course, we will examine both literary representations of the French Revolution, as well as the literary analyses of a society constantly dealing with the fears (or hopes) of a new Revolution. Primary readings by Stendhal, Balzac, Flaubert, Zola. Taught in French.

FRENCH 205. Songs of Love and War: Gender, Crusade, Politics. 3-5 Units.

Analysis of medieval love, satirical and Crusade lyrics of the troubadours. Study of deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Course readings include medieval treatises on lyric and modern translations of the troubadour tradition. Works by Ovid, Bernart de Ventadorn, Bertran de Born, La Comtessa de Dia, Thibaut de Champagne, Raimon Vidal, Dante, and Pound. Taught in English. Course includes a lab component for creation of multi-media translation projects: trobar. stanford.edu.

Same as: FEMGEN 205

FRENCH 206. The "Renaissance" of the Twelfth Century. 3-5 Units.

This course examines key intellectual, social and political developments in Europe during the twelfth century, and inquires after the afterlife of the "Renaissance" into the thirteenth century. Readings include works of literature (Chretien de Troyes, lyric poetry of troubadours and Minnesinger, fables such as *Roman de Renart*), philosophy (Peter Abelard and scholasticism), and studies about the rise of the Gothic architectural style. The course takes up the Fourth Lateran Council and the history of the crusading movement in the first half of the thirteenth century. Taught in English.

FRENCH 210. Representation and Theatre Culture in 20th Century France. 5 Units.

This course will examine some major French playwrights such as Alfred Jarry, Eugene Ionesco, Samuel Beckett, Jean Genet, Jean Tardieu, Albert Camus or Jean Anouilh in their global cultural environment. Discussion in English; French majors read in French.

Same as: TAPS 353

FRENCH 211. Emile Zola. 3-5 Units.

A comprehensive introduction to and historical analysis of Emile Zola's literary work as foundational for the late-nineteenth century literary movement that we call "Naturalism." The analysis of Zola's novels will be embedded in the historical situation of France in the transition from the Second Empire to the Third Republic, with special emphasis on the epistemological situation of that time. Knowledge of French desirable but participation through English translations will be possible.

Same as: COMPLIT 211A

FRENCH 213. When the World Spoke French: Kings, Writers, and Philosophers, 1630-1789/Old Regime France. 4-5 Units.

Starting in the mid-17th century, France became the cultural trendsetter for most of Europe and parts of the world. How did French culture impose itself as culture tout court? We will examine the importance of politics, literature, and philosophy in this process. Readings will include Corneille, Descartes, Pascal, Racine, Moliere, Montesquieu, Voltaire, Rousseau, Diderot, and Beaumarchais. Taught in French; readings in French.

FRENCH 214. Pirandello, Sartre, and Beckett. 3-5 Units.

In this course we will read the main novels and plays of Pirandello, Sartre, and Beckett, with special emphasis on the existentialist themes of their work. Readings include *The Late Mattia Pascal*, *Six Characters in Search of an Author*, *Henry IV*; *Nausea*, *No Exit*, "Existentialism is a Humanism"; *Molloy*, *Endgame*, *Krapp's Last Tape*, *Waiting for Godot*. Taught in English.

Same as: COMPLIT 281E, COMPLIT 381E, FRENCH 314, ITALIAN 214, ITALIAN 314

FRENCH 218. Skepticism and Atheism in Early-Modern French Thought. 4-5 Units.

Religious belief was a fundamental part of early-modern life, and the proposition that human beings could not prove God's existence had profound implications for all realms of human experience. This course will explore the complex relationship between philosophical skepticism and religious belief in early-modern Europe (particularly France) and investigate how these heterodox philosophies transformed the understanding of humanity's interaction with the surrounding world. We will begin by looking at the origins of religious unbelief and the revival of Pyrrhonian skepticism in the 16th century. By placing the atheists and the skeptics in dialogue with their deist and Christian opponents, we will see how these ideas evolved over the course of the 17th and 18th centuries and consider the influence of these subversive theories on the social and political fabric of Europe. Taught in English. Readings in French (English translations available).

FRENCH 219. The Renaissance Body in French Literature and Medicine. 3-5 Units.

If the Renaissance is famous for discovering unknown continents and ancient texts the body too was a new territory of conquest. How did literature respond to the rise of an anatomical gaze in the arts and in medicine and how did it stage the aesthetic religious philosophical and moral issues related to such a promotion or deconstruction of the body? Does literature aim at representing the body or does it use it instead as a ubiquitous signifier for intellectual emotional and political ideas? The locus of desire, pleasure and disease, the body also functioned as a reminder of human mortality and was caught in the web of gender issues, religious controversies and new norms of behavior. Texts from prose fiction (Rabelais) poetry (Scève Ronsard Labeau; D'Aubigné;) essays (Montaigne) and emblem literature. Extra documents include music scores tapestries paintings philosophical and anatomical plates from medical treatises. Taught in English. Visit the Web site: renaissancebodyproject.stanford.edu. Same as: FRENCH 319

FRENCH 221. Conceiving Other Worlds: Travel Narrative and Science Fiction in Early-Modern France. 4-5 Units.

This course will concentrate on the important role of science fiction and travel literature in early-modern France. Although these narratives were intended to describe distant worlds and different ways of living, they frequently revealed more about the aspirations, hopes, and concerns of the cultures in which they originated than about their actual subject matter. Authors frequently sought to determine the identity and uniqueness of their own cultures by contrasting them against the 'otherness' of their imagined subjects. Similarly, by describing either utopian or dystopian civilizations, writers attempted to highlight the problems that plagued their own societies. Among other texts, we will read selections from Montaigne's 'Essais,' Cyrano de Bergerac's 'L'Autre monde ou les tats et empires de la Lune,' Huygens's 'Nouveau traite; de la pluralite; des mondes,' Fontenelle's 'Entretiens sur la pluralite; des mondes,' Voltaire's 'Micromegas,' Bougainville's 'Voyage autour du monde,' and Diderot's 'Supplement au voyage de Bougainville.' Taught in English. Readings in French (English translations available).

FRENCH 222. Was Deconstruction an Illusion?. 3-5 Units.

A both systematic and historical presentation of "Deconstruction" as a philosophical and intellectual movement that dominated academic and general culture in many western societies during the final decades of the twentieth century, with special focus on the writings of Jacques Derrida and Paul de Man. Deconstruction's specific reception history obliges us to ask the question of whether the extremely high esteem that it enjoyed over two decades was intellectually justified - or the result of a misunderstanding.

FRENCH 223. 17th-Century French Theatre. 3-5 Units.

In this course, taught in French, we will explore theater from different angles including literary theory (the different dramatic genres), aesthetics (the classical representation) and cultural theories (the social function of theatre under absolutism). A new approach to acting will be considered, i.e. the many connections between theatre and possession. Amongst the authors considered, we will include Rotrou, Corneille, Cyrano de Bergerac, Racine, Molière and Regnard. Taught in French.

FRENCH 224. Leopardi, Baudelaire, and Modernity. 3-5 Units.

A close reading of Giacomo Leopardi's *Canti* and Charles Baudelaire's *Flowers of Evil* and *Paris Spleen* in the context of 19th-century Europe. Discussion of the poetry will be enriched by selections from their essays on literature and art and by notes from the Zibaldone and *Mon coeur mis à nu*. Key themes and concepts include language, imagination, "noia," "spleen," and the oppositions between nature and civilization, modernity and antiquity. Taught in English.

Same as: FRENCH 324, ITALIAN 224, ITALIAN 324

FRENCH 225. Introduction to Medieval French Literature. 5 Units.

Introduction to the premodern period of French literature through the interpretation of major works (*La Chanson de Roland*; *Beauvoir* and Thomas, *Tristan*; *lais* of Marie de France; *romans* of Chretien de Troyes; *Le Roman de la Rose*). Special attention given to the socio-cultural contexts in which these works were composed and first received, and to the emergence of the concept of writing as a self-defining act. Study of Old French language and the material aspects of a medieval work. Taught in English.

FRENCH 227. Paris: The Making of a Modern Icon. 3-5 Units.

Few places have been as heavily romanticized and mythologized as Paris. To many observers, Paris and its attractions serve as icons of modernity itself. By engaging with fiction, film, journalism, painting, photography, poetry, song, and other media, we will trace how different people at different times have used Paris as both backdrop and main protagonist, and we'll consider how the city itself has incorporated and rebelled against such representations. The scope of our inquiry will stretch from the late 18th century to the present, covering a host of topics, figures, and sites: from the French Revolution to the protests of May '68, from Baudelaire to Hemingway, from the Impressionists to the Situationists. Taught in English. Same as: HISTORY 239E, URBANST 142

FRENCH 228. Science, Technology, and Society in the Face of the Looming Disaster. 3-5 Units.

The major topic will be the indeterminacy regarding the survival of humankind. With the advent of the atomic bomb humankind became potentially the maker of its own demise. Will combine a number of significant case studies (environmental disasters, industrial catastrophes, threat of nuclear devastation, technological risks) with the lessons drawn from a form of literature that is at the intersection of STS and the Humanities, in particular the early warnings made by such thinkers as Ivan Illich, Martin Heidegger, Hans Jonas, Günther Anders, and Hannah Arendt.

Same as: ITALIAN 228, POLISCI 233F

FRENCH 228E. Getting Through Proust. 3-5 Units.

Selections from all seven volumes of "In Search of Lost Time". Focus on issues of personal identity (perspective, memory, life-narrative); interpersonal relations (friendship, love, homosexuality, jealousy, indirect expression); knowledge (objective truth, subjective truth, necessary illusions); redemption (enchantment, disenchantment, re-enchantment); aesthetics (music, painting, fiction); and Proust's own style (narrative sequence, sentence structure, irony, metaphor, metonymy, metalepsis). Taught in English; readings in French or English.

FRENCH 229. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer.
Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, CSRE 129B, HUMBIO 175L, MED 234

FRENCH 230. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.

An intensive reading of Vico's *New Science* with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Lévi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's *New Science* and Lévi-Strauss's "The Structural Study of Myth", and the first chapters of his book *The Savage Mind*. Taught in English.

Same as: FRENCH 330, ITALIAN 227, ITALIAN 327

FRENCH 233. French Political Thought From Rousseau to the Present. 3-5 Units.

An overview of the current awakening of French political thought as it is grounded in a new reading of the great classics of French social thought, from Rousseau to Tocqueville and Benjamin Constant. Readings of Lefort, Castoriadis, Louis Dumont, Ricoeur, Furet, Manent, Ferry, Renaut, Gauchet, Raynaud, etc. Discussions in French and in English.

FRENCH 234. Courtly Love: Deceit and Desire in the Middle Ages. 3-5 Units.

A comparative seminar on medieval love books and their reception. We will examine and question the notion of "amour courtois," which arose in the lyrics and romances of medieval France and was codified in Romantic-era criticism. Primary readings will be enriched by thinking about this notion through the lens of modern theories of desire, such as those of Girard, Lacan, and Žižek. Conducted in English with readings in translation.
Same as: COMPLIT 221A, ITALIAN 234

FRENCH 237. Cultural Contact in Medieval French Literature. 3-5 Units.

Introduction to medieval French literature through the analysis of representations of cross-cultural contact in historical perspective. Class conducted in French. Readings in modern French translation (with occasional reference to Old French) and in English. Readings include *La Chanson de Roland*; *Le Charroi de Nicir;mes*; *La Prise d'Orange*; *Le Conte de Floire et Blancheflor*; and *Chreacute;tien de Troyes, Cligeacute;s*. No previous knowledge of Old French or medieval literature is expected; willingness to engage with historical texts and questions required.

FRENCH 242. Beyond Casablanca: North African Cinema and Literature. 3-5 Units.

This course explores the emergence of Francophone cinema and literature from North Africa (Algeria, Tunisia, Morocco) in the post-independence era: aesthetics, exile, language message, race and gender relations, collective memory, parallax, nationalism, laiciteacute;, religion, emigration and immigration, and the Arab Spring will be covered. Special attention will be given to judeo-maghrebi history, and to the notions of francophone / maghrebi / "beur" / diasporic cinema and literature. Readings from Frantz Fanon, Albert Memmi, Kateb Yacine, Albert Camus, Colette Fellous, Abdelkebir Khatibi, Leila Sebbar, Benjamin Stora, Lucette Valensi, Abdelwahab Meddeb. Movies include *Viva Laldjeacute;rie*, *Tenja*, *Le Chant des Marieacute;es*, *Franccedil;aise*, *Bled Number One*, *Omar Gatlato*, *Casanegra*, *La Saison des Hommes*. Taught in French. Films in French and Arabic with English subtitles.

Same as: COMPLIT 247F, JEWISHST 242

FRENCH 245. French Political Thought From Rousseau to the Present. 3-5 Units.

An overview of the current awakening of French political thought as it is grounded in a new reading of the great classics of French social thought, from Rousseau to Tocqueville and Benjamin Constant. Readings of Lefort, Castoriadis, Louis Dumont, Ricoeur, Furet, Manent, Ferry, Renaut, Gauchet, Raynaud, etc. Readings in French. (Translations in English will be made available whenever possible.) Discussions in French and in English.
Same as: POLISCI 336C

FRENCH 248. Literature, History and Memory. 3-5 Units.

Analysis of literary works as historical narratives. Focus on the relationship history, fiction, and memory as reflected in Francophone literary texts that envision new ways of reconstructing or representing ancient or immediate past. Among questions to be raised: individual memory and collective history, master narratives and alternatives histories, the role of reconstructing history in the shaping or consolidating national or gender identities. Readings include fiction by Glissant, Kane, Condeacute;, Schwarz-Bart, Djebbar, Perec, as well as theoretical texts by Ricoeur, de Certeau, Nora, Halbwachs, White, Echevarriac;a. Taught in French.
Same as: COMPLIT 250

FRENCH 251. Writing, Memory, and Self-Fashioning. 3-5 Units.

Writing is not a mere recording of the past, but a selection and reinvention of our experiences. We will look at how writing is central to the philosophical project of fashioning the self, even as it reveals that much of what we call the self is a fictional construct. Materials include fiction and memoirs (Primo Levi, Michel Tournier, Melania Mazzucco, Jonathan Littell), and theoretical works in philosophy (Bergson, James, Freud, Jung, Derrida, Wyschogrod, Nehamas), psycholinguistics, and neuroscience.
Taught in English.

Same as: ITALIAN 251

FRENCH 253. Honoré de Balzac. 3-5 Units.

Working through a selection of novels by the author widely considered as a founder of western (19th-century) "Literary Realism." Balzac's will be contextualized within his life and the French culture and literature of his time. We will also approach, from a philosophical point of view, the emergence and functions of "Literary Realism." Another focus will be Balzac's work as exemplary of certain traditions within Literary Criticism (particularly Marxist Literary Criticism). Taught in English.
Same as: COMPLIT 253

FRENCH 254. Was Deconstruction an Illusion?. 3-5 Units.

A both systematic and historical presentation of "Deconstruction" as a philosophical and intellectual movement that dominated academic and general culture in many western societies during the final decades of the twentieth century, with special focus on the writings of Jacques Derrida and Paul de Man. Deconstruction's specific reception history obliges us to ask the question of whether the extremely high esteem that it enjoyed over two decades was intellectually justified acirc;## or the result of a misunderstanding. Participation through English translations is possible.
Same as: COMPLIT 254A

FRENCH 258. The Great War: WWI in Literature, Film, Art, and Memory. 3-5 Units.

This course concerns how writers, artists, and other cultural producers understood and represented the traumas of the First World War and its aftermath. Rather than tracing a political or military history of the conflict, we will focus on how the horrors of War (both in the trenches and on the home front) fostered broader social and cultural shifts, as people questioned the very foundations of European civilization. Most specifically, we'll explore the connections between the War and the emergence of post-War modernist movements, as writers and artists created new works to help them make sense of the catastrophe and the new world it wrought. Though France provides our starting point, we'll also travel beyond the Hexagon to incorporate other views and major works. Course readings will be in English, though students may elect to read works in French if they wish. Same as: FRENCH 358, HISTORY 231C, HISTORY 332C

FRENCH 260. Italy, France, and Postcolonialism. 3-5 Units.

The starting point for our seminar is the question of how postcolonial thought enhances our possible understandings of Italy - as a nation, as a territorial unit coalescing cultural parts that remain disparate to this day, and as a population that has not come fully to terms with its fascist history, its crimes in World War II, or the atrocities it perpetrated as a colonizing state. The Italian case is unusual compared to others, in that the country's colonial past in north and east Africa is still being uncovered after a long period of public silence and government suppression; and what might be called the postcolonial Italian project has begun only recently, driven by a distinct minority of scholars, 'migrant' authors, and activists. French cultural politics and history are often taken as a point of reference from which to analyze Italian phenomena. In this case, we will make use of the French postcolonial tradition as a point of both comparison and differentiation. Among other things, we will focus on the different meanings of 'postcolonial' in a country that is strongly centralized (France) and another which is unremittingly fragmented (Italy). As just one example, we will scrutinize how Gramsci's work has been understood in Anglophone and Francophone criticism (cultural studies, Subaltern studies, and so on), as opposed to how it may be read in its original Italian context, where it concerned subalterns within the nation-state. Asking what is postcolonial, for whom, when, and where?, ultimately our goal is to discern the specific contours of Italy's postcolonialism by juxtaposing it with France's, and to simultaneously ask what light can be shed on French postcolonial particularities by placing it in this dialogue. Beginning with fundamental historical readings (Gramsci, Fanon, Memmi) and touching on some early Anglophone postcolonial critics (Said, Bhabha), the seminar will then be structured around key literary and theoretical readings from Italy and France. Ideally, readings will be in the original language, but as often as possible they will be selected such that they will be accessible in English translation as well. Taught in English.

Same as: ITALIAN 260

FRENCH 265. The Problem of Evil in Literature, Film, and Philosophy. 3-5 Units.

Conceptions of evil and its nature and source, distinctions between natural and moral evil, and what belongs to God versus to the human race have undergone transformations reflected in literature and film. Sources include Rousseau's response to the 1755 Lisbon earthquake; Hannah Arendt's interpretation of Auschwitz; Guumlnther Anders' reading of Hiroshima; and current reflections on looming climatic and nuclear disasters. Readings from Rousseau, Kant, Dostoevsky, Arendt, Anders, Jonas, Camus, Ricoeur, Houellebeck, Girard. Films by Lang, Bergman, Losey, Hitchcock.

Same as: POLISCI 338E

FRENCH 271. Thinking Modernity: Montaigne to Lafayette. 3-5 Units.

From the times of the religious wars to those of Louis XIV, a series of French thinkers played a major role in the speculations that helped establish the norms of what is now thought of as "Western modernity." We will look at some of these, especially their moral and political philosophy in the contexts of a centralizing growth toward bureaucratic absolutist monarchy, of increasing colonization and imperialist urges, of growing intolerance (leading eventually to the Revocation of the Edict of Nantes - more or less simultaneous in 1685 with the promulgation of the *Code noir*, seeking to control the treatment of slaves in the colonies). We shall also be interested in the complex "development" of the modern western "individual," of new notions of "truth," ethical conduct, the politics of authoritarian individualism, the aesthetics of "taste," and the perplexities of gender politics. Closely examining a number of works, we will look at the interplay between these contexts and the epistemology, psychology, ethics and politics that gradually became normative. Authors from among: Montaigne, Gournay, Descartes, Pascal, Hobbes (*De cive*), Cyrano, Madame de Lafayette, but participants may wish to bring other authors to the table. Taught in French.

FRENCH 275. Twentieth-Century French Thought: Literature, Politics, and Intellectual History. 3-5 Units.

This course will introduce students to the major intellectual and historical movements of twentieth-century France. We will consider the impact of key events (including WWI, the rise of fascism, the Nazi occupation, and May '68) on literary and intellectual life. Special importance will be placed on existentialism, structuralism, leftism, and feminism. Students will read a variety of literary, philosophical, and political essays. Taught in French.

FRENCH 277. Literature and the Self in Twentieth-Century France. 3-5 Units.

In this course, we will explore how the different discoveries concerning the self during the XXth Century (throughout philosophy, politics or psychoanalysis) do reflect in the domain of literature. Nouveau roman, autobiography, auto fiction or self references will be amongst the themes explored in class. Our main texts will be taken out of the official list issued by the French Department. Taught in French.

FRENCH 284. Nineteenth-Century French Realism: Classic Novels and Contemporary Interpretations. 3-5 Units.

This course will read three great novels of the French 19th century: Stendhal's *Le rouge et le noir*; Balzac's *Le Pegrave;re Goriot*; Flaubert's *Madame Bovary*. These texts are the classics of "Realism." But this course intends to complicate the genre designation. "Realist" novels are richer and deeper than any "objective recording" of external and internal events could capture. They are visionary, poetic, and politically explosive. Reading them today requires us to stretch beyond what many critics have asserted about them, and indeed beyond what the novels asserted about themselves. That will be a significant objective of our analysis. Taught in French.

FRENCH 293A. Topics in French Literature and Philosophy. 2 Units.

Five-week course. May be repeated for credit. Taught in French.

FRENCH 293B. Topics in French Literature and Philosophy. 2 Units.

Five-week course. May be repeated for credit. Taught in French.

FRENCH 312. Oscar Wilde and the French Decadents. 3-5 Units.

Close reading of Oscar Wilde's work together with major texts and authors of 19th-century French Decadence, including Symbolism, l'art pour l'art, and early Modernism. Points of contact between Wilde and avant-garde Paris salons; provocative, creative intersections between (homo)erotic and aesthetic styles, transgression; literary and cultural developments from Baudelaire to Mallarmeacute;, Huysmans, Flaubert, Rachilde, Lorrain, and Proust compared with Wilde; Salomeacute;, Picture of Dorian Gray, and critical writings; relevant historical and philosophical contexts. All readings in English; all student levels welcome.

Same as: COMPLIT 112, COMPLIT 312, FRENCH 112

FRENCH 314. Pirandello, Sartre, and Beckett. 3-5 Units.

In this course we will read the main novels and plays of Pirandello, Sartre, and Beckett, with special emphasis on the existentialist themes of their work. Readings include *The Late Mattia Pascal*, *Six Characters in Search of an Author*, *Henry IV*; *Nausea*, *No Exit*, "Existentialism is a Humanism"; *Molloy*, *Endgame*, *Krapp's Last Tape*, *Waiting for Godot*. Taught in English.

Same as: COMPLIT 281E, COMPLIT 381E, FRENCH 214, ITALIAN 214, ITALIAN 314

FRENCH 316. Understanding and Staging Molière Theatre. 3-5 Units.

Devoted to an in depth analysis of Molière's major plays, as well as a study of contemporary productions of his work. Taught in French.

Same as: TAPS 368S

FRENCH 318. Literature and the Brain. 5 Units.

Recent developments in and neuroscience and experimental psychology have transformed the way we think about the operations of the brain. What can we learn from this about the nature and function of literary texts?

Can innovative ways of speaking affect ways of thinking? Do creative metaphors draw on embodied cognition? Can fictions strengthen our "theory of mind" capabilities? What role does mental imagery play in the appreciation of descriptions? Does (weak) modularity help explain the mechanism and purpose of self-reflexivity? Can the distinctions among types of memory shed light on what narrative works have to offer?.

Same as: ENGLISH 118, ENGLISH 218, FRENCH 118, PSYCH 118F

FRENCH 319. The Renaissance Body in French Literature and Medicine. 3-5 Units.

If the Renaissance is famous for discovering unknown continents and ancient texts the body too was a new territory of conquest. How did literature respond to the rise of an anatomical gaze in the arts and in medicine and how did it stage the aesthetic religious philosophical and moral issues related to such a promotion or deconstruction of the body? Does literature aim at representing the body or does it use it instead as a ubiquitous signifier for intellectual emotional and political ideas? The locus of desire, pleasure and disease, the body also functioned as a reminder of human mortality and was caught in the web of gender issues, religious controversies and new norms of behavior. Texts from prose fiction (Rabelais) poetry (Scegrave;ve Ronsard Labeacute; D'Aubigneacute;) essays (Montaigne) and emblem literature. Extra documents include music scores tapestries paintings philosophical and anatomical plates from medical treatises. Taught in English. Visit the Web site: renaissancebodyproject.stanford.edu.

Same as: FRENCH 219

FRENCH 320. The Posthumanistic Subject. 3-5 Units.

The course will examine the need to rethink the traditional western idea of the strong subject. Through close readings of works by Agamben, Braidotti, Derrida, Deleuze, Hall, Haraway, Latour, Wolfe, among others, this course will explore posthumanist theories of individual and collective subjectivity that challenge traditional ways of defining the human and the non-human subject/person and promote fundamental reconsideration of issues such as agency, autonomy, essence, freedom, dignity, otherness, substance, personhood, sociality, and life itself. The course would consider, how we can empower the subject and community in order to develop a desired model of participatory democracy. Prerequisite: graduate standing or consent of instructor.

FRENCH 324. Leopardi, Baudelaire, and Modernity. 3-5 Units.

A close reading of Giacomo Leopardi's *Canti* and Charles Baudelaire's *Flowers of Evil* and *Paris Spleen* in the context of 19th-century Europe. Discussion of the poetry will be enriched by selections from their essays on literature and art and by notes from the *Zibaldone* and *Mon coeur mis a grave; nu*. Key themes and concepts include language, imagination, "noia," "spleen," and the oppositions between nature and civilization, modernity and antiquity. Taught in English.

Same as: FRENCH 224, ITALIAN 224, ITALIAN 324

FRENCH 327. Genres of the Novel. 5 Units.

Provides students with an overview of some major genres in the history of the modern novel, along with major theorists in the critical understanding of the form. Novels might include works by Cervantes, Defoe, Lafayette, Radcliffe, Goethe, Scott, Balzac, Melville, and Woolf. Theorists might include Lukacs, Bakhtin, Jameson, Gallagher, Barthes, Kristeva, and Bourdieu. *PLEASE NOTE: Course for graduate students only.*.

Same as: COMPLIT 327, ENGLISH 327

FRENCH 328. Literature, Narrative, and the Self. 3-5 Units.

The role of narrative in the well-lived life. Are narratives necessary? Can they, and should they, be literary? When might non-narrative approaches, whether literary or otherwise, be more relevant? Is unity of self something given, something to be achieved, or something to be overcome? Readings from Aristotle, Montaigne, Schopenhauer, Nietzsche, Camus, Sartre, MacIntyre, G. Strawson, Velleman; Ricoeur, Brooks; Shakespeare, Stendhal, Musil, Levi, Beckett, Morrison; film. Taught in English.

Same as: COMPLIT 328, ITALIAN 328

FRENCH 330. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.

An intensive reading of Vico's *New Science* with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Leacute;vi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's *New Science* and Leacute;vi-Strauss's "The Structural Study of Myth", and the first chapters of his book *The Savage Mind*. Taught in English.

Same as: FRENCH 230, ITALIAN 227, ITALIAN 327

FRENCH 331. The Craft of Confession and Its Cultural Contexts. 5 Units.

Course examines medieval treatises and literature relating to the practice of confession as well as modern examples, with a focus on medieval concern with a sincere and authentic confession in theological, ethical, and aesthetic terms. Study includes expressions of subjectivity, institutional frameworks of confession, and the phenomenon as an instrument for political activity such as crusade. Texts: Augustine's *Confessions*, pastoral treatises, Aquinas, Arthurian romances concerning the grail legend, crusade lyric, and Foucault; films such as Dreyer and martyrdom videos. Taught in French.

FRENCH 335A. Animism and Alter-Native Modernities. 5 Units.

For many years indigenous knowledges were treated as a field of research for anthropologists and as "mistaken epistemologies," i. e., unscientific and irrational folklore and childish worldviews. This old view of animism was a product of the evolutionist and anthropocentric worldview of the Enlightenment. However within the framework of ecological humanities, current interest in posthumanism, postsecularism and discussions on building altermodernity (Michael Hardt and Antonio Negri), indigenous thought is used to critique modern epistemology and develop an alternative to the Western worldview. Treating native thought as an equivalent to Western knowledge is presented as a decolonizing and liberating practice. The term alter-native modernities as response to the challenges of Euromodernity and suggests modernities that might emerge out of indigenous ways of being in the world. Comparison between literature on indigenous cultures from Latin America and from Russia (animism in Amazonia and Siberia). Following recent works by anthropologists and archaeologists such as Nurit Bird-Rose, Philippe Descola, Graham Harvey, Tim Ingold and Viveiros de Castro, new animism is treated as an alternative (relational) ontology that allows rethinking the problem of matter and agency, goes beyond human exceptionalism and embraces non-humans. Topics include: alternative and alter-native modernities; Jean Piaget's theory of childhood animism; problem of anthropomorphism and personification; indigenous knowledge and the problem of epistemic violence; vitalist materialism (Jane Bennett, Rosi Braidotti); connectedness as the principle of life (relational epistemologies and ontologies); non-human agency (Bruno Latour).

Same as: ANTHRO 335A, REES 335A

FRENCH 338. The Gothic in Literature and Culture. 5 Units.

This course examines the Gothic as both a narrative subgenre and an aesthetic mode, since its 18th century invention. Starting with different narrative genres of Gothic expression such as the Gothic novel, the ghost tale, and the fantastic tale by writers such as Walpole, Radcliffe, Sade, Poe, and E.T.A. Hoffmann, the course goes on to ask how the Gothic sensibility permeates a wide range of 19th century cultural phenomena that explore the dark side of Enlightenment, from Romantic poetry and art to melodrama, feuilleton novels, popular spectacles like the wax museum and the morgue. If time permits, we will also ask how the Gothic is updated into our present in popular novels and cinema. Critical readings will examine both the psychology of the Gothic sensibility and its social context, and might be drawn from theorists such as Benjamin, Freud, Lacan, Kristeva, and Zizek. Same as: COMPLIT 338, ENGLISH 338

FRENCH 339A. Technologies of Extinctions: Ecocides and Genocides. 5 Units.

This course will explore the relationship between history, ecological evolution and mass killing in the age of humanly caused species extinction. It will explore the universalization of the notion of the Jewish Holocaust, its use to integrate into genocide studies the Native American "spiritual" holocaust, the Japanese nuclear holocaust and the Rwandan genocide, and the ethical dilemmas posed by the ideas of biotic, animal and ecological holocausts. Anthropology and history of genocides and extinctions as well as posthumanist, multispecies theories will provide theoretical frames for the course.

Same as: ANTHRO 339A

FRENCH 345B. Africa in Atlantic Writing. 3 Units.

This course explores the central place Africa holds in prose writing emerging during periods of globalization across the Atlantic, including the middle passage, colonialism, black internationalism, decolonization, immigration and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of new citizenship, to evoke histories of racial unity and examine social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Adichie, Condeacute;, Olinto), prose poetry (Ceacute;saire, Neto, Walcott), theoretical reflection (Fanon, Glissant), reportage (Gide, Gourevitch), ethnography (Leiris, Oulougouem) and autobiography (Barack Obama).

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B

FRENCH 350. Season and Off-Season of North-African Cinema and Literature. 3-5 Units.

This course explores the emergence of Francophone cinema and literature from North Africa (Algeria, Tunisia, Morocco) in the post-independence era: aesthetics, language metissage and hybridization, ethnic interactions, gender relations, collective imagination and collective memory, nationalism, popular culture, religion, urbanism, post-colonialism, migration, and the Arab Spring will be covered. Special attention will be given to Moroccan cinema, and to the notions of francophone/maghrebi/"beur"/diasporic cinema and literature. Readings from Franz Fanon, Albert Memmi, Kateb Yacine, Albert Camus, Reda Bensmaia, Assia Djebar, Colette Fellous, Abdelkebir Khatibi, Michel de Certeau, Benjamin Stora, Lucette Valensi, Abdelwahab Meddeb. Movies include *Viva Laldjeacute;rie*, *Rome plutot que vous*, *Les Sabots en or*, *Les Silence des Palais*, *Halfaouine*, *Satin Rouge*, *Le Chant des Marieacute;es*, and *Mort agrave; Vendre*. Taught in French. Films in French and Arabic with English subtitles.

Same as: FRENCH 150

FRENCH 358. The Great War: WWI in Literature, Film, Art, and Memory. 3-5 Units.

This course concerns how writers, artists, and other cultural producers understood and represented the traumas of the First World War and its aftermath. Rather than tracing a political or military history of the conflict, we focus on how the horrors of War (both in the trenches and on the home front) fostered broader social and cultural shifts, as people questioned the very foundations of European civilization. Most specifically, we'll explore the connections between the War and the emergence of post-War modernist movements, as writers and artists created new works to help them make sense of the catastrophe and the new world it wrought. Though France provides our starting point, we'll also travel beyond the Hexagon to incorporate other views and major works. Course readings will be in English, though students may elect to read works in French if they wish. Same as: FRENCH 258, HISTORY 231C, HISTORY 332C

FRENCH 368A. Imagining the Oceans. 5 Units.

How has Western culture constructed the world's oceans since the beginning of global ocean exploration? How have imaginative visions of the ocean been shaped by marine science, technology, exploration, commerce and leisure? Primary authors read might include Cook, Banks, Equiano, Ricketts, and Steinbeck; Defoe, Cooper, Verne, Conrad, Woolf and Hemingway; Coleridge, Baudelaire, Moore, Bishop and Walcott. Critical readings include Schmitt, Rediker and Linebaugh, Baucom, Best, Corbin, Auden, Sontag and Heller-Roazen. Films by Sekula, Painleveacute; and Bigelow. Seminar coordinated with a 2015 Cantor Arts Center public exhibition. Visits to the Cantor; other possible field trips include Hopkins Marine Station and SF Maritime Historical Park. Open to graduate students only.

Same as: COMPLIT 368A, ENGLISH 368A

FRENCH 369. Introduction to Graduate Studies: Criticism as Profession. 3 Units.

A history of literary theory for entering graduate students in national literature departments and comparative literature.

Same as: COMPLIT 369, DLCL 369, GERMAN 369, ITALIAN 369

FRENCH 395. Philosophical Reading Group. 1 Unit.

Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit. Taught in English. Same as: COMPLIT 359A, ITALIAN 395

FRENCH 398. Intensive Reading in French/Italian. 10 Units.

Enrollment is limited to French/Italian Ph.D. students. Course is designed for French/Italian Ph.D. students to prepare for department milestone exams.

Same as: ITALIAN 398

FRENCH 399. Individual Work. 1-12 Unit.

For students in French working on special projects or engaged in predissertation research.

FRENCH 801. TGR Project. 0 Units.

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FRENCH 802. TGR Dissertation. 0 Units.

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GSB General Interdisciplinary Courses

GSBGEN 10SC. Lives of Consequence. 2 Units.

This course examines how exceptionally creative individuals from a variety of domains (including the arts, sciences, politics, technology, and society) found a sense of purpose in their lives and then successfully pursued that purpose. In the creative domain, for example, we examine the lives of filmmaker George Lucas, Apple CEO Steve Jobs, lifestyle designer Martha Stewart, and master chef Thomas Keller. In the political sphere, we examine the lives of Margaret Thatcher, Martin Luther King, and Robert F. Kennedy. We also explore the work of individuals engaged in philanthropic efforts around the globe, including Melinda Gates and Paul Farmer. We complement the study of these individuals, and others, with a variety of readings from the social science literature on happiness, meaning, and creativity. Students interested in psychology, philosophy, creativity, the arts and sciences, or business should find the course particularly useful and engaging. Students, working individually and in small groups, will have a chance to apply the course concepts to their own lives, using a series of reflective writing exercises. Students will complete an independent research project on a topic or person of interest to them. They will make a presentation to the class on the basis of their research. The course is designed to be highly discussion-oriented and interactive. Students may take this course for either a letter grade or on a pass/fail basis. Letter grades for the course will be based upon the quality of the independent library research and class presentation, along with the quality and consistency of class participation. Both components (research and class participation) are equally weighted.

GSBGEN 111Q. Seminar in Entrepreneurial Communication. 3 Units.

College campuses have been the incubators for thousands of new business ventures. What makes the difference between a successful entrepreneur and an initial failure out of the gate? It's often not the quality of the idea, but rather the ability of the entrepreneurs to successfully communicate their vision to potential investors, employees, and customers. This seminar will explore successful and failed entrepreneurial communication. Students will learn the basics of persuasive oral and written communication, and then apply these principles to their own ideas.

GSBGEN 112Q. Leading Out Loud: an Exploration of Leadership Communication through an LGBT Lens. 3 Units.

Students of all sexual orientations are invited to apply for this unique new seminar looking at the distinct challenge LGBT leaders have faced in communicating effectively. Through the years, many individuals have led the struggle for gay rights and inclusion through a variety of different communication strategies and tactics; some were successful while others were not. This seminar course will explore some of the key leaders in the LGBT community and how they chose to communicate. Together we will search through a variety of film clips, transcripts, news reports, and other historical elements to see how the message, media, and moments work together. A number of guest speakers will also share their perspective on what it means to "Lead Out Loud." Heterosexual identified students as well as LGBT students are encouraged to apply; in fact, we seek to have a true diversity of opinions in the room as we explore this topic. All students will benefit from this exploration of how to communicate about controversial, sensitive, and personal subjects with greater strength and purpose.

GSBGEN 113N. The Economic Survival of the Performing Arts. 3 Units.

Even the most artistically accomplished and well-managed performing arts organizations--symphony orchestras, operas, dance companies, and many theaters--tend to live on the edge financially. In fact, most performing arts groups are organized as nonprofit organizations, because they cannot make enough money to cover costs and survive as profit-seeking businesses. In this seminar we will explore the reasons for the tension between artistic excellence and economic security, drawing on the experience of performing arts organizations in the United States and in countries (whose governments have adopted quite different policies toward the arts). Using economic concepts and analysis that we develop in the seminar, you will first examine the fundamental reasons for the economic challenges faced by performing arts organizations. In later sessions, we will consider and evaluate alternative solutions to these challenges in the United States and other countries. The seminar may include meetings with managers and/or trustees of arts organizations. By the end of the seminar, you will be able to assess the economic condition of an arts organization, evaluate alternative strategies for its survival, and understand the consequences of alternative government policies toward the arts. During the early part of the course, you will prepare two short papers on topics or questions that I will suggest. Later, you will prepare a longer paper applying concepts learned to one of the performing arts or a particular arts organization that interests you. You will submit that paper in stages, as you learn about concepts and issues that are relevant to your analysis. There will also be a final exam.

GSBGEN 199. Curricular Practical Training for PhD Students. 1 Unit.

GSB students are eligible to report on work experience that is relevant to their core studies under the direction of the Director of the PhD Program. Registration for this work must be approved by the Director of the PhD Program and is limited to students who present a project which in judgment of the Advisor may be undertaken to enhance the material learned in PhD courses. It is expected that this research be carried on by the student with a large degree of independence and the expected result is a written report, due at the end of the quarter in which the course is taken. Because this course runs through the summer, reports are due the 2nd week of October. Units earned for this course do not meet the requirements needed for graduation.

GSBGEN 202. Critical Analytical Thinking. 3 Units.

The Critical Analytical Thinking (CAT) seminar helps develop and hone the skills needed to analyze complex issues, to formulate well-reasoned arguments and to evaluate others' arguments. In sections of 18 students or less, you will analyze, write about, and debate a set of topics that exemplify the types of problems contemporary managers regularly confront. CAT will enhance your ability to identify critical issues when exploring challenging business and policy problems. The emphasis will be on developing reasoned positions and making valid, evidenced-based arguments that support those positions.

GSBGEN 203. Global Strategy. 1 Unit.

The economies of the world are ever more closely linked. Record levels of international trade and investment are achieved every year. Cross-border mergers and acquisitions are booming. The foreign exchange markets handle trillions of dollars of volume daily. Offshore provision of services has grown immensely. Host governments and non-governmental organizations operating internationally affect how companies do business far from their home bases and close to home. Nearly all businesses today are somehow connected to the world economy, and it is quite likely that the process of globalization will continue apace. To succeed as a leader in your career, you will need to be able to think systematically about the challenges and opportunities brought about by globalization. This course is designed to help you develop as a leader in this international environment. Our objectives are to help you: 1. To develop an analytic framework that you can use to understand how countries are different or similar in ways that matter to the globalization of business. 2. To understand how corporate strategies can deal with these differences and similarities, resulting in competitive advantage.

GSBGEN 208. Ethics in Management. 2 Units.

With leadership comes responsibility. This course explores the numerous ethical duties faced by managers and organizations. It combines analytical frameworks with the latest findings on human behavior to inform a wide range of ethical decisions and strategies. Readings include case studies, insights from experimental psychology and economics, and excerpts from or about major works of moral philosophy. Through online and in-class exercises, discussions, and personal reflection, you will reveal and assess your ethical intuitions, compare them with more explicit modes of ethical thought, and learn how to use ethics in business settings. A diverse set of ethical viewpoints will be considered with an emphasis on not only their implications for ethical behavior but also on the social and cognitive pitfalls that undermine the ability of business leaders to fulfill their ethical duties.

GSBGEN 239. MSx: Executive Communication Strategies. 2 Units.

Communication is crucial to the success of all leaders, but as you climb within an organization the ability to write and speak effectively is magnified. This course will explore how individuals can develop and execute effective communication strategies for a variety of business settings. This course introduces the essentials of communication strategy and persuasion at an executive level. We will study: audience analysis, communicator credibility, message construction and delivery. Deliverables will include written documents and oral presentations and you will present both individually and in a team. You will receive continuous feedback to improve your communication effectiveness. Through this highly interactive course, you will see why ideas, data and advocacy are combined for a professional, persuasive presentation. This practical course helps students at all levels of communication mastery develop confidence in their speaking and writing through weekly presentations and assignments, lectures and discussions, guest speakers, simulated activities, and filmed feedback. This section is specifically designed with the needs of a senior leader in mind and is only open to Sloan Students. Students who elect to take this course in the fall should not also take strategic communication in the winter or spring; the courses will have sufficient overlap in concepts and assignments.

GSBGEN 259. MSx: Ethics. 1 Unit.

With leadership comes responsibility. This course explores the numerous ethical duties faced by managers and organizations. It combines analytical frameworks with the latest findings on human behavior to inform a wide range of ethical decisions and strategies. Readings include case studies, insights from experimental psychology and economics, and excerpts from or about major works of moral philosophy. Through online and in-class exercises, discussions, and personal reflection, you will reveal and assess your ethical intuitions, compare them with more explicit modes of ethical thought, and learn how to use ethics in business settings. A diverse set of ethical viewpoints will be considered with an emphasis on not only their implications for ethical behavior but also on the social and cognitive pitfalls that undermine the ability of business leaders to fulfill their ethical duties.

GSBGEN 299. The Core Curriculum in the Workplace. 1 Unit.

GSB students are eligible to report on work experience that is relevant to their core studies under the direction of the Senior Associate Dean responsible for the MBA Program. Registration for this work must be approved by the Assistant Dean of the MBA Program and is limited to students who present a project which, in judgment of the Advisor, may be undertaken to enhance the material learned in the first year core required courses. It is expected that this research be carried on by the student with a large degree of independence and the expected result is a written report, typically due at the end of the quarter in which the course is taken. Specific assignment details and deadline information will be communicated to enrolled students. Units earned for this course do not meet the requirements needed for graduation.

GSBGEN 306. Real Estate Investment. 4 Units.

The major objective of this course is to provide the student with an understanding of the fundamentals of real estate investment. The course covers land economics, market analysis, finance, taxation, investment analysis, investment vehicles, real estate risk, development and urban design. Major land uses are discussed including apartments, retail, office, and industrial. The course is designed for students with limited or no background in real estate.

GSBGEN 313. Advanced Seminar on Social Entrepreneurship and Global Poverty. 3 Units.

As an "advanced" seminar, this course is designed for students with strong backgrounds or interests in social entrepreneurship as a tool for solving social problems. The learning format is based on active engagement. For most of the classes, students will be required to lead off the class discussions. The ultimate goal of this course is to make students (and the instructor) smarter about the strengths and limits of social entrepreneurship as a tool for social change. To this end, we will focus on global poverty reduction as a testing ground. During this process we will explore different theories, concepts, frameworks, and guidelines for effective social entrepreneurship to see whether, when and how these help. The course is organized into three modules. The first focuses on how social entrepreneurship fits in a broader framework of social change and social innovation. The second module provides a brief overview of issues, debates, and theories about poverty and development. The third module focuses on specific entrepreneurial interventions aimed at addressing some of the conditions that keep people poor or make them poor. This course allows us to dig into the complexities and challenges of effective social entrepreneurship. It will be taught in a discussion style. The reading will be demanding. So if you are not prepared to dig into the reading or to engage in active discussion, or if you don't feel like you bring relevant knowledge to add to the mix of discussion, this is not the course for you. It is not meant to be an introduction to social entrepreneurship. If everyone contributes, we will all emerge from the course with new perspectives and frameworks for advancing practice in this field. Only take this course if you are ready for an intellectual adventure and ready to make the investment it requires. This course will be taught by Greg Dees, his bio can be found here: <http://www.caseatduke.org/about/caseteam/#greg>.

GSBGEN 314. Creating High Potential Ventures in Developing Economies. 4 Units.

GSB314 - Creating High Potential Ventures in Developing Economies (4 Units)
 Note: Students who only want to participate in the seminar/discussion portion of the class and not do a team-based project (see details below) may enroll in GSB514 for 2 units.
 This course addresses the distinctive challenges and opportunities of launching high-potential new ventures in developing economies. Developing economies are attractive targets for entrepreneurs because many are just starting to move up the growth curve, and they offer low-cost operating environments that can be great development labs for potentially disruptive innovations. They increase in attractiveness when their political institutions stabilize and they become more market-friendly. At the same time, developing economies pose serious challenges. Pioneering entrepreneurs take on significant risks to gain early mover advantages. Specifically, entrepreneurs will not be able to count on the same kind of supportive operating environments that we take for granted in the developed world. They often face cumbersome permit and licensing processes, poorly developed financial and labor markets, problematic import and export procedures, unreliable local supply chains, weak infrastructure, corruption, currency risks, limited investment capital, lack of financial exits and more. This course is designed to help would-be entrepreneurs - both founders and members of entrepreneurial teams - better understand and prepare for these issues as they pursue the opportunities and address the challenges to start, grow, and harvest their ventures in these environments.
 GSB314 combines a seminar/discussion format (Tuesdays) with a team-based project (Thursdays). For the Tuesday sessions, students will read about and discuss the key challenges described above and potential solutions. Guests will describe their own startup and investing experiences in developing economies and answer questions. A framework based on the recently published World Economic Forum (WEF) report on "Entrepreneurial Ecosystems Around the Globe and Company Growth Dynamics" will be used to structure the course. Each student will prepare a short paper on a topic of interest from this portion of the course.
 The Thursday sessions is a team-based exercise for students who either have a specific idea or want to join a team of classmates to pursue more deeply an understanding of the team's country of focus and an initial investigation of the idea's viability. Students must come in willing to be team players and do the work necessary to complete this exercise over the full quarter. Each team member's contributions will be assessed by fellow teammates. Teams will be formed before the start of class or on the first day at the latest. The team will describe, in a final presentation, the challenges and opportunities in their country using the WEF framework. The final presentation will also include the team's thoughts on the viability of their proposed venture and how it capitalizes on their country's assets and addresses its challenges. A detailed business plan is not required; however, specific recommendations and plans for next steps that would be carried out during a 3 to 6 month field and market research study in the country will be part of the final presentation.

GSBGEN 315. Strategic Communication. 4 Units.

Business leaders have marketing strategies, expansion strategies, finance strategies, even exit strategies. Successful leaders, however, also have communication strategies. This course will explore how individuals and organizations can develop and execute effective communication strategies for a variety of business settings.
 This course introduces the essentials of communication strategy and persuasion: audience analysis, communicator credibility, message construction and delivery. Deliverables will include written documents and oral presentations and you will present both individually and in a team. You will receive feedback to improve your communication effectiveness. In the final team presentation, your challenge is to craft an oral presentation that will persuade your audience to accept your strategic recommendations. By doing this, you will see why ideas, data and advocacy are combined for a professional, persuasive presentation.
 This practical course helps students develop confidence in their speaking and writing through weekly presentations and assignments, lectures and discussions, guest speakers, simulated activities, and videotaped feedback. An important new feature of this course is that a team of external communications coaches work in concert with the professor to ensure that students get rigorous and individualized coaching and feedback.
 In this course you will learn to:
 - Create communication strategies at an individual and organizational level
 - Develop clearly organized and effective presentations and documents
 - Diagnose and expand your personal writing and oral delivery style
 - Adapt your delivery style to different material and audiences
 - Enhance oral delivery through effective visual aids
 Students at all levels of comfort and expertise with public speaking and business writing will benefit from this course. Waitlists have been long for this course and you're encouraged to keep that in mind as you make your super round selections.

GSBGEN 317. Reputation Management: Strategies for Successful Communicators. 3 Units.

Successful leaders have to conceive, author, rebuild, pivot, differentiate, and finally maintain a personal reputation to make a lasting, recognizable and powerful identity. Reputation Management will explore how you can effectively communicate to create, adapt and maintain your personal reputation. Your reputation remains fluid as you navigate your career decisions and interact with different professionals along your journey. The course is designed along three interlocking elements: reputation management literature, relevant case studies, and curated guest speakers. Students will learn the fundamentals of strategic corporate communication and the risk of not managing reputation effectively. These frameworks will be extended with specific case studies to illustrate where individuals, groups, and firms have faced the challenge of managing reputation effectively. We will focus on both traditional and virtual components of communication including the relevancy of online reputation management. Finally we will invite well-known leaders from a range of industries who have built and sustained their reputations, through effective communication. Each leader has had to manage their reputations in the public eye, and alongside their peers, supervisors, and employees. Guests will be invited to discuss their conscious and unplanned strategies of how to successfully communicate the kind of person, leader, innovator, or public figure they strive to be. Students will benefit from a rich blend of frameworks, cases, and speakers enabling them to successfully enter the work force and create their own, personal reputations. Students will create a case study drawn from their own experience (or personal network), of a reputation dilemma. A final assignment requires students to articulate their own reputation using any media of the student's choosing and share that with others in the course. Throughout the course students will post at least one blog drawn from class concepts and respond to posts by peers in the class.

GSBGEN 319. Advanced Topics in Philanthropy. 3 Units.

We will explore selected topics including: the roles of the philanthropic and nonprofit sectors in society; the justifications for tax-subsidized philanthropy; whether giving to the poor is morally obligatory or discretionary; barriers to the practice of strategic philanthropy; evaluating philanthropic outcomes; impact investing; alternative legal and organizational structures to carry out philanthropic programs, including donor-advised funds, direct giving, support organizations and foundations; and whether foundations should be designed and run to exist in perpetuity or to spend down corpus over a finite lifetime. The course will be structured around the perspective of a high net worth individual who has decided to devote substantial resources to philanthropy and wishes to decide which philanthropic goals to pursue and how best to achieve them. Although there are no formal prerequisites for the course, we will assume that students have experience working at a foundation, nonprofit organization, impact investing fund, or similar organization, or have taken an introductory course in strategic philanthropy such as GSBGEN 381. (There is sufficient overlap with Paul Brest's Autumn course, *Measuring and Improving the Impact of Social Enterprises* (GSBGEN 322), that students taking that course should not enroll in this one.) Finally, you should be forewarned that this course has a fair amount of reading - not more than is common in undergraduate and graduate courses, but more than is typical for MBA courses in the GSB.

GSBGEN 322. Measuring and Improving the Impact of Social Enterprises. 3 Units.

This course focuses on actionable measurement in government, nonprofit organizations, market-based social enterprises, philanthropy, and impact investing. **Actionable** means that the measurement is used by managers, investors, and other stakeholders in making decisions. The course explores the intersection of several ideas that seem to be in some tension with each other. (1) You can't manage what you can't measure. (2) Measurement is expensive and its results are often ignored. (3) "Not everything that counts can be counted and not everything that can be counted counts" (apocryphally attributed to Einstein). (4) "The more any quantitative social indicator is used for decision making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor." (Campbell's Law). Specifically the course will include: Logic models, theories of change, strategic planning, monitoring, and evaluation. Measuring the social impact of governments, non-governmental organizations, and market-based social enterprises, and asking how philanthropists and impact investors can assess their own impact. Corporate social responsibility, socially responsible investing, and impact investing. Performance measurement, performance contracting, and social impact bonds. Techniques for improving the behavior and accountability of individuals and organizations. The classes will be taught mainly through business school case studies, which place the students in the position of CEOs, managers, and investors called upon to make major decisions.

GSBGEN 324. Leading with Mindfulness and Compassion. 3 Units.

The course explores the role of mindfulness and compassion in the workplace, and the contribution of these qualities to leadership. Topics addressed will include: How can mindfulness enhance clarity in purpose and productivity? What is the connection between mindfulness and compassion? Is compassion in the business world a strength or a weakness? Are compassion and profit motives fundamentally incompatible, or can they support each other? What does compassionate leadership look like? Can mindfulness and compassion be trained at the individual level, and built into company policy? How does self-compassion support effective leadership and recovery from setbacks? Guests from the corporate or non-profit sectors will discuss the challenges of integrating mindfulness and compassion into business strategy and the work environment. Guests from the scientific field will discuss research on mindfulness and compassion as they relate to real-world challenges. Participants in the course will engage with exercises from evidence-based programs targeting the development of mindfulness and the various facets of compassion.

GSBGEN 332. Sustainable Energy: Business Opportunities and Public Policy. 3 Units.

This course examines trends and opportunities in the sustainable energy sector with a particular focus on low carbon energy. We examine these trends in the context of technological change, emerging business opportunities and the parameters set by public policy. Specific topics to be examined include: The State of the Global Cleantech Industry- The Impact of Regulatory Policies and Tax Subsidies- Cost Competitiveness of Alternative Energy Technologies- VC Perspective on Sustainable Energy Start-ups- Project Finances- Fossil Fuels and Carbon Capture n-Renewable Energy, including Solar PV and Biofuels- Energy Efficiency and Storage. Preliminary course syllabus: www.bit.ly/1jehaA9.

GSBGEN 334. Family Business. 3 Units.

Family-controlled private and public companies are the dominant form of enterprise worldwide. Despite their prominence, teaching and research have traditionally focused on analyzing the widely-held model of the firm. This course explores the challenges and opportunities faced by family firms. It is taught by Leo Linbeck III, Lecturer since 2005 at the GSB and President and CEO of Aquinas Companies, LLC. The course balances managerial perspectives with general frameworks. The course is intended for four main audiences: (1) Students whose family owns a business. (2) Students who are considering working for a family firm. (3) Students who are interested in acquiring a private firm either directly (search funds, minority investments, etc) or indirectly (private equity, etc). (4) Students who seek to consult or provide professional services to closely held firms or their owners (wealth management solutions, management consulting, etc). The main objectives of this course are three. First, to understand the challenges and characteristics of family firms. Second, to provide a coherent and consistent set of tools to evaluate the most relevant decisions faced by family firms. Third, to focus on decision-making. The course uses a combination of case studies, guest speakers, lectures, and student presentations to explore the central ideas of the course.

GSBGEN 335. Clean Energy Project Development and Finance. 3 Units.

This case study-oriented course will focus on the critical skills needed to evaluate, develop, finance (on a non-recourse basis), and complete standalone energy and infrastructure projects. The primary course materials will be documents from several representative projects - e.g. wind and carbon capture - covering key areas including market and feasibility studies, environmental permitting and regulatory decisions, financial disclosure from bank and bond transactions, and construction, input, and offtake contracts. Documents from executed transactions are highly customized. By taking a forensic approach, looking at several different deals, we can learn how project developers, financiers, and lawyers work to get deals over the finish line that meet the demands of the market, the requirements of the law, and (sometimes) broader societal goals.

GSBGEN 336. Energy Markets and Policy. 4 Units.

Transforming the global energy system to reduce climate change impacts, ensure security of supply, and foster economic development of the world's poorest regions depends on the ability of commercial players to deliver the needed energy at scale. Technological innovation is a necessary but not sufficient condition for this to occur. The complex institutional frameworks that regulate energy markets in the United States and around the world will play a major role in determining the financial viability of firms in the energy sector. In this course we survey the institutional contexts for energy enterprises of all types and consider what kinds of business models work in each setting. We study in detail how markets function for carbon (assessing the advantages and disadvantages of different policy tools and considering in particular California's implementation of A.B. 32); electricity (with extensive discussion of wholesale electricity markets, energy trading, and issues of market power); renewable energy technologies (focusing on ways to manage intermittency and on how renewable energy businesses respond to government incentives); nuclear power (as a case study of how the regulatory process affects investment decisions); oil and natural gas (treating both conventional and unconventional resources and emphasizing the key role of risk management in an industry characterized by uncertainty and high capital requirements); transportation fuels (discussing biofuels incentives, fuel efficiency standards, and other policy tools to lower carbon intensity); and energy for low-income populations, for which affordability and distribution pose special challenges. A primary teaching tool in the course is a game-based simulation of California's electricity markets under cap and trade. Student teams play the role of power companies and compete to maximize return by bidding generation into electricity markets and trading carbon allowances. The objective of the course is to provide a robust intellectual framework for analyzing how a business can most constructively participate in any sector like energy that is heavily affected by government policy. Instructors: Frank A. Wolak, Director, Program on Energy and Sustainable Development; Mark Thurber, Associate Director, Program on Energy and Sustainable Development.

GSBGEN 337. Business Collaboration to Promote a Sustainable Food System. 3 Units.

This goal of this class is to redesign our food system through project-based, experiential education and entrepreneurship. Projects will focus on food justice, sustainable food and farming technology and disruptive models of production and distribution. The class will scale change by providing creative spaces and resources for students, faculty, and community partners to learn and apply design thinking to real-world opportunities in the food system.

GSBGEN 340. Financial Crises in the U.S. and Europe. 4 Units.

This lecture course will explore the U.S. financial crisis of 2008 and the European debt crisis of 2011-13. We will examine the causes of both crises, policies implemented during the crisis, and options for reform. This is an economic policy course rather than a pure economics course. It will focus on the practical intersection of economics, financial markets and institutions, policy, and politics. Topics we will examine include the following for the 2008 crisis: Did a global savings glut, international savings flows, or Fed policy cause the credit bubble? What caused the housing and mortgage bubbles? How does a bad mortgage turn into a toxic financial asset? Why and how did large financial institutions fail? What's the difference between a solvency crisis and a liquidity crisis? What is Too Big To Fail? Is it real? Why was Bear Stearns bailed out but not Lehman? Was the global financial system on the verge of meltdown in September 2008? How? Why? What was the TARP? The TALF? The CPP? The stress tests? What can we learn from comparing the US financial crisis with that in other major economies? How effective were various policy tools during the crisis? How have policies enacted and implemented since the crisis changed the outlook for the future? For the European debt crisis we will examine: The fiscal and economic situations in various European countries; The structures and history of the Eurozone; Policy options to address problems in troubled European economies; The interaction between European financial institutions and European governments; Options for longer-term reform of the Eurozone. There will be no exams. Students will write two individual memos and a group memo.

GSBGEN 346. Comparing Institutional Forms: Public, Private, and Nonprofit. 4 Units.

For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials. Same as: EDUC 377, PUBLPOL 317, SOC 377

GSBGEN 347. Education Policy in the United States. 3 Units.

This course is designed to introduce major policies defining the U.S. education system today. The policy areas we will cover include, but are not limited to, governance, accountability, choice, finance, and personnel policies for K-12 education. We will also briefly address early childhood education and higher education. We will concern ourselves with policies made at the federal, state, and local levels and consider the implications of these policies for students, families, and communities. We will discuss the goals of policies and the extent to which the intention, implementation and ultimate effects of the policies align.

GSBGEN 348. The Economics of Higher Education. 4 Units.

Topics: the worth of college and graduate degrees, and the utilization of highly educated graduates; faculty labor markets, careers, and workload; costs and pricing; discounting, merit aid, and access to higher education; sponsored research; academic medical centers; and technology and productivity. Emphasis is on theoretical frameworks, policy matters, and the concept of higher education as a public good. Stratification by gender, race, and social class.

GSBGEN 349. Introduction to the Politics of Education. 4 Units.

The relationships between political and economic analysis and policy formulation in education; focus is on alternative models of the political process, the nature of interest groups, political strategies, policy efficiency, the external environment of organizations, and the implementations of policy. Applications to policy analysis, implementation, and politics of reform. (APA).

GSBGEN 350. International Internship. 1-2 Unit.

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GSBGEN 356. Dynamics of the Global Wine Industry. 4 Units.

This course will examine the world of wine with a fresh and contemporary lens. It will explore the market dynamics of this fascinating global industry. The goal of the course is to provide insight into the branding, marketing, and distribution dynamics that shape what consumers can buy and consume with a focus on the strategies of some of the world's leading wine brands. Attention will also be paid to the legal, regulatory, and market dynamics that define the U.S. wine industry as well as to issues of contested authenticity in the world of wine.

GSBGEN 359. Leading Your Life. 3 Units.

This course takes conventional managerial perspectives on the "strategic leadership" of organizations and applies them to the design and management of your life. Fundamental notions of "purpose" and "vision" are translated to the personal level in the form of "dreams" and "aspirations." Basic elements of strategy such as "scope" and "competitive advantage" are applied to help you evaluate fundamental choices about how you lead your life. Constructs such as "priorities," "commitments" and "resource allocation" all have analogues in individual life - as does the core objective of performance and success. The class begins with a hard-nosed and broad-based self-assessment of the quality of your life along a variety of dimensions including relationships, career, money, spirituality and health. Based on this assessment you will develop a strategy and a set of concrete goals for enhancing the quality of your life in targeted domains. The course consists of five intensive sessions designed to help you develop the skills and knowledge- but more importantly the insight and capacity - to be more strategic (in best sense of the term) and effective in how you lead your personal and professional life - meaning actively guiding, stewarding, and driving your results to create a life that is truly exceptional. Substantively, the course draws on a variety of different traditions including existential, humanistic, and positive psychology; personal growth, adult development, and the human potential movement; as well as the practice of life and executive coaching. Central themes and learning objectives include: * The development of self-awareness, self-acceptance, and self-control * An understanding of the power of choice and "authoring" one's life * The essential role of dreams and aspirations * The art and discipline of knowing and speaking your truth * The challenges and self-limiting impact of negative thoughts and self-theories * Developing a stance towards oneself and others that is rooted in grace and wisdom NB: While we expect the class to be helpful and of interest to a wide range of students, it involves a substantial commitment of time and emotional and intellectual energy. It is not for the faint of heart or those who are ambivalent about introspection, feedback, or constructive confrontation.

GSBGEN 360. Sports Business Management. 4 Units.

This course will examine the diverse management challenges facing the sports industry. The course will cover issues at the league level, the team level, the athlete/agent level, and the college level. The diverse constituencies with interests in sports issues (athletes, fans, media companies, advertisers, and legislators to name a few) will be discussed. Sports issues at a global level (the IOC) and both U.S. and outside U.S. will be covered. There will be coverage of evolving business ventures related to the sports industry (such as venture backed sports companies and sports networks). A key focus is on how the sports industry is similar to and different from other industries. Key concepts underlying the course are: value creation/value sharing; revenue ecosystem; virtuous circles and vicious circles; disruptive technologies; growth facilitators and growth inhibitors; leveragable assets/inherited liabilities; and entrepreneurship/new product innovations. Over 80% of the sessions typically will include a guest co-lecturer from the sporting industry.

GSBGEN 363. Fiscal Policy. 4 Units.

One of every five dollars in the American economy will be spent by the federal government this year. This course will examine how federal spending, taxes, deficits and debt affect the U.S. economy and global financial markets, and how the economy affects the federal budget. We will look inside the federal budget to understand entitlement spending, what causes it to grow so fast, how it could be reformed, and why that's so hard to do. We'll understand where the money goes -- how much goes to infrastructure, education, housing, health care, energy and the environment, parks, scientific research, national defense, and other needs. We'll look at the stimulus vs. austerity debate, both within the U.S. and between the U.S. and Europe. We'll look beyond partisan battle lines and explore various fiscal philosophies that sometimes split the political parties. We'll cover the federal budget process from developing the President's budget to enacting individual spending and tax bills, and discuss process reforms including spending and deficit reduction targets, a balanced budget amendment, and line item veto. We'll cover the major players in the budget debate and understand where the big and small budget decisions are made. We'll look at federal taxation, where the money comes from, how it affects the economy, and how it might be restructured. We'll examine the recommendations of the President's budget commission and see if we can predict what will become of its recommendations. And we'll see if we, as a class, can solve our nation's fiscal problems as Washington has so far been unable to do.

GSBGEN 370. Social Innovation Project. 2 Units.**GSBGEN 376. Work and Family. 3 Units.**

This course examines the strategies that highly educated women and men use to combine work and family and the strategies that managers and policy makers can use to help others strike a balance. Topics include the tradeoffs in becoming a stay-at-home parent, the economic value of unpaid labor, the consequences of balancing two high-powered careers and children, the economics of marriage, fertility, child care, and elder care, the gendered division of labor in the home, time-management, workplace innovations, and policy initiatives. Guest speakers add their own perspectives on these issues and describe the roles their organizations play.

GSBGEN 380. Real Estate Private Equity Investing. 4 Units.

This course is intended for any student interested in a career in managing, developing, or investing in real estate or private equity. The course covers cases involving the perspectives of general partners and limited partners; the attributes of successful real property investment firms; analyses of investment portfolios and individual transactions, primarily in the private equity real estate category. Cases will be global. Objectives include: How to construct a private real estate portfolio; How to assess the risks in projects and portfolios; How to perform relative value analyses of differing investments; How to manage troubled investments (when to "hold 'em and when to fold 'em"); How to manage a general partner firm. The course is divided into three modules with special emphasis on real estate financial analysis for transactions and portfolios. The first module will focus on portfolio construction issues and how to quantify whether the investor has been successful. The second module will focus on underwriting individual transactions and applying a relative value construct in determining the more attractive investments. The second module will also focus on the management of troubled investments, including deciding when to "double down" and how to protect investments already in place. The third module will address how general partners manage their firms.

GSBGEN 381. Strategic Philanthropy. 3 Units.

Appropriate for any student driven to effect positive social change from either the for-profit or nonprofit sector, Strategic Philanthropy will challenge students to expand their own strategic thinking about philanthropic aspiration and action. In recent decades, philanthropy has become an industry in itself - amounting to over \$300 billion in the year 2012. Additionally, the last decade has seen unprecedented innovation in both philanthropy and social change. This course explores the key operational and strategic distinctions between traditional philanthropic entities, such as community foundations, private foundations, and corporate foundations; and innovative models, including funding intermediaries, open-source platforms, technology-driven philanthropies, and venture philanthropy partnerships. Course work will include readings and case discussions that encourage students to analyze both domestic and global philanthropic strategies as they relate to foundation mission, grant making, evaluation, financial management, infrastructure, knowledge management, policy change, and board governance. Guest speakers will consist of high profile philanthropists, foundation presidents, social entrepreneurs and Silicon Valley business leaders creating new philanthropic models. The course will culminate in an individual project in which students will complete a business plan for a \$10 million private foundation.

GSBGEN 382. Thinking Like a Lawyer. 3 Units.

Open to all non-law graduate students at the University, this course will provide non-law students an analytical framework for understanding the core concepts of the law and familiarize students with how lawyers analyze and structure their work. This course will be taught by Vice Dean Mark Kelman and Law School faculty in their areas of expertise, with one to two classes devoted to each topic. It will introduce students to some of the foundational principles of law and will review topics such as contracts, litigation, intellectual property, securities and employment law. No previous study of law or legal systems is required and there are no pre-requisites. It will be offered in the Winter 2012-13 quarter (1/8/13 - 3/13/13), with lectures twice weekly on Tuesdays and Thursdays from 1:30 - 3:00 pm at the Law School. Additional mandatory TA-led discussion sections will be taught on Tuesday and Thursday - students must also attend one of these TA sessions each week. Students will indicate their availability for specific sections on forms passed out at the first lecture. Readings and assignments will be posted to Coursework; there is no textbook. Grading: The class is graded on a pass/fail basis. There will be no final exam, but completion of problem sets on various topics as well as attendance at discussion sections will be used to determine grading. All students must complete 4 problem sets. Two specific problem sets are required of all students and the other assignments can be chosen from a list of available assignments.

GSBGEN 390. Individual Research. 1-4 Unit.

Need approval from sponsoring faculty member and GSB Registrar.

GSBGEN 392. Modern Military Strategy: the Changing Face of War. 2 Units.

The course's goal is to introduce students to the complexities of military strategy in the modern era. We will cover a variety of types of warfare, ranging from early modern wars, through the great wars of the twentieth century to the strategic challenges posed by present-day counterinsurgency and low-intensity conflicts. Military planners are required to act fast in an uncertain and highly lethal environment. We will examine how, and why, they react to innovations that completely transform their worlds, and try to understand what makes such strategic responses successful. In so doing, we will explore the interlocking relations between strategy and economics, technology, ideology, state apparatuses, and various forms of armed organizations. Course requirements: Students are required to submit 2 assignments: a mid-term project analyzing a successful military strategy, and a final project. The final project will be based on an in-class simulation of a strategic military campaign. Students will be required to submit individual analyses of the simulation, and present their analyses in class.

GSBGEN 393. Practicum in Applied Philanthropy: Achieving Impact from a Major Gift. 3 Units.

Giving away money well--i.e., achieving genuine planned impact in a measurable way--turns out to be as hard or harder than earning or investing it. In this seminar, students will decide how and to which nonprofit organization they will make a real \$100,000 donation. The students, guided by the instructor, will choose what readings and resources to draw on in making their decisions from a bibliography provided as well as other sources they develop. They will also discover, debate, discuss and decide what evaluation approach approach to use as well as what decision-making process to apply. Students are likely to be asked to research and present knowledge on relevant topics. And a final presentation to a donor trying to decide whether to fund part of the \$100,000 is likely also.

GSBGEN 507. Impact Investing in the United States and Other Developed Markets. 2 Units.

In the past decade the notion of impact investing has gained substantial popularity. But what is impact investing and what do impact investors actually do? This course will explore the current role of impact investing in developed economies, with particular focus on the United States. We will review the history of the field and explore the concept of a continuum of risk and impact. The course is designed to examine the practice of impact investing from multiple perspectives. It will broadly cover impact investing across multiple asset classes with a focus on venture capital impact investing. Selected practitioners from leading firms, organizations and portfolio companies will join for a portion of a number of classes to provide first-hand insight. The creation and measurement of social impact while answering financial return expectations, as well as the Limited Partner perspective in impact investing will also comprise a key part of the course's intellectual underpinning. Assignments are created to mimic the real-world tasks and challenges in impact investing, debate the issues that those in the field grapple with today and encourage students to explore how the industry can expand. There will be a final project and presentation for the course. Classes will include both presentation and dialogue, with frequent student participation strongly encouraged. Ideally, at the conclusion of the course, you will not only understand the qualitative aspects of impact investing and the role of metrics, but also the basic financial analysis that underlies investments made across numerous asset classes and in particular venture capital.

GSBGEN 508. Deals II. 2 Units.

This course applies economic concepts to the practice of structuring contracts. The course extends over two quarters, meeting three hours per week the first quarter and two hours per week the second quarter. Students enrolled in the course must take both quarters. All or most of the first quarter is spent in a traditional classroom setting, discussing economics articles and case studies of actual contracts that illustrate the concepts described in the articles. Beginning either at the end of the first quarter or the beginning of the second quarter until the end of the course (the "deals" segment of the course), the class explores the connection between economic theory and contracting practice by studying specific current deals. Students, divided into groups, study a deal beginning in the first quarter. Then, during the deals segment of the course, each group gives a presentation of its deal to the class. The following week, a lawyer or other participant in the deal will come to class and lead a discussion of the deal. When it works, the students' and the practitioners' analyses are mutually enlightening. The course examines new deals each year. Deals that studied over the years have included movie financings, biotech alliances, venture capital financings, cross-border joint ventures, private equity investments, and corporate reorganizations.

GSBGEN 510. Taking Stock and Moving Forward. 1 Unit.

This spring quarter elective is designed to help you prepare for a challenging, fulfilling, and meaningful future. GSBGEN 510 seeks to:nn1). Provide you with the opportunity and tools to take stock of what you have learned about yourself as a person and as a leader over the last 18 months at the GSBnn2).Expose you to research on personal and professional development and help you apply it nn3). Encourage you to reflect on what matters most to you, personally and professionally, and begin to determine how to achieve it, and nn4). Prepare you for the challenges and transition immediately ahead and, in so doing, learn how to manage life's big transitions in the future. nn nnWe will address four major life and career themes: nnn- Learning from Choices nn- Fulfillment and Meaningnn- Failure and Resilience nn- Transitions and Renewal nnnThis class is limited to 36 students. Each class will begin with conceptual input and an overview of that session's topic in the main classroom. Students will then be divided into three twelve-person break-out groups during the remainder of the class time. These groups are NOT T-groups, for those of you who took Interpersonal Dynamics, but rather discussion groups. Discussion will be of a reflective and personal nature. Each group will have 2 Group Leaders who are experienced executive coaches specializing in helping people through life and career transitions.

GSBGEN 512. Funding Social Impact: Methods and Measurement. 2 Units.

The past decade has seen an increasing interest in impact investments, which seek to generate financial returns at the same time as they have social (or environmental) impact. But how does an investor actually achieve impact? We explore this question through a framework that requires that the investee enterprise itself has net positive impact and that the investor's financial or other contribution increases that impact. We consider the challenges of measuring an enterprise's impact, and then turn to assessing the value added by investors, fund managers, and other intermediaries. The course will be taught mainly through case studies that consider investments in different asset classes ranging from those that expect below-market returns to ones that expect risk-adjusted market returns or better. We will look at investments at various stages, from R&D to start-ups to mature enterprises and entire sectors, considering the role of subsidies (for better or worse) and how an enterprise's social mission can be protected upon exit, and also will examine social impact bonds. The course is taught by Paul Brest, <http://www.law.stanford.edu/profile/paul-brest>. With its focus on assessing impact, it has a different mission than Matt Bannick's winter quarter course, *New Business Models in the Developing World*, which examines enterprises serving the base of the pyramid, and David Chen's spring quarter course, *Impact Investing: Strategies and Tools*, which broadly examines the domain of impact investments with emphasis on those yielding market returns. Students will find only slight overlap among the three courses.

GSBGEN 514. Creating High Potential Ventures in Developing Economies. 2 Units.

GSB514 - Creating High Potential Ventures in Developing Economies (2 Units)nnNote: Students who want to work on a team to investigate a specific new venture idea in addition to participating in the seminar/discussion sessions (see details below) should enroll in GSB314 for 4 units. nnThis course addresses the distinctive challenges and opportunities of launching high-potential new ventures in developing economies. Developing economies are attractive targets for entrepreneurs because many are just starting to move up the growth curve, and they offer low-cost operating environments that can be great development labs for potentially disruptive innovations. They increase in attractiveness when their political institutions stabilize and they become more market-friendly. At the same time, developing economies pose serious challenges. Pioneering entrepreneurs take on significant risks to gain early mover advantages. Specifically, entrepreneurs will not be able to count on the same kind of supportive operating environments that we take for granted in the developed world. They often face cumbersome permit and licensing processes, poorly developed financial and labor markets, problematic import and export procedures, unreliable local supply chains, weak infrastructure, corruption, currency risks, limited investment capital, lack of financial exits and more. This course is designed to help would-be entrepreneurs - both founders and members of entrepreneurial teams - better understand and prepare for these issues as they pursue the opportunities and address the challenges to start, grow, and harvest their ventures in these environments. nnGSB514 is a seminar/discussion format in which students will read about and discuss the key challenges described above and potential solutions. Guests will describe their own startup and investing experiences in developing economies and answer questions. A framework based on the recently published World Economic Forum (WEF) report on "Entrepreneurial Ecosystems Around the Globe and Company Growth Dynamics" will be used to structure the course. Each student will prepare a short paper on a topic of interest from the course.

GSBGEN 515. Essentials of Strategic Communication. 2 Units.

Successful leaders understand the power of authentic, memorable communication.nnnThis course uses the lens of oral communication and presentations, to introduce the essential elements of the strategic communication strategies that make authentic, memorable communication work.nnnFocusing on oral communication and presentation, we introduce the essentials of communication strategy and persuasion: audience analysis, message construction, communicator credibility, and delivery.nnnDeliverables include written documents, focusing on individual and team presentations, with students receiving continuous feedback to improve their communication effectiveness, and to sharpen their authentic leadership voice.nn nnThis highly interactive, practical course, is focused on feedback to help students at all levels of communication mastery develop confidence in their speaking and writing. Course includes presentations, assignments, lectures, discussions, simulated activities, in-class feedback, and filmed feedback.nn nnIn this course you will learn to:nn-Recognize strategically effective communicationnn-Implement the principles of strategic communication across different platformsnn-Develop clearly organized and effective presentations and documentsnn-Diagnose and expand, your personal authentic communication stylennnAs you make your super round selection, keep in mind that wait lists have been long for this course.

GSBGEN 516. Using Neuroscience to Influence Human Behavior. 1 Unit.

Why is it so difficult to change human behavior? Why is it that more than 80% of individuals who sign up for fitness classes drop out within a few weeks, even a few days? Why is it that despite the dramatic increase in devices and apps that are geared for changing behaviors, people still struggle to adopt and maintain new behaviors? The issue is not about a desire to change—it is about using the right methods and techniques to bring about habit change. The primary goal of this seminar is to gain a rich understanding of changing behaviors through frameworks and concepts that are grounded in neuroscience. In this seminar, we will examine (1) ways of characterizing different domains of behavior change, each requiring different methods and techniques, (2) why methods that often work in one domain are often unsuccessful in others and (3) how companies create habits in users and how one can leverage the power of technology to bring about behavior change.

GSBGEN 518. Dynamics of the Global Wine Industry. 2 Units.

This course will examine the world of wine with a fresh and contemporary lens. It will explore the market dynamics of this fascinating global industry. The goal of the course is to provide insight into the branding, marketing, and distribution dynamics that shape what consumers can buy and consume with a focus on the strategies of some of the world's leading wine brands. Attention will also be paid to the legal, regulatory, and market dynamics that define the U.S. wine industry as well as to issues of contested authenticity in the world of wine.

GSBGEN 520. The Frinky Science of the Human Mind. 2 Units.

The exponential growth in our understanding of the workings of the human brain has led to a rather startling and maybe embarrassing (even depressing) conclusion. While the human brain is unique among species in its ability to strategize, conceptualize, hypothesize, etc., it is now undeniable that most of our decisions, behaviors and experiences are shaped by instinctual brain systems. Thus, constituting the broad goals of this seminar, it behooves us to first understand the workings of the instinctual brain and then leverage this understanding to craft solutions for real-world issues from the vantage points of the "firm" as well as an individual, a leader and an innovator. Topics that will be covered from your vantage point include leadership skills including being effective at influencing key stakeholders within and outside the firm and being effective at making decisions, personal as well as professional. Topics that will be covered from the firm's vantage point include crafting superior value propositions at the decision as well as the experience phases of the "customer" journey, fostering an innovative organizational culture and developing incentives to increase employee engagement.

GSBGEN 521. Managing Under Uncertainty. 2 Units.

Uncertainty with changing opportunity shapes investment planning whether in financial firms, corporations or entities such as pension funds, venture capital and private equity, and, in particular, in non-traded assets or securities. We will develop an approach to understanding (1) capital allocation issues; (2) capital structure planning; (3) optimization policies with changing opportunity sets and adjustment costs; and, (4) the selection of levels of risk taking. These relate to what is needed to manage uncertainty. The following three areas: (1) developing feedback mechanisms to assist planning; (2) reporting mechanisms for management and investors; and, (3) compensation planning and business structure, relate to managerial effectiveness under uncertainty. These internal risks must be integrated with external risks such as geopolitical issues and fiscal and monetary policies in a global setting. I will provide selective reading on each topic and a list of questions to provide follow on discussion. Students will work with me to flesh out not only the answers to these questions, but also provide additional questions and discover additional readings that are germane to expanding understanding and to following developments in each of these areas.

GSBGEN 524. Leading with Mindfulness and Compassion. 2 Units.

The course explores the role of mindfulness, self-compassion and compassion in the workplace, and the contribution of these qualities to leadership. Topics addressed will include: How can mindfulness enhance clarity in purpose and productivity? What is the connection between mindfulness and compassion? Is compassion in the business world a strength or a weakness? Are compassion and profit motives fundamentally incompatible, or can they support each other? What does compassionate leadership look like? Can mindfulness and compassion be trained at the individual level, and built into company policy? How does self-compassion support effective leadership and recovery from setbacks? Participants in the course will engage with exercises from evidence-based programs targeting the development of mindfulness and the practical application of the skills of self-awareness, self-compassion, and perspective taking in the context of work and relationships.

GSBGEN 525. From Business Concept to Business Plan. 1 Unit.

This entrepreneurship course is designed to teach students the basic processes and tasks required to construct a business plan en route to the creation of a new venture. The course is designed not only for students with immediate entrepreneurial aspirations, but for any student considering being involved in an entrepreneurial venture at any point in his or her career. The course is organized around a number of business concepts that we have selected. With your team, you will study one of the concepts, analyze it and evolve it into a business plan. The class comprises multiple student teams, each working on a different business concept. Each team will also review and critique the work of the other two teams.

GSBGEN 526. Finding the Right Match: Jobs, School, and Love. 1 Unit.

We will analyze markets that match people to other parties. We will spend one day each on the job market, higher education, and life partners. We will investigate the following issues: Can we expect a competitive environment to lead to an efficient outcome? If not, why are there "market failures"? What is the role of hidden information in the market? How can the problems in the market be solved? What are the business opportunities in this market? Do entrepreneurs entering the market make it operate better or worse? We will spend one day each on job markets, higher education, and dating/marriage markets. Each of these three days will be divided into three sections: Section 1: Lay out an underlying economic concept related to the market (such as Network Externalities, Signaling, Adverse Selection, or Search Theory) Section 2: Analyze a case or a few mini-cases focusing on players in the relevant market. Section 3: Discussion with a guest from the relevant industry. The fourth day will be a set of shorter analyses of other matching markets, potentially including pets, car sharing, apartment rentals, and the like. Also, if any students in the class have a related business idea they would like to share and discuss, we will analyze that for part of the final day. To determine whether you would be interested in the class, it may be useful to look at the instructor's book *Everything I Ever Needed to Know About Economics I Learned From Online Dating* (you can look inside on Amazon or find excerpts, articles, and videos online if you Google Paul Oyer book). Only one day of the class will focus on dating/partners, but the book will give you a sense of the types of issues we will address on any given day.

GSBGEN 527. Successful Creativity and the MBA Mind: A Scientific Framework for Engaging Personal Creativity. 1 Unit.

Creativity is one of the most coveted attributes of successful business leaders. It is also among the most widely sought attributes that innovative companies like Facebook, Google and Apple are looking for when they hire. Yet, creativity remains a mystery to many individuals. Who has it and who doesn't? Can it be learned? How do successful creators really think and work? Is there anything different or special about the way they organize their lives and manage their work? This new Week 0 course will engage these provocative questions and others. We will explore what recent research tells us about the roots of creativity and its developmental course over the life-span. We will also examine some of the prevalent myths regarding the nature of creativity. The course will take a variety of approaches to mastering these topics, including reviewing the latest academic research (including some of my own work in this area). These ideas will be illustrated, moreover, by provocative and inspiring case studies. You will also have an opportunity to think about your own personal creativity and how to develop it further. The course is designed to be very intellectually engaging, as well as offer you an opportunity for self-reflection lively discussion.

GSBGEN 528. Creativity, Problem Solving, and Innovation. 2 Units.

This course is designed to expose second-year MBAs to research on creativity in problem-solving. The course has straightforward practical goals: it will explore ways in which individuals, groups, and organizations can become more creative, in useful ways. In order to do this effectively, we will study hard-nosed research on problem-solving. We will not read articles entitled "The five-fold path to creativity." If there really were recipes or algorithms for reliably increasing creativity, I would certainly teach them. (Or more likely, I wouldn't need to: they would routinely be taught in the core curriculum of every MBA program.) Instead, we will study what cognitive and social scientists have discovered about novelty and effectiveness in problem-solving. Some of this work--e.g., Scott Page's examination of the value of cognitive diversity in teams--will have relatively direct action-implications. The pragmatic implications of other research--e.g., on organizational norms for resolving conflict--will be more indirect. Because the course's practical goal is easy to state but hard to achieve, some patience is required. As indicated above, we will study creativity at three levels: individuals, groups and organizations. Because there is pretty good evidence that different kinds of factors are prominent at these different levels, the course's approach is multi-disciplinary. We will read articles and books by cognitive psychologists and cognitive scientists, social psychologists, organization theorists, and perhaps historians who have studied industrial innovation. Disciplinary boundaries are irrelevant: any work that articulates a significant claim about pragmatically useful creativity and backs up that claim with a good argument is grist for our mill. Because the course focuses on creativity that makes a difference--i.e., that ultimately makes some organizational stakeholder better off--we will also study how innovations get selected. This inevitably means studying how new ideas get criticized and sometimes discarded. This process is less fun than generating new ideas, but given that brand-new ideas are usually flawed in one way or another, critical and hard-headed scrutiny of innovations is vital. Hence, we will examine psychological, political, and organizational obstacles to the effective criticism and evaluation of novel solutions, and we will also look at some ideas on how these obstacles might be reduced. Classes will be run seminar-style: they'll focus on examining the readings closely and critically. Understanding what a study does not establish is sometimes just as important as understanding what it does establish. Hence, I will expect everyone to read carefully; skimming won't cut it. This effort will probably result in a rather deep and sophisticated comprehension of the topic. Given the importance of creativity and innovation in modern organizations, that should be adequate return for hard effort.

GSBGEN 529. Leading With Agility. 2 Units.

Can you actually prepare for unexpected make or break career challenges you will face in the years ahead? By definition, the future is unpredictable, but understanding and grappling with the types of challenges seasoned leaders describe as the toughest they've faced can help to prepare one for the emotional demands that come with increasingly broad leadership responsibilities. Those challenges include role and team transitions, confrontations and conflicts, turning around poor performance (in individuals or groups), and recruiting or developing talent. This class will draw from a collection of video cases, role plays and exercises, based on real-life examples that are the product of hundreds of interviews conducted with leaders by the school's Center for Leadership Development and Research. The goal is to help students prepare for some of the gut-wrenching choices they will make in leadership roles, while evaluating how their mental and emotional responses influence their own managerial judgment.

GSBGEN 530. Learning from Experience. 1 Unit.

It is commonly believed that experience is a great teacher. But is it? Do we always learn what we can or should from experience? Research on this question suggests that the answer is no. Often we do not learn all that experience has to teach us and often the lessons we draw from experience are the wrong ones. This seminar examines what research suggests about how managers and others learn and don't learn from experience. Among the questions we will consider are: (1) How does experience teach? (2) What are the impediments to learning from experience? (3) How can we learn better from our experiences? (4) How can we have better learning experiences; that is, design and structure our experience and that of others so that it produces better learning?.

GSBGEN 531. Global Trip Leadership. 2 Units.

This course is open only to leaders of the Service Learning Trips or Global Study Trips. The course will meet nine times only on Tuesdays (because of the limited time and the fact that the course is experientially based, attendance at all classes are required). In addition, students will meet with a Master Coach just before their trip to review how they are operating as a team. There will be a final lunch meeting in January where the Winter Trip leaders will share their experience with the Spring Trip leaders. The purpose of this course is to help trip leaders in the planning and conducting of the trip so as to maximize the learning for the trip participants and the trip leaders as well as increasing the overall success of the trip. A range of topics will be covered including: articulating a vision for the trip, developing their team as a high performing team, making quality decision, resolving interpersonal issues (within the team and with participants), understanding how to make full use of the faculty member and dealing with the myriad of issues that are likely to arise. Class time will mainly be spent discussing and role-playing a series of short cases that have been developed around issues that have come up in past trips. These role plays will be the basis of peer feedback. The cases will be supplemented by short lectures to provide the conceptual underpinning. There will be a very modest reading list.

GSBGEN 532. Cleantech: Business Fundamentals and Public Policy. 2 Units.

This course examines trends and opportunities in the cleantech sector with a particular focus on low carbon energy and carbon emission reductions. We examine these trends in the context of changing technology, economic fundamentals, and public policy. A particular focus of the course will be on the role of regulation and tax subsidies in determining the cost competitiveness of clean energy sources. Specific topics and industries to be analyzed include: Expanding role of Natural Gas in Electricity Generation; Carbon Capture by Fossil Fuel Power Plants; Solar PV industry; Cellulosic Biofuels; Energy Efficiency; Clean Energy Policies and Investment in China.

GSBGEN 533. Sustainability as Market Strategy. 2 Units.

The increasing social emphasis on environmental sustainability creates both dilemmas and opportunities for firms. Recognizing that sustainability means a focus on not just the environment, but also on broader issues of corporate social responsibility, we will examine the ways in which some companies are developing a "sustainability strategy." We will also consider the way in which companies are profiting from such a strategy with an eye toward understanding the conditions under which such a strategy can generate profits for firms. We will also focus on the way in which many companies are partnering with non-governmental organizations to develop business strategies that focus not only on profits, but also on the environment and social responsibility.

GSBGEN 535. Emerging Network-Based Consumer Services. 1 Unit.

This seminar considers the economics, development, and growth of emerging networks that use technology to connect people (typically sharing a purpose) to one another. Each day of the seminar will focus on a different company (or a few companies) and a different theme. The set of companies is preliminary, and is shown here just to illustrate a potential example.
 nn- Network Platforms/Zynga: Zynga is one of the leading and most advanced network-based consumer services. It has been struggling recently with growth and monetization on Facebook. We'll examine Zynga's business model, Zynga as an application vs. Zynga as a platform, and the choices Zynga has made along the way.
 nn- Metrics/LinkedIn: We'll examine the use of metrics to track application growth, engagement and monetization. We'll also compare the use of a proprietary social graph vis-a-vis Facebook's, considering the choices made by LinkedIn vs. a few Facebook apps.
 nn- Growth and Evolution: We'll discuss how network-based consumer services can grow and evolve their business models using a few company examples.
 nn- Monetization/Pinterest: We'll analyze interest and content networks, focusing on how they may be monetized vis-a-vis Facebook.
 nnSome of the seminar topics overlap topics covered in OIT 256 or OIT 356. Students who took one of these courses will not be allowed to take this course.

GSBGEN 537. The Role of Business in Sustainable Food Systems. 1 Unit.

The food system in the United States has contributed to a number of societal and ecological problems, from increasing rates of diet- and food-related illnesses, to "food deserts" in our inner cities, to the loss of farmland to urban sprawl, to agricultural chemical runoff into our water sources, to unjust farm labor practices, to the overuse of antibiotics, to an enormous amount of food waste, to questionable animal husbandry practices, and more generally to a diminishing level of diversity among the people, plants, and animals on whom we rely for our sustenance. These problems create both dilemmas and opportunities for business. This course will focus on how some companies (both for-profit and non-profit) are working to try to repair the damaged food system in the United States. Topics include (but are not limited to): organic and biodynamic agriculture, the economic demise of the family farm, the health effects of our current system of food production and the habits it has engendered, and opportunities for entrepreneurship and new modes of food distribution. We will have several guest speakers, field trips, and cooking/food preparation workshops and demonstrations.

GSBGEN 538. Energy Policy, Markets, and Climate Change. 2 Units.

This course will consider world energy markets as well as national and international policy challenges for the energy sector, in the context of climate change and its probable impacts. Case studies, readings, and class discussions will explore the history of fossil fuel price changes and their effects on trade, the influence of subsidies and tax incentives on the prospects for renewable alternative sources, and the role of governments in setting import and export policies. The class will consider such questions as: What policies are adopted when energy developments confront other land values, or are associated with human or environmental risks? What role do Public Utility Commissions play and how do international agreements influence the sector? How do new technologies for improving energy yield, building efficiency, and transportation affect use? What is the role of regulation in establishing patterns of energy use? Cases may require students to play such roles as: (1) an executive director of an environmental non-governmental organization considering approval for construction of a large solar-thermal facility in the Mojave Desert; (2) the chief executive officer of a company drilling shale deposits for natural gas developing his case for a governor; (3) a Senator evaluating her position on converting a port to permit US coal to be exported to China.

GSBGEN 541. Problem-Solving and Creativity. 2 Units.

This is a project-based course on problem solving and creativity. It is expected that everyone who takes the class will work on some significant problem that's currently ongoing (e.g., the design of part of a complex project, a difficult negotiation over a new venture). The course is designed to achieve two goals. First, it will give you tools that should increase the probability that you'll make (hopefully substantial) progress on your problem. Second, it will introduce you to research that explains why it's sensible to try those tools on hard problems---i.e., the point of those tools.
 nPlease note that the first goal is stated rather cautiously. There are good reasons for this. I expect that most students will be working on hard problems. (Everyone in the class will be getting help from classmates on their particular problem; why bother your peers with an easy problem that you could solve yourself?) An important idea in cognitive science, Newell's Law, says that magic doesn't exist: if a problem-solving method is powerful (very likely to solve a certain type of problem), then it only works on a narrow class of problems. So... this course will not give you tools that are both powerful and general. It can't: such tools don't exist. Happily, improving your problem-solving skills, at least in certain domains, is possible, and that's what the course aims to do.
 nProgress on hard problems usually requires help from friends and colleagues. Virtually all researchers of creativity agree that most innovations that are both bold and useful involve multiple problem solvers. This course will implement this important pattern by requiring every student to help some classmate with their problem. Carrying out this help will be an important part of your grade.
 nAnother important empirical regularity in the field of innovation is that when problems are hard many (perhaps most) candidate-solutions don't work out. It's easy to accept that about other people's ideas; about my own, not so much. So a vital component of effective problem-solving is tough-minded evaluation. This implies rejecting bad ideas or bad parts of a would-be solution. Hence, at the end of the course you will be required to evaluate the progress that a classmate has made on his/her problem and to explain your assessment. (For obvious reasons you will not evaluate the same person you're helping.)
 nIn sum, every student will do three things in this course: generate new ways to make some progress on a problem of their own choosing; help somebody else work on their project; evaluate somebody's progress.

GSBGEN 542. How to Tell a Story. 1 Unit.

"Tell me the facts and I'll learn. Tell me the truth and I'll believe. But tell me a story and it will live in my heart forever." Stories are all around us. Stories move us, make us feel alive, inspire us to be more than we would be otherwise. As famed screenwriting coach and author of the screenwriting bible, *Story*, McKee says: "Story is not only our most prolific art form, but rivals all activities - work, play, eating, exercise - for our waking hours. We tell and take in stories as much as we sleep - and even then we dream." ** Despite our love for stories, most of us leave stories to "storytellers" - fiction writers, journalists, and film makers. But we all have this skill. We simply need to hone it. The question is - how can we hone it? In this seminar, we will break down the basic elements of storytelling, elucidate the power of the verbal as well as the visual, and discuss how storytelling helps build brands and organizations. For the final project, you will create tell a 3 minute story about (a) your organization, (b) your brand, or (c) you. Thus, the goals for this class: (1) Understand what makes bad stories, okay stories, and great stories. (2) Learn how to create storyboards. (3) Gain practice in crafting and telling a compelling 3 minute story about yourself. You will get feedback by filmmakers on what went well, went poorly, and how to take the story to level further. ** Robert McKee, *Story*, (Regan Books: 1997), p. 11.

GSBGEN 543. The Power of Stories in Business. 2 Units.

In this class, we will illuminate the power of story in business by revealing the key elements of storytelling, discussing the power of the verbal as well as the visual, and uncovering how storytelling helps build brands and organizations that align their brand value proposition with their internal culture. This skill is important if you are a new venture trying to build a reputation, or you are an established company trying to grow and innovate.

GSBGEN 544. The Role of the Modern General Counsel. 2 Units.

The news is filled with reports of one corporate crisis after another - names like BP, Goldman Sachs, Bank of America, AIG, Siemens, Toyota, and issues like backdating, bribery, antitrust violations, insider trading, procurement fraud, health and safety violations, consumer class actions and the like. And often the cry is heard - where are the lawyers? This course explores the evolution of the role of the general counsel of major American public companies and, more broadly, the expanding role of in-house counsel. These are the lawyers in the trenches, on the front lines of American businesses. Each week, we'll review another dimension of the general counsel's job. We'll consider how general counsel today play an important role on the executive team of major companies and explore the different ways in which general counsels manage large corporate legal departments and direct functional legal areas like litigation, IP, corporate and securities, M&A, environmental and employment law. We will also examine the professional responsibilities and legal obligations of the general counsel -- including the delicate and sometimes conflicting reporting relationships to the CEO and the board of directors -- and consider how an in-house legal department fits into a corporation's organizational structure and how it supports the company's operating units on a day-to-day basis. We will explore the general counsel's role in internal investigations, regulatory investigations and compliance programs, and governmental affairs. We will also consider current practices in how in-house lawyers select, collaborate with and evaluate outside counsel. The class will meet weekly and we will invite current and former general counsels to join us occasionally for our discussions. Each student will be expected to participate actively in class discussions, and will be required to complete two projects, each in collaboration with three other students and submitted as a team, presenting how the team would address a complex set of legal and business issues. The course grade will be based 1/3 on class participation and 1/3 on each of the two team projects.

GSBGEN 548. Crafting Your Life Story. 1 Unit.

This new seminar explores how the "life stories" we tell ourselves influence the choices we make in life, including the personal and professional choices we make, the ambitions we pursue - and, ultimately, our very success. Together, we will look at the science and art of what might be called "generative autobiography" - finding the particular life story that helps you pursue a more consequential and meaningful life. In developing this idea, you will learn to identify the essential elements of a great life story. You will learn how to craft a better, more creative life story for yourself, and you'll learn also how to tell your life story more effectively to other people in order to engage them more deeply and lead them more effectively. The course will include a series of outstanding readings from psychology, philosophy and literature on how to think more creatively about the life you are living now - and the life you hope to live going forward. One distinctive feature of this new seminar will be the extensive use of materials from award-winning films to illustrate the major themes and dilemmas of telling a good life story. We will examine the lives of a number of fascinating high achievers from business, science, politics and the arts. The course also includes several exercises designed to help you craft, refine, and project your life story. The seminar will be very discussion-oriented and very engaging!

GSBGEN 550. Issues in Leadership. 2 Units.

This seminar will explore the nature and role of leadership in organizations. We will examine such questions as (1) What is leadership? (2) Why is it important? (3) What is it that leaders actually do? (4) How do they do it? (5) How are leaders developed? (6) Why do leaders succeed or fail? (7) What about your potential for leadership and your strategy for developing it? Our primary objective in this seminar is to achieve a deeper understanding of the nature and role of leadership in organizations. Our approach will be to examine a small sample of the literature, together with the amazing story of Ernest Shackleton and his Endurance crew, and then to probe several key questions through lively class discussion. The discussion, informed by the readings and also by our collective experiences, will seek to develop some general principles and observations about leadership - particularly about how you might better develop yourself as a leader.

GSBGEN 551. Innovation and Management in Health Care. 2 Units.

The health care system accounts for over 17% of US GDP and is one of the fastest growing segments of the economy. This two unit class focuses on the interplay and tension between the main players in the health care field - providers of health care services (individual doctors, group practices, integrated health care systems), payors (insurances companies, employers, consumers, and government), patients, and innovator companies (biopharma, medical device, diagnostics, and health care IT). The course is designed for students with a broad diversity of backgrounds and interests who want to better understand the health care business and system. No prior experience in the health care or medical field is assumed or needed. The focus of the class will be primarily on the US health care system, but there will be limited discussion of non-US systems as well. The course is divided into four modules: n1. An overview of the US Health Care System and the interplay between payers, providers, and innovators n2. Provider delivery models, health care information technology, and incentive structures n - The relationship between quality, cost, and access n - Integrated systems and fee for service models n - New IT technologies, including electronic data records n - The role of information and incentives n3. Innovator business models and issues n - Financing and managing new product development and portfolio management n - Clinical trial management and gaining regulatory approval n - Marketing, communication and sales strategies (both physician and patient communication and sales) to drive product adoption and gain third party reimbursement n - Business models to drive innovation n4. Health care reform and technological innovations n The class will be taught primarily from the perspective of a business person operating a company rather than that of a policy maker, academic, or investor. While there will be a few lectures to provide background and frameworks for course topics, most classes will involve a case discussion and prominent guest speakers from the health care industry. Past speakers have included CEOs and senior executives from Genentech, UnitedHealth, Intermountain Health, Genomic Health, PracticeFusion, GE, Safeway, Gilead, Intuitive Surgical, and Venrock. n The class is taught by Rob Chess, a health care entrepreneur, Chairman of Nektar Therapeutics, and a lecturer at the GSB since 2003.

GSBGEN 552. Winning Writing. 2 Units.

This two-week, six-session workshop will offer techniques and practical in-class exercises for writing better -- better memos, emails, feedback for colleagues, news releases, responses to media questions, opinion pieces and social-media postings. Glenn Kramon, a senior editor who has helped New York Times reporters win 10 Pulitzer Prizes, will teach the course along with accomplished journalists with expertise in powerful, persuasive writing for business. They will provide not only helpful tips but constructive feedback on students' work, which will be completed mostly in class. They will also share thoughts on how best to work with the news media.

GSBGEN 553. Intrapreneurship for Sustainability: Driving Environmental Change from Within Corporations. 2 Units.

An organizational change approach to the development and introduction of new corporate strategies and product lines that have a sustainability benefit. Students will be given the opportunity to work on real-world cases to help them effectively incorporate sustainability strategy into their chosen career path. n Learning Objectives: na. Articulate the sustainability challenges facing today's corporation in terms that will make executives receptive to action nb. Employ organizational change management techniques to spur environmentally-friendly product and process innovation nc. Expand the repertoire of techniques for priming the market for new sustainability offerings nd. Refine collaboration skills within multi-disciplinary teams ne. Improve oral and written presentation skills for executive audiences n This class is appropriate for those seeking positions within large enterprises or business consultancies, or those seeking to refine their thinking on social entrepreneurship.

GSBGEN 554. Savvy: Crafting Effective Communication. 1 Unit.

This course is designed for individuals interested in improving their communication skills. As a leader, you will spend the majority of your time communicating with others - team members, subordinates, clients, and other constituents. Right now, you probably don't spend much time thinking about the way you communicate, nor are you likely, in the corporate setting, to get honest feedback on the messages you send. Yet the quality of your communications will have a large impact on your overall effectiveness. This class will help you appreciate the nature and complexity of communication and provide guidelines for both improving your communication style and recognizing the unique styles of others. n The class is based on the assumption that organizations are fundamentally political entities, and interpersonal influence through communication is a key mechanism by which things get done. Effective leaders don't simply lead by fiat - they often must influence and persuade others to go along with their ideas. In each session, we'll consider a number of well-studied tactics of interpersonal communication. For each tactic, we'll talk about why it works, when it works best, and what its limitations might be. We'll discuss how you can put these approaches to work in order to support your attempts at persuasion and how to resist them as an unwilling target of persuasion. n After taking this course, you will be better able to: (1) identify strategies for crafting effective communication in the form of everyday conversation, written work, and public presentations, (2) develop techniques for building strong, long-term alliances with your colleagues, and (3) become more persuasive in advancing an agenda, acquiring resources, or eliciting compliance from others. These skills will be invaluable to you throughout your career.

GSBGEN 555. Designing Empathy-Based Organizations. 1 Unit.

Organizations are often designed for efficiency or optimization of workflow, not for user empathy. How do you design for both? This pop-up class is geared toward the design (or redesign) for empathy-based organizations. It will teach early-stage leaders about the three basic levers they have for organizational design/re-design: organizational culture, organizational structure (informal and formal), and organizational routines. Emphasis will be placed on how to align these levers to facilitate communication and to structure workflows for empathy-based organizations. The class will work with a fast-growing, design-driven startup, which will articulate to students its goals as a business, as well as its challenges in designing the business. Students will interview and observe multiple stakeholders from diverse teams and use design thinking to address uncovered needs and insights with respect to organizational design.

GSBGEN 557. Authenticity in Markets: The Case of the Wine Industry. 1 Unit.

Evidence has mounted that consumer care about issues of authenticity in many kinds of markets. This seminar explores the meanings of authenticity in market contexts. It emphasizes the idea that authenticity attaches as much or more to the characteristics and actions of producers than to characteristics of products. Although these issues arise in many kinds of markets, they are especially intense for food and drink. So the seminar emphasizes these contexts, especially the wine industry. In wine production we see battles over the soul of wine, what it means for a wine to provide an authentic representation of terroir, national traditions, and so forth. Especially interesting for understanding authenticity is the recent success of biodynamic producers.

GSBGEN 561. Sports Business Financing. 2 Units.

Course examines investment and financing issues that face a diverse set of participants in the sports industry (defined very broadly). A key theme is using general financial concepts to better structure decision making in the sports industry. Specific topics illustrate the broad set of perspectives considered: Player Payroll Financial Dynamics; Asset Appreciation Opportunities; Assessing the Value of Players (& General Managers); Investment Syndicates in Sports; Investing in Startup Leagues ; Financial Valuation of Sporting Clubs; Financial/Strategy Analysis for a Mixed Martial Arts (MMA) Venture; and On-Line Sports Venture Evaluation. One hand in requires feedback to the CEO's of several new sporting ventures about ways to expand their opportunity set; the CEO's come to a class and present their venture. The second hand in is a case study of a sports investment where there was sizable value creation or value destruction. Each session typically is co-taught with an industry visitor.

GSBGEN 562. Sports Marketing. 2 Units.

This Sports Marketing course combines (a) a focus on key marketing themes (such as branding, customer attraction/retention, and celebrity power) and (b) an analysis of marketing in diverse areas of the sporting industry: the league level, the team level, the player level, the network level, the advertiser level, the sponsor level, the fan level, and the media level. The nine sessions cover the following: Corporate Sponsorship; Online Marketing; Events as Brand Building Investments; Marketing to Youth; Sports/Entertainment Nexus; Club Marketing Strategies; Brand Revitalization & Strengthening; Motor Sports Marketing; Marketing in a Web 2.0/Social Networking World. Each session is typically taught with an industry visitor.

GSBGEN 564. The Entertainment Industry - An Intersection of Art and Commerce. 2 Units.

In this seminar we will explore the intersection of art and commerce in the entertainment industry. We will look at creating films and television programming that are artistically meaningful and/or have the potential for commercial success. Films are also increasingly used as a tool for social change, and we will examine this power. The entertainment industry is one of enormous importance - both from a business and cultural standpoint, and has influence in virtually every sphere of our society. Sometimes the industry can seem baffling, mercurial, and characterized more by madness than method. But despite its uncertainties, Hollywood does have its own rules, rhythms, methods and strategies - and examining and evaluating them will be a key part of this seminar. This is a time when old formulas are being reconsidered or jettisoned, and emergent technologies are bringing further changes - and tracking and analyzing them, will also be part of the class. As a writer, producer, director in film and television, I will also bring my own experiences into the classroom, where I'll discuss my work (including directing, writing, acquiring financing, producing films, executive producing a network series, etc.), and its rewards and challenges, and look at these experiences thorough the intersection of the business and creative sides of the industry. The students in the seminar, working either individually or in small groups, will be asked to generate and present proposals for projects that have artistic and/or commercial merit, and we will examine how they may best fit into the industry - to gain widespread distribution or have social influence. The seminar will cover the entertainment industry from multiple angles and be very discussion oriented.

GSBGEN 565. Political Communication: How Leaders Become Leaders. 2 Units.

Politics, perhaps like no other arena, provides a rich and dramatic laboratory for studying the art and science of influential communication. Whether it is a local school bond election or a Congressional race, a Presidential debate or a State of the Union Address, the demanding communications of politics provide insights into our own strengths and gaps as a communicator and leader. Political campaigns, by their very nature, are highly visible, oriented toward very specific objectives, and increasingly leverage a variety of new media platforms. They are often emotionally charged, and rife with conflict and drama. The principles of political communications transcend politics, and are useful guides for leaders in business, the non-profit community, as well as government. How candidates, elected officials, and leaders in all kinds of organizations communicate vision, values, and experience, as well as how they perform in very fluid environments, not the least of which may be during a crisis, has a great deal to do with their career success. In its seventh year, this highly interactive course allows students to explore both theory and practice behind effective positioning and presentation. Students will analyze and evaluate both successful and unsuccessful communications strategies of political campaigns and candidates. They will explore historic examples of US Presidential debates, from Nixon/Kennedy to the present. Further they will experience political events as they happen -- with each class drawing lessons from political developments around the nation and the world. Students will also hone their own strategic communications skills in a activities requiring both written and spoken communication. This is not a course in political science, American government, or in public speaking. However, the engaged student will gain insights into those areas as well. The course is taught by David Demarest, Vice President of Public Affairs for Stanford University. Demarest has broad communications experience across the public and private sector in financial services, education, and government. After serving as Assistant U.S. Trade Representative, and Assistant Secretary of Labor in the Reagan Administration, in 1988 he served as Communications Director for Vice President George H. W. Bush's successful presidential campaign. He then became a member of the White House senior staff as White House Communications Director. After leaving government in 1993, he spent the next decade leading communications for two Fortune 50 companies, before coming to Stanford in 2005.

GSBGEN 566. Real-Life Ethics. 2 Units.

GSBGEN 566 will be an elective course offered to 2nd-year MBA and MSx students. The goal of this course is to improve students' judgment in confronting ethical situations encountered in the normal course of business activities. Classes use the Socratic method to examine ethical questions and build analytical skills. The course aims to sharpen moral reasoning and build judgment without favoring a particular position. The course will be taught by Mark Leslie and Peter Levine, Lecturers, and will include additional guest lecturers in many of the specific areas. The course, which will be case-based, will involve frequent student-to-student and student-to-instructor role-playing. Cases will be drawn from a wide selection of business situations, including such topics as raising venture capital, managing major industrial customers, product distribution agreements, board of director fiduciary conflicts, developing financial instruments, senior management mutiny, etc. This class is for two GSB credits and will be graded on a pass/fail basis. Sixty percent of the final grade will be derived from classroom performance; the remainder will be based on a final written assignment.

GSBGEN 567. SEEDing Change: Approaches and Innovations in Poverty Alleviation. 2 Units.

This Bass Seminar is an opportunity to help lay the foundation for the GSB's new initiative on poverty alleviation in developing economies, the Stanford Institute for Innovation in Developing Economies (nicknamed SEED). Following an introduction to the major approaches to poverty alleviation and the role of entrepreneurial activity, the course will be a student-driven seminar. Groups of students will work on focused projects of their choosing within the confines of SEED's mission, which is to stimulate, develop, and disseminate research and innovations that enable entrepreneurs, managers, and leaders to alleviate poverty in developing economies. A particular focus will be given to exploring and assessing the different ways in which SEED can most effectively help entrepreneurs in developing countries grow and scale. Project deliverables can take a variety of forms, including business plans, proofs of concept, case studies, teaching notes, etc.

GSBGEN 568. Managing Difficult Conversations. 2 Units.

This elective 2-credit course is offered to 2nd-year, 3rd-year, and 4th-year Medical students, Residents, and Fellows, and to 2nd-year MBA students who aspire to improve their ability to deal effectively with difficult interpersonal situations. The course will be taught at Stanford Medical School by H. Irving Grousbeck, Consulting Professor of Management, Stanford Graduate School of Business, with assistance from Dr. Charles G. Prober, Senior Associate Dean for Medical Education. Teaching techniques that have been successful in helping business school students improve their ability to manage difficult conversations will be used. The course, which will be case-based, will involve frequent student-to-student and student-to-instructor role-playing in actual medical situations. Physician-experts often will be present to participate as class guests. Relevant principles of professionalism, leadership, and psychology underlie the course pedagogy. There will be seven classes held on Wednesdays beginning September 24th and concluding on November 12th. (No class on October 22) Each class will begin promptly at 12:35 and end at 2:05, without a break. Due to the abbreviated nature of the class (7 sessions), students will be expected to attend all classes unless excused in advance. Class preparation will include reading of assigned cases; analysis of the cases and recommendations as to how to confront specific difficult conversations (consistent with assigned study questions); and reading of assigned background material. While optional, it is suggested that students form regular study groups. For GSB students, 50% of the final grade will depend on classroom performance; the remainder will be based on a final written assignment of no more than 6 pages. GSB students will be graded on a Pass/Fail basis. The course will be ungraded for Medical School students, Residents and Fellows. All students will be expected to complete the written assignment. Class size will be limited to 35 students per the following: (1) a maximum of 15 MBA2 students and (2) a maximum of 20 2nd-year, 3rd-year and 4th-year Medical Students, Residents, and Fellows.

GSBGEN 569. Online Financial Training for Managers and Entrepreneurs in Developing Economies. 2 Units.

Growing and scaling a successful business demands familiarity and comfort with financial principles and decision-making. Yet particularly in developing countries, where the need for growth is greatest, a large fraction of the population, and entrepreneurs and managers in particular, lack this basic knowledge. The goal of this project-based seminar is for teams of students to develop education modules for teaching financial literacy to entrepreneurs in developing economies. We will partner with on the ground organizations who work directly with these entrepreneurs, and who can provide feedback on the user's needs and market validation for project teams' approaches. We will examine research on the effectiveness of credit-linked training and review some existing programs offering similar training. Students will be expected to deliver a short training video at the end of the course.

GSBGEN 571. Becoming a Leader: Managing Early Career Challenges. 2 Units.

This course is based on a large number of interviews with MBA grads who have been out of the GSB for 4-10 years. These interviews identified a set of common early career challenges that young MBAs faced--and the lessons they learned from these. This 10-session course is based on these critical transitions, formative experiences, and personal conflicts that characterize the challenges young leaders face. The course objective is to help current students better understand some of the pitfalls they are likely to face as they become leaders and to avoid the career-limiting mistakes that these can bring.

GSBGEN 572. The Art of Damage Control. 2 Units.

In the Information Age, there are two kinds of leaders, institutions, and organizations: those who have been hit with a crisis and those who haven't been around very long. And of those who have confronted a crisis, the landscape has a few winners, but is crowded with losers who simply did not have what it took to survive the crisis. Crisis is a constant state of nature in our age and if you do not effectively fight back, in the modern spin cycle, you will no longer have your brand, your image, or your reputation. This course will cover the strategies, techniques, and art of damage control. The course will also explore the five fundamental elements responsible for why we live in a state of crisis: the proliferation of media outlets communicating information; the speed in which information travels; the erosion of trust from society related to the quality of information received; the capacity to selectively leverage information; and the community nature of how information is developed and shared. Building from an analysis of these elements, we will explore methods of surviving and thriving in this environment. The course will also offer detailed approaches to managing one's way through a crisis. We will provide case studies of those who failed to master the art of damage control whose mistakes endangered the survival of their company and/or their careers. We will also study cases where those in a crisis handled it deftly. By considering, analyzing, and reviewing these techniques, it is hoped the students will learn how best manage the crisis - and what it takes to survive. The course will co-taught by Chris Lehane and Bill Guttentag. Chris Lehane is one of the nation's leading political consultants with a particular expertise in damage control. He was a Special Assistant Counsel to President Bill Clinton where he was responsible for helping to manage the Clinton White House's damage control operation and later served as Vice President Al Gore's Press Secretary, and has been a top advisor to many who have run for President, Senate, Governor or other elected offices, both in the US and internationally. He consults for numerous Fortune 500 Companies, professional sports leagues and teams, Hollywood studios and high profile individuals. Bill Guttentag is a narrative and documentary film writer, producer, director who has been teaching at the GSB since 2001. He is a two-time Oscar winner, his films have played extensively in the US and internationally, and have premiered at a number of prominent film festivals including Sundance and Cannes. Lehane and Guttentag are the co-authors of *Masters of Disaster: The 10 Commandments of Damage Control*. The book will be published this fall by Palgrave/Macmillan and will serve as the principal text for this course.

GSBGEN 574. Effective Virtual Communication: Presenting via the web, video, and teleconference. 2 Units.

Ever wonder if your online audience is paying attention to your web presentation or meeting? Have you wanted more engagement from your participants? Communicating virtually - using conference or video calls, web tools, and mobile devices is very challenging. Yet more and more communication is happening with presenter and audience connecting electronically. Informed by scholarly research and industry best practices, this workshop will provide a hands-on, practical introduction to immediately applicable techniques that will help you prepare and deliver engaging, participative, and impactful virtual presentations. Specifically, you will learn techniques for confidently delivering virtual presentations, how to create content that invites engagement, and how to facilitate speaker-audience interactions that invite collaboration without losing control. We will also cover best practices for responding to audience input and questions that will amplify your message and for handling challenging interactions and questions. With these virtual-presenting skills, you will feel more confident presenting and your audience will be more connected and engaged.

GSBGEN 575. Leadership and Crisis Management. 2 Units.

During this class, you will: * Challenge your basic beliefs about the nature of crisis * Learn to scan your business practices for political and social risks * Anticipate and prepare for potential crises * Explore techniques for successfully solving problems in high-pressure crisis situations characterized by complex decision environments, time-pressure, high stakes, unanticipated events, and information overload * Develop strategies for managing stakeholders, public opinion, media relations, and public officials * Integrate your crisis management approach into your overall business strategy.

GSBGEN 576. Work and Family. 2 Units.

This course examines the strategies that highly educated women and men use to combine work and family and the strategies that managers and policy makers can use to help others strike a balance. Topics include the tradeoffs in becoming a stay-at-home parent, the economic value of unpaid labor, the consequences of balancing two high-powered careers and children, the economics of marriage, fertility, child care, and elder care, the gendered division of labor in the home, time-management, workplace innovations, and policy initiatives. Guest speakers add their own perspectives on these issues and describe the roles their organizations play.

GSBGEN 578. Decisions About the Future. 2 Units.

How should you decide between now and the future? This course will cover the descriptive and prescriptive theories of intertemporal choice in psychology and economics. Topics will include financial decision making, social (who should you marry?), environmental, and health. The goal of the course is to maximize the long term happiness and effectiveness of yourself and others. Grading will be based on: class participation, a decision diary (in three parts), and an exam.

GSBGEN 580. Management of Real Estate Investment Portfolios. 2 Units.

This course is intended for any student interested in a career in managing, developing, or investing in real estate. The course covers cases involving the perspectives of general partners and limited partners; the attributes of successful real property investment firms; analyses of investment portfolios and individual transactions, primarily in the private equity real estate category. Cases will be global. Objectives include: How to construct a private real estate portfolio; How to assess the risks in projects and portfolios; How to perform relative value analyses of differing investments; How to manage troubled investments (when to "hold 'em and when to fold 'em"). The course is divided into three modules with special emphasis on real estate financial analysis for transactions and portfolios. The first module will focus on portfolio construction issues and how to quantify whether the investor has been successful. The second module will focus on underwriting individual transactions and applying a relative value construct in determining the more attractive investments. The third module will focus on the management of troubled investments, including deciding when to "double down" and how to protect investments already in place.

GSBGEN 585. Social Innovation through Corporate Social Responsibility. 2 Units.

This course accepts that the (CSR) movement linking business, communities and sustainability has moved past the stage of debate. The last decade has seen an increased awareness in regard to environmental and social issues that has found its way up the corporate ladder and into company boardrooms. How companies incorporate CSR programs and strategies, however, is varied and diverse. The course will utilize reading assignments, case analysis and/or company presentations to provide an overview of CSR, the frameworks and models for developing a CSR strategy and the growing utilization of cross-sector partnerships in CSR and innovation efforts. Particular focus will be on cutting edge business strategies for squaring social and environmental responsibilities with competitive demands. The latter part of the course will examine the role of cross-sector partnerships as a critical lever. Cross-sector collaboration is increasingly desirable as a strategy for addressing many of society's problems; however, research evidence indicates that it is hardly easy. Guests will bring to life the challenges and rewards in working collaboratively to implement social change.

GSBGEN 586. Poverty, Entrepreneurship, and Development. 2 Units.

Global poverty is a problem that persists on a massive scale, and its persistence may itself be a major impediment to growth in emerging economies. Recent years have seen a blossoming interest in socially innovative approaches to alleviating poverty and stimulating economic growth in emerging economies. In this short course, we will explore different conceptualizations of the problem of global poverty, the potential role of entrepreneurship in helping to address it, as well as the strengths and weaknesses of different approaches. Some possible areas of focus include: * Different conceptualizations of the main drivers of persistent, extreme poverty * The challenges to entrepreneurship posed by the institutional environments of emerging economies * The appropriate role of entrepreneurship as a means of addressing the concerns of the poor * The pros and cons of different models (e.g., venture philanthropy, social enterprise, non-profit) * Ethical issues and concerns associated with different strategies. In addition to reading and in-class discussion, the course will also draw on the expertise and experiences of one or more guest speakers.

GSBGEN 587. Survive and Thrive: The Art of Navigating Crucial Conversations. 2 Units.

Careers are enjoyed in the good times but truly made when challenging situations are successfully managed throughout every business cycle. Individuals who both perform well and communicate effectively in tense situations, gain the attention of senior management and are relied upon to deliver. A key to this success is the ability to successfully navigate crucial conversations. Crucial conversations are those which not only have a bearing on your firm and business but, also can also enhance or destroy your own personal reputation and credibility by poorly communicated situation analysis, facts and the mode in which you deliver information. Sometimes these conversations take place in minutes while others evolve over the course of days and weeks. Regardless, a professional's ability to read the "tea leaves" and execute a communication plan to address is vitally important to long term career success. This highly interactive course will take you through a series of business inflection points in a simulated firm where you will be expected to navigate different situations and make quick decisions both as an individual and as part of a team. Students can expect to leave this course with a heightened sense of their own gifts as communicators, a greater understanding of the research around effective communication, and specific tools and tactics to use throughout their career when faced with pivotal situations. Attendance at all six sessions is required to pass this course and participation counts for half the grade. Students will regularly give and receive feedback with their peers on their ability to apply course concepts in the simulation as it unfolds. While no prerequisite exists for this course, we expect that students seeking fundamentals of communication consider other course offerings. This course relies on students who are already reasonably comfortable communicating in high-stakes settings seeking greater mastery and nuance in their communication. Required pre-reading will provide the theoretical frameworks and case background necessary for the six-session simulation. One final reflection paper will be due within a week after the final class session. The balance of each student's grade is based on their participation and learning within the simulation and the depth and quality of their feedback to peers. This course is co-created and co-taught by JD Schramm and Steve Mellas. Schramm brings over a decade of MBA communication teaching and coaching to the course along with more than 15 years of professional experience in healthcare, financial services, and education. He founded the GSB's Mastery Initiative and co-founded LOWKeynotes. He is a sought out speaker and coach with two talks in the TED library. Mellas serves as a principal at AQR Capital in Greenwich CT where he oversees operations. Prior to joining AQR he worked for Goldman Sachs as a Managing Director in the Investment Management Division with responsibility for Asset Management Operations worldwide. Before that Mellas was with Morgan Stanley where he managed fixed income trading operations. Schramm and Mellas have teamed up on a number of highly ranked courses at NYU Stern since 2005 and hatched this latest collaboration while delivering a Mastery workshop for the GSB in January 2012.

GSBGEN 598. Stanford-Tsinghua Exchange Program. 2 Units.

This course is open only to students participating in the Stanford-Tsinghua Exchange Program and is required of those students. Requirements include researching and reporting on companies to be visited, attending lectures in preparation for the China visit, attending lectures at Tsinghua, and carrying out and reporting on a project with one or more Tsinghua student. Offered Pass/No Pass only. 2 units. Winter quarter.

GSBGEN 635. Neuroscience for Business and Economics. 4 Units.

A growing number of scholars in business and economics are turning to neuroscience for new theoretical insights and new methodologies. This seminar will explore how findings from neuroscience can inform research in business and economics. The objectives of this course are for students to: Gain an understanding of the basic theories of neuroscience Gain an understanding of the basic methodologies of neuroscience, including behavioral paradigms, eye-tracking, and fMRI Survey the key literature at the intersection of business, economics, and neuroscience Learn how to critically reflect on and evaluate research that uses principles from neuroscience Learn how to design experiments that utilize principles from neuroscience.

GSBGEN 641. Advanced Empirical Methods. 3 Units.

This course covers various advanced quantitative methods with applications in marketing and economics. Topics include simulation-based estimation, dynamic decision processes, and other topics relating to empirical models of demand and supply. The course stresses the conceptual understanding and application of each technique. Students will learn to apply these techniques using Matlab or an equivalent language.

GSBGEN 645. Communication Strategies for Scholars. 2 Units.

Educators must be experts in their subject matter, but also effective scholarly communicators. This course will examine the theories for effective communication in the wide range of settings that PhDs will encounter: seminars, academic conferences, job talks, and ultimately in the classroom. This course will provide PhD candidates with the opportunity to practice course principles in simulated communication settings and receive direct and filmed feedback on their performance. Students will benefit from participating in observations of GSB classes (within and beyond their discipline), readings on current education and communication theory and practice, class discussion, and visits from GSB professors. Learning Objectives: By the end of this course students will: Understand the essentials of oral communication in scholarly settings Understand the fundamentals of business education including syllabus development, classroom instruction, case method teaching, assessment and grading Understand and practice the essential elements of effective presentations - the verbal, vocal, and visual aspects of oral presentation Articulate essential distinctions of teaching undergraduate, graduate (including MBA), and executive education students, and how to adapt their approach for these audiences Demonstrate effectiveness as a presenter and growth in the ability to plan and present content in a variety of simulated settings from benchmark to final mock class Apply course content to job talks, conference presentations, and other professional settings beyond the classroom Evaluate peers and other educators on their ability to practice effective teaching and presentation delivery.

GSBGEN 646. Behavioral Decision Making. 3 Units.

This seminar examines research on the psychology of judgment and choice. Although the normative issue of how decisions should be made is relevant, the descriptive issue of how decisions are made is the main focus of the course. Topics of discussion include choice, judgment heuristics and biases, decision framing, prospect theory, mental accounting, context effects, task effects, regret, and other topics. The goal of the seminar is twofold: to foster a critical appreciation of existing knowledge in behavioral decision theory, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that knowledge.

GSBGEN 652. Online Research Methods. 2 Units.

This course will cover the practicalities of running research on the internet, including: online research tools, experimental design, online process measures, subject pool selection, detecting and dealing with inattentive participants, basic programming techniques, debugging, data organization, and data cleaning. Class time and assignments will take a hands-on approach, giving you direct experience and practice. There will be two main projects, both of which should be useful for your research. The first will be creating a personal web page (or, if you already have a web page that you like, you can substitute a different project). The second assignment will be designing and running an online experiment with a dynamic component. Grading will be based on these projects, as well as class participation and small weekly assignments.

GSBGEN 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

GSBGEN 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

GSBGEN 697. Research Fellows Practicum. 1-6 Unit.

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GSBGEN 698. Doctoral Practicum in Teaching. 1 Unit.

Doctoral Practicum in Teaching.

GSBGEN 699. Doctoral Practicum in Research. 1 Unit.

Doctoral Practicum in Research.

GSBGEN 802. TGR Dissertation. 0 Units.

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Same as: ACCT 802, FINANCE 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

Genetics Courses

GENE 104Q. Law and the Biosciences. 3 Units.

Preference to sophomores. Focus is on human genetics; also assisted reproduction and neuroscience. Topics include forensic use of DNA, genetic testing, genetic discrimination, eugenics, cloning, pre-implantation genetic diagnosis, neuroscientific methods of lie detection, and genetic or neuroscience enhancement. Student presentations on research paper conclusions.

GENE 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

GENE 200. Genetics and Developmental Biology Training Camp. 1 Unit.

Open to first year Department of Genetics and Developmental Biology students, to others with consent of instructors. Introduction to basic manipulations, both experimental and conceptual, in genetics and developmental biology.

Same as: DBIO 200

GENE 202. Human Genetics. 4 Units.

Utilizes lectures and small group activities to develop a working knowledge of human genetics as applicable to clinical medicine. Basic principles of inheritance, risk assessment, and population genetics are illustrated using examples drawn from diverse areas of medical genetics practice including prenatal, pediatric, adult and cancer genetics. Practical aspects of molecular and cytogenetic diagnostic methods are emphasized. Existing and emerging treatment strategies for single gene disorders are also covered. Prerequisites: basic genetics.

GENE 205. Advanced Genetics. 3 Units.

For PhD students in any of the Biosciences Departments and Programs at Stanford University. Emphasis on developing the ability to solve problems using genetic ideas and methods, to understand the nature and reliability of genetic inference, and to apply genetic reasoning to biological research. Weekly paper discussions based on original research papers that define or illustrate the ideas and techniques covered in the lecture.

GENE 209. Current Topics in Human, Population, and Statistical Genomics. 2 Units.

Intensive seminar/workshop. Topics, drawn from current and past literature, may include: assessing and population genetic analysis of genomic variation; genome-to-phenome mapping; reconstructing demographic history from genome sequence data; domestication genomics; host-pathogen genome evolution; detecting signatures of selection; experimental design in human genetics; linkage and association mapping; ethical and social issues in human, plant, and animal genetics research. Emphasis on analysis and logic or experimental and observational genomics research. Faculty-led discussion with evaluation of response papers, problem sets, and intensive course project. May be repeated for credit.

GENE 210. Genomics and Personalized Medicine. 3 Units.

Principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Topics include: genetic and environmental risk factors for complex genetic disorders; design and interpretation of genome-wide association studies; pharmacogenetics; full genome sequencing for disease gene discovery; population structure and genetic ancestry; use of personal genetic information in clinical medicine; ethical, legal, and social issues with personal genetic testing. Hands-on workshop making use of personal or publicly available genetic data. Prerequisite: GENE 202, Gene 205 or BIOS 200. Same as: DBIO 220

GENE 211. Genomics. 3 Units.

The goal of this course is to explore how different experimental strategies are applied to a variety of biological questions. By experimental strategy, we refer to both the general method and the logic with which the method is applied. An underlying theme of the course is that each strategy we discuss can be applied to problems that cut across different disciplines, for example immunology, cancer biology, or embryology. Genome evolution, organization, and function; technical, computational, and experimental approaches; hands-on experience with representative computational tools used in genome science; and a work knowledge of the scripting language Python.

GENE 212. Introduction to Biomedical Informatics Research Methodology. 3 Units.

Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Because the team projects start in the first week of class, attendance that week is strongly recommended. Prerequisites: BIOMEDIN 210 or 211 or 214 or 217 or consent of instructor. Same as: BIOE 212, BIOMEDIN 212, CS 272

GENE 213. Neurogenetics Core. 1 Unit.

For first-year Neurosciences graduate students; open to other graduate students as space permits with preference given to Neurosciences students. Intensive introduction to genetics. Classical and modern genetics with an emphasis on their application to neurosciences research. Topics include: model organisms, genetic screens, genome editing, genetically-encoded tools, GWAS, next-generation sequencing, epigenetics, genetic interactions, human genetics, and neurological disease genetics. Interactive class with student-led discussions, presentations, and group work, including next-generation sequencing workshops and data analysis tutorials. Limited enrollment.

GENE 214. Representations and Algorithms for Computational Molecular Biology. 3-4 Units.

Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units. Same as: BIOE 214, BIOMEDIN 214, CS 274

GENE 215. Frontiers in Biological Research. 1 Unit.

Literature discussion in conjunction with the Frontiers in Biological Research seminar series in which investigators present current work. Students and faculty meet beforehand to discuss papers from the speaker's primary research literature. Students meet with the speaker after the seminar to discuss their research and future directions, commonly used techniques to study problems in biology, and comparison between the genetic and biochemical approaches in biological research. Same as: BIOE 215, DBIO 215

GENE 217. Translational Bioinformatics. 4 Units.

(Same as BIOMEDIN 217, CS 275) Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine using bioinformatics. Case studies. Prerequisites: programming ability at the level of CS 106A and familiarity with statistics and biology.

GENE 218. Computational Analysis of Biological Information: Introduction to Python for Biologists. 2 Units.

Computational tools for processing, interpretation, communication, and archiving of biological information. Emphasis is on sequence and digital microscopy/image analysis. Intended for biological and clinical trainees without substantial programming experience. Same as: MI 218, PATH 218

GENE 221. Current Issues in Aging. 2 Units.

Current research literature on genetic mechanisms of aging in animals and human beings. Topics include: mitochondria mutations, insulin-like signaling, sirtuins, aging in flies and worms, stem cells, human progeria, and centenarian studies. Prerequisite: GENE 203, 205 or BIOS 200.

GENE 224. Principles of Pharmacogenomics. 3 Units.

Introduction to the relevant pharmacology, genomics, experimental methods for high-throughput measurements (sequencing, expression, genotyping), analysis methods for GWAS, chemoinformatics, and natural language processing. Review of key gene classes (cytochromes, transporters, GPCRs), key drugs for which genetics is critical (warfarin, clopidogrel, statins, NSAIDs, neuropsychiatric drugs and cancer drugs). Also reviews resources for pharmacogenomics (PharmGKB, Drugbank, CMAP, and others) as well as issues in doing clinical implementation of pharmacogenomics testing. Reading of key papers, including student presentations of this work. Problem sets; final project selected with approval of instructor. Prerequisites: two of BIO 41, BIO 42, BIO 43, BIO 44X, BIO 44Y or consent of instructor. Same as: BIOMEDIN 224

GENE 232. Advanced Imaging Lab in Biophysics. 4 Units.

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

Same as: APPPHYS 232, BIO 132, BIO 232, BIOPHYS 232

GENE 233. The Biology of Small Modulatory RNAs. 2 Units.

Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal. Same as: MI 233, PATH 233

GENE 234. Fundamentals of RNA Biology. 2 Units.

For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students. Same as: MI 234, PATH 234

GENE 235. C. Elegans Genetics. 2 Units.

Genetic approaches to *C. elegans*, practice in designing experiments and demonstrations of its growth and anatomy. Probable topics include: growth and genetics, genome map and sequence, mutant screens that start with a desired phenotype, reverse genetics and RNAi screens, genetic duplications, uses of null phenotype non-null alleles, genetic interactions and pathway analysis, and embryogenesis and cell lineage. Focus of action, mosaic analysis, and interface with embryological and evolutionary approaches.

GENE 241. Biological Macromolecules. 3-5 Units.

The physical and chemical basis of macromolecular function. Topics include: forces that stabilize macromolecular structure and their complexes; thermodynamics and statistical mechanics of macromolecular folding, binding, and allostery; diffusional processes; kinetics of enzymatic processes; the relationship of these principles to practical application in experimental design and interpretation. The class emphasizes interactive learning, and is divided equally among lectures, in-class group problem solving, and discussion of current and classical literature. Enrollment limited to 50. Prerequisites: Background in biochemistry and physical chemistry recommended but material available for those with deficiency in these areas; undergraduates with consent of instructor only. Same as: BIOE 241, BIOPHYS 241, SBIO 241

GENE 243. Intellectual Property: Scientific Evidence in Patent Litigation. 3 Units.

(Same as LAW 343) Open to clinical MD and graduate students. Explores the role of scientific experts in patent infringement litigation. In other areas of the law where scientific experts are used -- medical malpractice, environmental law, criminal law -- the science itself is often in dispute. In patent cases, however, the parties generally agree on the science. This affects the relationship between the lawyer and the expert and the substantive content of their interactions. Patent experts need to be able to explain science to the judge and jury. But they also must help the litigators choose which legal issues to press and which to concede, and to be aware of how the complications of the science might help, hurt, obscure or reveal how the law should be applied to the facts. The class examines judicial decisions and trial documents involving scientific evidence in patent litigation, followed by work in teams on final projects: simulations of expert testimony in a patent case. Simulations are performed at the end of the quarter before panels of practicing patent lawyers. Prerequisite: graduate students must have completed their required coursework and have TGR status.

GENE 244. Introduction to Statistical Genetics. 3 Units.

Statistical methods for analyzing human genetics studies of Mendelian disorders and common complex traits. Probable topics include: principles of population genetics; epidemiologic designs; familial aggregation; segregation analysis; linkage analysis; linkage-disequilibrium-based association mapping approaches; and genome-wide analysis based on high-throughput genotyping platforms. Prerequisite: STATS 116 or equivalent or consent of instructor.
Same as: STATS 344

GENE 245. Statistical and Machine Learning Methods for Genomics. 3 Units.

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets.
Same as: BIO 268, BIOMEDIN 245, CS 373, STATS 345

GENE 260. Supervised Study. 1-18 Unit.

Genetics graduate student lab research from first quarter to filing of candidacy. Prerequisite: consent of instructor.

GENE 271. Human Molecular Genetics. 4 Units.

For genetic counseling students, graduate students in genetics, medical students, residents, and postdoctoral fellows interested in the practice of medical genetics and genomics. Gene structure and function; the impact of mutation and polymorphism as they relate to developmental pathways and human disease; mitochondrial genetics; approaches to the study of complex genetic conditions; GWAS and genome sequencing technologies; variant curation; gene therapy, stem cell biology, and pharmacogenetics. Undergraduates require consent of instructor and a basic genetics course.

GENE 272. Introduction to Medical Genetics. 2-3 Units.

For genetic counseling students, graduate students in human genetics, medical students, residents, and fellows; undergraduates with consent of instructor. Principles of medical genetics practice, including taking a family history, modes of inheritance and risk assessment, and mathematical principles of medical genetics (Bayes theorem, population genetics). An additional problem set is required for 3 units.

GENE 273. Introduction to Clinical Genetics Testing. 1 Unit.

For genetic counseling students, medical students, residents, and fellows. Uses a combination of case based assignments, laboratory observation and didactic lectures to introduce the laboratory concepts of cytogenetics, molecular genetics and biochemical genetics, and to illustrate common genetic conditions that are commonly diagnosed through genetic testing, introducing students to skills in case preparation, management and presentation.

GENE 274A. A Case Based Approach to Clinical Genetics. 2 Units.

For genetic counseling students, graduate students in genetics, medical students, residents and fellows. Case-based scenarios and guest expert lectures. Students learn skills in case preparation, management, and presentation, as well as content around common genetic disorders.

GENE 274B. A Case Based Approach to Clinical Genetics. 2 Units.

For genetic counseling students, graduate students in genetics, medical students, residents, and fellows. Case-based scenarios and guest expert lectures. Students learn skills in case preparation, management, and presentation, as well as content around common genetic disorders. This course is a continuation of GENE 274A, but may be taken individually with instructor permission.

GENE 275. Role Play and Genetic Counseling Observations. 2 Units.

Students role play aspects of genetic counseling sessions and learn through clinical observations. Observation includes genetic counseling sessions in prenatal, pediatric, and cancer settings.

GENE 276. Genetic Counseling Clinical Rotations. 4-7 Units.

For genetic counseling students only. Supervised clinical experiences. May be repeated for credit. Prerequisite: GENE 275.

GENE 278. Prenatal Genetic Counseling. 1 Unit.

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial prenatal genetics rotation. Topics include prenatal genetic screening and diagnosis in the first and second trimesters, ultrasound, teratology, and genetic carrier screening.

GENE 279. Pediatric and Adult Genetic Counseling. 1 Unit.

Internet based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial general genetics rotation. Topics include: common genetic conditions, assessment of child development and medical history in the context of a genetic workup, the pediatric genetics medical examination, dysmorphology, introduction to laboratory genetic testing, development of a differential diagnosis, and resources for case management and family support.

GENE 280. Metabolic Genetic Counseling. 1 Unit.

Internet based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows genetic counseling students should take this course in conjunction with their metabolic genetics rotation. Topics include: overview of metabolic diseases; common pathways; diagnosis, management, and treatment of metabolic disorders; and newborn screening.

GENE 281. Cancer Genetic Counseling. 1 Unit.

Internet based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial cancer genetics rotation. Topics include: cancer biology and cytogenetics; diagnosis and management of common cancer genetic syndromes; predictive testing; psychology of cancer genetic counseling; and topics recommended by ASCO guidelines.

GENE 282A. Genetic Counseling Research Seminar. 1 Unit.

For genetic counseling students only. Facilitated discussions on identifying a topic and mentor for genetic counseling departmental research projects.

GENE 282B. Genetic Counseling Research Seminar. 1 Unit.

For genetic counseling students only. Lectures and facilitated discussions on research methodology for genetic counseling departmental research projects. Prerequisite: GENE 282A.

GENE 283. Genetic Counseling Research. 1-8 Unit.

Genetic counseling students conduct clinical research projects as required by the department for graduation. May be repeated for credit. Pre- or corequisite: GENE 282.

GENE 284. Medical Genetics Seminar. 1-2 Unit.

Presentation of research and cases. Students enrolling for 2 units also attend and report on external seminars. May be repeated for credit.

GENE 285A. Genetic Counseling Seminar. 2-3 Units.

Year-long seminar primarily for genetic counseling students. Autumn: basics of medical communication; crosscultural and disability sensitive communication about genetics, and principles of providing genetic counseling. Undergraduates may enroll in Autumn Quarter with consent of instructor.

GENE 285B. Genetics Counseling Seminar. 2 Units.

Year-long seminar primarily for genetic counseling students. Winter: the impact of chronic illness and genetic disease in a developmental manner.

GENE 285C. Genetic Counseling Seminar. 2 Units.

Year-long seminar primarily for genetic counseling students. Spring: applying therapeutic counseling approaches to the practice of genetic counseling.

GENE 286. Advanced Genetic Counseling Seminar. 2 Units.

For genetic counseling students only. Psychosocial issues associated with genetic counseling cases are discussed through presentation of cases that students have seen throughout their training. Professional development topics will be included. Must be taken for 3 quarters. Prerequisites: GENE 285 A,B,C and 276.

GENE 287. CARDIOVASCULAR GENETICS. 1 Unit.

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellow; genetic counseling students should take this course in conjunction with their cardiovascular genetics rotation. Topics include: Basic cardiology principles, including relevant anatomy and physiology; diagnosis, management and genetic testing as it relates to common inherited cardiovascular conditions in both the pediatric and adult setting; predictive genetic testing issues specific to inherited cardiovascular conditions; psychologic issues related to sudden death conditions. This course is designed for genetic counseling students, medical students, residents, post-doctoral fellows and nurses interested in inherited cardiovascular conditions.

GENE 299. Directed Reading in Genetics. 1-18 Unit.

Prerequisite: consent of instructor.

GENE 399. Graduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

GENE 801. TGR Project. 0 Units.

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GENE 802. TGR Dissertation. 0 Units.

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Geological Environmental Sciences Courses

GES 1A. Introduction to Geology: The Physical Science of the Earth. 5 Units.

For non-majors or prospective majors in the Earth Sciences. Lectures, hands-on laboratories, and three one-day weekend field trips. Focus is on the physical and chemical processes of heat and mass transfer within the earth and its fluid envelopes, including deep-earth, crustal, surface, and atmospheric processes. Topics include the dynamics of and interactions between the inner earth, plate tectonics, surface processes, and atmospheric processes such as climate change and global warming. Only one of GES 1A, 1B, or 1C may be taken for credit. Prerequisites: MATH 19 or equivalent.

GES 1B. Introduction to Geology. 4 Units.

For non-majors and prospective majors or minors in the Earth Sciences. Introduction to physical geology. Lectures and lab exercises focus on understanding the dynamics of Earthquakes; ongoing physical and chemical processes. Major themes include plate tectonics, the rock cycle, the hydrologic cycle, and mineral resources. We will employ local CA geology, current events, and the state-of-the-art to drive discussions on landscapes, hazards, and economics. Only one of GES 1A, 1B, or 1C may be taken for credit. Recommended: high school chemistry.

GES 1C. Introduction to Geology: Dynamic Earth. 4 Units.

For non-majors or prospective majors in the Earth Sciences. Integrated lecture-lab includes hands-on activities and local field trips. Focus is on reading the dynamic geological landscape, with an emphasis on California—primarily Bay Area—geology. Topics include plate tectonics, earthquakes and volcanoes, Earth materials, geologic time, stream processes, and climate change over geologic time. Only one of GES 1A, 1B, or 1C may be taken for credit.

GES 4. Evolution and Extinction: Introduction to Historical Geology. 4 Units.

Introduction to the history of the Earth, with a focus on processes that maintain or threaten habitability. Principles of stratigraphy, correlation, the geological timescale, the history of biodiversity, and the interpretation of fossils. The use of data from sedimentary geology, geochemistry, and paleontology to test theories for critical events in Earth history such as mass extinctions. One half-day field trip. Same as: EARTHYSYS 4

GES 5. Living on the Edge. 1 Unit.

A weekend field trip along the Pacific Coast. Tour local beaches, geology, and landforms with expert guides from the Department of Geological and Environmental Sciences. Enjoy a BBQ dinner and stay overnight in cabins along the Santa Cruz coast. Get to know faculty and graduate students in the Earth Sciences. Requirements: Two campus meeting and weekend field trip to Pacific Coast. Enrollment limited to 25. Freshman have first choice.

GES 8. Oceanography: An Introduction to the Marine Environment. 3 Units.

For non-majors and earth science and environmental majors. Topics: topography and geology of the sea floor; evolution of ocean basins; circulation of ocean and atmosphere; nature of sea water, waves, and tides; and the history of the major ocean basins. The interface between continents and ocean basins, emphasizing estuaries, beaches, and continental shelves with California margin examples. Relationships among the distribution of inorganic constituents, ocean circulation, biologic productivity, and marine environments from deep sea to the coast. One-day field trip to measure and analyze waves and currents.

GES 12SC. Environmental and Geological Field Studies in the Rocky Mountains. 2 Units.

The Rocky Mountain area, ecologically and geologically diverse, is being strongly impacted by changing land-use patterns, global and regional environmental change, and societal demands for energy and natural resources. This three-week field program emphasizes coupled environmental and geological problems in the Rocky Mountains and will cover a broad range of topics including the geologic origin of the American West from three billion years ago to the recent; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West that are related to changing land-use patterns and increased demand for its abundant natural resources. These broad topics are integrated into a coherent field study by examining earth/environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin that host abundant gas and oil reserves and also contain the long-term climate history of this region; and 3) the volcanic center of Yellowstone National Park and mountainous region of Teton National Park, and the economic and environmental problems associated with gold mining and extraction of oil and gas in areas adjoining these national parks. Students will complete six assignments based upon field exercises, working in small groups to analyze data and prepare reports and maps. Lectures will be held in the field prior to and after fieldwork. Note: This course involves one week of backpacking in the Wind Rivers and hiking while staying in cabins near Jackson Hole, Wyoming, and horseback riding in the Dubois area of Wyoming. Students must arrive in Salt Lake City on Monday, Sept. 1. (Hotel lodging will be provided for the night of Sept. 1, and thereafter students will travel as a Sophomore College group.) We will return to campus on Sunday, Sept. 21. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

Same as: EARTHSYS 12SC, EESS 12SC

GES 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration. 3 Units.

This course examines the motivations and experiences of polar explorers under the harshest conditions on Earth, as well as the chronicles of their explorations and hardships, dating to the 1500s for the Arctic and the 1700s for the Antarctic. Materials include *The Worst Journey in the World* by Aspley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Optional field trip into the high Sierra in March.

Same as: EARTHSYS 38N, EESS 38N

GES 39N. Forensic Geoscience: Stanford CSI. 3 Units.

Preference to freshmen. Geological principles, materials, and techniques indispensable to modern criminal investigations. Basic earth materials, their origin and variability, and how they can be used as evidence in criminal cases and investigations such as artifact provenance and environmental pollution. Sources include case-based, simulated forensic exercises and the local environments of the Stanford campus and greater Bay Area. Local field trips; research presentation and paper.

GES 40N. Diamonds. 3 Units.

Preference to freshmen. Topics include the history of diamonds as gemstones, prospecting and mining, and their often tragic politics. How diamond samples provide clues for geologists to understand the Earth's deep interior and the origins of the solar system. Diamond's unique materials properties and efforts in synthesizing diamonds.

GES 42N. Landscapes and Tectonics of the San Francisco Bay Area. 4 Units.

Active faulting and erosion in the Bay Area, and its effects upon landscapes. Earth science concepts and skills through investigation of the valley, mountain, and coastal areas around Stanford. Faulting associated with the San Andreas Fault, coastal processes along the San Mateo coast, uplift of the mountains by plate tectonic processes, and landsliding in urban and mountainous areas. Field excursions; student projects.

GES 43Q. Environmental Problems. 3 Units.

Preference to sophomores. Components of multidisciplinary environmental problems and ethical questions associated with decision making in the regulatory arena. Students lead discussions on environmental issues such as groundwater contamination from point and nonpoint sources, cumulative watershed effects related to timber and mining practices, acid rain, and subsurface disposal of nuclear waste.

GES 46Q. Environmental Impact of Energy Systems: What are the Risks?. 3 Units.

In order to reduce CO₂ emissions and meet growing energy demands during the 21st Century, the world can expect to experience major shifts in the types and proportions of energy-producing systems. These decisions will depend on considerations of cost per energy unit, resource availability, and unique national policy needs. Less often considered is the environmental impact of the different energy producing systems: fossil fuels, nuclear, wind, solar, and other alternatives. One of the challenges has been not only to evaluate the environmental impact but also to develop a systematic basis for comparison of environmental impact among the energy sources. The course will consider fossil fuels (natural gas, petroleum and coal), nuclear power, wind and solar and consider the impact of resource extraction, refining and production, transmission and utilization for each energy source. Same as: EARTHSYS 46Q

GES 50Q. The Coastal Zone Environment. 3 Units.

Preference to sophomores. The oceanographic, geological, and biological character of coastal zone environments, including continental shelves, estuaries, and coastal wetlands, with emphasis on San Francisco Bay. Five required field trips examine estuarine and coastal environments, and agencies and facilities that manage these resources. Students present original research. Prerequisite: beginning course in Biology such as BIOSCI 51, Chemistry such as CHEM 30 or 31, Earth Sciences such as GES 1 or 2, or Earth Systems such as EARTHSYS 10.

GES 55Q. The California Gold Rush: Geologic Background and Environmental Impact. 3 Units.

Preference to sophomores. Topics include: geologic processes that led to the concentration of gold in the river gravels and rocks of the Mother Lode region of California; and environmental impact of the Gold Rush due to population increase, mining operations, and high concentrations of arsenic and mercury in sediments from hard rock mining and milling operations. Recommended: introductory geology.

GES 90. Introduction to Geochemistry. 3-4 Units.

The chemistry of the solid earth and its atmosphere and oceans, emphasizing the processes that control the distribution of the elements in the earth over geological time and at present, and on the conceptual and analytical tools needed to explore these questions. The basics of geochemical thermodynamics and isotope geochemistry. The formation of the elements, crust, atmosphere and oceans, global geochemical cycles, and the interaction of geochemistry, biological evolution, and climate. Recommended: introductory chemistry.

GES 101. Environmental and Geological Field Studies in the Rocky Mountains. 3 Units.

Three-week, field-based program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such as acid mine drainage and changing land-use patterns.

Same as: EARTHSYS 100, EESS 101

GES 102. Earth Materials: Introduction to Mineralogy. 4 Units.

The minerals and materials that comprise the earth and their uses in modern society. How to identify, classify, and interpret rock-forming minerals. Emphasis is on information provided by common minerals about the nature of the Earth's interior and processes such as magmatism and metamorphism that operate there, as well as the major processes of weathering and erosion that link plate tectonics to earth cycles. Required lab section. Prerequisite: introductory geology course. Recommended: introductory chemistry.

GES 103. Earth Materials: Rocks in Thin Section. 3 Units.

Use of petrographic microscope to identify minerals and common mineral associations in igneous, metamorphic, and sedimentary rocks. Crystallization histories, mineral growth and reaction relations, deformation textures in metamorphic rocks, and provenance of siliciclastic rocks. Prerequisite 102.

GES 104. Introduction to Petrology. 4 Units.

The origin of different rock types as a function of geologic and plate tectonic setting. How to identify rocks and interpret their conditions of formation. Required lab section. Prerequisite: introductory geology course; GES102.

Same as: GES 204

GES 105. Introduction to Field Methods. 3 Units.

Two-week, field-based course in the White Mountains of eastern California. Introduction to the techniques for geologic mapping and geologic investigation in the field: systematic observations and data collection for lithologic columns and structural cross-sections. Interpretation of field relationships and data to determine the stratigraphic and deformational history of the region. Prerequisite: GES 1, recommended: GES 102.

GES 107. Journey to the Center of the Earth. 3 Units.

The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter. Next offering Winter 2013-14.

Same as: GEOPHYS 184, GEOPHYS 274, GES 207

GES 110. Structural Geology and Tectonics. 3-5 Units.

Theory, principles, and practical techniques to measure, describe, analyze, and interpret deformation-related structures on Earth. Collection of fault and fold data in the field followed by lab and computer analysis; interpretation of geologic maps and methods of cross-section construction; structural analysis of fault zone and metamorphic rocks; measuring deformation; regional structural styles and associated landforms related to plate tectonic convergence, rifting, and strike-slip faulting; the evolution of mountain belts and formation of sedimentary basins. Prerequisite: GES 1, calculus. Recommended: 102.

GES 111. Fundamentals of Structural Geology. 3 Units.

Techniques for mapping using GPS and differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; measurement and analysis of stress; elastic deformation and properties of rock; brittle deformation including fracture and faulting; linear viscous flow including folding and magma dynamics; model development and methodology. Models of tectonic processes are constructed and solutions visualized using MATLAB. Prerequisites: GES 1, MATH 51.

Same as: CEE 195

GES 115. Engineering Geology and Global Change. 3 Units.

The application of geology and global change to the planning, design, and operation of engineering projects. Case histories taught in a seminar setting and field trips emphasize the impact of geology and global change on both individual engineering works and the built environment by considering Quaternary history and tectonics, anthropogenic sea level rise, active geologic processes, engineering properties of geologic deposits, site exploration, and professional ethics. Prerequisite: GES 1 or consent of instructor.

Same as: CEE 196

GES 118. Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions. 3 Units.

Integrating the science of natural hazards, methods for quantitatively estimating the risks that these hazards pose to populations and property, engineering solutions that might best ameliorate these risks and increase resilience to future events, and policy and economic decision-making studies that may increase long-term resilience to future events. Panel discussions by outside experts exploring the science, engineering, policy, and economics that underly the hazards, risks, and strategies for increasing resilience. Group assignments to evaluate the way in which natural hazards, and human population and developing interact in megacities to produce risk, and what strategies might be adopted in each area to reduce risks posed by the specific hazards faced by these urban areas.

Same as: EESS 118, EESS 218, GEOPHYS 118, GEOPHYS 218, GES 218

GES 119. A Solar System Odyssey: Introduction to Planetary Geology. 3 Units.

How could planetary bodies such as Earth, Moon and Mars form so close together, with such similar starting products have such drastically different outcomes? Did Mars ever have standing water? Does Europa have a subsurface ocean teeming with life? In this course, you will study the formation and evolution of planets and moons, and how differences such as mass and composition have led to a diverse selection of terrain. Through our exploration of selected topics in planetary geology (volcanism, cratering, tectonics), we will actively debate contemporary controversies in planetary geology. GES 1 required or permission of the instructor.

GES 120. Planetary and Early Biological Evolution Seminar. 2-3 Units.

Interdisciplinary. For upper division science undergraduates and graduate students. Synthesis of biology, geology, physics, and chemistry. Recent approaches for identifying traces of past life on Earth. How to look for life on other planets such as Mars, Europa, and Titan. May be repeated for credit.

Same as: GES 220

GES 121. What Makes a Habitable Planet?. 3 Units.

Physical processes affecting habitability such as large impacts and the atmospheric greenhouse effect, comets, geochemistry, the rise of oxygen, climate controls, and impact cratering. Detecting and interpreting the spectra of extrasolar terrestrial planets. Student-led discussions of readings from the scientific literature. Team taught by planetary scientists from NASA Ames Research Center.

Same as: GES 221

GES 122. Planetary Systems: Dynamics and Origins. 3-4 Units.

(Students with a strong background in mathematics and the physical sciences should register for 222.) Motions of planets and smaller bodies, energy transport in planetary systems, composition, structure and dynamics of planetary atmospheres, cratering on planetary surfaces, properties of meteorites, asteroids and comets, extrasolar planets, and planetary formation. Prerequisite: some background in the physical sciences, especially astronomy, geophysics, or physics.

GES 123. Paleobiology. 4 Units.

Introduction to the fossil record with emphasis on marine invertebrates. Major debates in paleontological research. The history of animal life in the oceans. Topics include the nature of the fossil record, evolutionary radiations, mass extinctions, and the relationship between biological evolution and environmental change. Fossil taxa through time. Exercises in phylogenetics, paleoecology, biostratigraphy, and statistical methods. Same as: EARTHSYS 122

GES 128. Evolutionary History of Terrestrial Ecosystems. 4 Units.

The what, when, and how do we know it regarding life on land; including plants, fungi, invertebrates, and vertebrates (yes, dinosaurs); and how all of those components interact with each other and with changing climates, continental drift, atmospheric composition, and environmental perturbations like glaciation and mass extinction. Same as: EARTHSYS 128, GES 228

GES 130. Soil Physics and Hydrology. 3 Units.

The occurrence, distribution, circulation, and reaction of water at the surface and within the near surface. Topics: precipitation, evapotranspiration, infiltration and vadose zone, groundwater, surface water and streamflow generation, and water balance estimates. Current and classic theory in soil physics and hydrology. Urban, rangeland, and forested environments.

GES 131. Hydrologically-Driven Landscape Evolution. 3 Units.

Materials of the Earth and hydrologically driven landscape processes. Topics: hillslope hydrology, weathering of rocks and soils, erosion, flow failures, mass wasting, and conceptual models of landscape evolution. Current and classic theory in geomorphology.

GES 150. Senior Seminar: Issues in Earth Sciences. 3 Units.

Focus is on written and oral communication in a topical context. Topics from current frontiers in earth science research and issues of concern to the public. Readings, oral presentations, written work, and peer review. Same as: GEOPHYS 199

GES 151. Sedimentary Geology and Petrography: Depositional Systems. 4 Units.

Topics: weathering, erosion and transportation, deposition, origins of sedimentary structures and textures, sediment composition, diagenesis, sedimentary facies, tectonics and sedimentation, and the characteristics of the major siliciclastic and carbonate depositional environments. Lab: methods of analysis of sediments in hand specimen and thin section. Field trips. Prerequisites: 1, 102, 103.

GES 163. Introduction to Isotope Geochemistry. 3 Units.

Stable, cosmogenic, and radiogenic isotopes; processes that govern isotopic variations. Application of isotopes to geologic, biologic, and hydrologic questions. Major isotopic systems and their applications. Simple modeling techniques used in isotope geochemistry. Same as: GES 263

GES 170. Environmental Geochemistry. 4 Units.

Solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and chemical interactions. Contrast between natural sources of hazardous elements and compounds and types and sources of anthropogenic contaminants and pollutants. Chemical and physical processes of weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. The release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The impact of contaminants and design of remediation strategies. Case studies. Prerequisite: 90 or consent of instructor.

Same as: EARTHSYS 170, GES 270

GES 171. Geochemical Thermodynamics. 3 Units.

Introduction to the application of chemical principles and concepts to geologic systems. The chemical behavior of fluids, minerals, and gases using simple equilibrium approaches to modeling the geochemical consequences of diagenetic, hydrothermal, metamorphic, and igneous processes. Topics: reversible thermodynamics, solution chemistry, mineral-solution equilibria, reaction kinetics, and the distribution and transport of elements by geologic processes. Prerequisite: GES 102.

GES 180. Igneous Processes. 4 Units.

For juniors, seniors and beginning graduate students in Earth Sciences. Structure and physical properties of magmas; use of phase equilibria and mineral barometers and thermometers to determine conditions of magmatic processes; melting and magmatic lineages as a function of tectonic setting; processes that control magma composition including fractional crystallization, partial melting, and assimilation; petrogenetic use of trace elements and isotopes. Labs emphasize identification of volcanic and plutonic rocks in thin section and interpretation of rock textures. Prerequisite 102, 103, or consent of instructor.

GES 181. Metamorphic Processes. 3-5 Units.

For juniors, seniors, and beginning graduate students in Earth Sciences. Thermodynamics and phase equilibria of multiple component systems; use of phase equilibria to determine pressure and temperature of metamorphic assemblages; geochronology of metamorphic rocks; heat flow in the lithosphere; links between tectonics and metamorphism; and the role of heat and mass transfer in the Earth's crust and mantle. Labs emphasize identification of metamorphic rocks and minerals for common pelitic and basic rocks and interpretation of rock textures. May be taken for 3 units without lab. Prerequisites: 102, 103, or consent of instructor.

GES 183. California Desert Geologic Field Trip. 1 Unit.

Field seminar. Three class meetings during Winter quarter followed by a 6-day field trip over Spring Break to Mojave Desert, Death Valley, and Owens Valley. Basin-and-range faulting, alluvial fans, playas, sand dunes, metamorphic rocks, granites of the Sierra Nevada, lava flows and the deposits of supervolcanic eruptions, hot springs, ore deposits, and desert landscapes. Involves camping and some hiking. Recommended: introductory geology. Enrollment limited to 25 students; preference given to freshman and sophomores; additionally graduate students in the School of Earth Sciences.

GES 184. Field Seminar on Eastern Sierran Volcanism. 1 Unit.

For nonmajors and prospective majors in the earth sciences and archaeology. Four-day trip over Memorial Day weekend to study silicic and mafic volcanism in the eastern Sierra Nevada: basaltic lavas and cinder cones erupted along normal faults bounding Owens Valley, Long Valley caldera, postcaldera rhyolite lavas, hydrothermal alteration and hot springs, Holocene rhyolite lavas of the Inyo and Mono craters, subaqueous basaltic and silicic eruptions of Mono Basin, floating pumice blocks. If snow-level permits, silicic volcanism associated with the Bodie gold district. Recommended: 1 or equivalent.

GES 185. Volcanology. 3-4 Units.

For juniors, seniors, and beginning graduate students in earth sciences. Eruptive processes that create volcanic deposits and landforms; relation to physical properties of magmas. Volcanic hazards and the effects of eruptions on climate; volcanic-hosted geothermal systems and mineral resources. Required 4-day field trip over Memorial Day weekend to study silicic and mafic volcanism in the eastern Sierra Nevada. Those taking the class for 4 units will complete a 3-hour weekly lab involving hand specimen and thin section identification and interpretation, which emphasizes recognizing types of lavas and products of explosive eruptions. Prerequisite: 1, for those taking the course for 3 units; 103 and 104 or equivalent for those taking the course for 4 units.

GES 190. Research in the Field. 3 Units.

Two to three-week long courses that provide students with the opportunity to collect data in the field as part of a team-based investigation of research questions or topics under the expert guidance of knowledgeable faculty and graduate students. Topics and locations vary. May be taken multiple times for credit. Prerequisites: GES 1, GES 102, GES 105.

GES 191. GES Field Trips. 1 Unit.

Four- to seven-day field trips to locations of geologic and environmental interest. Includes trips offered during Thanksgiving and Spring breaks. May be repeated for credit. See <http://pangea.stanford.edu/GES/undergraduates/courses/>.

Same as: EARTHSCI 191

GES 192. Undergraduate Research in Geological and Environmental Sciences. 1-10 Unit.

Field-, lab-, or literature-based. Faculty supervision. Written reports. May be repeated for credit.

GES 197. Senior Thesis. 3-5 Units.

For seniors who wish to write a thesis based on research in 192 or as a summer research fellow. May not be repeated for credit; may not be taken if enrolled in 199.

GES 198. Special Problems in Geological and Environmental Sciences. 1-10 Unit.

Reading and instruction under faculty supervision. Written reports. May be repeated for credit.

GES 199. Honors Program. 1-10 Unit.

Research on a topic of special interest. See "Undergraduate Honors Program" above. May be repeated for credit.

GES 204. Introduction to Petrology. 4 Units.

The origin of different rock types as a function of geologic and plate tectonic setting. How to identify rocks and interpret their conditions of formation. Required lab section. Prerequisite: introductory geology course; GES102.

Same as: GES 104

GES 204A. Extraordinary Glimpses of Past Life. 1 Unit.

Soft bodied fossils are a major source of information on the history of life. Focus on exceptional preservation and the factors that contribute to and control it. Topics include: exceptionally preserved biotas, experimental taphonomy, ediacaran death masks, Burgess Shale-type preservation, the Herefordshire fossils, Mazon Creek, fossils in glass, the preservation of color, and conodonts.

GES 206. Topics in Organismal Paleobiology. 2-3 Units.

Seminar course covering an area of structural biology, physiology, and ecology relevant to understanding the fossil record. Topic will change each time the course is offered. Examples of potential topics are biomineralization, fluid mechanics, biomechanics, taphonomy & biochemical preservation, and photosynthesis in air and water.

GES 207. Journey to the Center of the Earth. 3 Units.

The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter. Next offering Winter 2013-14.

Same as: GEOPHYS 184, GEOPHYS 274, GES 107

GES 208. Topics in Geobiology. 1 Unit.

Reading and discussion of classic and recent papers in the field of Geobiology. Co-evolution of Earth and life; critical intervals of environmental and biological change; geomicrobiology; paleobiology; global biogeochemical cycles; scaling of geobiological processes in space and time.

Same as: EESS 208

GES 210. Geologic Evolution of the Western U.S. Cordillera. 1-3 Unit.

The geologic and tectonic evolution of the U.S. Cordillera based on its rock record through time. This region provides good examples of large-scale structures and magmatic activity generated during crustal shortening, extension, and strike-slip faulting and affords opportunity to study crustal-scale processes involved in mountain building in context of plate tectonic motions.

GES 211. Topics in Regional Geology and Tectonics. 2-3 Units.

May be repeated for credit.

GES 212. Topics in Tectonic Geomorphology. 2 Units.

For upper-division undergraduates and graduate students. Topics vary and may include coupling among erosional, tectonic, and chemical weathering processes at the scale of orogens; historical review of tectonic geomorphology; hillslope and fluvial process response to active uplift; measures of landscape form and their relationship to tectonic uplift and bedrock lithology. May be repeated for credit.

GES 213. Topics in Sedimentary Geology. 2 Units.

For upper division undergraduates and graduate students. Topics vary each year but the focus is on current developments and problems in sedimentary geology, sedimentology, and basin analysis. These include issues in deep-water sediments, their origin, facies, and architecture; sedimentary systems on the early Earth; and relationships among tectonics, basin development, and basin fill. May be repeated for credit.

GES 214. Topics in Paleobiology. 2 Units.

For upper division undergraduates and graduate students. Topics vary each year; focus is on paleontological, sedimentological, and geochemical approaches to the history of life. Topics may include: mass extinction events; evolutionary radiations; the history of global biodiversity; links between evolutionary histories of primary producers and consumers; and the quality of the fossil record. Term paper. May be repeated for credit.

GES 215. Structural Geology and Rock Mechanics. 4 Units.

Quantitative field and laboratory data integrated with solutions to boundary value problems of continuum mechanics to understand tectonic processes in Earth's crust that lead to the development of geological structures including folds, faults, fractures and fabrics. Topics include: techniques and tools for structural mapping; differential geometry to characterize structures; dimensional analysis and scaling relationships; kinematics of deformation and flow; traction and stress analysis, conservation of mass and momentum in a deformable continuum; linear elastic deformation and elastic properties; brittle deformation including fracture and faulting; model development and methodology. Data sets analyzed using MATLAB. Prerequisites: GES 1, MATH 53, MATLAB or equivalent.

Same as: CEE 297R, GEOPHYS 251

GES 216. Rock Fracture Mechanics. 3 Units.

Principles and tools of elasticity theory and fracture mechanics are applied to the origins and physical behaviors of faults, dikes, joints, veins, solution surfaces, and other natural structures in rock. Field observations, engineering rock fracture mechanics, and the elastic theory of cracks. The role of natural fractures in brittle rock deformation, and fluid flow in the earth's crust with applications to crustal deformation, structural geology, petroleum geology, engineering, and hydrogeology. Prerequisite: 215 or equivalent.

GES 217. Faults, Fractures, and Fluid Flow. 3 Units.

Process-based approach to rock failure; the microstructures and overall architectures of the failure products including faults, joints, solution seams, and types of deformation bands. Fluid flow properties of these structures are characterized with emphasis on sealing and transmitting of faults and their role in hydrocarbon flow, migration, and entrapment. Case studies of fracture characterization experiments in aquifers, oil and gas reservoirs, and waste repository sites. Guest speakers; weekend field trip. Prerequisite: first-year graduate student in Earth Sciences.

GES 218. Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions. 3 Units.

Integrating the science of natural hazards, methods for quantitatively estimating the risks that these hazards pose to populations and property, engineering solutions that might best ameliorate these risks and increase resilience to future events, and policy and economic decision-making studies that may increase long-term resilience to future events. Panel discussions by outside experts exploring the science, engineering, policy, and economics that underly the hazards, risks, and strategies for increasing resilience. Group assignments to evaluate the way in which natural hazards, and human population and developing interact in megacities to produce risk, and what strategies might be adopted in each area to reduce risks posted by the specific hazards faced by these urban areas.

Same as: EESS 118, EESS 218, GEOPHYS 118, GEOPHYS 218, GES 118

GES 220. Planetary and Early Biological Evolution Seminar. 2-3 Units.

Interdisciplinary. For upper division science undergraduates and graduate students. Synthesis of biology, geology, physics, and chemistry. Recent approaches for identifying traces of past life on Earth. How to look for life on other planets such as Mars, Europa, and Titan. May be repeated for credit.

Same as: GES 120

GES 221. What Makes a Habitable Planet?. 3 Units.

Physical processes affecting habitability such as large impacts and the atmospheric greenhouse effect, comets, geochemistry, the rise of oxygen, climate controls, and impact cratering. Detecting and interpreting the spectra of extrasolar terrestrial planets. Student-led discussions of readings from the scientific literature. Team taught by planetary scientists from NASA Ames Research Center.

Same as: GES 121

GES 222. Planetary Systems: Dynamics and Origins. 3-4 Units.

(For students with a strong background in mathematics and the physical sciences; other should register for 122.) Motions of planets, moons, and small bodies; energy transport in planetary systems; meteorites and the constraints they provide on the formation of the solar system; asteroids and Kuiper belt objects; comets; planetary rings; planet formation; and extrasolar planets. In-class presentation of student papers.

GES 223. Reflection Seismology Interpretation. 1-4 Unit.

The structural and stratigraphic interpretation of seismic reflection data, emphasizing hydrocarbon traps in two and three dimensions on industry data, including workstation-based interpretation. Lectures only, 1 unit.

Prerequisite: 222, or consent of instructor.

Same as: GEOPHYS 183, GEOPHYS 223

GES 224. Modeling Transport and Transformations in the Environment. 2-3 Units.

An introduction to geochemical and reactive transport modeling using Geochemist's Workbench and other appropriate models. Working knowledge of geochemical and hydrologic principles is assumed. Throughout the quarter the students will use the principles and tools to develop and analyze an environmental problems as part of a simulated consulting exercise. Topics covered include contaminant transport, mineral dissolution/precipitation and aquifer microbiology. An additional focus of the course will be to develop presentation skills through practice, feedback and discussions. Prerequisites: Either EESS 221 (CEE 260C) or EESS 220 (CEE 260A) and either GES 90, 170, or 171, or permission from instructors.

GES 225. Contaminant Hydrogeology and Reactive Transport. 4 Units.

For earth scientists and engineers. Environmental, geologic, and water resource problems involving migration of contaminated groundwater through porous media and associated biogeochemical and fluid-rock reactions. Conceptual and quantitative treatment of advective-dispersive transport with reacting solutes. Predictive models of contaminant behavior controlled by local equilibrium and kinetics. Modern methods of contaminant transport simulation and reactive transport modeling using geochemical transport software. Some Matlab programming / program modification required. Prerequisite: Physical Hydrogeology EESS 220 / CEE 260A (Gorelick) or equivalent. Recommended: course work in environmental chemistry or geochemistry (e.g., one or more of the following: EESS 155, EESS 156/256 GES 90, GES 170/279, GES 171, CEE 177 or CEE 270).

Same as: CEE 260C, EESS 221

GES 226. At the intersection of geochemistry, sedimentary geology, and paleobiology. 3 Units.

Recent work in geochemistry, sedimentary geology, and paleobiology increasingly supports the notion that common geological factors control long-term biogeochemical cycles, the erosion and deposition of sedimentary rocks, and the evolution of the marine biosphere. During this course students will read and discuss recent primary literature addressing the possible mechanisms underlying these patterns. Questions addressed will include: Why do sedimentary rock area and biodiversity covary? How are these records linked to biogeochemical cycles, as inferred from the stable isotope compositions of elements such as carbon and sulfur? What are the relative roles of biotic interactions vs. physical environmental changes in shaping the macroevolutionary history of life?.

GES 227. Modern Turbidite Systems as Analogues for Deep-water Petroleum Plays. 3 Units.

This seminar is designed for earth science upperclassmen and graduate students. Marine geophysical and geological techniques will be used to illustrate and understand source-to-sink characteristics of modern turbidite systems. The course will examine a wide variety of small-scale base-of-apron (km) to large-scale (100's of km) sand-rich to mud-rich systems. New research on mass transport deposits, hybrid beds, and turbidite paleoseismology will be presented. Variations in turbidite system architecture, that are dependent upon tectonic setting, sediment supply, climate, sea level change, and contour currents will be discussed. The utility and pitfalls of model-driven approaches are also explored.

Same as: EESS 227

GES 228. Evolutionary History of Terrestrial Ecosystems. 4 Units.

The what, when, and how do we know it regarding life on land; including plants, fungi, invertebrates, and vertebrates (yes, dinosaurs); and how all of those components interact with each other and with changing climates, continental drift, atmospheric composition, and environmental perturbations like glaciation and mass extinction.

Same as: EARTHSYS 128, GES 128

GES 237. Surface and Near-Surface Hydrologic Response. 3 Units.

Quantitative review of process-based hydrology and geomorphology. Introduction to finite-difference and finite-element methods of numerical analysis. Topics: biometeorology, unsaturated and saturated subsurface fluid flow, overland and open channel flow, and physically-based simulation of coupled surface and near-surface hydrologic response. Links hydrogeology, soil physics, and surface water hydrology.

Same as: CEE 260B

GES 238. Soil Physics. 3 Units.

Physical properties of the soil solid phase emphasizing the transport, retention, and transformation of water, heat, gases, and solutes in the unsaturated subsurface. Field experiments.

GES 240. Geostatistics. 2-3 Units.

Geostatistical theory and practical methodologies for quantifying and simulating spatial and spatio-temporal patterns for the Earth Sciences. Real case development of models of spatial continuity, including variograms, Boolean models and training images. Estimation versus simulation of spatial patterns. Loss functions. Estimation by kriging, co-kriging with secondary data. Dealing with data on various scales. Unconditional and conditional Boolean simulation, sequential simulation for continuous and categorical variables. Multi-variate geostatistical simulation. Probabilistic and pattern-based approaches to multiple-point simulation. Trend, secondary variable, auxiliary variable and probability-type constraints. Quality control techniques on generated models. Workflows for practical geostatistical applications in mining, petroleum, hydrogeology, remote sensing and environmental sciences. prerequisites: Energy 160/260 or basic course in data analysis/statistics. Same as: ENERGY 240

GES 246. Reservoir Characterization and Flow Modeling with Outcrop Data. 3 Units.

Project addressing a reservoir management problem by studying an outcrop analog, constructing geostatistical reservoir models, and performing flow simulation. How to use outcrop observations in quantitative geological modeling and flow simulation. Relationships between disciplines. Weekend field trip.

Same as: ENERGY 146, ENERGY 246

GES 248. The Petroleum System: Investigative method to explore for conventional & unconventional hydrocarbons. 1 Unit.

How the petroleum system concept can be used to more systematically investigate how hydrocarbon fluid becomes an unconventional accumulation in a pod of active source rock and how this fluid moves from this pod to a conventional pool. How to identify, map, and name a petroleum system. The conventional and unconventional accumulation as well as the use of modeling.

GES 249. Petroleum Geochemistry in Environmental and Earth Science. 3 Units.

How molecular fossils in crude oils, oil spills, refinery products, and human artifacts identify their age, origin, and environment of formation. The origin and habitat of petroleum, technology for its analysis, and parameters for interpretation, including: origins of molecular fossils; function, biosynthesis, and precursors; tectonic history related to the evolution of life, mass extinctions, and molecular fossils; petroleum refinery processes and the kinds of molecular fossils that survive; environmental pollution from natural and anthropogenic sources including how to identify genetic relationships among crude oil or oil spill samples; applications of molecular fossils to archaeology; worldwide petroleum systems through geologic time.

GES 250. Sedimentation Mechanics. 3-4 Units.

The mechanics of sediment transport and deposition and the origins of sedimentary structures and textures as applied to interpreting ancient rock sequences. Dimensional analysis, fluid flow, drag, boundary layers, open channel flow, particle settling, erosion, sediment transport, sediment gravity flows, soft sediment deformation, and fluid escape. Field trip required.

GES 251. Sedimentary Basins. 3 Units.

Analysis of the depositional framework and tectonic evolution of sedimentary basins. Topics: tectonic and environmental controls on facies relations, synthesis of basin development through time in terms of depositional systems and tectonic settings. Weekend field trip required. Prerequisites: 110, 151.

GES 252. Sedimentary Petrography. 4 Units.

Siliciclastic sediments and sedimentary rocks. Research in modern sedimentary mineralogy and petrography and the relationship between the composition and texture of sediments and their provenance, tectonic settings, and diagenetic histories. Topics vary yearly. Prerequisite: 151 or equivalent.

GES 253. Petroleum Geology and Exploration. 3 Units.

The origin and occurrence of hydrocarbons. Topics: thermal maturation history in hydrocarbon generation, significance of sedimentary and tectonic structural setting, principles of accumulation, and exploration techniques. Prerequisites: 110, 151. Recommended: GEOPHYS 223.

GES 254. Carbonate Sedimentology. 3-4 Units.

Processes of precipitation and sedimentation of carbonate minerals with emphasis on marine systems. Topics include: geographic and bathymetric distribution of carbonates in modern and ancient oceans; genesis and environmental significance of carbonate grains and sedimentary textures; carbonate rocks and sediments as sources of geochemical proxy data; carbonate diagenesis; changes in styles of carbonate deposition through Earth history; carbonate depositional patterns and the global carbon cycle. Lab exercises emphasize petrographic and geochemical analysis of carbonate rocks including map and outcrop scale, hand samples, polished slabs, and thin sections.

GES 255. Basin and Petroleum System Modeling. 3 Units.

For advanced undergraduates or graduate students. Students use stratigraphy, subsurface maps, and basic well log, lithologic, paleontologic, and geochemical data to construct 1-D, 2-D, and 3-D models of petroleum systems that predict the extent of source-rock thermal maturity, petroleum migration paths, and the volumes and compositions of accumulations through time (4-D). Recent software such as PetroMod designed to reconstruct basin geohistory. Recommended: 251 or 253.

GES 256. Quantitative Methods in Basin and Petroleum System Modeling. 1-3 Unit.

Examine the physical processes operating in sedimentary basins by deriving the basic equations of fundamental, coupled geologic processes such as fluid flow and heat flow, deposition, compaction, mass conservation, and chemical reactions. Through hands-on computational exercises and instructor-provided "recipes," students will deconstruct the black box of basin modeling software. Students write their own codes (Matlab) as well as gain expertise in modern finite-element modeling software (PetroMod, COMSOL).

Same as: ENERGY 275

GES 257. Clastic Sequence Stratigraphy. 3 Units.

Sequence stratigraphy facilitates integration of all sources of geologic data, including seismic, log, core, and paleontological, into a time-stratigraphic model of sediment architecture. Tools applicable to regional and field scales. Emphasis is on practical applications and integration of seismic and well data to exploration and field reservoir problems. Examples from industry data; hands-on exercises.

GES 258. Introduction to Depositional Systems. 3 Units.

The characteristics of the major sedimentary environments and their deposits in the geologic record, including alluvial fans, braided and meandering rivers, aeolian systems, deltas, open coasts, barred coasts, marine shelves, and deep-water systems. Emphasis is on subdivisions; morphology; the dynamics of modern systems; and the architectural organization and sedimentary structures, textures, and biological components of ancient deposits.

GES 259. Stratigraphic Architecture. 1 Unit.

The stratigraphic architecture of deposits associated with a spectrum of depositional environments, using outcrop and subsurface data. Participants read and discuss selected literature.

GES 260. Laboratory Methods in Organic Geochemistry. 2-3 Units.

Knowledge of components in geochemical mixtures to understand geological and environmental samples. The presence and relative abundance of these compounds provides information on the biological source, depositional environment, burial history, biodegradation, and toxicity of organic materials. Laboratory methods to detect and quantify components of these mixtures. Methods for separation and analysis of organic compounds in geologic samples: extraction, liquid chromatography, absorption by zeolites, gas chromatography and gas chromatography-mass spectrometry. Student samples considered as material for analysis. Prerequisite: GES 249 or consent of instructor.

GES 261. Physics and Chemistry of Minerals and Mineral Surfaces. 4 Units.

The concepts of symmetry and periodicity in crystals; the physical properties of crystals and their relationship to atomic-level structure; basic structure types; crystal chemistry and bonding in solids and their relative stability; the interaction of x-rays with solids and liquids (scattering and spectroscopy); structural variations in silicate glasses and liquids; UV-visible spectroscopy and the color of minerals; review of the mineralogy, crystal chemistry, and structures of selected rock-forming silicates and oxides; mineral surface and interface geochemistry.

GES 262. Thermodynamics and Disorder in Minerals and Melts. 3 Units.

The thermodynamic properties of crystalline, glassy, and molten silicates and oxides in light of microscopic information about short range structure and ordering. Measurements of bulk properties such as enthalpy, density, and their pressure and temperature derivatives, and structural determination by spectroscopies such as nuclear magnetic resonance and Mössbauer. Basic formulations for configurational entropy, heats of mixing in solid solutions, activities; and the energetics of exsolution, phase transitions, and nucleation. Quantitative models of silicate melt thermodynamics are related to atomic-scale views of structure. A general view of geothermometry and geobarometry. Prerequisites: introductory mineralogy and thermodynamics.

GES 263. Introduction to Isotope Geochemistry. 3 Units.

Stable, cosmogenic, and radiogenic isotopes; processes that govern isotopic variations. Application of isotopes to geologic, biologic, and hydrologic questions. Major isotopic systems and their applications. Simple modeling techniques used in isotope geochemistry.

Same as: GES 163

GES 264. Mathematical Modeling in Biogeochemistry. 3 Units.

The basics of translating a conceptual model into a numerical model is presented. Emphasis on building models, box modeling, methods of solving models. Lab exercises draw from examples in biogeochemistry, including modeling global biogeochemical cycles, sediment biogeochemistry, and microbial processes.

GES 266. Managing Nuclear Waste: Technical, Political and Organizational Challenges. 3 Units.

The essential technical and scientific elements of the nuclear fuel cycle, focusing on the sources, types, and characteristics of the nuclear waste generated, as well as various strategies for the disposition of spent nuclear fuel - including reprocessing, transmutation, and direct geologic disposal. Policy and organizational issues, such as: options for the characteristics and structure of a new federal nuclear waste management organization, options for a consent-based process for locating nuclear facilities, and the regulatory framework for a geologic repository. A technical background in the nuclear fuel cycle, while desirable, is not required.

Same as: IPS 266

GES 267. Solution-Mineral Equilibria: Theory. 3 Units.

Procedures for calculating and evaluating the thermodynamic properties of reversible and irreversible reactions among rock-forming minerals and aqueous solutions in geologic systems. Emphasis is on the generation and utility of phase diagrams depicting solution-mineral interaction relevant to phase relations associated with weathering diagenetic, hydrothermal, and metamorphic processes, and the prediction of temperature, pressure, and the chemical potential of thermodynamic components compatible with observed mineralogic phase relations in geologic outcrops. Individual research topics. Prerequisite: 171.

GES 270. Environmental Geochemistry. 4 Units.

Solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and chemical interactions. Contrast between natural sources of hazardous elements and compounds and types and sources of anthropogenic contaminants and pollutants. Chemical and physical processes of weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. The release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The impact of contaminants and design of remediation strategies. Case studies. Prerequisite: 90 or consent of instructor.

Same as: EARTHSYS 170, GES 170

GES 272. Biomineralization. 3 Units.

The functional properties of many animal and plant skeletons are dependent largely on mineralization. The relationship between mineralization processes and adaptation for all the animal phyla is reviewed. The sedimentologic contribution of mineralized skeletons, especially in carbonate reefs and pelagic sedimentation is considered. Synthesis of organic matrix and the composite nature of many animal and plant skeletons, and their development and morphogenesis are described. The mechanisms of crystal nucleation and growth are considered. The macroevolutionary history of biomineralization, and mass extinctions and the diversification of well skeletonized groups in the geologic record are considered.

GES 273. Isotope Geochemistry Seminar. 1-3 Unit.

Current topics including new analytical techniques, advances in isotopic measurements, and new isotopic approaches and systems. May be repeat for credit for total completion of 5 and total unit allowed 15.

GES 275. Electron Probe Microanalytical Techniques. 2-3 Units.

The practical and theoretical aspects of x-ray generation and detection, and the behavior of electron beams and x-rays in solids. The basic principles needed to quantitatively analyze chemically complex geological materials. Operation of the JEOL 733 electron microprobe and associated computer software for quantitatively analyzing materials. X-ray chemical mapping. Enrollment limited to 8.

GES 276. Earth's Weathering Engine. 3 Units.

The complex interactions between the chemical, biological, hydrologic and tectonic process that control the chemical and isotopic flux of material to the oceans, and ultimately the long-term composition of both the atmosphere and the hydrosphere. Through a literature review and discussions students will identify key outstanding questions regarding global chemical weathering fluxes. Through data collection, data analysis, and application of appropriate modeling tools students will produce novel analyses and conclusions regarding the operation of the Earth's weathering engine. Permission of instructor required.

GES 277. Flood Basalts and Mass Extinctions. 3 Units.

Recent work in geochronology and paleobiology supports the temporal coincidence of the eruption of continental flood basalts with mass extinction in the marine and terrestrial realms. The mechanisms and timescale of flood basalt eruptions, their likely environmental and biological consequences, and the evidence for flood basalt eruptions as the triggers of many mass extinction events. Sources include recent primary literature.

GES 278. Mantle Processes. 1-3 Unit.

The mantle is the largest reservoir on Earth and is fundamental to a variety of plate tectonic processes, from convection to the generation of crust. This course reviews current knowledge of the mantle based on the geochemistry and rheology of rocks derived from the upper mantle. Focus is on processes at ocean ridges and subduction zones. The tools used for studying the mantle, including radiogenic isotopes, trace elements, melting equations, diffusion coefficients and rheological flow laws, are explored in detail. Pre-requisites: basic geology, petrology and chemistry or consent of the instructor.

GES 281. Principles of $^{40}\text{Ar}/^{39}\text{Ar}$ Thermochronometry. 3-4 Units.

The $^{40}\text{Ar}/^{39}\text{Ar}$ method is based upon the K-Ar decay scheme and allows high precision geochronology and thermochronology to be performed with K-bearing minerals. Provides a detailed exploration of the method including all practical considerations and laboratory procedures for standardization and instrument calibration. A laboratory component allows practical experience in making measurements and interpreting results.

GES 282. Interpretative Methods in Detrital Geochronology. 3 Units.

Over the past decade, the number of studies that make use of isotopic provenance data has sky-rocketed. This type of data is now routinely used throughout the geosciences to solve a broad range of geologic problems. This seminar examines the state-of-the-art of existing interpretative methods for detrital geo/thermochronology data in provenance studies and critically examines their strengths and weaknesses. While this course will touch upon sampling approaches analytical aspects of data collection, focus is primarily upon data interpretation.

GES 283. Thermochronology and Crustal Evolution. 4 Units.

Thermochronology analyzes the competition between radioactive ingrowth and temperature-dependant loss of radiogenic isotopes within radioactive mineral hosts in terms of temperature-time history. Coupled with quantitative understanding of kinetic phenomena and crustal- or landscape-scale interpretational models, thermochronology provides an important source of data for the Earth Sciences, notably tectonics, geomorphology, and petrogenesis. Focus on recent developments in thermochronology, specifically analytical and interpretative innovations developed over the past decade. Integrates the latest thermochronology techniques with field work in a small-scale research project focused upon crustal evolution.

GES 284. Field Seminar on Eastern Sierran Volcanism. 1 Unit.

For graduate students in the earth sciences and archaeology. Four-day trip over Memorial Day weekend to study silicic and mafic volcanism in the eastern Sierra Nevada: basaltic lavas and cinder cones erupted along normal faults bounding Owens Valley, Long Valley caldera, postcaldera rhyolite lavas, hydrothermal alteration and hot springs, Holocene rhyolite lavas of the Inyo and Mono craters, subaqueous basaltic and silicic eruptions of Mono Basin, floating pumice blocks. If snow-level permits, silicic volcanism associated with the Bodie gold district. Recommended: 1 or equivalent.

GES 285. Igneous Petrogenesis of the Continents. 2-4 Units.

Radiogenic isotopes, stable isotopes, and trace elements applied to igneous processes; interaction of magmas with mantle and crust; convergent-margin magmatism; magmatism in extensional terrains; origins of rhyolites; residence times of magmas and magma chamber processes; granites as imperfect mirrors of their source regions; trace element modeling of igneous processes; trace element discriminant diagrams in tectonic analysis; phase equilibria of partial melting of mantle and crust; geothermometry and geobarometry. Topics emphasize student interest. Prerequisite: 180 or equivalent.

GES 286. Secondary Ionization Mass Spectrometry. 3 Units.

Secondary ionization mass spectrometry (SIMS) is a versatile method capable of performing elemental and isotopic analysis in the solid-state at the nanogram to picogram scale. SIMS offers the most favorable combination of high spatial resolution, sensitivity, and mass resolving power. This course explores the ion optics of the primary and secondary columns of SIMS instruments and explains instrumental mass fractionation and standardization methods for both positive and negative secondary ions. Ion imaging and depth profiling approaches are also covered. Practical experience using Stanford's SHRIMP-RG and NanoSIMS instruments is provided.

GES 287. Fundamentals of Mass Spectrometry. 3 Units.

This course explains ion creation, mass separation, and ion detection in mass spectrometry methods commonly used in the Earth Sciences. Gas source (C-O-H-S stable isotope, $^{40}\text{Ar}/^{39}\text{Ar}$, and (U-Th)-He), secondary ionization (SIMS), laser ablation and solution-based mass inductively coupled (ICP-MS) and thermal ionization (TIMS) mass spectrometry techniques are also explored. Additional topics include ion optics, vacuum generation, and pressure measurement, instrument calibration, data reduction, and error propagation methods.

GES 290. Departmental Seminar in Geological and Environmental Sciences. 1 Unit.

Current research topics. Presentations by guest speakers from Stanford and elsewhere. May be repeated for credit.

GES 291. GES Field Trips. 1 Unit.

Field trips for teaching and research purposes. Trips average 5-10 days. Prerequisite: consent of instructor.

GES 292. Directed Reading with Geological and Environmental Sciences Faculty. 1-10 Unit.

May be repeated for credit.

GES 299. Field Research. 2-4 Units.

Two-three week field research projects. Written report required. May be repeated three times.

GES 310. Climate Change, Climate Variability, and Landscape Development. 1 Unit.

The impact of long-term climate change on erosional processes and the evolution of Cenozoic landscapes. Climate data that highlight recurring climate variability on inter-annual to decadal timescales. The behavior of climate on multi-decadal to tectonic timescales over which significant changes in topography take place. The effects of climate change and variability on landscape development, sedimentary environments, and the deposits of these events. May be repeated for credit.

GES 311. Interpretation of Tectonically Active Landscapes. 3 Units.

Focuses on interpreting various topographic attributes in terms of horizontal and vertical tectonic motions. Topics include identification, mapping, and dating of geomorphic markers, deducing tectonic motions from spatial changes in landscape steepness, understanding processes that give rise to different landscape elements, interrogating the role of climate and lithology in producing these landscape elements, and understanding relationships between tectonic motions, surface topography, and the spatial distribution of erosion. Consists of two one hour lectures per week and one laboratory section that help students gain proficiency in Quaternary mapping and interpretation of topographic metrics.

GES 312. Analysis of Landforms. 3 Units.

Quantitative methods to analyze digital topography and to interpret rates of tectonic and geomorphic processes from topographic metrics. Topics include analysis of digital topography using local and neighborhood-based methods, spectral methods, and wavelet methods. Course consists of two one hour lectures per week and one laboratory section that will help students gain proficiency in calculating topographic metrics using ArcGIS and Matlab.

GES 313. Modeling of Landforms. 3 Units.

Geomorphic-transport-rule-based, as well as mass- and momentum-conservation based models to understand the evolution of Earthquakes; topography. Topics include formulation of land-sculpting processes as geomorphic transport rules, coupling this mass-conservation approach with mechanical models of crustal deformation, and analysis of landscape forms in terms of events for which mass and momentum of fluid and sediment can be conserved. Both analytical, as well as numerical (finite-volume) treatments of particular problems in tectonic geomorphology will be covered. The specific problems addressed as part of the course will be tailored to those currently investigated by class participants.

GES 315. Literature of Structural Geology. 1 Unit.

Classic studies and current journal articles. May be repeated for credit.

GES 325. The Evolution of Body Size. 2 Units.

Preference to graduate students and upper-division undergraduates in GES and Biology. The influence of organism size on evolutionary and ecological patterns and processes. Focus is on integration of theoretical principles, observations of living organisms, and data from the fossil record. What are the physiological and ecological correlates of body size? Is there an optimum size? Do organisms tend to evolve to larger size? Does productivity control the size distribution of consumers? Does size affect the likelihood of extinction or speciation? How does size scale from the genome to the phenotype? How is metabolic rate involved in evolution of body size? What is the influence of geographic area on maximum body size?.

Same as: BIO 325

GES 328. Seminar in Paleobiology. 1 Unit.

For graduate students. Current research topics including paleobotany, vertebrate and invertebrate evolution, paleoecology, and major events in the history of life on Earth.

GES 336. Stanford Alpine Project Seminar. 1 Unit.

Seminar on the geology of Italy. Weekly student presentations on continental collision tectonics, sedimentology, petrology, geomorphology, climate, culture, and other topics of interest. Students create a guidebook of geologic stops in advance of field trip. May be repeated for credit.

GES 340. Seminar on the Earth's Interior. 1 Unit.

Seminar to review and discuss current research in mineral physics, seismology, geochemistry and geodynamics on understanding the distribution, form, and role of volatiles in Earth's mantle.

GES 355. Advanced Stratigraphy Seminar and Field Course. 1-3 Unit.

Student-led presentations; poster-sized display on assigned topic; field trip.

GES 373. METAMORPHIC PETROLOGY. 3 Units.

Metamorphic petrology is concerned with the range of solid-state recrystallization and chemical mass transfer processes under physical conditions ranging from those prevalent at the Earth's surface to crustal melting. This course explores the phenomenology of these processes from mineralogic, textural, structural, geochemical, and geodynamic perspectives. The focus is on subduction, arc magmatic, rift magmatic and regional tectonic (collisional and extensional) settings. Important concepts and methods in phase equilibria, thermobarometry, geochronology, and fabric analysis are explored.

GES 373L. Metamorphic Petrology Laboratory. 1 Unit.

Teaches petrographic methods for characterizing recrystallization of common clastic and chemically precipitated sedimentary, mafic and felsic igneous, and ultramafic mantle rocks. Features suites from contact and regional metamorphic settings including arc magmatic, subduction, convergent, and extensional metamorphic settings.

GES 381. Igneous Petrology and Petrogenesis Seminar. 1-2 Unit.

Topics vary by quarter. May be repeated for credit.

GES 384. Volcanology Seminar. 1-2 Unit.

Specialized and advanced topics vary by offering. May be repeated for credit.

GES 385. Practical Experience in the Geosciences. 1 Unit.

On-the-job training in the geosciences. May include summer internship; emphasizes training in applied aspects of the geosciences, and technical, organizational, and communication dimensions. Meets USCIS requirements for F-1 curricular practical training.nn (Staff).

GES 399. Advanced Projects. 1-10 Unit.

Graduate research projects that lead to reports, papers, or other products during the quarter taken. On registration, students designate faculty member and agreed-upon units.

GES 400. Graduate Research. 1-15 Unit.

Faculty supervision. On registration, students designate faculty member and agreed-upon units.

GES 801. TGR Project. 0 Units.

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GES 802. TGR Dissertation. 0 Units.

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Geophysics Courses

GEOPHYS 20N. Predicting Volcanic Eruptions. 3 Units.

Preference to sophomores. The physics and chemistry of volcanic processes and modern methods of volcano monitoring. Volcanoes as manifestations of the Earth's internal energy and hazards to society. How earth scientists better forecast eruptive activity by monitoring seismic activity, bulging of the ground surface, and the discharge of volcanic gases, and by studying deposits from past eruptions. Focus is on the interface between scientists and policy makers and the challenges of decision making with incomplete information. Field trip to Mt. St. Helens, site of the 1980 eruption.

GEOPHYS 50N. Planetary Habitability, World View, and Sustainability. 3 Units.

Sustainability lessons from the geological past Life on Earth has partially perished in sudden mass extinctions several time over the Earth's history. Threats include actions of our own volition, including fossil fuel burning as well as natural events, including the impact of large asteroids. The end Permian 250 million years ago and end Paleocene 55 million years ago extinctions involved natural burning of fossil fuels. The 65 million year ago end Cretaceous extinction involved the impact of and asteroid and possibly fossil fuel burning. Related sustainability topics in the popular press will be discussed as they arise. Student pairs lead discussions on topics on how humanity might avert these catastrophes. Offered occasionally.

GEOPHYS 60N. Man versus Nature: Coping with Disasters Using Space Technology. 4 Units.

Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. GER:DB-EngrAppSci.

Same as: EE 60N

GEOPHYS 80. The Energy-Water Nexus. 3 Units.

Energy, water, and food are our most vital resources constituting a tightly intertwined network: energy production requires water, transporting and treating water needs energy, producing food requires both energy and water. The course is an introduction to learn specifically about the links between energy and water. Students will look first at the use of water for energy production, then at the role of energy in water projects, and finally at the challenge in figuring out how to keep this relationship as sustainable as possible. Students will explore case examples and are encouraged to contribute examples of concerns for discussion as well as suggest a portfolio of sustainable energy options.

Same as: EARTHYSYS 140

GEOPHYS 90. Earthquakes and Volcanoes. 3 Units.

Is the "Big One" overdue in California? What kind of damage would that cause? What can we do to reduce the impact of such hazards in urban environments? Does "fracking" cause earthquakes and are we at risk? Is the United States vulnerable to a giant tsunami? The geologic record contains evidence of volcanic super eruptions throughout Earth's history. What causes these gigantic explosive eruptions, and can they be predicted in the future? This course will address these and related issues. For non-majors and potential Earth scientists. No prerequisites. More information at https://pangea.stanford.edu/research/CDFM/CourseDescriptions/GP_113_announcement.pdf.
Same as: EARTHYSYS 113

GEOPHYS 100. Directed Reading. 1-2 Unit.
(Staff).**GEOPHYS 104. The Water Course. 3 Units.**

The pathway that water takes from rainfall to the tap using student home towns as an example. How the geological environment controls the quantity and quality of water; taste tests of water from around the world. Current U.S. and world water supply issues.
Same as: EARTHYSYS 104

GEOPHYS 110. Earth on the Edge: Introduction to Geophysics. 3 Units.

Introduction to the foundations of contemporary geophysics. Topics drawn from four broad themes in: whole Earth geodynamics, geohazards, natural resources, and environment/sustainability. In each case the focus is on how the interpretation of a variety of geophysical measurements (e.g., gravity, seismology, heat flow, magnetism, electromagnetics, and geodesy) can be used to provide fundamental insight into the behavior of the Earth's complex geosystems. Prerequisite: CME 100 or MA TH 51, or co-registration in either.

GEOPHYS 112. Exploring Geosciences with MATLAB. 1-3 Unit.

How to use MATLAB as a tool for research and technical computing, including 2-D and 3-D visualization features, numerical capabilities, and toolboxes. Practical skills in areas such as data analysis, regressions, optimization, spectral analysis, differential equations, image analysis, computational statistics, and Monte Carlo simulations. Emphasis is on scientific and engineering applications. Offered every year, autumn quarter.

GEOPHYS 118. Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions. 3 Units.

Integrating the science of natural hazards, methods for quantitatively estimating the risks that these hazards pose to populations and property, engineering solutions that might best ameliorate these risks and increase resilience to future events, and policy and economic decision-making studies that may increase long-term resilience to future events. Panel discussions by outside experts exploring the science, engineering, policy, and economics that underly the hazards, risks, and strategies for increasing resilience. Group assignments to evaluate the way in which natural hazards, and human population and developing interact in megacities to produce risk, and what strategies might be adopted in each area to reduce risks posted by the specific hazards faced by these urban areas.

Same as: EESS 118, EESS 218, GEOPHYS 218, GES 118, GES 218

GEOPHYS 120. Ice, Water, Fire. 3-5 Units.

Introductory application of continuum mechanics to ice sheets and glaciers, water waves and tsunamis, and volcanoes. Emphasis on physical processes and mathematical description using balance of mass and momentum, combined with constitutive equations for fluids and solids. Designed for undergraduates with no prior geophysics background; also appropriate for beginning graduate students. Prerequisites: CME 100 or MATH 52 and PHYSICS 41 (or equivalent). Offered every year, winter quarter.
Same as: GEOPHYS 220

GEOPHYS 130. Introductory Seismology. 3 Units.

Introduction to seismology including: elasticity and the wave equation, P, S, and surface waves, dispersion, ray theory, reflection and transmission of seismic waves, seismic imaging, large-scale Earth structure, earthquake location, earthquake statistics and forecasting, magnitude scales, seismic source theory. Offered every year, Autumn quarter. (Beroza, G).

GEOPHYS 141. Remote Sensing of the Oceans. 3-4 Units.

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

Same as: EARTHYSYS 141, EARTHYSYS 241, EESS 141, EESS 241

GEOPHYS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: EARTHYSYS 146A, EARTHYSYS 246A, EESS 146A, EESS 246A, GEOPHYS 246A

GEOPHYS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A or EESS 246A, or CEE 164 or CEE 262D, or consent of instructor.

Same as: EARTHYSYS 146B, EARTHYSYS 246B, EESS 146B, EESS 246B, GEOPHYS 246B

GEOPHYS 150. Geodynamics: Our Dynamic Earth. 3 Units.

In this course we cover the dynamic forces acting upon the Earth. We will investigate how geophysical forces effect the bending of tectonic plates, the flow of heat, sea level topography, the breaking point of rocks, porous flow, and how faults store and release energy. Math 52 or CME 102, GP 107 or permission from instructor. Offered every year, Spring quarter.

GEOPHYS 162. Laboratory Methods in Geophysics. 3-4 Units.

Lab. Types of equipment used in experimental rock physics. Principles and measurements of geophysical properties such as porosity, permeability, acoustic wave velocity, and resistivity through lectures and laboratory experiments. Training in analytical project writing skills and understanding errors for assessing accuracy and variability of measured data. Students may investigate a scientific problem to support their own research. Prerequisites: Physics 45 (Light and Heat); and CME 100 (Vector Calculus).

Same as: GEOPHYS 259

GEOPHYS 170. Global Tectonics. 3 Units.

The architecture of the Earth's crust; regional assembling of structural or deformational features and their relationship, origin and evolution. The plate-tectonic cycle: rifting, passive margins, sea-floor spreading, subduction zones, and collisions. Case studies.

GEOPHYS 171. Tectonics Field Trip. 1-3 Unit.

Long weekend field trip to examine large-scale features in the crust. Destinations may include the San Andreas fault, Mendocino Triple Junction, Sierra Nevada, and western Basin and Range province.

GEOPHYS 181. Fluids and Flow in the Earth: Computational Methods. 3 Units.

Interdisciplinary problems involving the state and movement of fluids in crustal systems, and computational methods to model these processes. Examples of processes include: nonlinear, time-dependent flow in porous rocks; coupling in porous rocks between fluid flow, stress, deformation, and heat and chemical transport; percolation of partial melt; diagenetic processes; pressure solution and the formation of stylolites; and transient pore pressure in fault zones. MATLAB, Lattice-Boltzmann, and COMSOL Multiphysics. Term project. No experience with COMSOL Multiphysics required. Offered every other year, winter quarter.
Same as: GEOPHYS 200

GEOPHYS 182. Reflection Seismology. 3 Units.

The principles of seismic reflection profiling, focusing on methods of seismic data acquisition and seismic data processing for hydrocarbon exploration.
Same as: GEOPHYS 222

GEOPHYS 183. Reflection Seismology Interpretation. 1-4 Unit.

The structural and stratigraphic interpretation of seismic reflection data, emphasizing hydrocarbon traps in two and three dimensions on industry data, including workstation-based interpretation. Lectures only, 1 unit.
Prerequisite: 222, or consent of instructor.
Same as: GEOPHYS 223, GES 223

GEOPHYS 184. Journey to the Center of the Earth. 3 Units.

The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter. Next offering Winter 2013-14.
Same as: GEOPHYS 274, GES 107, GES 207

GEOPHYS 185. Rock Physics for Reservoir Characterization. 3 Units.

How to integrate well log and laboratory data to determine and theoretically generalize rock physics transforms between sediment wave properties (acoustic and elastic impedance), bulk properties (porosity, lithology, texture, permeability), and pore fluid conditions (pore fluid and pore pressure). These transforms are used in seismic interpretation for reservoir properties, and seismic forward modeling in what-if scenarios. Offered every other year, spring quarter.
Same as: GEOPHYS 260

GEOPHYS 186. Tectonophysics & Global Tectonics. 3 Units.

The physics of faulting and plate tectonics. Topics: plate driving forces, lithospheric rheology, crustal faulting, and the state of stress in the lithosphere. Exercises: lithospheric temperature and strength profiles, calculation of seismic strain from summation of earthquake moment tensors, slip on faults in 3D, and stress triggering and inversion of stress from earthquake focal mechanisms. Offered every other year, winter quarter. This course is offered in 2014-15 instead of Geophys 170/220.
Same as: GEOPHYS 290

GEOPHYS 187. Environmental Soundings Image Estimation. 3 Units.

Imaging principles exemplified by means of imaging geophysical data of various uncomplicated types (bathymetry, altimetry, velocity, reflectivity). Adjoints, back projection, conjugate-gradient inversion, preconditioning, multidimensional autoregression and spectral factorization, the helical coordinate, and object-based programming. Common recurring issues such as limited aperture, missing data, signal/noise segregation, and nonstationary spectra. See <http://sep.stanford.edu/sep/prof/>.
Same as: GEOPHYS 211

GEOPHYS 190. Near-Surface Geophysics. 3 Units.

Introduction to the integration of geophysical field measurements and laboratory measurements for imaging and characterizing the top 100 meters of Earth. Examples will focus on applications related to water resource management. The link between the measured geophysical properties of rocks, soils, and sediments, and their material properties. Forward modeling and inversion of geophysical data sets. Each week includes two hours of lectures; plus one two-hour lab that involves acquisition of field or lab data, or computer modeling/analysis of data. Pre-requisite: CME 100 or Math 51, or co-registration in either.

GEOPHYS 196. Undergraduate Research in Geophysics. 1-10 Unit.

Field-, lab-, or computer-based. Faculty supervision. Written reports.

GEOPHYS 197. Senior Thesis in Geophysics. 3-5 Units.

For seniors writing a thesis based on Geophysics research in 196 or as a summer research fellow. Seniors defend the results of their research at a public oral presentation.

GEOPHYS 198. Honors Program. 1-3 Unit.

Experimental, observational, or theoretical honors project and thesis in geophysics under supervision of a faculty member. Students who elect to do an honors thesis should begin planning it no later than Winter Quarter of the junior year. Prerequisites: department approval. Seniors defend the results of their research at a public oral presentation.

GEOPHYS 199. Senior Seminar: Issues in Earth Sciences. 3 Units.

Focus is on written and oral communication in a topical context. Topics from current frontiers in earth science research and issues of concern to the public. Readings, oral presentations, written work, and peer review.
Same as: GES 150

GEOPHYS 200. Fluids and Flow in the Earth: Computational Methods. 3 Units.

Interdisciplinary problems involving the state and movement of fluids in crustal systems, and computational methods to model these processes. Examples of processes include: nonlinear, time-dependent flow in porous rocks; coupling in porous rocks between fluid flow, stress, deformation, and heat and chemical transport; percolation of partial melt; diagenetic processes; pressure solution and the formation of stylolites; and transient pore pressure in fault zones. MATLAB, Lattice-Boltzmann, and COMSOL Multiphysics. Term project. No experience with COMSOL Multiphysics required. Offered every other year, winter quarter.
Same as: GEOPHYS 181

GEOPHYS 201. Frontiers of Geophysical Research at Stanford: Faculty Lectures. 1 Unit.

Required for new students entering the department. Second-year and other graduate students may attend either for credit or as auditors. Department faculty and senior research staff introduce the frontiers of research problems and methods being employed or developed in the department and unique to department faculty and students: what the current research is, why the research is important, what methodologies and technologies are being used, and what the potential impact of the results might be. Offered every year, autumn quarter.

GEOPHYS 202. Reservoir Geomechanics. 3 Units.

Basic principles of rock mechanics and the state of stress and pore pressure in sedimentary basins related to exploitation of hydrocarbon and geothermal reservoirs. Mechanisms of hydrocarbon migration, exploitation of fractured reservoirs, reservoir compaction and subsidence, hydraulic fracturing, utilization of directional and horizontal drilling to optimize well stability. Course will have an online component in 2014-2015. Given alternate years.

GEOPHYS 204. Spectral Finite Element Method (SPECFEM) Seismograms. 3 Units.

This is a short course intended for graduate students, but senior level undergraduate students are welcome. The course will cover spectral finite element methods for generating synthetic seismograms. The course will emphasize application over theory, such that students will be able to generate synthetic seismograms by the end of the course. We will employ the SPECFEM code suite on the Center for Computational Earth and Environmental Science (CEES) cluster to generate synthetic seismograms. Bring your laptop to class! Pre-requisite: A working knowledge of differential equations, matrix algebra, unix/linux, and earthquake seismology.

GEOPHYS 205. Effective Scientific Presentation and Public Speaking. 2 Units.

The ability to present your work in a compelling, concise, and engaging manner will enhance your professional career. This course breaks down presentations into their key elements: the opening, body of the talk, closing, slide and poster graphics, Q&A, pacing, pauses, and voice modulation. We use clips from archived talks, slide sets and posters to illustrate the good, the bad, and the ugly. Each participant will use their upcoming conference talk or poster (e.g., AGU, SEG), or upcoming job talk or funding pitch, as their class project. The course will be 40% group meetings and 60% individual coaching. Everyone will come away a more skilled and confident speaker than they were before. Instructor: Ross S. Stein (USGS) The course syllabus is the third publication in <http://profile.usgs.gov/rstein>.

GEOPHYS 206. FLUID DYNAMICS OF THE SOLID EA. 3 Units.

Introduction to fluid dynamical processes in the interior and on the surface of the Earth. The main focus of this course are viscous flow systems with different rheologies. Topics include solid-mantle convection, lava flows, creep in ice sheets, flow instabilities in solid-fluid mixtures and basic principles of fluid percolation through porous media.

GEOPHYS 210. Basic Earth Imaging. 2-3 Units.

Echo seismogram recording geometry, head waves, moveout, velocity estimation, making images of complex shaped reflectors, migration by Fourier and integral methods. Anti-aliasing. Dip moveout. Computer labs. See <http://sep.stanford.edu/sep/prof/>. Offered every year, autumn quarter.

GEOPHYS 211. Environmental Soundings Image Estimation. 3 Units.

Imaging principles exemplified by means of imaging geophysical data of various uncomplicated types (bathymetry, altimetry, velocity, reflectivity). Adjoint, back projection, conjugate-gradient inversion, preconditioning, multidimensional autoregression and spectral factorization, the helical coordinate, and object-based programming. Common recurring issues such as limited aperture, missing data, signal/noise segregation, and nonstationary spectra. See <http://sep.stanford.edu/sep/prof/>. Same as: GEOPHYS 187

GEOPHYS 218. Understanding Natural Hazards, Quantifying Risk, Increasing Resilience in Highly Urbanized Regions. 3 Units.

Integrating the science of natural hazards, methods for quantitatively estimating the risks that these hazards pose to populations and property, engineering solutions that might best ameliorate these risks and increase resilience to future events, and policy and economic decision-making studies that may increase long-term resilience to future events. Panel discussions by outside experts exploring the science, engineering, policy, and economics that underly the hazards, risks, and strategies for increasing resilience. Group assignments to evaluate the way in which natural hazards, and human population and developing interact in megacities to produce risk, and what strategies might be adopted in each area to reduce risks posed by the specific hazards faced by these urban areas. Same as: EESS 118, EESS 218, GEOPHYS 118, GES 118, GES 218

GEOPHYS 220. Ice, Water, Fire. 3-5 Units.

Introductory application of continuum mechanics to ice sheets and glaciers, water waves and tsunamis, and volcanoes. Emphasis on physical processes and mathematical description using balance of mass and momentum, combined with constitutive equations for fluids and solids. Designed for undergraduates with no prior geophysics background; also appropriate for beginning graduate students. Prerequisites: CME 100 or MATH 52 and PHYSICS 41 (or equivalent). Offered every year, winter quarter. Same as: GEOPHYS 120

GEOPHYS 222. Reflection Seismology. 3 Units.

The principles of seismic reflection profiling, focusing on methods of seismic data acquisition and seismic data processing for hydrocarbon exploration.

Same as: GEOPHYS 182

GEOPHYS 223. Reflection Seismology Interpretation. 1-4 Unit.

The structural and stratigraphic interpretation of seismic reflection data, emphasizing hydrocarbon traps in two and three dimensions on industry data, including workstation-based interpretation. Lectures only, 1 unit. Prerequisite: 222, or consent of instructor.

Same as: GEOPHYS 183, GES 223

GEOPHYS 224. Seismic Reflection Processing. 2-3 Units.

Workshop in computer processing of 2D and 3D seismic reflection data. Students individually process a seismic reflection profile (of their own choice or instructor-provided) from field recordings to migrated sections and subsurface images, using interactive software (OpenCPS from OpenGeophysical.com). Prerequisite: GEOPHYS 222 or consent of instructor.

GEOPHYS 229. Earthquake Rupture Dynamics. 3 Units.

Physics of earthquakes, including nucleation, propagation, and arrest; slip-weakening and rate-and-state friction laws; thermal pressurization and dynamic weakening mechanisms; off-fault plasticity; dynamic fracture mechanics; earthquake energy balance. Problem sets involve numerical simulations on CEES cluster. Prerequisites: GEOPHYS 287. Offered occasionally.

GEOPHYS 235. WAVES AND FIELDS IN GEOPHYSICS. 3 Units.

Basic topics and approaches (theory and numerical simulations) on acoustic, electromagnetic, and elastic waves and fields for geophysical applications: dispersion, phase and group velocities, attenuation, reflection and transmission at planar interfaces, high frequency and low frequency approximations, heterogeneous media. Prerequisites: UG level class on waves or consent of instructor.

GEOPHYS 240. Borehole Seismic Modeling and Imaging. 3 Units.

Borehole seismic imaging for applications to subsurface reservoir characterization and monitoring. Topics include data acquisition, data processing, imaging and inversion. Analysis and processing of synthetic and field datasets. Prerequisites: Waves class equivalent to GP 230, Matlab or other computer programming.

GEOPHYS 241A. Seismic Reservoir Characterization. 3-4 Units.

(Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112.

Same as: ENERGY 141, ENERGY 241

GEOPHYS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: EARTHSYS 146A, EARTHSYS 246A, EESS 146A, EESS 246A, GEOPHYS 146A

GEOPHYS 246B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A or EESS 246A, or CEE 164 or CEE 262D, or consent of instructor.

Same as: EARTHSYS 146B, EARTHSYS 246B, EESS 146B, EESS 246B, GEOPHYS 146B

GEOPHYS 251. Structural Geology and Rock Mechanics. 4 Units.

Quantitative field and laboratory data integrated with solutions to boundary value problems of continuum mechanics to understand tectonic processes in Earth's crust that lead to the development of geological structures including folds, faults, fractures and fabrics. Topics include: techniques and tools for structural mapping; differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; traction and stress analysis, conservation of mass and momentum in a deformable continuum; linear elastic deformation and elastic properties; brittle deformation including fracture and faulting; model development and methodology. Data sets analyzed using MATLAB. Prerequisites: GES 1, MATH 53, MATLAB or equivalent.

Same as: CEE 297R, GES 215

GEOPHYS 255. Report on Energy Industry Training. 1-3 Unit.

On-the-job-training for master's and doctoral degree students under the guidance of on-site supervisors. Students submit a report detailing work activities, problems, assignment, and key results. May be repeated for credit. Prerequisite: written consent of adviser.

GEOPHYS 257. Introduction to Computational Earth Sciences. 2-4 Units.

Techniques for mapping numerically intensive algorithms to modern high performance computers such as the Center for Computational Earth and Environmental Science's (CEES). Topics include computer architecture performance analysis, and parallel programming. Topics covered include pthreads, OpenMP, MPI, Cilk++, and CUDA. Exercises using SMP and cluster computers. May be repeated for credit. Offered every other year, winter quarter.

GEOPHYS 258. Applied Optimization Laboratory (Geophys 258). 3-4 Units.

Application of optimization and estimation methods to the analysis and modeling of large observational data sets. Laboratory exercises using inverse theory and applied linear algebra to solve problems of indirect and noisy measurements. Emphasis on practical solution of scientific and engineering problems, especially those requiring large amounts of data, on digital computers using scientific languages. Also addresses advantages of large-scale computing, including hardware architectures, input/output and data bus bandwidth, programming efficiency, parallel programming techniques. Student projects involve analyzing real data by implementing observational systems such as tomography for medical and Earth observation uses, radar and matched filtering, multispectral/multitemporal studies, or migration processing. Prerequisites: Programming with high level language. Recommended: EE261, EE263, EE178, ME300 or equivalent.

Same as: EE 257

GEOPHYS 259. Laboratory Methods in Geophysics. 3-4 Units.

Lab. Types of equipment used in experimental rock physics. Principles and measurements of geophysical properties such as porosity, permeability, acoustic wave velocity, and resistivity through lectures and laboratory experiments. Training in analytical project writing skills and understanding errors for assessing accuracy and variability of measured data. Students may investigate a scientific problem to support their own research. Prerequisites: Physics 45 (Light and Heat); and CME 100 (Vector Calculus).

Same as: GEOPHYS 162

GEOPHYS 260. Rock Physics for Reservoir Characterization. 3 Units.

How to integrate well log and laboratory data to determine and theoretically generalize rock physics transforms between sediment wave properties (acoustic and elastic impedance), bulk properties (porosity, lithology, texture, permeability), and pore fluid conditions (pore fluid and pore pressure). These transforms are used in seismic interpretation for reservoir properties, and seismic forward modeling in what-if scenarios. Offered every other year, spring quarter.

Same as: GEOPHYS 185

GEOPHYS 262. Rock Physics. 3 Units.

Properties of and processes in rocks as related to geophysical exploration, crustal studies, and tectonic processes. Emphasis is on wave velocities and attenuation, hydraulic permeability, and electrical resistivity in rocks. Application to in situ problems, using lab data and theoretical results. Offered every year, autumn quarter.

GEOPHYS 265. Imaging Radar and Applications. 3 Units.

Radar remote sensing, radar image characteristics, viewing geometry, range coding, synthetic aperture processing, correlation, range migration, range/Doppler algorithms, wave domain algorithms, polar algorithm, polarimetric processing, interferometric measurements. Applications: surface deformation, polarimetry and target discrimination, topographic mapping surface displacements, velocities of ice fields. Prerequisites: EE261. Recommended: EE254, EE278, EE279.

Same as: EE 355

GEOPHYS 270. Electromagnetic Properties of Geological Materials. 2-3 Units.

Laboratory observations and theoretical modeling of the electromagnetic properties and nuclear magnetic resonance response of geological material. Relationships between these properties and water-saturated materials properties such as composition, water content, surface area, and permeability.

GEOPHYS 274. Journey to the Center of the Earth. 3 Units.

The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter. Next offering Winter 2013-14.

Same as: GEOPHYS 184, GES 107, GES 207

GEOPHYS 280. 3-D Seismic Imaging. 2-3 Units.

The principles of imaging complex structures in the Earth subsurface using 3-D reflection seismology. Emphasis is on processing methodologies and algorithms, with examples of applications to field data. Topics: acquisition geometrics of land and marine 3-D seismic surveys, time vs. depth imaging, migration by Kirchhoff methods and by wave-equation methods, migration velocity analysis, velocity model building, imaging irregularly sampled and aliased data. Computational labs involve some programming. Lab for 3 units. Offered every year, Spring quarter.

GEOPHYS 281. Geophysical Inverse Problems. 3 Units.

Concepts of inverse theory, with application to geophysics. Inverses with discrete and continuous models, generalized matrix inverses, resolving kernels, regularization, use of prior information, singular value decomposition, nonlinear inverse problems, back-projection techniques, and linear programming. Application to seismic tomography, earthquake location, migration, and fault-slip estimation. Prerequisite: MATH 51.

GEOPHYS 284. Hydrogeophysics. 3 Units.

The use of geophysical methods for imaging and characterizing the top 100 meters of Earth for hydrogeologic applications. Includes material properties, forward modeling, data acquisition, inversion, and integration with other forms of measurement. Each week includes three hours of lectures; plus one three-hour lab that involves acquisition of data at campus or nearby sites, or computer modeling of data. Offered occasionally.

GEOPHYS 286. Global Seismology. 3 Units.

This course investigates how waves propagate through the whole Earth. This course examines the questions "How do body waves and surface waves behave within the Earth?" and "What does that tell us about the Earth?" The course delves into both theory and how we apply that theory to understand seismic observations. Requirements: Math 52 or CME 102, GP130 or permission from instructor.

GEOPHYS 287. Earthquake Seismology. 3-5 Units.

Seismic wave propagation (body waves and surface waves, reflection/transmission), Green's functions, seismic moment tensors and equivalent forces, representation theorem, finite-source effects. Prerequisites: GEOPHYS 130 or equivalent. Offered every other year, spring quarter.

GEOPHYS 288A. Crustal Deformation. 3-5 Units.

Earthquake and volcanic deformation, emphasizing analytical models that can be compared to data from GPS, InSAR, and strain meters. Deformation, stress, and conservation laws. Dislocation models of strike slip and dip slip faults, in 2 and 3 dimensions. Crack models, including boundary element methods. Dislocations in layered and elastically heterogeneous earth models. Models of volcano deformation, including sills, dikes, and magma chambers. Offered every other year, autumn quarter.

GEOPHYS 288B. Crustal Deformation. 3-5 Units.

Earthquake and volcanic deformation, emphasizing analytical models that can be compared to data from GPS, InSAR, and strain meters. Viscoelasticity, post-seismic rebound, and viscoelastic magma chambers. Effects of surface topography and earth curvature on surface deformation. Gravity changes induced by deformation and elastogravitational coupling. Poro-elasticity, coupled fluid flow and deformation. Earthquake nucleation and rate-state friction. Models of earthquake cycle at plate boundaries.

GEOPHYS 289. Global Positioning System in Earth Sciences. 3-5 Units.

The basics of GPS, emphasizing monitoring crustal deformation with a precision of millimeters over baselines tens to thousands of kilometers long. Applications: mapping with GIS systems, airborne gravity and magnetic surveys, marine seismic and geophysical studies, mapping atmospheric temperature and water content, measuring contemporary plate motions, and deformation associated with active faulting and volcanism.

GEOPHYS 290. Tectonophysics & Global Tectonics. 3 Units.

The physics of faulting and plate tectonics. Topics: plate driving forces, lithospheric rheology, crustal faulting, and the state of stress in the lithosphere. Exercises: lithospheric temperature and strength profiles, calculation of seismic strain from summation of earthquake moment tensors, slip on faults in 3D, and stress triggering and inversion of stress from earthquake focal mechanisms. Offered every other year, winter quarter. This course is offered in 2014-15 instead of Geophys 170/220. Same as: GEOPHYS 186

GEOPHYS 385A. Reflection Seismology. 1-2 Unit.

Research in reflection seismology and petroleum prospecting. May be repeated for credit.

GEOPHYS 385B. Environmental Geophysics. 1-2 Unit.

Research on the use of geophysical methods for near-surface environmental problems. May be repeated for credit.

GEOPHYS 385D. Theoretical Geophysics. 1 Unit.

Research on physics and mechanics of earthquakes, volcanoes, ice sheets, and glaciers. Emphasis is on developing theoretical understanding of processes governing natural phenomena.

GEOPHYS 385E. Tectonics. 1-2 Unit.

Research on the origin, major structures, and tectonic processes of the Earth's crust. Emphasis is on use of deep seismic reflection and refraction data. May be repeated for credit.

GEOPHYS 385J. Global Seismic Techniques, Theory, and Application. 1-2 Unit.

Topics chosen from surface wave dispersion measurement, 1D inversion techniques, regional tomographic inversion, receiver functions, ray theory in spherical geometry, seismic attenuation, seismic anisotropy, seismic focusing, reflected phases, stacking, and interpretations of seismic results in light of other geophysical constraints. May be repeated for credit.

GEOPHYS 385K. Crustal Mechanics. 1-2 Unit.

Research in areas of petrophysics, seismology, in situ stress, and subjects related to characterization of the physical properties of rock in situ. May be repeated for credit.

GEOPHYS 385L. Earthquake Seismology, Deformation, and Stress. 1 Unit.

Research on seismic source processes, crustal stress, and deformation associated with faulting and volcanism. May be repeated for credit.

GEOPHYS 385N. Experimental Rock Physics. 1-2 Unit.

Research on the use of laboratory geophysical methods for the characterization of the physical properties of rocks and their response to earth stresses, temperature, and rock-fluid interactions. May be repeated for credit.

GEOPHYS 385S. Wave Physics. 1-2 Unit.

Theory, numerical simulation, and experiments on seismic and electromagnetic waves in complex porous media. Applications from Earth imaging and in situ characterization of Earth properties, including subsurface monitoring. Presentations by faculty, research staff, students, and visitors. May be repeated for credit.

GEOPHYS 385V. Poroelasticity. 1-2 Unit.

Research on the mechanical properties of porous rocks: dynamic problems of seismic velocity, dispersion, and attenuation; and quasi-static problems of faulting, fluid transport, crustal deformation, and loss of porosity. Participants define, investigate, and present an original problem of their own. May be repeated for credit.

GEOPHYS 385W. GEOPHYSICAL MULTI-PHASE FLOWS. 1-2 Unit.

Research on the dynamics of multi-phase systems that are fundamental to many geophysical problems such as ice sheets and volcanoes.

GEOPHYS 385Z. Radio Remote Sensing. 1-2 Unit.

Research applications, especially crustal deformation measurements. Recent instrumentation and system advancements. May be repeated for credit.

GEOPHYS 400. Research in Geophysics. 1-15 Unit.**GEOPHYS 801. TGR Project. 0 Units.****GEOPHYS 802. TGR Dissertation. 0 Units.**

German General Courses

German Language Courses

GERLANG 1. First-Year German, First Quarter. 5 Units.

Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken.

GERLANG 2. First-Year German, Second Quarter. 5 Units.

Continuation of GERLANG 1. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken. Prerequisite: Placement Test, GERLANG 1.

GERLANG 3. First-Year German, Third Quarter. 5 Units.

Continuation of GERLANG 2. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken. Fulfills the University language requirement. Prerequisite: Placement Test, GERLANG 2.

GERLANG 5A. Intensive First-Year German, Part A. 5 Units.

Same as GERLANG 1. Accelerated. Written exercises, compositions, conversation practice, and daily work. Only Stanford students restricted to 9 units may register for 205A,B,C.

GERLANG 5B. Intensive First-Year German, Part B. 5 Units.

Same as GERLANG 2. Continuation of 5A. Accelerated. Written exercises, compositions, conversation practice, and daily work. Only Stanford students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

GERLANG 5C. Intensive First-Year German, Part C. 5 Units.

Same as GERLANG 3. Continuation of 5B. Accelerated. Written exercises, compositions, conversation practice, and daily work. Only Stanford students restricted to 9 units may register for 205A,B,C. Prerequisite 2 or 5B. Fulfills the University Foreign Language Requirement.

GERLANG 10. Elementary German for Seniors and Graduate Students. 4 Units.

Intensive. For students who need to acquire reading ability in German for the Ph.D. or for advanced research in their own field. 250 fulfills Ph.D. reading exam.

GERLANG 11P. Individually Programmed Beginning German. 1-5 Unit.

For those who wish to complete fewer than 5 units a quarter, have scheduling conflicts, or prefer to work independently. Self-paced work with text and tapes; instructor available for consultation on a regular basis. 3-unit minimum for beginners. Conversational practice available for additional unit. May be repeated for credit. This course does not fulfill the University language requirement.

GERLANG 20A. Beginning German Conversation. 1 Unit. (AU).**GERLANG 20B. Intermediate German Conversation. 1 Unit. (AU).****GERLANG 20C. Advanced German Conversation. 1 Unit. (AU).****GERLANG 20E. Fun Facts about Europe. 1 Unit. (AU) (Staff).****GERLANG 20J. Central European Brewing. 1 Unit.**

This is a general survey course of the variety of German Beers. The course will have two components: (1) We will meet every other week for a beer tasting session and discussion of the history of German brewing culture. (2) Students will brew their own batch of beer once during the quarter. Beer Tasting will take place alternate Wednesday evenings. Brewing sessions will be hosted on the weekends. All sessions take place at Haus Mitt, 620 Mayfield Ave.

GERLANG 20K. Küche Mitt. 1 Unit. (AU).

Same as: German Cooking Class

GERLANG 20M. Mitt Movie Series. 1 Unit. (AU).**GERLANG 20P. Theme Projects. 1 Unit. (AU).****GERLANG 20R. German Art and Design. 1 Unit.****GERLANG 20T. Teaching German Conversation. 1 Unit. (AU).****GERLANG 21. Intermediate German I. 4 Units.**

Reading short stories, and review of German structure. Discussions in German, short compositions, videos. Prerequisite: Placement Test, GERLANG 3 or consent of instructor.

GERLANG 21S. Intermediate German. 4 Units.

Reading short stories, and review of German structure. Discussions in German, short compositions, videos. Prerequisite: one year of college German; or two years high school German or equivalent, or AP German.

GERLANG 21W. Intermediate German I: German for Business and International Relations. 4 Units.

Equivalent to 21, but focus is on business and the political and economic geography of Germany. CDs and videos. For students planning to do a business internship in a German-speaking country. Prerequisite: placement test, 3.

GERLANG 22. Intermediate German II. 4 Units.

Continuation of GERLANG 21, with greater emphasis on reading and writing skills. Literary texts of major 20th-century writers in historical context. Prerequisite: Placement Test, GERLANG 21.

GERLANG 22W. Intermediate German II: German for Business and International Relations. 4-5 Units.

Equivalent to 22, but continuation of 21W. Recommended for students planning to do a business internship in a German-speaking country. Prerequisite: placement test, 21, 21W.

GERLANG 23. One Hundred German Years. 4 Units.

Hundert deutsche Jahre - Hones German language skills while introducing the history and culture of Germany as experienced by ordinary people over the course of the 20th century. Themes include Germans and money, foreigners, Hitler, the Wall, food, etc. Video series, parallel readings, discussion in German, writing, advanced usage. Prerequisite: Placement Test, GERLANG 22, GERLANG 22W.

GERLANG 23C. Second Year German, Third Quarter. 4-5 Units.

Continuation of GERLANG 22.

GERLANG 99. Language Specials. 1-5 Unit.

Prerequisite: consent of instructor.

GERLANG 105. Advanced Business German. 4 Units.

For students planning to work in a German-speaking country and for preparation of the International Business German exams. Case studies of typical business situations with accompanying videos, listening comprehension exercises, and class simulations. Business correspondence and reports in German. Prerequisite: Placement Test, GERLANG 22.

GERLANG 110. German Newspapers. 3-4 Units.

For intermediate and advanced students. Articles from current newspapers and magazines, reading comprehension strategies with online news updates, and vocabulary. Writing practice if desired. May be repeated once for credit.

GERLANG 111. Television News from Germany. 3-4 Units.

For intermediate and advanced students. Current news reports and features for listening comprehension and vocabulary. Extra listening, speaking, or writing practice for fourth unit.

GERLANG 199. Individual Reading. 1-5 Unit.

Prerequisite: consent of instructor.

GERLANG 205A. Intensive First-Year German for Stanford Grads. 3-5 Units.

Equivalent to GERLANG 5A. For Stanford graduate students only. Stanford graduate students restricted to 9 units; may take 205A, B and C for a total of 9 units.

GERLANG 205B. Intensive First-Year German for Stanford Grads. 3-5 Units.

Equivalent to GERLANG 5B. For Stanford graduate students only. Continuation of 205A. Stanford graduate students restricted to 9 units; may take 205A, B and C for a total of 9 units.

GERLANG 205C. intensive First-Year German, Part C. 3-5 Units.

Equivalent to GERLANG 5C. For Stanford graduate students only. Continuation of 205B. Stanford graduate students restricted to 9 units may take 205A, B and C for a total of 9 units.

GERLANG 210. Elementary German for Graduate Students. 3-4 Units.

Restricted to Stanford graduate students. Prerequisite: consent of instructor.

GERLANG 250. Reading German. 4 Units.

For undergraduates and graduate students with a knowledge of German who want to acquire reading proficiency. Readings from scholarly works and professional journals. Recommended for students who need to pass the Ph.D. reading exam. Fulfills University reading requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year of German, or 10, or equivalent.

GERLANG 395. Graduate Studies in German. 1-5 Unit.

Prerequisite: consent of instructor.

GERLANG 399. Independent Study. 1-5 Unit.

Prerequisite: consent of instructor.

German Literature Courses

German Literature Courses

GERMAN 41N. Inventing Modern Theatre: Georg Büchner and Frank Wedekind. 3 Units.

The German writers Georg Büchner (1813-1837) and Frank Wedekind (1864-1918). Many of the most important theater and film directors of the last century, including Max Reinhardt, G. W. Pabst, Orson Welles, Robert Wilson, and Werner Herzog, have wrestled with their works, as have composers and writers from Alban Berg and Bertolt Brecht through Christa Wolf and Thalia Field. Rock artists as diverse as Tom Waits, Lou Reed, Duncan Sheik, and Metallica have recently rediscovered their urgency. Reading these works in translation and examining artistic creations they inspired. Classroom discussions and written responses; students also rehearse and present in-class performances of excerpts from the plays. The aim of these performances is not to produce polished stagings but to creatively engage with the texts and their interpretive traditions. No previous theatrical experience required.

Same as: TAPS 41N

GERMAN 80N. Modern Conservatives. 3 Units.

How do conservatives respond to the modern world? How do they find a balance between tradition and freedom, or between stability and change? This seminar will examine selections from some conservative and some classically liberal writers that address these questions. At the center of the course are thinkers who left Germany and Austria before the Second World War: Friedrich Hayek, Leo Strauss and Hannah Arendt. We will also look at earlier European writers, such as Edmund Burke and Friedrich Nietzsche, as well as some recent American thinkers. Taught in English.

GERMAN 88. Germany in 5 Words. 3-5 Units.

This course explores German history, culture and politics by tracing five (largely untranslatable) words and exploring the debates they have engendered in Germany over the past 200 years. This course is intended as preparation for students wishing to spend a quarter at the Bing Overseas Studies campus in Berlin, but is open to everyone. Taught in English.

GERMAN 88Q. Gateways to the World: Germany in 5 Words. 3-5 Units.

This course explores German history, culture and politics by tracing five (largely untranslatable) words and exploring the debates they have engendered in Germany over the past 200 years. This course is intended as preparation for students wishing to spend a quarter at the Bing Overseas Studies campus in Berlin, but is open to everyone. Preference to Sophomores. Taught in English.

GERMAN 104. Resistance Writings in Nazi Germany. 3 Units.

This course focuses on documents generated by nonmilitary resistance groups during the period of National Socialism. Letters, essays, diaries, and statements on ethics from the Bonhoeffer and Scholl families form the core of the readings. The resistance novel, *Every Man Dies Alone*, is also included. Texts will be read as historical documents, reflections of German thought, statements of conscience, attempts to maintain normal relationships with others in the face of great risk, as poetic works, and as guides for the development of an ethical life. Taught in English.

GERMAN 105. Going Medieval: Introduction to Freiburg, Germany, and its Surrounding Region. 1 Unit.

This course offers an introduction to materials that are pertinent to the BOSP summer seminar "Going Medieval" offered in summer 2015. It is a required course for participants of the seminar.

Same as: DLCL 105

GERMAN 116. Writing About Germany: New Topics, New Genres. 3-4 Units.

Writing about various topics in German Studies. Topics based on student interests: current politics, economics, European affairs, start-ups in Germany. Intensive focus on writing. Students may write on their experience at Stanford in Berlin or their internship. Fulfills the WIM requirement for German Studies majors.

GERMAN 118N. From Mozart to Metal, Germany in 99 Songs. 3-5 Units.

This course explores 200 years of German history and culture through popular songs -- the good, the bad and the very, very goofy. From songs composed by classical composers, via folksongs and operettas, all the way to punk, hip-hop, techno and heavy metal, this course explores the evolution of German popular culture and history. Prerequisite: 1 year of German.

GERMAN 120N. The Brothers Grimm and Their Fairy Tales. 4 Units.

Historical, biographical, linguistic, and literary look at the Kinder- and Hausmarchen of Jacob and Wilhelm Grimm. Readings from the fairy tales, plus materials in other media such as film and the visual arts. Four short essays, one or two oral reports. Preference to Freshmen; class then opens to all. Fulfills WIM for German majors (must be taken for letter grade.) In German.

GERMAN 120Q. Contemporary Politics in Germany. 3-4 Units.

This course provides an opportunity to engage with issues and actors, politicians and parties in contemporary Germany, while building German language abilities. We will work with current events texts, news reports, speeches and websites. Course goals include building analytic and interpretive capacities of political topics in today's Europe, including the European Union, foreign policy, and environmentalism. Differences between US and German political culture are a central topic. At least one year German language study required.

GERMAN 123. German Culture and Film. 3-5 Units.

This course has two primary goals. First, it is designed to provide students with a visual and linguistic foundation for discussing and writing about German film from the Weimar period to the present. To that end we will review important genres, directors, and technological developments in the history of German film. Second, using film as a lens, we will examine several key moments in German cultural history from the 1920s to the present. Certain themes will reoccur throughout the course, including gender, the city, technology, violence, and social crisis. All materials and class discussion in German. (Meets Writing-in-the-Major requirement).

GERMAN 124. Introduction to German Poetry. 3-5 Units.

Introduction to lyric poetry in German from the 18th century to the present. Readings include poems by Goethe, Holderlin, Brentano, Eichendorff, Heine, Rilke, Trakl, Celan, Brecht. Ways of thinking about and thinking with poetry. Focus on poetic form, voice, figural language, and the interaction of sensory registers. Taught in German, with attention to discussion and writing skills. Prerequisite: Gerlang 1-3 or equivalent.

GERMAN 126. Old Stories, New Media: Great German Tales and their Adaptations. 3-5 Units.

There are some characters that we see again and again: the love-struck artist, the mad genius, and the valiant hero. Where do these tropes come from? How do they evolve through history? This course will survey German history through the eyes of some of its most well-known stories. We will explore how audience, medium, cultural ideals, and historical changes can transform the meaning of a narrative over time. The central aim of this course is to provide students with an analytical framework with which to approach an unfamiliar work of art or literature. The course also aims to improve students' quest; German language proficiency and give students a broad understanding of German intellectual history. Taught in German.

GERMAN 127. Modernity, Memory, Mourning: 20th Century German Short Fiction. 3-5 Units.

Through a sampling of short stories and novellas from 1918 to 1952, this course will explore major historical and cultural questions related to Germany in the early 20th century. Students will develop an understanding of recent German history and of how German writers have chosen to engage with this history in various ways. Themes will include the impact of modernity on the individual, violence and war, fascism and its effect on personal agency, exile and mourning, memory and trauma, and tradition and its breakdown. Authors include Kafka, Mann, Seghers, and Bouml;l. Readings and discussion in German.

GERMAN 128N. Medicine, Modernism, and Mysticism in Thomas Mann's the Magic Mountain. 3 Units.

Published in 1924, *The Magic Mountain* is a novel of education, tracing the intellectual growth of a budding engineer through a maze of intellectual encounters during a seven-year sojourn in a sanatorium set high in the Swiss Alps. It engages with the key themes of modernism: the relativity of time, the impact of psychoanalysis, the power of myth, and an extended dispute between an optimistic belief in progress and a pessimistic vision of human nature. Through its detailed discussion of disease (tuberculosis), this remarkable text connects the study of medicine to the humanities. There will be an exploration of this rich and profound novel both as a document of early twentieth-century Europe and as a commentary on the possibilities of education that are urgent for liberal arts education today. Taught in English.

GERMAN 130N. Nobel Prize Winners in German Literature. 3 Units.

Readings from some of the best German-language authors, including Thomas Mann, Hermann Hesse, Heinrich Boll and Herta Muller. How imaginative literature engages with history, and how great authors address the major questions in politics and philosophy in modern Germany. Taught in German. German language equivalent to high school AP.

GERMAN 131. What is German Literature?. 3-5 Units.

This course covers material from the fairy tales of German romanticism, expressionist poetry and painting, literary responses to Nazi Germany and reflections on a unified Germany. Exploring the shifting relationships between cultural aesthetics, entertainment, historical context, and "what is German", we will cover roughly 250 years of literary and artistic production, social and political upheavals, as well as the lives of numerous authors, both male and female. Taught in German. Prerequisite: One year of German language at Stanford or equivalent.

GERMAN 132. Dynasties, Dictators and Democrats: History and Politics in Germany. 3-5 Units.

Key moments in German history through documents: personal accounts, political speeches and texts, and literary works. The course begins with the Prussian monarchy and proceeds to the crisis years of the French Revolution. Documents from the 1848 revolution and the age of Bismarck and German unification follow. World War I and its impact on Germany, including the rise of Hitler, as well as the aftermath, divided Germany in the Cold War through the fall of the Berlin Wall. Taught in German. Same as: COMPLIT 132A

GERMAN 133. Marx, Nietzsche, Freud. 3-5 Units.

We read and discuss selections from works by the key master thinkers who have exerted a lasting influence by debunking long-cherished beliefs. Do these authors uphold or repudiate Enlightenment notions of rationality, autonomy and progress? How do they assess the achievements of civilization? How do their works illuminate the workings of power in social and political contexts? Readings and discussion in German.

GERMAN 137. Hysteria and Modern Culture. 3-5 Units.

The term "hysteria" has been used for centuries to categorize the mysterious ailments of others. This course will focus on the history of hysteria's representation and production from the late nineteenth century through WWI. Readings will include medical writings (Charcot, Bernheim, Freud), plays (Ibsen, Strindberg, Toller), and feminist theory (Cixous, Cleacute;ment, Diamond). We will also devote some attention to the ongoing influence of the discourse of hysteria on contemporary medical and popular cultures.

Same as: HUMBIO 162H, TAPS 169

GERMAN 140. German Sports Culture and History. 3-5 Units.

The course highlights specificities of sports in Germany and thus provides a unique point of access for understanding German culture in past and present. Concepts of competition and performance will be examined, as well as the relations between sports and politics in different periods of modern German history. Special attention will be given to soccer, but boxing, cycling, gymnastics (Turnen), and other Olympic sports will be studied as well. Materials will include theoretical and literary texts in English and German, media representations of athletic contests. To improve writing skills students will write a weekly essay on various phenomena. Language: German, requirement: one year of college German or equivalent.

GERMAN 150. Masterpieces: Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. Same as: COMPLIT 114, JEWISHST 145

GERMAN 154. Poetic Thinking Across Media. 4 Units.

Even before Novalis claimed that the world must be romanticized, thinkers, writers, and artists wanted to perceive the human and natural world poetically. The pre- and post-romantic poetic modes of thinking they created are the subject of this course. Readings include Ecclesiastes, Zhaozhou Congshen, Montaigne, Nietzsche, Kafka, Benjamin, Arendt, and Sontag. This course will also present poetic thinking in the visual arts--from the expressionism of Ingmar Bergman to the neo-romanticism of Gerhard Richter.

Same as: COMPLIT 154B, COMPLIT 354B, GERMAN 354, JEWISHST 144B

GERMAN 181. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English. Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, FRENCH 181, ITALIAN 181, PHIL 81, SLAVIC 181

GERMAN 182. War and Warfare in Germany. 3 Units.

Survey of Germany at war through historical, theoretical and literary accounts. War in the international system and the role of technology. Religious wars, rationalization of warfare, violence and politics, terrorism. War films, such as All Quiet on the Western Front. Readings by authors such as Clausewitz, Juuml;nger, Remarque, Schmitt, and Arendt. Taught in English.

GERMAN 184. Technology, Innovation, and the History of the Book. 3-5 Units.

An historical perspective on the intellectual and social impact of developments in information technology will be examined. Focusing on the evolution of media from scrolls to codices to printed books we will look at the social, historical, cultural, and economic sources and ramifications of innovation in media and information technology, and explore why such innovation occurs in certain places and within certain social groups and not others. Examples draw from German cultural history, e.g. Gutenberg and the printing press, but also from the broader European history of the book. Students will have the opportunity to work with historical materials from Special Collections. Taught in English.

GERMAN 190. German Capstone: Reading Franz Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. (Meets Writing-in-the-Major requirement).

Same as: COMPLIT 111, COMPLIT 311C, GERMAN 390, JEWISHST 147, JEWISHST 349

GERMAN 191. German Capstone Project. 1 Unit.

Each student participates in a capstone interview and discussion with a panel of the German Studies faculty on topics related to German cultural and literary analysis. In preparation for the interview/discussion, students submit written answers to a set of questions based on several authentic cultural texts in German. The written answers, normally in English, should be well-formed and coherent. Within the interview/discussion, students must demonstrate a further understanding of the topic(s) posed, through cogent argument.

GERMAN 199. Individual Work. 1-12 Unit.

Repeatable for Credit. Instructor Consent Required.

GERMAN 200. The Ballad Tradition. 3-5 Units.

This team-taught cross-disciplinary course traces the history and aesthetics of the ballad in German, English, and Scottish literature, from the 18th century to the early 20th century. No knowledge of German is required, but reading knowledge is a plus.

Same as: COMPLIT 227A, ENGLISH 383A

GERMAN 217. The Poetry of Friedrich Holderlin. 3-5 Units.

A working through of the complex prosodic forms, existential and political concerns, and poetological reflections of both the most past-oriented and most pathbreaking German poet of the late eighteenth and early nineteenth century. A comprehensive introduction that will attempt to develop an innovative view in which Holderlin will appear as one of the founding figures of literary Modernity. Knowledge of German desirable but participation through English translations will be possible.

Same as: COMPLIT 217

GERMAN 218. Central European Literature. 4 Units.

Central Europe is not a clearly defined region so much as an idea debated with particular intensity in the successor states of the Austro-Hungarian monarchy. Part reality part fantasy, "Central Europe" refers to a contested space between East and West, between cosmopolitanism and provincial narrowness, a space whose diversity has fostered cultural creativity, political conflict and utopian fantasy. Our survey will focus on fiction, memoirs and essayistic commentary from the successor states of the Austro-Hungarian monarchy. It will comprise the dissolution of the empire, the interwar years, the Cold War decades and the postcommunist era. Attention to the predicament of small nations, "minor" literatures and cultural cross-pollination. Authors include Musil, Kafka, Roth, Kosztoacute;nyi, Maacute;rai, Hasek, Svevo, Kis, Torberg, Hrabal, Kundera, Esterhaacute;zy, Magris. Discussion and readings in English.

GERMAN 220. German Literature 1: How Stories are Told (ca. 1170-1600). 5-8 Units.

This seminar offers a survey of medieval and early modern German literature and culture from ca.1170 to 1600. Genres include heroic epic, romance, lyric poetry, and mysticism as well as the popular literary forms characteristic of Reformation culture. We will pay special attention to the changing strategies of storytelling across time, genre, and medium. Discussion in English. All texts are available in modern German or English translation. Undergraduates enroll in 220 for 5 units, graduate students enroll in 320 for 5 or 8 units.

Same as: GERMAN 320

GERMAN 221. German Literature 2: Selfhood and History. 3-8 Units.

How the literature of the period between 1750 and 1900 gives voice to new conceptions of selfhood and articulates the emergent self understanding of modernity. Responses to unprecedented historical experiences such as the French Revolution and the ensuing wars, changes in the understanding of nature, the crisis of foundations, and the persistence of theological motifs. Lessing, Herder, Goethe, Schiller, Holderlin, Kleist, Heine, Buchner, Keller, and Fontane. Taught in English, readings in German. (Note: Fulfills DLCL 325 for AY 1415 for the PhD Minor in the Humanities).

Same as: COMPLIT 321A, GERMAN 321

GERMAN 222. German Literature 3: Myth and Modernity. 5-8 Units.

Masters of German 20th- and 21st-Century literature and philosophy as they present aesthetic innovation and confront the challenges of modern technology, social alienation, manmade catastrophes, and imagine the future. Readings include Nietzsche, Freud, Rilke, Musil, Brecht, Kafka, Doebelin, Benjamin, Juenger, Arendt, Musil, Mann, Adorno, Celan, Grass, Bachmann, Bernhardt, Wolf, and Kluge. Taught in English. Undergraduates enroll in 222 for 5 units, graduate students enroll in 322 for 8 units.

Same as: COMPLIT 222A, GERMAN 322

GERMAN 223. GERMANY BETWEEN EAST AND WEST. 3-5 Units.

A consideration of German political culture and its contradictory orientations toward alternative poles: the Russian East and the American West. How historical traditions inform current debates, such as the response to the Ukraine crisis. Conflicts between liberal and populist paradigms, enlightenment and romantic legacies. Germany and its geopolitical imagination. The German image of Russia. Texts such as Th. Mann, *quest*; The German Republic, *quest*; Carl Schmitt, *Land and Sea*, *Wolf*, *Divided Heaven*, and documents of contemporary popular culture.

GERMAN 245. German Idealist and Romantic Aesthetics. 3-5 Units.

Focus on influential theories of aesthetic experience as an autonomous cultural domain that supplements science and morality. How the discovery of beauty and sublimity in nature led to an unprecedented celebration of art as the highest form of human activity. The problem of the relation between aesthetic experience and conceptual understanding. Readings by Kant, Schiller, Friedrich Schlegel, Schelling, Hegel, and more recent responses to their works. Taught in English.

GERMAN 246. Hegel's Phenomenology of Spirit. 3-5 Units.

Hegel's groundbreaking work models the mind's efforts to understand itself and tells a historically rich story of the evolution of social forms of life. The book begins with basic sensory awareness and ends with the recognition that thought is not finite and constrained by an inert reality but absolutely free, the only source of authority for modern subjects. Topics include the question of whether the human standpoint is inherently limited and fixed, the role of history, knowledge and agency, political conflict and power, rationality and religion, the ancient and the modern world.

GERMAN 250. Humanities Education in the Changing University. 3 Units.

Advanced study in the humanities faces changes within fields, the university and the wider culture. Considers the debate over the status of the humanities with regard to historical genealogies and current innovations. Particular attention on changes in doctoral education. Topics include: origins of the research university; disciplines and specialization; liberal education in conflict with professionalization; literature and literacy education; interdisciplinarity as a challenge to departments; education policy; digital humanities; accountability in education, assessment and student-centered pedagogies.

Same as: COMPLIT 275, DLCL 320

GERMAN 258. Song Collections as a Reflection of Social and Political Practices at the Hapsburg Court ca. 1500. 3-5 Units.

Artistic endeavors were of crucial importance for Emperor Maximilian I; his self-conception and his notion of an emerging German nation. Up to now it has been investigated particularly by looking at literary and visual artworks commissioned by him. In the seminar musical products of the Imperial court, especially songs will be surveyed as expressions of courtiers, urban patricians and humanists in the German lands. A manuscript collection, which was prepared for the Diet in Augsburg 1518 will be at the core of the course, complemented by an early print from 1512. Besides a panegyric on Maximilian as defender of Christendom against the Turks there are standard lyrics, mostly on the theme of love and some merry topics, punctuated by a considerable amount of politically conceived texts, complaining about grievances and social evils at court. Recent approaches have tried to decipher courtly love poems of pre-conversational times as a method of launching social or political opinions in a disguised way. Thus the anthology can be checked as a vehicle of political communication. Philological aspects of source description, material, layout and handwriting will also be examined. Additionally, excursions to Early Modern High German and to musical procedures will be undertaken.

GERMAN 262. The Total Work of Art. 5 Units.

Frequently associated with the work of Richard Wagner, The Total Work of Art (or Gesamtkunstwerk) is a genre that aims to synthesize a range of artistic forms into an organic unity, a unity that both models and helps to forge an ideal state. This seminar will examine the history of the Gesamtkunstwerk from its roots in German Romanticism to the present day, focusing on the genre's relations with technology and mass culture across a wide range of media. Creations we will consider include Wagner's Festival Theatre at Bayreuth, Walter Gropius' plans for a Totaltheater, Bertolt Brecht and Kurt Weill's radio-oratorio *The Lindbergh Flight*, Leni Riefenstahl's *Triumph of the Will*, Walt Disney's theme parks, Andy Warhol's *Exploding Plastic Inevitable*, and Bill Gates' "home of the future." Taught in English.

Same as: TAPS 262S

GERMAN 262A. Explosions of Enlightenment. 3-5 Units.

Eighteenth-century culture seen as permeated by intellectual and artistic practices and plays pushing principles of reason and rationality to an extreme that becomes self-undercutting. Such obsessions and practices are becoming more visible and prominent now, as the traditional concept of "Enlightenment" (synonymous with the 18th century) is undergoing a profound transformation. Among the protagonists of this seminar will be: Diderot as a philosopher and novelist; Lichtenberg as a scientist and writer of everyday notes; Goya, accusing violence and obsessed with nightmarish visions; Mozart as the excessive master of repetition and variation.

Same as: COMPLIT 262A

GERMAN 264. Post-Cold War German Foreign Policy. 3-5 Units.

This course is devoted to Germany's role and policy in international relations since 1990. It is based on the premise that Germany's post-Cold War foreign policy was shaped by two potentially conflicting impulses which is historical learning versus the country's economic role and geopolitical position. The course's objective is to make students familiar with the overall conditions of German Foreign Policy in the post-Cold War era and to analyze related tensions and dilemmas. Empirical examples are Germany's role in the Yugoslavian wars in the first half of the 1990s, the transatlantic crisis over the Iraq war of 2003 and Germany's engagement in Afghanistan and German Foreign Policy during the country's tenure as a non-permanent member of the UN Security Council 2011-2012. Discussion in English; German reading knowledge required.

GERMAN 264A. Walter Benjamin. 3-5 Units.

Walter Benjamin's work as cultural historian, critic, literary author and philosopher, seen from the trajectory of a German-Jewish intellectual life in the context of the first half of the 20th century. Providing such a historical perspective will be the condition for an actively critical reading of Benjamin's works; a reading that -- counter to the predominant Benjamin-reception -- will try to distinguish between works of purely biographical and historical interest and those Benjamin texts that prove to be of great and lasting intellectual value. Taught in English.

Same as: COMPLIT 264

GERMAN 271. Futurity: Why the Past Matters. 3-5 Units.

Drawing on literature, the arts, political discourse, museums, and new media, this course asks why and how we take interest in the watershed events of the modern era; how does contemporary culture engage with modern, made-made disasters such as the World Wars or 9/11? Readings and viewings include the literature of G. Grass, W. G. Sebald, Ian McEwan, Toni Morrison and Cormac McCarthy; the cinema of Kathryn Bigelow and Steven Spielberg; speeches by Barak Obama; and the theoretical writing of Walter Benjamin, Hayden White, Fredric Jameson, among others. Taught in English.

Same as: COMPLIT 271A

GERMAN 282. Martin Heidegger. 3-5 Units.

Working through the most systematically important texts by Martin Heidegger and their historical moments and challenges, starting with *Being and Time* (1927), but emphasizing his philosophical production after World War II. The philological and historical understanding of the texts function as a condition for the laying open of their systematic provocations within our own (early 21st-century) situations. Satisfies the capstone seminar requirement for the major tracks in Philosophy and Literature. Taught in English.

Same as: COMPLIT 213A, COMPLIT 313A, GERMAN 382

GERMAN 283. Brecht. 3-5 Units.

Arguably the most influential theatrical artist of the twentieth century, Bertolt Brecht continues to be a lightning rod for debates over art and politics. This course will consider Brecht as playwright, director, and theorist. Alongside reading and discussing texts such as *Threepenny Opera*, *Mother Courage*, and *Galileo*, students will also be expected to participate in occasional in-class performances in order better to grapple with his plays and theories. No previous theatrical experience is necessary.

Same as: TAPS 382

GERMAN 284. The Nervous Age: Neurosis, Neurology, and Nineteenth-century Theatre. 5 Units.

The nineteenth century witnessed profound developments in neurological and psychological sciences, developments that fundamentally altered conceptions of embodiment, agency, and mind. This course will place these scientific shifts in conversation with theatrical transformations of the period. We will read nineteenth-century neuropsychologists such as Charles Bell, Johannes Müller, George Miller Beard, Jean-Martin Charcot, and Hippolyte Bernheim alongside artists such as Percy Shelley, Georg Büchner, Richard Wagner, Émile Zola, and August Strindberg.

Same as: HUMBIO 162, TAPS 354

GERMAN 285. Environmentalism, Literature and Cultural Criticism. 3-5 Units.

Concern for environmental threats increasingly draw on traditions of cultural and civilizational criticism. This course explores literary and cultural dimensions of environmentalist discourse, especially in German-speaking Europe but with opportunities for comparative treatments of ecological tendencies in other countries. Topics include: Environmentalism as progressive or as conservative; ambivalence toward technology; sustainability and the critique of growth; humans and animals. Authors such as F. Jünger, Jahn, Wolf, C. Amery, Dath, with comparisons to Leopold, Atwood, Ghosh, Latouche and others. Reading knowledge of German or permission of instructor.

GERMAN 289. Buechner and Wedekind. 3-5 Units.

Modern theatre owes an incalculable debt to two German playwrights: Georg Büchner (1813-1837) and Frank Wedekind (1864-1918). We will read their still-shocking portraits of sex, madness, and social brutality in plays such as *Woyzeck* and *Spring's Awakening*, and explore the international journeys these works have made from stage to film and from opera to musical theatre.

Same as: TAPS 289

GERMAN 298. Writing Workshop. 1-12 Unit.

Open only to German majors and to students working on special projects, including written reports for internships. Honors students use this number for the honors essay. May be repeated for credit.

GERMAN 300. Concepts of Modernity I: Philosophical Foundations. 5 Units.

In the late eighteenth century Immanuel Kant proclaimed his age to be "the genuine age of criticism." He went on to develop the critique of reason, which set the stage for many of the themes and problems that have preoccupied Western thinkers for the last two centuries. This fall quarter course is intended as an introduction to these themes and problems. We begin this course with an examination of Kant's philosophy before approaching a number of texts that extend and further interrogate the critique of reason. In addition to Kant, we will read texts by Hegel, Marx, Nietzsche, Weber, Freud, Lukács, and Heidegger. This course is the first of a two-course sequence. Priority to graduate students in MTL and English. The course will be capped at 12 students.

Same as: ENGLISH 334A, MTL 334A

GERMAN 310A. Music and Critical Theory. 3-5 Units.

The seminar provides an opportunity to study some of the seminal texts of Critical Theory dealing with music. Concentrating on Theodor Adorno's writings on music, we will also include key philosophers who informed Adorno's thinking (in particular Kant, Hegel and Nietzsche), influential nineteenth-century aesthetics of music (Hoffmann, Schopenhauer and Hanslick), other contemporaries of Adorno (for example, Ernst Bloch), and some later authors whose work was influenced by the Frankfurt School (such as Carl Dahlhaus). We will also consider the impact of Critical Theory on recent scholarship. Weekly meetings will be organized around various topics, ranging from central concepts such as "Enlightenment" and "musical material" to individual composers. Music by Wagner, Mahler, Schoenberg, Stravinsky and Weill will feature prominently on the syllabus.

Same as: MUSIC 310A

GERMAN 320. German Literature 1: How Stories are Told (ca. 1170-1600). 5-8 Units.

This seminar offers a survey of medieval and early modern German literature and culture from ca. 1170 to 1600. Genres include heroic epic, romance, lyric poetry, and mysticism as well as the popular literary forms characteristic of Reformation culture. We will pay special attention to the changing strategies of storytelling across time, genre, and medium. Discussion in English. All texts are available in modern German or English translation. Undergraduates enroll in 220 for 5 units, graduate students enroll in 320 for 5 or 8 units.

Same as: GERMAN 220

GERMAN 321. German Literature 2: Selfhood and History. 3-8 Units.

How the literature of the period between 1750 and 1900 gives voice to new conceptions of selfhood and articulates the emergent self understanding of modernity. Responses to unprecedented historical experiences such as the French Revolution and the ensuing wars, changes in the understanding of nature, the crisis of foundations, and the persistence of theological motifs. Lessing, Herder, Goethe, Schiller, Holderlin, Kleist, Heine, Buchner, Keller, and Fontane. Taught in English, readings in German. (Note: Fulfills DLCL 325 for AY 1415 for the PhD Minor in the Humanities).

Same as: COMPLIT 321A, GERMAN 221

GERMAN 322. German Literature 3: Myth and Modernity. 5-8 Units. Masters of German 20th- and 21st-Century literature and philosophy as they present aesthetic innovation and confront the challenges of modern technology, social alienation, manmade catastrophes, and imagine the future. Readings include Nietzsche, Freud, Rilke, Musil, Brecht, Kafka, Doebelin, Benjamin, Juenger, Arendt, Musil, Mann, Adorno, Celan, Grass, Bachmann, Bernhardt, Wolf, and Kluge. Taught in English. Undergraduates enroll in 222 for 5 units, graduate students enroll in 322 for 8 units. Same as: COMPLIT 222A, GERMAN 222

GERMAN 354. Poetic Thinking Across Media. 4 Units. Even before Novalis claimed that the world must be romanticized, thinkers, writers, and artists wanted to perceive the human and natural world poetically. The pre- and post-romantic poetic modes of thinking they created are the subject of this course. Readings include Ecclestias, Zhaozhou Congshen, Montaigne, Nietzsche, Kafka, Benjamin, Arendt, and Sontag. This course will also present poetic thinking in the visual arts--from the expressionism of Ingmar Bergman to the neo-romanticism of Gerhard Richter. Same as: COMPLIT 154B, COMPLIT 354B, GERMAN 154, JEWISHST 144B

GERMAN 369. Introduction to Graduate Studies: Criticism as Profession. 3 Units. A history of literary theory for entering graduate students in national literature departments and comparative literature. Same as: COMPLIT 369, DLCL 369, FRENCH 369, ITALIAN 369

GERMAN 382. Martin Heidegger. 3-5 Units. Working through the most systematically important texts by Martin Heidegger and their historical moments and challenges, starting with *Being and Time* (1927), but emphasizing his philosophical production after World War II. The philological and historical understanding of the texts function as a condition for the laying open of their systematic provocations within our own (early 21st-century) situations. Satisfies the capstone seminar requirement for the major tracks in Philosophy and Literature. Taught in English. Same as: COMPLIT 213A, COMPLIT 313A, GERMAN 282

GERMAN 390. German Capstone: Reading Franz Kafka. 3-5 Units. This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. (Meets Writing-in-the-Major requirement). Same as: COMPLIT 111, COMPLIT 311C, GERMAN 190, JEWISHST 147, JEWISHST 349

GERMAN 397. Graduate Studies Colloquium. 1 Unit. Colloquium for graduate students in German Studies. Taught in English.

GERMAN 398. Dissertation Prospectus Colloquium. 1-12 Unit. Repeatable for Credit.

GERMAN 399. Individual Work. 1-12 Unit. Repeatable for Credit. Instructor Consent Required.

GERMAN 802. TGR Dissertation. 0 Units.

Health Research Policy Courses

HRP 28SI. Alternative Spring Break: Prevention, Treatment, and Policy Perspectives on Alzheimer's Disease. 1 Unit.

Examines four aspects of Alzheimer's disease. Goal is to give participants a clearer sense of the struggle that patients actually feel and experience during the progression of the disease. Also explores difficulties and issues that many relatives face in assuming the responsibility of full-time caregiver for an Alzheimer's patient. Addresses ethical considerations on genetic testing, should these advances be embraced or should we be wary of the knowledge they may bring? Finally, explores the notion of service through engaged scholarship by exposing oneself to cutting-edge discoveries as researchers attempt to unravel the puzzle.

HRP 89Q. Introduction to Cross Cultural Issues in Medicine. 3 Units. Preference to sophomores. Introduction to social factors that impact health care delivery, such as ethnicity, immigration, language barriers, and patient service expectations. Focus is on developing a framework to understand culturally unique and non-English speaking populations in the health care system.

HRP 198. Unite, Empower, Experience: Understanding the Universality of Women's Health. 1 Unit.

Directed reading course reading. Focus is on the impact of the unique challenges women face in the healthcare system on women and their communities. Examines the current state of women's health from global perspective, considering: community health, health policy, and the medical technology sector.

HRP 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

HRP 205. Innovation in a Changing Health Care System. 2 Units.

Brings to light issues faced by many different sectors of the healthcare field in response to both health reform and other marketplace changes, with particular emphasis on ways that innovators in health care organizations and delivery can understand and respond to these issues. Considers ways that various components of the healthcare delivery system are innovating and evolving in response to dramatic changes in U.S. healthcare marketplace. Topics include health insurance, provider systems, pharmaceuticals, medical devices, information technology. Guest speakers from private-sector and public-sector healthcare organizations.

HRP 206. Meta-research: Appraising Research Findings, Bias, and Meta-analysis. 3 Units.

Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics. Same as: MED 206, STATS 211

HRP 207. Introduction to Concepts and Methods in Health Services and Policy Research I. 2 Units.

Primarily for medical students in the Health Services and Policy Research scholarly concentration. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines.

HRP 208. Introduction to Concepts and Methods in Health Services and Policy Research II. 3 Units.

Primarily for medical students in the Health Services and Policy Research scholarly concentration; continuation of 207. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines. Recommended: 207.

HRP 209. Health Law: The FDA. 2-3 Units.

(Same as LAW 458) Open to law and medical students; other graduate students by consent of instructor. The FDA's regulatory authority over drugs, biologics, medical devices, and dietary supplements. The nature of the pharmaceutical, biotech, medical device, and nutritional supplement industries.

HRP 210. Health Law and Policy. 3 Units.

(Same as Law 313) Open to law, medicine, business, and graduate students. Focus this term is on the physician/patient relationship, medical ethics, and public health law.

HRP 211. Law and the Biosciences: Neuroscience. 3 Units.

(Same as LAW 368) Legal, social, and ethical issues arising from advances in neuroscience, including effects upon law and society through improvements in predicting illnesses and behaviors, reading minds through neuroimaging, understanding responsibility and consciousness, treating criminal behavior, and cognitive enhancement.

HRP 212. Cross Cultural Medicine. 3 Units.

Developing interviewing and behavioral skills needed to facilitate culturally relevant health care across all population groups. Discussions focus on explicit and implicit cultural influences operating in formal and informal medical contexts.

HRP 213. Writing in the Sciences. 2-3 Units.

Primarily for medical students in the Clinical Research Scholarly concentration; open to graduate students except Epidemiology graduate students. Development of research questions and plans for statistical analysis. Study design, sample size and power calculations, and statistical analysis of study data. Analytic methods to carry out statistical power and sample size calculations. Prerequisites: 225, and 258 or 259, or consent of instructor.

HRP 214. Scientific Writing. 2-3 Units.

Step-by-step through the process of writing and publishing a scientific manuscript. How to write effectively, concisely, and clearly. Preparation of an actual scientific manuscript. Students are encouraged to bring a manuscript on which they are currently working to develop and polish throughout the course.

HRP 215. Scientific Writing for Basic and Translational Scientists. 2-3 Units.

Teaches students in the basic sciences how to write clearly, concisely, and effectively. Focuses on the process of writing and publishing a scientific manuscript. 3 unit option requires work on a manuscript. Not intended for epidemiology graduate students.

HRP 216. Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research. 2-3 Units.

Topics include: advanced aspects of study design and data analyses; development of health measurement instruments; methods of summarizing literature and quantifying effect sizes; and multivariable nature of health events in human populations. 3 units requires a term paper. Prerequisites: 225, and 258 or 261, or consent of instructor.

HRP 220. BIOTECHNOLOGY LAW AND POLICY. 3 Units.

(Same as LAW 440) Open to all law or medical students; other graduate students by consent of the instructor. Focuses on the biotechnology industry, with some discussion of the "med tech" or medical device industry and the pharmaceutical industry. The life cycle of a biotech firm, from a good idea to a start-up company to FDA approval and beyond. Guest speakers. In addition to a final exam, students are required to participate in a group project during the term, making law and business recommendations about a biotech firm.

HRP 221. Law and the Biosciences: Genetics. 3 Units.

(Same as LAW 480) Open to all law or medical students; other graduate students by consent of the instructor. Focus is on ethical, legal, and social issues arising from advances in our knowledge of human genetics. Includes forensic uses of genetics, genetic testing, widespread whole genome sequencing, the consequences of genetics for human reproduction, and the ethics of genomic biobanks for research. Research paper required.

HRP 222A. Advising Congress on Health Policy. 1 Unit.

(Same as LAW 413L) Focus on conducting research on national health policy problems for the Medicare Payment Advisory Commission, or MedPAC. Students work in teams with lawyers and PhD economists from MedPAC, resident and fellow physicians from Stanford Hospital, and other students from throughout the University on expanding the healthcare workforce through reform of states' scope of practice regulation or designing antitrust policy to achieve the benefits of coordination and avoid the costs of consolidation. Application required.

HRP 222B. Advising Congress on Health Policy. 2 Units.

(Same as LAW 413L) Focus on conducting research on national health policy problems for the Medicare Payment Advisory Commission, or MedPAC. Students work in teams with lawyers and PhD economists from MedPAC, resident and fellow physicians from Stanford Hospital, and other students from throughout the University on expanding the healthcare workforce through reform of states' scope of practice regulation or designing antitrust policy to achieve the benefits of coordination and avoid the costs of consolidation. Application required.

HRP 223. Introduction to Data Management and Analysis in SAS. 2 Units.

Provides hands-on introduction to basic data management and analysis techniques using SAS. Data management topics include: Introduction to SAS and SAS syntax, importing data, creating and reading SAS datasets, data cleaning and validation, creating new variables, and combining data sets. Analysis techniques include: basic descriptive statistics (e.g., means, frequency) and bivariate procedures for continuous and categorical variables (e.g., t-tests, chi-squares).

HRP 225. Design and Conduct of Clinical and Epidemiologic Studies. 3-4 Units.

Intermediate-level. The skills to design, carry out, and interpret epidemiologic studies, particularly of chronic diseases. Topics: epidemiologic concepts, sources of data, cohort studies, case-control studies, cross-sectional studies, sampling, estimating sample size, questionnaire design, and the effects of measurement error. Prerequisite: A basic/introductory course in statistics or consent of instructor.

HRP 226. Advanced Epidemiologic and Clinical Research Methods. 3-4 Units.

The principles of measurement, measures of effect, confounding, effect modification, and strategies for minimizing bias in clinical and epidemiologic studies. Students enrolled for 4 units complete an additional assignment or paper. Prerequisite: 225 or consent of instructor.

HRP 228. Genetic Epidemiology. 2 Units.

Provides framework for physicians, epidemiologists, and other scientists to interpret the literature and incorporate genetic information into human disease research. Topics include: common genetic measures, approaches to finding disease genes, study design and analysis issues, genome-wide association studies, meta-analysis of genetic studies, genetic risk prediction, and applications of new genomic technologies. Includes reading seminal papers in genetic epidemiology.

HRP 230. Cancer Epidemiology. 2-3 Units.

Descriptive epidemiology and sources of incidence/mortality data; the biological basis of carcinogenesis and its implications for epidemiologic research; methodological issues relevant to cancer research; causal inference; major environmental risk factors; genetic susceptibility; cancer control; examples of current research; and critique of the literature. 3 units requires paper or project. Prerequisite: 225, or consent of instructor.

HRP 231. Epidemiology of Infectious Diseases. 3 Units.

Principles of the transmission of the infectious agents (viruses, bacteria, rickettsiae, mycoplasma, fungi, and protozoan and helminth parasites). The role of vectors, reservoirs, and environmental factors. Pathogen and host characteristics that determine the spectrum of infection and disease. Endemicity, outbreaks, and epidemics of selected infectious diseases. Principles of control and surveillance.

HRP 236. Epidemiology Research Seminar. 1 Unit.

Weekly forum for ongoing epidemiologic research by faculty, staff, guests, and students, emphasizing research issues relevant to disease causation, prevention, and treatment. May be repeated for credit.

HRP 237. Practical Approaches to Global Health Research. 3 Units.

Enrollment limited to graduate students; undergraduates in their junior or senior year may enroll with consent of instructor only. Introduces research methods for conducting studies involving health in low-income context. Focuses on developing a concept note to support a funding proposal. addressing research question of student's interest. Skills developed include developing a compelling research question; synthesizing a focused literature review; selecting and adapting appropriate study design, target population, sampling methods, data collection and analysis; addressing human subject issues; developing productive cross-collaboration. Same as: IPS 290, MED 226

HRP 238. Genes and Environment in Disease Causation: Implications for Medicine and Public Health. 2-3 Units.

The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor. Same as: HUMBIO 159

HRP 239. Statistical Methods for Group Comparisons and Causal Inference. 3 Units.

Critical examination of statistical methods in social science applications, especially for cause and effect determinations. Topics: path analysis, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, longitudinal data, mediating and moderating variables. See <http://web.stanford.edu/~rag/stat209/>. Prerequisite: intermediate-level statistical methods. Same as: EDUC 260X, STATS 209

HRP 241. Measuring Global Health. 4 Units.

Open to MD, graduate, and undergraduate students. Assessing the global burden of disease, its distribution among and within countries, its causes, and appropriate interventions requires rigorous quantitative approaches. This course develops skills in these areas by critically examining questions like: How do we know who is sick and where? How are risk factors incorporated into our projections of future disease trends? How do we combine mortality and morbidity in a meaningful way? What works for improving health efficiently? Workshops build familiarity with relevant data and their analysis. Prerequisite: coursework in statistics, biostatistics, quantitative epidemiology, econometrics, or equivalent. Same as: HUMBIO 129M, MED 231

HRP 251. Design and Conduct of Clinical Trials. 3 Units.

The rationale for phases 1-3 clinical trials, the recruitment of subjects, techniques for randomization, data collection and endpoints, interim monitoring, and reporting of results. Emphasis is on the theoretical underpinnings of clinical research and the practical aspects of conducting clinical trials.

HRP 252. Outcomes Analysis. 4 Units.

Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics. Same as: BIOMEDIN 251, MED 252

HRP 255. Observational Studies. 2-3 Units.

This course will cover statistical methods for the design and analysis of observational studies. Topics for the course will include the potential outcomes framework for causal inference; randomized experiments; methods for controlling for observed confounders in observational studies; sensitivity analysis for hidden bias; instrumental variables; tests of hidden bias; coherence; and design of observational studies. Same as: STATS 355

HRP 256. Economics of Health and Medical Care. 5 Units.

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51. Same as: BIOMEDIN 156, BIOMEDIN 256, ECON 126

HRP 258. Introduction to Probability and Statistics for Clinical Research. 3 Units.

Open to medical and graduate students; required of medical students in the Clinical Research Scholarly Concentration. Tools to evaluate medical literature. Topics include random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals, correlation, regression, analysis of variance, and survival analysis.

HRP 259. Introduction to Probability and Statistics for Epidemiology. 3-4 Units.

Topics: random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals. Correlation, regression, analysis of variance, and nonparametric tests. Introduction to least squares and maximum likelihood estimation. Emphasis is on medical applications. Differential between 3 and 4 units is the amount of out-of-class work required.

HRP 260A. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student.
Same as: STATS 260A

HRP 260B. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student.
Same as: STATS 260B

HRP 260C. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student.
Same as: STATS 260C

HRP 261. Intermediate Biostatistics: Analysis of Discrete Data. 3 Units.

Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference.
Same as: BIOMEDIN 233, STATS 261

HRP 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis. 3 Units.

Methods for analyzing longitudinal data. Topics include Kaplan-Meier methods, Cox regression, hazard ratios, time-dependent variables, longitudinal data structures, profile plots, missing data, modeling change, MANOVA, repeated-measures ANOVA, GEE, and mixed models. Emphasis is on practical applications. Prerequisites: basic ANOVA and linear regression.
Same as: STATS 262

HRP 263. Advanced Decision Science Methods and Modeling in Health. 3 Units.

Advanced methods currently used in published model-based cost-effectiveness analyses in medicine and public health, both theory and technical applications. Topics include: Markov and microsimulation models, model calibration and evaluation, and probabilistic sensitivity analyses. Prerequisites: a course in probability, a course in statistics or biostatistics, a course on cost-effectiveness such as HRP 392, a course in economics, and familiarity with decision modeling software such as TreeAge.
Same as: MED 263

HRP 268. Genetics and Reproductive Technologies. 2 Units.

(Same as LAW 568) Examines the complex interrelationship among legal, political, ethical, and social issues shaping the intersection of genetics, reproductive technologies and reproductive rights. Issues discussed may include, but are not limited to: the commercialization and sale of reproductive materials like sperm, ovum, and surrogacy services; genetic technologies, prenatal genetic screening, and diagnostic testing of offspring; criminalization of reproductive decision-making such as sex-selection and genetic enhancement; stem cells, cloning, and abortion; DNA databanks and collection of genetic information; in vitro fertilization and other emerging reproductive technologies.

HRP 274. Design for Service Innovation. 4 Units.

(Same as OIT 343/01) Open to graduate students from all schools and departments. An experiential project course in which students work in multidisciplinary teams to design new services to address the needs of medically patients. Project teams partner with "safety net" hospitals and clinics to find better ways to deliver care to the low income and uninsured patients these institutions serve. Students learn proven innovation processes from experienced GSB, d. school, and SoM faculty, interface with students from across the university, and have the opportunity to see their ideas translated into improvements in the quality and efficiency of healthcare in the real world. Prerequisite: admission to the course is by application only. Applications available at <http://DesignForService.stanford.edu>. Applications must be submitted by November 16, 2011.
Same as: BIOE 372, MED 274

HRP 280. Spanish for Medical Students. 3 Units.

First quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on taking the medical history. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).
Same as: SPANLANG 121M

HRP 281. Spanish for Medical Students. 2 Units.

Second quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on performing a physical examination. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).
Same as: SPANLANG 122M

HRP 282. Spanish for Medical Students. 2-3 Units.

Third quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on different specialties and medical conditions. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).
Same as: SPANLANG 123M

HRP 283. Health Services Research Core Seminar. 1 Unit.

Presentation of research in progress and tutorials in the field of health services research.

HRP 290. Advanced Medical Spanish Oral Communication. 2 Units.

Enrollment limited to medical students. Designed to further develop linguistic skills, covering all medical specialties according to student needs. Sessions also include topics on patient education and diseases, such as diabetes, asthma, TB, and CVDs.

HRP 295. Advanced Topics in Epidemiologic and Clinical Research. 2 Units.

Topics include alternative study designs, causal inference methods, instrumental variables, time-varying confounding, registry-based research, missing data, and repeated events. Weekly readings and discussions will consider how these methods apply to numerous substantive areas including pharmacoepidemiology, reproductive and perinatal epidemiology, and many areas of chronic disease epidemiology. Prerequisite: HRP 225 and HRP 226 or permission of instructor.

HRP 296. Current Topics in Bioethics. 3 Units.

(Same as LAW 596) Explores the ethical, legal, and public policy issues arising from recent advances in biomedicine and the biosciences. Approaches to bioethical reasoning including casuistry, social justice, resource allocation, and individual rights in areas such as refusal of treatment conception. Topics include: the use of forensic genetics in criminal law, neuroscience and national security, race and ethnicity in genetic research, experimentation on human subjects and prisoners, privacy of medical and genetic information in the information age, synthetic biology, and do-it-yourself medical and genetic testing. No prior knowledge in science, medicine, philosophy or related disciplines is required.

HRP 299. Directed Reading in Health Research and Policy. 1-18 Unit.

Epidemiology, health services research, preventive medicine, medical genetics, public health, economics of medical care, occupational or environmental medicine, international health, or related fields. May be repeated for credit. Prerequisite: consent of instructor.

HRP 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

HRP 391. Health Law: Finance and Insurance. 3 Units.

(SAME AS LAW 348, MGTECON 331) Provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. Potential topics include: health reform, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), medical malpractice and quality regulation, pharmaceuticals, the corporate practice of medicine, regulation of fraud and abuse, and international comparisons.

Same as: PUBLPOL 231

HRP 392. Analysis of Costs, Risks, and Benefits of Health Care. 4 Units.

(Same as MGTECON 332) For graduate students. How to do cost/benefit analysis when the output is difficult or impossible to measure. How do M.B.A. analytic tools apply in health services? Literature on the principles of cost/benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application.

Same as: BIOMEDIN 432

HRP 399. Graduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

HRP 801. TGR Project. 0 Units.

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HRP 802. TGR Dissertation. 0 Units.

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History Courses

HISTORY 1A. Global History: The Ancient World. 3-5 Units.

This course examines the emergence of "world empires"-- the first way of constituting a world-- in four regions of the eastern hemisphere from the first millennium BCE to the year 900 CE. It will study the pivotal role of cities, the importance of rulers, the incorporation of diverse peoples, and how the states that followed their collapse constituted new world orders through combining imitation of the vanished empire with the elaboration of the new "world religions."

Same as: CLASSICS 76

HISTORY 1B. Global History: The Early Modern World, 1300 to 1800. 3-5 Units.

Topics include early globalization and cross-cultural exchanges; varying and diverse cultural formations in different parts of the world; the growth and interaction of empires and states; the rise of capitalism and the economic divergence of "the west"; changes in the nature of technology, including military and information technologies; migration of ideas and people (including the slave-trade); disease, climate, and environmental change over time. Designed to accommodate beginning students, non-majors, and more advanced history students.

HISTORY 3. The Historical and Geographical Background of Current Global Events. 1 Unit.

This one-unit lecture course aims to provide the historical and geographical context necessary for understanding the most important global issues of the day. Weekly lectures will explore two or more major issues in some detail, illustrating them with maps, timelines, photographs, and other images.

Topics are not planned in advance, but will instead reflect stories currently in the news.

HISTORY 4N. A World History of Genocide. 3-5 Units.

Reviews the history of genocide from ancient times until the present. Defines genocide, both in legal and historical terms, and investigates its causes, consequences, and global dimensions. Issues of prevention, punishment, and interdiction. Main periods of concern are the ancient world, Spanish colonial conquest; early modern Asia; settler genocides in America, Australia, and Africa; the Armenian genocide and the Holocaust; genocide in communist societies; and late 20th century genocide.

Same as: JEWISHST 4N

HISTORY 5C. Human Trafficking: Historical, Legal, and Medical Perspectives. 3 Units.

(Same as History 105C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.

Same as: FEMGEN 5C, HUMBIO 178T, SOMGEN 205

HISTORY 5W. Human Trafficking Service Learning. 2 Units.

Continuation of service learning for students who completed History 105C.

HISTORY 6W. Service-Learning Workshop on Human Trafficking Part I. 3-4 Units.

Two-quarter service-learning workshop to accompany course, "Human Trafficking: Historical, Legal, and Medical Perspectives." Considers purpose and practice of service learning. Provides training for students' work in community. Examines current scope of human trafficking in Bay Area, pressing concerns, capacity and obstacles to effectively address them. Students work with community partners dedicated to confronting human trafficking and problems it entails on a daily basis. Must currently be enrolled in or have previously taken History 5C/105C (FEMGEN 5C/105C, HUMBIO 178T, SOMGEN 205, INTNLREL 105C).

Same as: FEMGEN 6W

HISTORY 7E. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization. These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography. Same as: ANTHRO 13A, ARCHLGY 13, HISTORY 107E

HISTORY 7W. Service-Learning Workshop on Human Trafficking Part II. 3 Units.

Prerequisite: History 6W. Two-quarter service-learning workshop to accompany course, "Human Trafficking: Historical, Legal, and Medical Perspectives." Considers purpose and practice of service learning. Provides training for students' work in community. Examines current scope of human trafficking in Bay Area, pressing concerns, capacity and obstacles to effectively address them. Students work with community partners dedicated to confronting human trafficking and problems it entails on a daily basis. Must currently be enrolled in or have previously taken History 5C/105C ((FEMGEN 5C/105C, HUMBIO 178T, SOMGEN 205, INTNLREL 105C). Same as: FEMGEN 7W

HISTORY 10B. Survey of Early Modern Europe. 3 Units.

(Same as HISTORY 110B. History majors and others taking 5 units, register for 110B.) From 1350 to 1789, Europe went from being a provincial backwater to a new global center of power. This course surveys the profound changes of the period that shape our world today: the spread of humanism and science, religious reformation, new styles of warfare, the rise of capitalism and a new global economy, the emergence of the state, and revolution which sought to overthrow established governments.

HISTORY 10C. Introduction to Modern Europe. 3 Units.

(SAME as HISTORY 110C. History majors and others taking 5 units, register for 110C.) From the late 18th century to the present. How Europeans responded to rapid social changes caused by political upheaval, industrialization, and modernization. How the experience and legacy of imperialism and colonialism both influenced European society and put in motion a process of globalization that continues to shape international politics today.

HISTORY 10SC. Biography in History, Fiction, and Elsewhere. 2 Units.

How biographers, novelists, critics and others have written about the rhythms of life the lives of the famous as well as the obscure - will be explored in this course. Biographical writing can be frivolous, but at its best it has the capacity to undercover so much of life's richness, complexity, and confusions. We'll study biography with the use of some of the most resonant, compelling examples of the genre. Together we'll read books about poets Sylvia Plath and Ted Hughes, Henry James Aspern Papers, the brilliant novel on biographical writing, A. S. Byatt's *Possession*, and Norman Mailer on Marilyn Monroe. How one chooses one topic over another; the differences and similarities between the representation of lives in fiction and biography; the benefits and pitfalls of an intense identification with one's own subjects these and other matters will be examined. We'll meet in San Francisco with local writers wrestling with issues of this sort, and students will be encouraged to try their hands at writing about lives based on research, personal observation, or both.

HISTORY 11N. The Roman Empire: Its Grandeur and Fall. 4 Units.

(Formerly CLASSHIS 24N.) Preference to freshmen. Explore themes on the Roman Empire and its decline from the 1st through the 5th centuries C.E.. What was the political and military glue that held this diverse, multi-ethnic empire together? What were the bases of wealth and how was it distributed? What were the possibilities and limits of economic growth? How integrated was it in culture and religion? What were the causes and consequences of the conversion to Christianity? Why did the Empire fall in the West? How suitable is the analogy of the U.S. in the 21st century?. Same as: CLASSICS 26N

HISTORY 11SC. How Is a Buddhist. 2 Units.

Buddhism as a system of thought, a culture, a way of life, a definition of reality, a method for investigating it, and a mental, physical, and social practice. Buddhism as a total phenomenon. Readings, films, music, and art. How Buddhist practices constitute the world of the Buddhist.

HISTORY 11W. Service-Learning Workshop on Issues of Education Equity. 1 Unit.

Introduces students to a variety of issues at stake in the public education of at-risk high school youth in California. Participants will hear from some of the leading faculty in the School of Education as well as the Departments of Psychology, Sociology, and others, who will share perspectives on the problems and challenges of educating a diverse student body in the state's public school system. The service-learning component of the workshop is a mentoring project (Stanford Students for Educational Equity) with junior class history students from East Palo Alto Academy High School, a Stanford charter school. Same as: CSRE 11W

HISTORY 12. Medicine and Disease in the Ancient World. 3 Units.

(Same as HISTORY 112. History majors and others taking 5 units, register for 112.) This course explores medicine and disease through case studies from civilizations of the ancient world such as Egypt, Greece, and Peru. We will discuss how these cultures conceptualized disease, and in turn, how they contended with illnesses. Lectures will address different forms of illness through medical texts, art, and human remains. Weekly discussion will incorporate evidence from these sources to explore both their potential and their limitations.

HISTORY 12N. The Early Roman Emperors: History, Biography, and Fiction. 3 Units.

Preference to freshmen. The politics, drama, and characters of the period after the fall of the Roman Republic in 49 B.C.E. Issues of liberty and autocracy explored by Roman writers through history and biography. The nature of history writing, how expectations about literary genres shape the materials, the line between biography and fiction, and senatorial ideology of liberty. Readings include: Tacitus' *Annals*, Suetonius' *Lives of the Caesars*, and Robert Graves' *I Claudius* and episodes from the BBC series of the same title.

HISTORY 13. The Historical and Geographical Background of Current Global Events. 3 Units.

This three-unit course is designed to complement History 3, which aims to provide the historical and geographical context necessary for understanding important global issues of the day. Students taking the three-unit course will, in addition to attending the weekly lectures, participate in a weekly seminar in which the same topics addressed in lecture will be examined in greater depth. Students will also be required to write a research paper on a generally neglected news topic of their own choosing.

HISTORY 15D. The Civilization and Culture of the Middle Ages. 3-5 Units.

This course provides an introduction to Medieval Europe from the fall of Rome to the Renaissance. While the framework of the course is chronological, we will concentrate particularly on the structure of medieval society. Rural and urban life, kingship and papal government, wars and plagues provide the context for our examination of the lives of medieval people, what they believed, and how they interacted with other, both within Christendom and beyond it.

Same as: HISTORY 115D

HISTORY 15N. Inequality: the Last 100,000 Years. 3 Units.

(Formerly CLASSHIS 13N.) This seminar traces the evolution of resource inequality from the Stone Age to the present. Only this long-term perspective reveals the forces that drive inequality and allows us to address two key questions: what causes inequality, and what factors have been capable of reducing it, at least for a while? We are going to confront challenging arguments: that inequality has been closely tied up with overall economic and human development, and that over the long course of history, war, revolution and pestilence were the most effective equalizers of income and wealth. This class will help you appreciate contexts and complexities that are usually obscured by partisan polemics and short-term thinking. Seminar participants will be directly involved in the instructor's current research project on the history of inequality.

Same as: CLASSICS 28N

HISTORY 20A. The Russian Empire, 1450-1800. 3 Units.

(Same as HISTORY 120A. History majors and others taking 5 units, register for 120A.) Explores rise of Russian state and expanse of empire; patterns of governance of a Eurasian empire; strategies and institutions of governance; survey of various ethnic and religious groups in empire and their varied cultures and political economies; gender and family; serfdom; Russian Orthodox religion and culture; reforms and Europeanization of 18th century.

HISTORY 20N. Russia in the Early Modern European Imagination. 4 Units.

Preference to freshmen. The contrast between the early modern image of Europe as free, civilized, democratic, rational, and clean against the notion of New World Indians, Turks, and Chinese as savage. The more difficult, contemporary problem regarding E. Europe and Russia which seemed both European and exotic. Readings concerning E. Europe and Russia from the Renaissance to the Enlightenment; how they construct a positive image of Europe and conversely a negative stereotype of E. Europe. Prerequisite: PWR 1.

HISTORY 24SC. Martin Luther King, Jr., and the African American Freedom Struggle. 2 Units.

Many of us understand Martin Luther King, Jr. through the lens of his most civil rights activities and his "I Have a Dream" oration at the 1963 March in Washington for Jobs and Freedom. But who was King really? What can we learn about his inner life? To what extent did he actually lead a movement that was beyond the control of any single leader? How did thousands of grassroots activists become a movement that changed the course of history? This course will examine these questions and more by utilizing the vast number of primary source materials of the King Institute. Students will have the opportunity to conduct research and carry out their own individual research projects, which can be traditional papers, multi-media presentations, or even educational websites. Guest speakers may include various experts, such as King Institute scholar-in-residence Clarence Jones, who served as King's attorney, adviser, and occasional speechwriter. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

HISTORY 25. St. Petersburg: A Cultural Biography. 1 Unit.

This course explores the rich cultural heritage of St. Petersburg: art, architecture, urban planning, literature, dance, music, theater. Lectures will be extensively slide-illustrated, particularly on architecture and art. The course will meet Thursday evenings 7:00-9:00 pm as part of the Continuing Studies Program (CSP) for adult students; undergraduate students are welcome to participate by enrolling in this 1-unit History course. Readings will be posted in Coursework for CSP participants and will be available but optional for undergraduate students. Satisfactory credit for undergraduates will be earned by attending 80% of the lectures and by submitting a 5-page paper on a topic of the student's choice utilizing the CSP assigned readings and sources suggested by the instructor.

HISTORY 29S. The Animal Other: Humans and Animals in Western History. 5 Units.

Enter a world in which war was waged not by tanks but on horseback and oceans brimmed with fantastic monsters. This class explores the animal-human divide in Western cultural history through topics including: the rise of natural history; the centralized state and its relationship to nature; monstrosity and witchcraft; the ethics of metaphor; scapegoating, sexism, racism; history of animal-rights. Students will have the opportunity to help curate a Green Library exhibition on this subject. The course fulfills the departmental Sources and Methods requirement.

Same as: FEMGEN 29S

HISTORY 30C. Culture and Society in Reformation England. 3 Units.

(Same as History 130C. History majors and others taking 5 units, register for 130C.) Focuses on the appeal of both Reformed and Catholic ideas in the political and cultural contexts of early modern Europe. Topics include: the Lutheran revolt; the spread of Protestant ideas; Calvin's Geneva; the English Reformation; Tridentine reform and the Jesuits; toleration and the underground churches; wars and religious violence; and the making of European confessional identities. Sources include sermons, religious polemic, autobiographies, graphic prints, poetry, and music.

HISTORY 30N. Eighteen-Year-Olds Go to War: Global Experiences of World War I. 4 Units.

Exactly one hundred years ago, eighteen-year-olds like you went to war, imagining a romantic, life-changing experience. They found instead an apocalyptic nightmare, senseless mass death, unending stalemate, mud, rats, and endless trauma. In this course we will revisit the journeys of young men and women who lived through the First World War in Europe, India, the Middle East, and Africa. We will explore the causes, unfolding, legacy, and memory of the war, using diaries, letters, memoirs, novels, poetry, films, and works of historical analysis. Witness the birth of the modern world.

HISTORY 31. Leonardo's World: Science, Technology, and Art in the Renaissance. 3-5 Units.

(Same as HISTORY 31. History majors and others taking 5 units, register for 131.) What did Leonardo actually know? How did he acquire that knowledge? Explores Leonardo's interests and accomplishments in such fields as painting, architecture, engineering, physics, mathematics, geology, anatomy, and physiology, and more generally the nature of Renaissance science, art, and technology. Considers the relationship between the society of fifteenth century Italy and the work of the man from Vinci: why did this world produce a Leonardo? How might we use him to understand creativity, innovation, and invention in the Renaissance and beyond? What was his legacy and how did he become a myth? Designed both for students interested in the history of science, medicine, and technology and for students interested in the history and art of Renaissance Italy.

Same as: HISTORY 131

HISTORY 36N. Gay Autobiography. 4 Units.

Preference to freshmen. Gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Louganis, Barbin, Cammermeyer, Gingrich, and Lorde. To what degree do these writers view sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view identity? What politics follow from these writers' experiences?.

Same as: FEMGEN 36N

HISTORY 38A. Germany and the World Wars. 3 Units.

(Same as HISTORY 138A. Majors and others taking 5 units, enroll in 138A.) Germany's tumultuous history from the Second Empire through the end of the Cold War. International conflict, social upheaval, and state transformation during Bismarck's wars of unification, World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.

Same as: JEWISHST 38A

HISTORY 39. Modern Britain and the British Empire. 3 Units.

(Same as HISTORY 139. History majors and others taking 5 units, register in 139.) From American Independence to the latest war in Iraq. Topics include: the rise of the modern British state and economy; imperial expansion and contraction; the formation of class, gender, and national identities; mass culture and politics; the world wars; and contemporary racial politics. Focus is on questions of decline, the fortunes and contradictions of British liberalism in an era of imperialism, and the weight of the past in contemporary Britain.

HISTORY 39S. Brave New World: Berlin in the Twenties. 5 Units.

From Expressionism to Nazism, the bloodstream of Germany's Weimar Republic (1918-33) coursed with bold and terrifying ideas about how to be modern. Using classic films and architecture, cabaret songs and novels, propaganda posters and newspapers, we will explore Berlin's Roaring Twenties. Yet we will also see that profound and frightening questions accompanied the glamour and sex appeal: about technology and the city, gender and modernity, political violence and the fragility of democracy, the place of emotions in public life. The course fulfills the departmental Sources and Methods requirement.

HISTORY 40. World History of Science. 3 Units.

(Same as HISTORY 140. History majors and others taking 5 units, register for 140.) The earliest developments in science, the prehistoric roots of technology, the scientific revolution, and global voyaging. Theories of human origins and the oldest known tools and symbols. Achievements of the Mayans, Aztecs, and native N. Americans. Science and medicine in ancient Greece, Egypt, China, Africa, and India. Science in medieval and Renaissance Europe and the Islamic world including changing cosmologies and natural histories. Theories of scientific growth and decay; how science engages other factors such as material culture and religions.

HISTORY 40S. Magic and Occult Science in Early Modern Europe. 5 Units.

The history of magic and occult philosophy in Europe during the Renaissance, the Scientific Revolution, and the Enlightenment. How did magical and occult ways of approaching the world figure in the development of science, technology, and culture, and how do they relate to our views today? We will read primary texts on astrology and alchemy, esoteric cosmology, mathematical mysticism, magic and technology, exploration and discovery, and the Chinese occult tradition, as well as consider their expression in art and music. The course fulfills the departmental Sources and Methods requirement.

HISTORY 41Q. Mad Women: Women and Mental Illness in U.S. History. 3 Units.

Explores how gender and historical context have shaped the experience and treatment of mental illness in U.S. history. Why have women been the witches and hysterics of the past, and why have there historically been more women than men among the mentally ill? Topics include the relationship between historical ideas of femininity and insanity, the ways that notions of gender influence the definition and treatment of mental disorder, and the understanding of the historically embedded nature of medical ideas, diagnoses, and treatments.

HISTORY 42S. The Circle of Life: Visions of Nature in Modern Science, Religion, Politics and Culture. 5 Units.

A new understanding of nature emerged in the 1700s that fundamentally altered our perception of the living world and humanity's relationship with it. By tracing the evolution of this understanding forward, we gain insight into the interactions among science, religion, politics and culture. Topics include: nature in Romantic science, poetry and art; Darwin's theory of evolution and its afterlife in science, literature and popular culture; the science and politics of the 20th-century environmental movement; and the philosophical presuppositions underlying modern debates about biodiversity. In addition to close readings of canonical texts and contemporary commentaries, students will be introduced to digital history methods. Students will design their own final projects in consultation with the instructor.

HISTORY 44. History of Women and Gender in Science, Medicine and Engineering. 3 Units.

(Same as HISTORY 144. Majors and others taking 5 units, enroll in HISTORY 144.) Men's and women's roles in science, medicine, and engineering over the past 200 years with a focus on the present. What efforts are underway globally to transform research institutions so that both men's and women's careers can flourish? How have science and medicine studied and defined males and females? How can we harness the creative power of gender analysis to enhance knowledge and spark innovation?.

HISTORY 45B. Africa in the Twentieth Century. 3 Units.

(Same as HISTORY 145B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans.

HISTORY 46N. Science and Magic in History. 4-5 Units.

Preference to freshmen. This course explores the intertwined histories of science and magic. We will begin with the emergence of experimental modern science from natural magic during the Renaissance and will look closely at the apparatus of the natural magician -- magic lanterns and other optical devices, magnets, siphons and other tricky gadgets -- which supplied the first experimental philosophers with their instruments. We will follow the development of scientific performances through the electrical and pneumatic amusements of the 18th century and the founding of "modern magic" in the 19th. Finally, we will look at the legacy of this joint history for both magic and science today. You may think magic and science sound like opposites, but by the light of history -- presto! -- you will see them merge in surprising ways.

HISTORY 47. History of South Africa. 3 Units.

(Same as HISTORY 147. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: AFRICAAM 47

HISTORY 47N. Global History of Death and Dying. 4 Units.

Does death have a history? Explores the changing realities of, attitudes towards and ways of coping with death. The role of death in shaping the modern world via the global slave trades, imperial conquests, pandemics, wars and genocides. Ways people have made sense of death in extraordinary circumstances and during calmer times. Continuities and transformations in death rituals, intellectual and philosophical debates about the personal and social meanings of death, and the consequences of ways and patterns of dying.

HISTORY 48Q. South Africa: Contested Transitions. 3 Units.

Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet. Same as: AFRICAAM 48Q

HISTORY 49C. THE SLAVE TRADE. 3 Units.

(Same as HISTORY 149C. History majors and others taking 5 units, enroll in 149C.) Slave trades and forms of slavery in W. Africa from 1000 to 1885; impacts on lives, social organization, and political structures. Slavery in Islam, the slave market in the Mediterranean and Middle East, and the Saharan slave trade. Slavery within Africa, growth of the Atlantic trade, the Middle Passage, and war and trade that produced slaves. Impact of the Industrial Revolution and European abolition movements on the use of slaves and warfare in Africa. The relationship between slaving and the European conquest of Africa.

HISTORY 50A. Colonial and Revolutionary America. 3 Units.

(Same as HISTORY 150A. History majors and others taking 5 units, register for 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution.

HISTORY 50B. 19th Century America. 3 Units.

(Same as HISTORY 150B. History majors and others taking 5 units, register in 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. Same as: AFRICAAM 50B

HISTORY 50C. The United States in the Twentieth Century. 3 Units.

(Same as HISTORY 150C. History majors and others taking 5 units, register for 150C.) Major political, economic, social, and diplomatic developments in the U.S. Themes: the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 50s and 60s); the changing status of women since WW II; shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy in WW I and II, and the Cold War.

HISTORY 50K. John F. Kennedy: Fifty Years Later. 1 Unit.

November 22, 2013 marks the 50th anniversary of President John F. Kennedy's assassination. Half a century on, our visually saturated culture remains besotted with images of the youthful president and his strikingly photogenic family. But the passage of time has also yielded new perspectives on Kennedy's presidency and on his era. November 22, 1963 may well come to be remembered not only as the day when the life of a promising young leader was violently cut short, but also as the pivot between two distinct eras in American history. Ironically, though Kennedy was the first World War II veteran to reach the White House, his death heralded the end of the long postwar season of national pride, optimism, confidence, and widely shared prosperity; and may have opened the road to the great catastrophe that was the Vietnam War. His passing also helped to pry open the portals to historic changes in the lives of millions of African Americans, as witnessed by Lyndon Johnson's artful invocation of the fallen president to bring about passage of the epic civil rights legislation of the late 1960s. This course will examine the postwar domestic and international settings in which Kennedy rose to and exercised power. It will probe our continuing fascination with his character and with his family; his role as a Cold Warrior, especially in the tense confrontation known as the Cuban Missile Crisis; and his relation to the African American struggle to bury Jim Crow. We will conclude with an assessment of the longer-term historical consequence of his brief moment in the arenas of celebrity and power. Guest speakers will include noted Kennedy biographer Robert Dallek; Johnson biographer Bruce Schulman; Taylor Branch, acclaimed biographer of Martin Luther King, Jr.; and Stanford's own Jennifer Burns, historian of modern America.

HISTORY 50N. Who Killed Jane Stanford?. 4 Units.

In 1905 Jane Stanford died of strychnine poisoning. Who may have killed her remains unknown. You will, in effect, be a grand jury. Like most of your real life intellectual work, the class will be collaborative. Together you will identify suspects and examine the often odd actions of central figures in the case: her personal secretary, physicians, and David Starr Jordan, the president of Stanford.

HISTORY 54. American Intellectual and Cultural History to the Civil War. 3 Units.

(Same as HISTORY 154. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images.

HISTORY 54N. African American Women's Lives. 3-4 Units.

Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality.

Same as: AFRICAAM 54N, AMSTUD 54N, CSRE 54N, FEMGEN 54N

HISTORY 55Q. The Origins of the Modern American City, 1865-1920. 3 Units.

Are we living in a new Gilded Age? To answer this question, we go back to the original Gilded Age, as well as its successor, the Progressive Era. How did urban Americans around the turn of the twentieth century deal with stark inequalities of class, race, ethnicity, gender, and sexuality? And what can we learn from their struggles for our own time? Students use primary and secondary sources in digital and print formats. Possible field trip to San Francisco.

Same as: AMSTUD 25Q, URBANST 25Q

HISTORY 57E. State of the Union 2014. 1 Unit.

This course will examine major themes that contribute to the health, or disease, of the US body politic. Challenges and opportunities abound: we live in an age of rising inequality, dazzling technological innovation, economic volatility, geopolitical uncertainty, and the accumulating impact of climate change. These conditions confront our political leaders and us as citizens of a democracy plagued by dysfunction. What are the implications for the body politic? Led by Rob Reich (Political Science, Stanford), David Kennedy (History, Stanford), and James Steyer (CEO, Common Sense Media), the course will bring together distinguished analysts of American politics. Together, we will examine the following topics: inequality; energy and the environment; media and technology; the economy; and the 2014 midterm elections. The course is designed for the entire Stanford community: jointly offered for undergraduate and graduate students at Stanford (through listings in Political Science and History) and for community members through the Continuing Studies Program. For students, the course is available for 1 credit. This course may not be taken for a Letter Grade.

Same as: POLISCI 57E

HISTORY 60N. Revolutionaries and Founders. 3 Units.

Americans remain fascinated by the revolutionary generation which secured independence and established a national constitutional republic. Books about the founders come steadily from the presses, some describing the lives of individual revolutionaries, others trying to analyze and explain what made these events possible. This seminar will approach the Revolution through both a biographical and analytical framework, relying both on scholarly writings and the massive array of primary sources that are readily available through letterpress editions and on-line. The course will rely on the instructor's own recent book, *Revolutionaries: A New History of the Invention of America*, which carries the story from the crisis around the Boston Tea Party of 1773 through the end of President Washington's first administration. The course will be divided evenly between modern scholarship and the careful reading of original materials, and students will write short essays that will involve the analysis of explanatory problems, the close interpretation of documents, and the crafting of historical narratives. Topics to be discussed will include the outbreak of the revolution, constitution-making at both the state and national levels of government, the conduct of the war, and the legacies that Americans particularly associate with Thomas Jefferson, James Madison, and Alexander Hamilton.

HISTORY 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.

This course explores the emergence of concepts of gender equality in world history. It asks how gender inequality relates to racial, ethnicity, and sexual identities, how men engage with feminism, whether gender equality is purely a western cultural tradition, and much more. We approach the long history of ideas about gender and equality by reading primary historical documents from around the world, moving from the 15th century to the present. Topics include education, the body, sexuality, violence, labor, and politics.

Same as: AMSTUD 63N, CSRE 63N, FEMGEN 63N

HISTORY 64. Racial and Ethnic Diversity in Modern America. 4-5 Units.

How ethnicity influenced the American experience and how prevailing attitudes about racial and ethnic groups over time have affected the historical and contemporary reality of the nation's major minority populations. Focus is on the past two centuries.

Same as: CSRE 64

HISTORY 64S. Debtor Nation: 20th Century American Capitalism. 5 Units.

This course explores the history of 20th century American capitalism through the workings of credit and debt. What is debt? Who has access to credit and how is creditworthiness determined? Using a range of sources, from crop-lien contracts, to installment plans, to advertisements for municipal bonds, students will examine the ways in which capitalism shapes and is shaped by the allocation of credit along race, class, and gendered lines. The course fulfills the departmental Sources and Methods requirement.

HISTORY 65D. The Pacific World. 3 Units.

(Same as HISTORY 165D. Majors and others taking 5 units, enroll in 165D.) Taking the Pacific and the regions of the world that touch the ocean as the unit of analysis, we will explore geographic, social, cultural, and political interactions that created what we now call the Pacific World. Ranging over four hundred years of history, we will examine human migrations, explorations, interactions and conflicts, and human ecology. The course is not nation-focused but is transnational and international in approach.

HISTORY 65S. Intimate Frontiers: Race, Gender, and Colonialism in the American West. 5 Units.

Historians have increasingly recognized the American West as a place of empire and settler colonialism. This course will explore the colonial dimensions of the 19th century American West through a variety of sources produced in the most "intimate" spaces on North America's multicultural frontier: in homes, missions, boardinghouses, schools, mining camps, courtrooms, and more. By examining how the intimate shaped everyday lives, we will pay special attention to how ambiguous concepts like race, gender, class, sexuality, and national identity coalesced. The course fulfills the departmental Sources and Methods requirement.

Same as: CSRE 65M, FEMGEN 65S

HISTORY 66S. The Americans are Coming!: The Cold War at Home and Abroad. 5 Units.

This course explores the relationship between U.S. foreign and domestic policy from 1945 to 1975. How did fighting the "Communist menace" shape notions of race, gender, and national identity within the United States? In what ways did nation-building abroad trigger clashes over the meaning of democracy at home? Using textual sources, photographs, films, and cartoons, students will examine notions of what it meant to be "American," both inside and outside the nation's borders, in a Cold War climate. The course fulfills the departmental Sources and Methods requirement.

Same as: CSRE 66S

HISTORY 70. Culture, Politics, and Society in Latin America. 3 Units.

(Same as HISTORY 170B. History majors and others taking 5 units, enroll in HISTORY 170B.) The course of Latin American history from the colonial era to the present day. Key issues such as colonialism, nationalism, democracy, and revolution will be examined critically in light of broad comparative themes in Latin American and world history. Sources include writings in the social sciences as well as primary documents, fiction, and film.

HISTORY 71S. American Political Thought from the Civil War to the Cold War. 5 Units.

This course explores America's most important political tradition: liberalism. What does liberalism mean? Does it mean something different today than it did in the past? Using multiple textual and visual sources, students will grapple with how Americans remade liberalism in the 19th and 20th centuries and how political thinkers have understood its meaning over time. We will see how American liberalism was shaped by factors of race, gender, and class and by competing ideologies like conservatism and socialism.

HISTORY 72S. Family and Law in American History. 5 Units.

This course explores connections between family and law in American history, from the colonial period through the early twentieth century. We will examine the roles, status, and agency of husbands, wives, mothers, fathers, and children, within the family, the law, and broader society. Using a variety of primary sources, we will consider topics including property rights, marriage, divorce, illegitimacy, child labor, slave families and family relationships among freedpeople, child custody, adoption, polygamy, immigration and citizenship, and child welfare. The course fulfills the departmental Sources and Methods requirement.

HISTORY 74. Mexico Since 1876: History of a "Failed State"?. 3 Units.

This course is an introduction to the history and diverse peoples of modern Mexico from 1876 to the present. Through lectures, discussions, primary and secondary readings, short documentaries, and written assignments, students will critically explore and analyze the multiplicity of historical processes, events and trends that shaped and were shaped by Mexicans over the course of a century. The course will cover some of the social and political dimensions of rural social change, urbanization and industrialization, technological innovation and misuse, environmental degradation and conservation, education, ideology, culture and media, migration, and the drug trade.

HISTORY 74S. Sounds of the Century: Popular Music and the United States in the 20th Century. 5 Units.

What can popular music teach us about the past? What can we learn about music if we study it historically? This course grapples with these two questions by examining various examples of American music in the 20th century, as well as more conventional historical sources, scholarly books, and essays. Will pay special attention to how issues of race, gender, sexuality, class, and nation were reflected in and produced by people's interactions with music, inside and outside American borders.

HISTORY 78N. Film and History of Latin American Revolutions. 3 Units.

In this course we will watch and critique films made about Latin America's 20th century revolutions focusing on the Mexican, Cuban, Chilean and Nicaraguan revolutions. We will analyze the films as both social and political commentaries and as aesthetic and cultural works, alongside archivally-based histories of these revolutions.

HISTORY 82C. Making of the Islamic World, 600-1500. 3 Units.

(Same as HISTORY 182C. Majors and other taking 5 units, register for 182C.) The History of Islam and Muslim peoples from 600-1500. Topics include Muhammad and his community; the early Arab conquests and empires; sectarian movements; formation of Islamic belief, thought, legal culture and religious institutions; transregional Sufi and learned networks; family and sexuality; urban, rural and nomadic life; non-Muslim communities; the development of Mediterranean and Indian Ocean trade; relations with Byzantium, the Latin West, China; the Crusades and the Mongols.

HISTORY 84. Zionism. 3 Units.

(Same as HISTORY 184. History majors and others taking 5 units, register for 184.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond. Same as: CSRE 84, JEWISHST 84, REES 84

HISTORY 84N. The American Empire in the Middle East. 4-5 Units.

What have been the traditional objectives of U.S. policy in the Middle East since the end of World War II? What forces shape U.S. policy towards the Middle East? Did those interests and the means employed to pursue them change substantially after the demise of the Soviet Union? What has been the impact of U.S. policy on the region itself? The three principal cases to be examined are Afghanistan, Iraq and Israel/Palestine.

HISTORY 87. The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan. 3 Units.

(Same as HISTORY 187. History majors and other taking 5 units, register for 187.) Explores the contested politics of these societies in modern times. Topics include controversies surrounding the meaning of revolution, state building, war, geopolitics, Islamic law, clerical authority, gender, an Islamic economy, culture, and ethnic, national and religious identities from the 1940s to the present. Assignments will focus on primary sources (especially legal documents, poetry, novels, and memoirs) and films.

HISTORY 90. EARLY CHINESE THOUGHT. 3-5 Units.

This course will examine the basic themes that emerged among the philosophical texts of early China; including writings attributed to Confucius and his followers, those of the early Daoists, and those focused on the authoritarian state; and analyze their relation to the changes in the state and social order in that period. Themes to be discussed will include the nature of human networks, the state, the family, the body, personality or temperaments, stratagems, language, and the structure of the cosmos. Same as: HISTORY 190

HISTORY 91D. China: The Northern and Southern Dynasties. 3 Units.

(Same as HISTORY 191D. History majors and others taking 5 units, register for 191D.) Examines one of the most dynamic periods of Chinese history with the emergence of the institutional religions (Buddhism and Daoism), the development of the garden as an art form, the rise of landscape as a theme of verse and art, the invention of lyric poetry, and the real beginnings of the southward spread of Chinese civilization.

HISTORY 92A. The Historical Roots of Modern East Asia. 4-5 Units.

Focus is on China and Japan before and during their transition to modernity. The populous, urbanized, economically advanced, and culturally sophisticated Ming empire and Muromachi shogunate in the 16th century when Europeans first arrived. How the status quo had turned on its head by the early 20th century when European and American steamships dominated the Pacific, China was in social and political upheaval, and Japan had begun its march to empire.

Same as: HISTORY 392E

HISTORY 93. Late Imperial China. 3 Units.

(Same as HISTORY 193. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINLIT 93, FEMGEN 93

HISTORY 93S. Bandits, Merchants, and Saints: The Sino-Tibetan Frontier, 1700-2000. 5 Units.

Beginning in the eighteenth century, this course traces the complex transition from empire to nation-state along the Sino-Tibetan frontier, touching upon a number of important issues such as imperial policies of incorporation, resistance, and the rise of modernity. We will explore varied methodological approaches to a wide range of primary sources; Tibetan histories, Sufi hagiographies, legal cases, short stories; and investigate how the frontier; merchants, herders, and farmers experienced the enormous social and political changes of the last three centuries. The course fulfills the departmental Sources and Methods requirement.

HISTORY 94B. Japan in the Age of the Samurai. 3 Units.

(Same as HISTORY 194B. History majors and others taking 5 units, register for 194B.) From the Warring States Period to the Meiji Restoration. Topics include the three great unifiers, Tokugawa hegemony, the samurai class, Neoconfucian ideologies, suppression of Christianity, structures of social and economic control, frontiers, the other and otherness, castle-town culture, peasant rebellion, black marketing, print culture, the floating world, National Studies, food culture, samurai activism, black ships, unequal treaties, anti-foreign terrorism, restorationism, millenarianism, modernization as westernization, Japan as imagined community.

HISTORY 94S. Muscle Men and Iron Girls: Sex and Masculinity in Chinese and American History. 5 Units.

How is masculinity represented and experienced in different cultural contexts? How do gender, sexuality, race, and class inform the construction of American and Chinese masculinities? How do historians use primary sources to make arguments? Examines visual and textual sources including magazines, photographs, propaganda posters, legal cases and film. Analyzes transnational history of masculinity in China and the United States from the late 1800s to the present. Topics include bodybuilding, martial arts, female masculinity, homosexuality, Cold War, and 1960s social movements. The course fulfills the departmental Sources and Methods requirement. Same as: FEMGEN 94S

HISTORY 95. Modern Korean History. 3 Units.

(Same as HISTORY 195. History majors and others taking 5 units, register for 195.) This lecture course provides a general introduction to the history of modern Korea. Themes include the characteristics of the Chosŏn dynasty, reforms and rebellions in the nineteenth century, Korean nationalism; Japan's colonial rule and Korean identities; decolonization and the Korean War; and the different state-building processes in North and South, South Korea's democratization in 1980s, and the current North Korean crisis.

HISTORY 95C. Modern Japanese History: From Samurai to Pokemon. 3 Units.

(Same as History 195C. History majors and others taking 5 units, register for 195C.) Japan's modern transformation from the late 19th century to the present. Topics include: the Meiji revolution; industrialization and social dislocation; the rise of democracy and empire; total war and US occupation; economic miracle and malaise; Japan as soft power; and politics of memory. Readings and films focus on the lived experience of ordinary men and women across social classes and regions.

HISTORY 95N. Mapping the World: Cartography and the Modern Imagination. 4-5 Units.

Preference to freshmen. Focus is on cutting-edge research. Topics: the challenge of grasping the globe as a whole; geography's roots in empire; maps as propaganda and as commodities; the cultural production of scale; and the cartography of imaginary worlds. Sources include resources in the Green Library Special Collections and in the Stanford Spatial History Lab.

HISTORY 96. Worlds of Gandhi. 3 Units.

Place the paradox of Gandhi in context of global convulsions of 20th century. Gandhi lived across continents; maturing in South Africa, struggling in India, attaining celebrity in Europe. As leader of masses, his method of Satyagraha was distinctively at odds with his times. Yet, he also privileged sacrifice, dying, even euthanasia. In a world beset by fear and war, Gandhi's complex theory of nonviolence is compelling. What kind of nonviolent politics did Gandhi envision after Fascism, Auschwitz, Hiroshima, and Pakistan?

HISTORY 98. The History of Modern China. 3 Units.

(Same as HISTORY 198. History majors and others taking 5 units, register for 198.) This course charts major historical transformations in modern China, and will be of interest to those concerned with Chinese politics, culture, society, ethnicity, economy, gender, international relations, and the future of the world.

HISTORY 98N. Beijing, Shanghai, and the Structure of Modern China. 3 Units.

This course examines the transformation of China from the late empire to the present by studying the nature of its two greatest cities. Topics examined will include the evolving physical structure of the cities, their changing relations to the Chinese state and the outside world, shifting understandings of the urban population/crowd, the changing nature of time, new modes of self-definition through patterns of consumption, the cities as topics of literature and movies, and the nature of urban modernity.

HISTORY 99S. Christianity in East Asia. 5 Units.

How did Christianity spread in East Asia? Was it simply a by-product of Western imperialism? How should we evaluate the social transformations that accompanied Christianity? How have historians addressed the related issues such as cultural encounter, nationalism, imperialism, gender, and secularism? Through a wide range of primary and secondary sources, this course examines the history of Christianity in East Asia from its origins in the 16th century to the present. The course fulfills the departmental Sources and Methods requirement.

HISTORY 101. The Greeks. 4-5 Units.

(Formerly CLASSHIS 101.) 250 years ago, for almost the first time in history, a few societies rejected kings who claimed to know what the gods wanted and began moving toward democracy. Only once before had this happened--in ancient Greece. This course asks how the Greeks did this, and what they can teach us today. It uses texts and archaeology to trace the material and military sides of the story as well as cultural developments, and looks at Greek slavery and misogyny as well as their achievements. Weekly participation in a discussion section is required. Same as: CLASSICS 83

HISTORY 102. History of the International System. 5 Units.

After defining the characteristics of the international system at the beginning of the twentieth century, this course reviews the primary developments in its functioning in the century that followed. Topics include the major wars and peace settlements; the emergence of Nazism and Communism; the development of the Cold War and nuclear weapons; the rise of China, India, and the EU; and the impact of Islamic terrorism. The role of international institutions and international society will also be a focus as will the challenge of environment, health, poverty, and climate issues to the functioning of the system. Same as: INTNLREL 102

HISTORY 102A. The Romans. 3-5 Units.

(Formerly CLASSHIS 60.) How did a tiny village create a huge empire and shape the world, and why did it fail? Roman history, imperialism, politics, social life, economic growth, and religious change. Weekly participation in a discussion section is required; enroll in sections on Coursework. Same as: CLASSICS 84

HISTORY 103D. Human Society and Environmental Change. 4 Units.

Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1. Same as: EARTHSYS 112, EESS 112

HISTORY 103E. The International History of Nuclear Weapons. 5 Units.

The development of nuclear weapons and policies. How existing nuclear powers have managed their relations with each other. How nuclear war has been avoided so far and whether it can be avoided in the future. Same as: POLISCI 116

HISTORY 103F. Introduction to Military History. 5 Units.

Introduces students to the rich history of military affairs and, at the same time, examines the ways in which we think of change and continuity in military history. How did war evolve from ancient times, both in styles of warfare and perceptions of war? What is the nature of the relationship between war and society? Is there such a thing as a Western way of war? What role does technology play in transforming military affairs? What is a military revolution and can it be manufactured or induced? Chronologically following the evolution of warfare from Ancient Greece to present day so-called new wars, we will continuously investigate how the interdependencies between technological advances, social change, philosophical debates and economic pressures both shaped and were influenced by war.

HISTORY 104D. International Security in a Changing World. 5 Units.

This class surveys the most pressing international security issues facing the world today and includes an award-winning two-day international crisis simulation led by Stanford faculty and former policymakers. Guest lecturers have included former Secretary of Defense William Perry, former U.S. Ambassador to Afghanistan Gen. Karl Eikenberry, and former Secretary of State Condoleezza Rice. Major topics covered: cyber security, nuclear proliferation, insurgency and intervention, terrorism, the Arab Spring, and the future of U.S. leadership in the world. No prior background in international relations is necessary.

Same as: IPS 241, POLISCI 114S

HISTORY 105C. Human Trafficking: Historical, Legal, and Medical Perspectives. 5 Units.

(Same as HISTORY 5C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.

Same as: FEMGEN 105C, INTNLREL 105C

HISTORY 106A. Global Human Geography: Asia and Africa. 5 Units.

Global patterns of demography, economic and social development, geopolitics, and cultural differentiation, covering E. Asia, S. Asia, S.E. Asia, Central Asia, N. Africa, and sub-Saharan Africa. Use of maps to depict geographical patterns and processes.

HISTORY 106B. Global Human Geography: Europe and Americas. 5 Units.

Patterns of demography, economic and social development, geopolitics, and cultural differentiation. Use of maps to depict geographical patterns and processes.

HISTORY 107E. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization. These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography.

Same as: ANTHRO 13A, ARCHLGY 13, HISTORY 7E

HISTORY 109E. Global Women Leaders: Past, Present, and Future. 3-4 Units.

What conditions prompted the emergence of women political leaders around the world and what difference has their leadership made? This course introduces students to global women's history and focuses on a series of individual women leaders in the 20th century. We look at movements for women's self-determination in the 19th and 20th centuries that set the stage for women's emergence as national political leaders and activists in the 20th century. We then focus on a series of global women leaders including Eleanor Roosevelt, Golda Meir, Margaret Thatcher, Benazir Bhutto, Michelle Bachelet and Aung San Suu Kyi. By studying their biographies and historical contributions, we will explore the ways women leaders make distinctive contributions as heads of state and political activists.

HISTORY 110B. Survey of Early Modern Europe. 5 Units.

(Same as HISTORY 10B. History majors and others taking 5 units, register for 110B.) From 1350 to 1789, Europe went from being a provincial backwater to a new global center of power. This course surveys the profound changes of the period that shape our world today: the spread of humanism and science, religious reformation, new styles of warfare, the rise of capitalism and a new global economy, the emergence of the state, and revolution which sought to overthrow established governments.

HISTORY 112. Medicine and Disease in the Ancient World. 5 Units.

(Same as HISTORY 12. History majors and others taking 5 units, register for HISTORY 112.) This course explores medicine and disease through case studies from civilizations of the ancient world such as Egypt, Greece, and Peru. We will discuss how these cultures conceptualized disease, and in turn, how they contended with illnesses. Lectures will address different forms of illness through medical texts, art, and human remains. Weekly discussion will incorporate evidence from these sources to explore both their potential and their limitations.

HISTORY 113. Before Globalization: Understanding Premodern World History. 3-5 Units.

(Formerly CLASSHIS 147.) This course covers the history of the world from 60,000 years ago until 1500 by asking big questions: Why did civilizations develop the way they did? What factors were responsible for similarities and differences between different parts of the world? What does this mean for our newly globalized world?

HISTORY 114. Origins of History in Greece and Rome. 4-5 Units.

(Formerly CLASSHIS 117.) The beginnings and development of historical writing in the ancient world. Emphasis on major classical historians and various models of history they invented, from local to imperial, military, cultural, biographical, world history and church history. Focus on themes of power, war, loss, growth and decline, as put by the ancients into historical narrative forms and probed by way of historical questioning and explanation. Attention to how these models resonate still today. Readings in translation: Herodotus, Thucydides, Tacitus, Livy and others. Participation in a weekly discussion section is required.

Same as: CLASSICS 88

HISTORY 115D. The Civilization and Culture of the Middle Ages. 3-5 Units.

This course provides an introduction to Medieval Europe from the fall of Rome to the Renaissance. While the framework of the course is chronological, we will concentrate particularly on the structure of medieval society. Rural and urban life, kingship and papal government, wars and plagues provide the context for our examination of the lives of medieval people, what they believed, and how they interacted with other, both within Christendom and beyond it.

Same as: HISTORY 15D

HISTORY 116N. Howard Zinn and the Quest for Historical Truth. 3 Units.

With more than two million copies in print, Howard Zinn's *A People's History* is a cultural icon. We will use Zinn's book to probe how we determine what was true in the past. *A People's History* will be our point of departure, but our journey will visit a variety of historical trouble spots: debates about whether the US was founded as a Christian nation, Holocaust denial, and the "Birther" controversy of President Obama.

Same as: EDUC 116N

HISTORY 117. Ancient Empires: Near East. 4-5 Units.

Why do imperialists conquer people? Why do some people resist while others collaborate? This course tries to answer these questions by looking at some of the world's earliest empires. The main focus is on the expansion of the Assyrian and Persian Empires between 900 and 300 BC and the consequences for the ancient Jews, Egyptians, and Greeks. The main readings come from the Bible, Herodotus, and Assyrian and Persian royal inscriptions, and the course combines historical and archaeological data with social scientific approaches. Weekly participation in a discussion section is required.

Same as: CLASSICS 81

HISTORY 120A. The Russian Empire, 1450-1800. 5 Units.

(Same as HISTORY 20A. History majors and others taking 5 units, register for 120A.) Explores rise of Russian state and expanse of empire; patterns of governance of a Eurasian empire; strategies and institutions of governance; survey of various ethnic and religious groups in empire and their varied cultures and political economies; gender and family; serfdom; Russian Orthodox religion and culture; reforms and Europeanization of 18th century.

HISTORY 120B. The Russian Empire. 5 Units.

From Peter the Great to the Bolsheviks. Russia as an empire; its varied regions, including the Caucasus, Central Asia, Ukraine, Poland, and the Baltics. Focus is on the politics and cultures of empire. Sources include novels, political tracts, paintings, music, and other primary sources.

HISTORY 120C. 20th-Century Russian and Soviet History. 5 Units.

The Soviet polity from the 1917 Revolution to its collapse in 1991. Essentials of Marxist ideology; the Russian Empire in 1917. Causation in history; interpretations of the Revolution; state building in a socialist polity; social engineering through collectivization of agriculture, force-paced industrialization, and cultural revolution; terror as concept and practice; nationality policies in a multiethnic socialist empire; the routinization, decline, and collapse of the revolutionary ethos; and the legacy of the Soviet experiment in the new Russia.

HISTORY 126B. Protestant Reformation. 4 Units.

The emergence of Protestant Christianity in 16th-century Europe. Analysis of writings by evangelical reformers (Luther, Calvin, Zwingli, Sattler, Hubmeier, Muuml;ntzer) and study of reform movements (Lutheran, Reformed, Anabaptist, Spiritualist) in their medieval context and as expressions of new and influential visions of Christian belief, life, social order.

Same as: RELIGST 126

HISTORY 130A. In Sickness and In Health: Medicine and Society in the United States: 1800-Present. 5 Units.

Explores the history of medical institutions, ideas and practices in the United States from the early nineteenth century to the present. How are ideas of illness and health historically rooted and socially constructed? How did scientific and medical discoveries lead to the risk of scientific medicine, and how were these innovations adopted within the American cultural landscape? Topics include the transformation of therapeutics and technologies, medicine and the scientific ideal in the U.S., gender and race and medicine, the history of public health, and the professionalization and specialization of American medical practice.

HISTORY 131. Leonardo's World: Science, Technology, and Art in the Renaissance. 3-5 Units.

(Same as HISTORY 31. History majors and others taking 5 units, register for 131.) What did Leonardo actually know? How did he acquire that knowledge? Explores Leonardo's interests and accomplishments in such fields as painting, architecture, engineering, physics, mathematics, geology, anatomy, and physiology, and more generally the nature of Renaissance science, art, and technology. Considers the relationship between the society of fifteenth century Italy and the work of the man from Vinci: why did this world produce a Leonardo? How might we use him to understand creativity, innovation, and invention in the Renaissance and beyond? What was his legacy and how did he become a myth? Designed both for students interested in the history of science, medicine, and technology and for students interested in the history and art of Renaissance Italy.

Same as: HISTORY 31

HISTORY 132. Ordinary Lives: A Social History of the Everyday in Early Modern Europe. 5 Units.

What war meant for foot soldiers and the peasants across whose fields they marched. Ordinary people's lives in the eras of Machiavelli, Shakespeare, the Reformation, and the scientific revolution. Topics include: birth, marriage, and death; city life and peasant culture; lay encounters with religious and intellectual ideas; war and crime; and gender and sexuality.

HISTORY 137. The Holocaust. 4 Units.

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 337, JEWISHST 183, JEWISHST 383

HISTORY 137A. Europe, 1945-2002. 5 Units.

Europe's transformation from the end of WW II to an expanded EU. Political, cultural, economic, and social history. Topics: postwar reconstruction, Cold War, consumer versus socialist culture, collapse of Communism, postcommunist integration.

HISTORY 138A. Germany and the World Wars. 5 Units.

(Same as HISTORY 38A. Majors and others taking 5 units, enroll in 138A.) Germany's tumultuous history from the Second Empire through the end of the Cold War. International conflict, social upheaval, and state transformation during Bismarck's wars of unification, World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.

Same as: JEWISHST 138A

HISTORY 139. Modern Britain and the British Empire. 5 Units.

(Same as HISTORY 39. History majors and others taking 5 units, register in 139.) From American Independence to the latest war in Iraq. Topics include: the rise of the modern British state and economy; imperial expansion and contraction; the formation of class, gender, and national identities; mass culture and politics; the world wars; and contemporary racial politics. Focus is on questions of decline, the fortunes and contradictions of British liberalism in an era of imperialism, and the weight of the past in contemporary Britain.

HISTORY 140. World History of Science. 5 Units.

(Same as HISTORY 40. History majors and others taking 5 units, register for 140.) The earliest developments in science, the prehistoric roots of technology, the scientific revolution, and global voyaging. Theories of human origins and the oldest known tools and symbols. Achievements of the Mayans, Aztecs, and native N. Americans. Science and medicine in ancient Greece, Egypt, China, Africa, and India. Science in medieval and Renaissance Europe and the Islamic world including changing cosmologies and natural histories. Theories of scientific growth and decay; how science engages other factors such as material culture and religions.

HISTORY 144. History of Women and Gender in Science, Medicine and Engineering. 5 Units.

(Same as HISTORY 44. Majors and others taking 5 units, enroll in HISTORY 144.) Men's and women's roles in science, medicine, and engineering over the past 200 years with a focus on the present. What efforts are underway globally to transform research institutions so that both men's and women's careers can flourish? How have science and medicine studied and defined males and females? How can we harness the creative power of gender analysis to enhance knowledge and spark innovation?. Same as: FEMGEN 144

HISTORY 145A. Africa Until European Conquest. 5 Units.

Episodes in African history from the earliest records up until European partition of the continent, focusing on how knowledge about the natural, social, and spiritual worlds was linked to the exercise of power. The effects of technological innovations on states and other forms of social complexity; use of religious beliefs and practices to legitimate or critique authority. The effects of slave trades and imperial conquest on these forms of authority.

HISTORY 145B. Africa in the 20th Century. 5 Units.

(Same as HISTORY 45B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans.

Same as: AFRICAAM 145B

HISTORY 146. History of Humanitarian Aid in sub-Saharan Africa. 4-5 Units.

Explores humanitarian endeavors through the era of the slave trade, colonialism, the Cold War and the present. Our focus is both local and global examining international humanitarian policy and the effects and perceptions of humanitarian aid within different African localities. Assignments use primary and secondary sources including organizational reports, ethnographies, memoirs and film. Topics: anti-slave trade and abolition movements, `civilizing`quest; missions, development, refugees, peacekeeping, famine and women's rights.

HISTORY 147. History of South Africa. 5 Units.

(Same as HISTORY 47. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: AFRICAAM 147

HISTORY 149C. The Slave Trade. 5 Units.

(Same as HISTORY 49C. History majors and others taking 5 units, enroll in 149C.) Slave trades and forms of slavery in W. Africa from 1000 to 1885; impacts on lives, social organization, and political structures. Slavery in Islam, the slave market in the Mediterranean and Middle East, and the Saharan slave trade. Slavery within Africa, growth of the Atlantic trade, the Middle Passage, and war and trade that produced slaves. Impact of the Industrial Revolution and European abolition movements on the use of slaves and warfare in Africa. The relationship between slaving and the European conquest of Africa.

HISTORY 150A. Colonial and Revolutionary America. 5 Units.

(Same as HISTORY 50A. History majors and others taking 5 units, register for HISTORY 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution.

Same as: AMSTUD 150A

HISTORY 150B. 19th-Century America. 5 Units.

(Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: AFRICAAM 150B, AMSTUD 150B

HISTORY 150C. The United States in the Twentieth Century. 5 Units.

(Same as HISTORY 50C. History majors and others taking 5 units, register for 150C.) Major political, economic, social, and diplomatic developments in the U.S. Themes: the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 50s and 60s); the changing status of women since WW II; shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy in WW I and II, and the Cold War.

Same as: AMSTUD 150C

HISTORY 151. The American West. 5 Units.

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ARTHIST 152, ENGLISH 124, POLISCI 124A

HISTORY 152. History of American Law. 5 Units.

(Same as LAW 318.) Modern history of American law, legal thought, legal institutions and the legal profession. Topics include law and regulation of corporate organizations and labor relations in the age of enterprise, law of race relations in the South and North, development of classical legalism, critiques of classical legalism, modern administrative state, organized legal profession, New Deal legal thought and legislation, legal order of the 50s, expansion of enterprise liability, civil rights movements from 1940, rights revolution of the Warren Court and Great Society.

Same as: HISTORY 352B

HISTORY 152E. From Gold Rush to Google Bus: History of San Francisco. 5 Units.

This class will examine the history of San Francisco from Native American and colonial settlement through the present. Focus is on social, environmental, and political history, with the theme of power in the city. Topics include Indians and Spanish settlers, the Gold Rush, immigration and nativism, earthquake and fire, progressive reform and unionism, gender, race and civil rights, sexuality and politics, redevelopment and gentrification.

Same as: AMSTUD 150X, URBANST 150

HISTORY 153. CREATION OF THE CONSTITUTION. 5 Units.

(Same as LAW 230.) The course begins with readings setting forth the intellectual and experiential background of the framing, including common law and natural rights theory, republicanism, economic & political scientific ideas, and colonial and post-Independence experience. We then study large parts of the debates at the Constitutional Convention, primarily using Madison's Notes. Next come the ratification debates, including readings from antifederalist writers, about half of *The Federalist*, and overviews of the Virginia and New York ratification conventions. We conclude with the addition of the Bill of Rights. Classes consist of a combination of lecture and extensive participation by students. Elements used in grading: Exam.

HISTORY 154. American Intellectual and Cultural History to the Civil War. 5 Units.

(Same as HISTORY 54. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images.

Same as: AMSTUD 154

HISTORY 154D. Religion and War in America. 4 Units.

Scholars have devoted much attention to wars in American history, but have not agreed as to whether religion was a major cause or simply a cover for political, economic, and other motives. We will compare interpretations that leave religion out, with those that take it into account. We will also look at the impact of war on the religious lives of ordinary Americans. We will examine both secondary as well as primary sources, beginning with King Philip's War in the 17th century, and ending with the "War on Terror" in the present day.

Same as: RELIGST 105

HISTORY 155. American Constitutional History from the Civil War to the War on Poverty. 5 Units.

(Same as LAW 738.) American Constitutional History from the Civil War to the Cold War. This course will address U.S. constitutional history from the post-Civil War Reconstruction period through the mid-20th century. Because of the breadth of the subject matter, the view will necessarily be partial. In particular we will take as our focus the way the Constitution has provided a point of political mobilization for social movements challenging economic and social inequality. Topics covered include: Civil War Reconstruction and restoration; the rise of corporate capitalism and efforts to constrain it; Progressive Era regulation; the New Deal challenge to federalism and the anti-New Deal backlash; government spending; the World Wars and emergency powers; Civil Liberties including speech and privacy; and the beginning of the Civil Rights Era. Readings will include both legal and historical materials with a focus on the relationship between law and society. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Paper extensions will be granted with instructor permission. No automatic grading penalty for late papers.

HISTORY 156. American Economic History. 5 Units.

The American economy from colonial times to the present, illustrating the role of history in economic life. Topics: U.S. economic development in global and comparative context; slavery as an economic system; emergence of American technology and business organization; economics of the Great Depression and the New Deal; post-World War II economic performance and social change; globalization, information technology, and inequality. Prerequisite: 1 or 1A or 1V.

Same as: AMSTUD 116, ECON 116

HISTORY 156G. Women and Medicine in US History: Women as Patients, Healers and Doctors. 5 Units.

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing.

Same as: AMSTUD 156H, FEMGEN 156H

HISTORY 157. The Constitution: A Brief History. 5 Units.

A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime.

Same as: AMSTUD 157, POLISCI 128S

HISTORY 158. The United States Since 1945. 4-5 Units.

Focus is on foreign policy and politics with less attention to social and intellectual history. Topics include nuclear weapons in WW II, the Cold War, the Korean and Vietnam wars, Eisenhower revisionism, the Bay of Pigs and Cuban missile crisis, civil rights and the black freedom struggle, the women's movement, the Great Society and backlash, welfare policy, conservatism and liberalism, the 60s anti-war movement, Watergate and the growth of executive power, Iran-Contra and Reagan revisionism, Silicon Valley, the Gulf War, the Clinton impeachment controversy, 2004 election, and 9/11 and Iraq war.

HISTORY 158B. History of Education in the United States. 3-5 Units.

How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching.

Same as: AMSTUD 201, EDUC 201

HISTORY 158C. History of Higher Education in the U.S. 3-5 Units.

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities.

Same as: AMSTUD 165, EDUC 165, EDUC 265

HISTORY 161. Women in Modern America. 4-5 Units.

This course explores the transition from Victorian to modern womanhood in the U.S. from the 1890s to the end of the 20th century, including the experiences of Native, European, African, Mexican, and Asian American women. It asks how, when, and why the majority of American women become wage earners, gained full citizenship, and enacted political opportunities; how race- and class-specific ideals of womanhood changed in popular culture; and how women have redefined their reproductive and sexual relations.

Same as: AMSTUD 161, CSRE 162, FEMGEN 161

HISTORY 163. A History of North American Wests. 5 Units.

The history, peoples, and natural systems of a region that has never been contained within a single empire or nation state, but has been united by the movement of peoples, species, and things. Topics include smallpox, horses, gold, salmon, rivers, coal, and oil.

HISTORY 164C. From Freedom to Freedom Now: African American History, 1865-1965. 5 Units.

(Same as HISTORY 64C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music.

Same as: AMSTUD 164C

HISTORY 165. Mexican American History through Film. 4-5 Units.

Focus is on the 20th century. Themes such as immigration, urbanization, ethnic identity, the role of women, and the struggle for civil rights.

HISTORY 165D. The Pacific World. 5 Units.

(Same as HISTORY 65D. History majors and others taking 5 units, register for 165D.) Taking the Pacific and the regions of the world that touch the ocean as the unit of analysis, we will explore geographic, social, cultural, and political interactions that created what we now call the Pacific World. Ranging over four hundred years of history, we will examine human migrations, explorations, interactions and conflicts, and human ecology. The course is not nation-focused but is transnational and international in approach.

HISTORY 166. Introduction to African American History - the Modern Freedom Struggle. 3-5 Units.

(AFRICAAM-166/ AMSTUD-166/ HISTORY-166) This course focuses on African-American political movements of the period after 1930, with special emphasis on the contributions of grassroots activists and visionary leaders such as W. E. B. Du Bois, Martin Luther King, Jr., and Malcolm X. The lectures will utilize audio-visual materials extensively, and the exams will cover these materials as well as the content of traditional lectures. Students are encouraged to undertake research projects utilizing the unique resources of the King Research and Education Institute. Same as: AFRICAAM 166, AMSTUD 166

HISTORY 166B. Immigration Debates in America, Past and Present. 3-5 Units.

Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. Part Two considers new immigration patterns after 1965, including those of refugees, and investigates the contemporary debate over immigration and immigration policy in the post 9/11 era as well as inequalities within the system and the impact of foreign policy on exclusions and inclusions. Same as: CSRE 166B, HISTORY 366B

HISTORY 167A. Martin Luther King, Jr. and the Global Freedom Struggle. 3-5 Units.

Using the unique documentary resources and publications of Stanford's King Research and Education Institute, this course will be taught by Professor Carson and his colleagues at the Institute. It will provide a general introduction to the life and legacy of Martin Luther King, Jr., as well as devote attention to the movements he inspired. In addition to lectures, the course will include presentations of documentaries such as *Eyes on the Prize*. Students will be expected to read the required texts, participate in class discussions, and take a final exam or submit a research paper (or an audio-visual project developed in consultation with the professor).

HISTORY 168. American History in Film Since World War II. 3-4 Units.

U.S. society, culture, and politics since WW II through feature films. Topics include: McCarthyism and the Cold War; ethnicity and racial identity; changing sex and gender relationships; the civil rights and anti-war movements; and mass media. Films include *The Best Years of Our Lives*, *Salt of the Earth*, *On the Waterfront*, *Raisin in the Sun*, *Kramer v Kramer*, *Falling Down*, and *Never Forever*, among others.

HISTORY 170B. Culture, Society and Politics in Latin America. 5 Units.

(Same as HISTORY 70. History majors and others taking 5 units, enroll in HISTORY 170B.) The course of Latin American history from the colonial era to the present day. Key issues such as colonialism, nationalism, democracy, and revolution will be examined critically in light of broad comparative themes in Latin American and world history. Sources include writings in the social sciences as well as primary documents, fiction, and film.

HISTORY 172A. Mexico: From Colony to Nation, or the History of an impossible Republic?. 5 Units.

Was a republican form of government even possible in 19th-century Mexico after 300 years of colonial rule under the Spanish monarchy? Was the Spanish colonial heritage a positive or a negative legacy according to 19th-century Mexican politicians? How were they to forge a new national identity with so many ethnically and culturally diverse peoples throughout the territory? Just how iquest;traditionaliquest; was, in fact, the colonial period? These are some of the questions we will explore in this course. Journeying from the late colonial period (c.1700) to the 35-year dictatorship known as El Porfiriato (1876-1911) we will examine how Mexicoiquest;s diverse indigenous peoples adapted to both colonial and postcolonial rule, how they actively participated in politics and political discourse to preserve their cultures, customs and colonial privileges, and how after independence in 1821, a new republican political culture was forged. Mexico was not an impossible republic, but rather another kind of republic.

HISTORY 174. Mexico Since 1876: Hlstory of a "Failed State"?. 5 Units.

(Same as History 374.) This course is an introduction to the history and diverse peoples of modern Mexico from 1876 to the present. Through lectures, discussions, primary and secondary readings, short documentaries, and written assignments, students will critically explore and analyze the multiplicity of historical processes, events and trends that shaped and were shaped by Mexicans over the course of a century. The course will cover some of the social and political dimensions of rural social change, urbanization and industrialization, technological innovation and misuse, environmental degradation and conservation, education, ideology, culture and media, migration, and the drug trade.

HISTORY 177D. U.S. Intervention and Regime Change in 20th Century Latin America. 5 Units.

Policy discussions of regime change by US politicians, journalists and pundits usually focus on Iraq, Iran, Syria and North Korea, often with little or no historical context or perspective. This course does the opposite and takes seriously the proverbial saying "if history is any guide..." by examining U.S. interventions in Latin America, a region where so-called preventive regime change (covert as well as overt) has been operative policy for well over a century. Investigates the rationales, motivations and strategies behind U.S.-backed or engineered regime changes in Mexico in the 1910s, Guatemala in the 1950s, Chile in the 1970s, and Nicaragua in the 1980s.

HISTORY 182C. Making of the Islamic World, 600-1500. 5 Units.

(Same as HISTORY 82C. Majors and other taking 5 units, register for 182C.) The History of Islam and Muslim peoples from 600-1500. Topics include Muhammad and his community; the early Arab conquests and empires; sectarian movements; formation of Islamic belief, thought, legal culture and religious institutions; transregional Sufi and learned networks; family and sexuality; urban, rural and nomadic life; non-Muslim communities; the development of Mediterranean and Indian Ocean trade; relations with Byzantium, the Latin West, China; the Crusades and the Mongols.

HISTORY 184. Zionism. 5 Units.

(Same as History 84.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.

Same as: CSRE 184C, JEWISHST 184, REES 184

HISTORY 187. The Islamic Republics: Politics and Society in Iran, Afghanistan and Pakistan. 5 Units.

(Same as HISTORY 87. History majors and others taking 5 units, register for 187.) Explores the contested politics of these societies in modern times. Topics include controversies surrounding the meaning of revolution, state building, war, geopolitics, Islamic law, clerical authority, gender, an Islamic economy, culture and ethnic, national and religious identities from the 1940s to the present. Assignments will focus on primary sources (especially legal documents, poetry, novels, and memoirs) and films.

HISTORY 187D. Zionism and Its Critics. 4-5 Units.

Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

HISTORY 190. EARLY CHINESE THOUGHT. 3-5 Units.

This course will examine the basic themes that emerged among the philosophical texts of early China; including writings attributed to Confucius and his followers, those of the early Daoists, and those focused on the authoritarian state; and analyze their relation to the changes in the state and social order in that period. Themes to be discussed will include the nature of human networks, the state, the family, the body, personality or temperaments, stratagems, language, and the structure of the cosmos. Same as: HISTORY 90

HISTORY 191D. China: The Northern and Southern Dynasties. 5 Units.

(Same as HISTORY 91D. History majors and others taking 5 units, register for 191D.) Examines one of the most dynamic periods of Chinese history with the emergence of the institutional religions (Buddhism and Daoism), the development of the garden as an art form, the rise of landscape as a theme of verse and art, the invention of lyric poetry, and the real beginnings of the southward spread of Chinese civilization.

HISTORY 193. Late Imperial China. 5 Units.

(Same as HISTORY 93. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: FEMGEN 193

HISTORY 194B. Japan in the Age of the Samurai. 5 Units.

(Same as HISTORY 94B. History majors and others taking 5 units, register for 194B.) From the Warring States Period to the Meiji Restoration. Topics include the three great unifiers, Tokugawa hegemony, the samurai class, Neoconfucian ideologies, suppression of Christianity, structures of social and economic control, frontiers, the other and otherness, castle-town culture, peasant rebellion, black marketing, print culture, the floating world, National Studies, food culture, samurai activism, black ships, unequal treaties, anti-foreign terrorism, restorationism, millenarianism, modernization as westernization, Japan as imagined community.

HISTORY 195. Modern Korean History. 5 Units.

(Same as HISTORY 95. History majors and others taking 5 units, register for 195.) This lecture course provides a general introduction to the history of modern Korea. Themes include the characteristics of the Chosŏn dynasty, reforms and rebellions in the nineteenth century, Korean nationalism; Japanese colonial rule and Korean identities; decolonization and the Korean War; and the different state-building processes in North and South, South Korean democratization in 1980s, and the current North Korean crisis.

Same as: HISTORY 395

HISTORY 195C. Modern Japanese History: From Samurai to Pokemon. 5 Units.

(Same as HISTORY 95C. History majors and others taking 5 units, register for 195C.) Japan's modern transformation from the late 19th century to the present. Topics include: the Meiji revolution; industrialization and social dislocation; the rise of democracy and empire; total war and US occupation; economic miracle and malaise; Japan as soft power; and politics of memory. Readings and films focus on the lived experience of ordinary men and women across social classes and regions.

HISTORY 195X. Islam in India: Conflict and Accommodation. 4 Units.

This course will investigate the history of Islam in South Asia, particularly interactions between Muslims and Hindus, through the lenses of conflict and accommodation. This topic has become increasingly important in modern times as India and neighboring nations experience sectarian violence and simultaneously strive to engender the peaceful coexistence of multiple religious communities. In many ways the debate over South Asia's present and future is being played out in regards to interpretations of its past. In this course, students will gain a solid overview of the chronological development of Islam in India and its negotiations with other religious traditions on the subcontinent. We will think critically about the relevance of South Asia's past to its present and the crucial role of forms of Indian Islam in the broader context of Islamic cultures across the globe.

Same as: RELIGST 111

HISTORY 196. Worlds of Gandhi. 5 Units.

(Same as HISTORY 96. History majors and others taking 5 units, register for 196.) Place the paradox of Gandhi in context of global convulsions of 20th century. Gandhi lived across continents; maturing in South Africa, struggling in India, attaining celebrity in Europe. As leader of masses, his method of Satyagraha was distinctively at odds with his times. Yet, he also privileged sacrifice, dying, even euthanasia. In a world beset by fear and war, Gandhi's complex theory of nonviolence is compelling. What kind of nonviolent politics did Gandhi envision after Fascism, Auschwitz, Hiroshima, and Pakistan?

HISTORY 197. Southeast Asia: From Antiquity to the Modern Era. 5 Units.

The history of S.E. Asia, comprising Indonesia, the Philippines, Malaysia, Singapore, Thailand, Vietnam, Burma, Cambodia, and Laos, from antiquity to the present. The spread of Indian cultural influences, the rise of indigenous states, and the emergence of globally linked trade networks. European colonization, economic transformation, the rise of nationalism, the development of the modern state, and the impact of globalization.

HISTORY 198. History of Modern China. 5 Units.

(Same as HISTORY 98. History majors and others taking 5 units, register for 198.) This course charts major historical transformations in modern China, and will be of interest to those concerned with Chinese politics, culture, society, ethnicity, economy, gender, international relations, and the future of the world.

HISTORY 198G. Beijing, Shanghai, and the Structure of China. 3-5 Units.

China's modern history through the rivalry of its two most important cities. The course begins in the nineteenth century, contrasting Beijing, the classic imperial capital and a foreign foundation paradoxically celebrated as the embodiment of "traditional" China, with Shanghai, a treaty port and demographic/economic center of China, but identified as a "foreign" city. After following the cities' history through the warlord period, the "Shanghai decade" of Nationalist rule, and the Japanese occupation, the course examines the two cities' developments under Mao and Deng. The course concludes with a look at their current relations and roles, and the transformed nature of China's cities.

HISTORY 201. Introduction to Public History and Public Service. 4-5 Units.

Gateway course for the History and Public Service interdisciplinary track. Topics include the production, presentation, and practice of public history through narratives, exhibits, web sites, and events in museums, historical sites, parks, and public service settings in nonprofit organizations, government agencies, and educational institutions. Service Learning Course (certified by Haas Center).

Same as: AFRICAAM 102, CSRE 201, HISTORY 301

HISTORY 201A. The Global Drug Wars. 4-5 Units.

Explores the global story of the struggle over drugs from the nineteenth century to the present. Topics include the history of the opium wars in China, controversies over wine and tobacco in Iran, narco-trafficking and civil war in Lebanon, the Afghan 'narco-state,' Andean cocaine as a global commodity, the politics of U.S.- Mexico drug trafficking, incarceration, drugs, and race in the U.S., and the globalization of the American 'war on drugs.'

Same as: HISTORY 301A

HISTORY 201C. The U.S., U.N. Peacekeeping, and Humanitarian War. 5 Units.

The involvement of U.S. and the UN in major wars and international interventions since the 1991 Gulf War. The UN Charter's provisions on the use of force, the origins and evolution of peacekeeping, the reasons for the breakthrough to peacemaking and peace enforcement in the 90s, and the ongoing debates over the legality and wisdom of humanitarian intervention. Case studies include Croatia and Bosnia, Somalia, Rwanda, Kosovo, East Timor, and Afghanistan.

Same as: INTNLREL 140C

HISTORY 202. International History and International Relations Theory. 5 Units.

The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system.

Same as: HISTORY 306E, POLISCI 216E, POLISCI 316

HISTORY 202G. Peoples, Armies and Governments of the Second World War. 4-5 Units.

Clausewitz conceptualized war as always consisting of a trinity of passion, chance, and reason, mirrored, respectively, in the people, army and government. Following Clausewitz, this course examines the peoples, armies, and governments that shaped World War II. Analyzes the ideological, political, diplomatic and economic motivations and constraints of the belligerents and their resulting strategies, military planning and fighting. Explores the new realities of everyday life on the home fronts and the experiences of non-combatants during the war, the final destruction of National Socialist Germany and Imperial Japan, and the emerging conflict between the victors. How the peoples, armies and governments involved perceived their possibilities and choices as a means to understand the origins, events, dynamics and implications of the greatest war in history.

Same as: HISTORY 302G

HISTORY 203. Premodern Economic Cultures. 5 Units.

A comparative survey of premodern economies and the value systems that supported them. Students will read and discuss theories of economic culture as well as historical monographs about specific regions. Discussions will focus on the comparison and conceptualization of premodern economic cultures. Students will be required to research the literature on a particular premodern society of their choosing, compile an annotated bibliography of that literature, and compose an essay analyzing the problems and possibilities presented therein.

Same as: HISTORY 303

HISTORY 203C. History of Ignorance. 5 Units.

Scholars pay a lot of attention to knowledge--how it arises and impacts society--but much less attention has been given to ignorance, even though its impacts are equally profound. Here we explore the political history of ignorance, through case studies including: corporate denials of harms from particular products (tobacco, asbestos), climate change denialism, and creationist rejections of Darwinian evolution. Students will be expected to produce a research paper tracing the origins and impact of a particular form of ignorance.

HISTORY 203D. The Holocaust in Recent Memory: Conflicts - Commemorations - Challenges. 5 Units.

This course offers an in-depth approach to the study of the Holocaust as a historical point of reference for European memory, or for the memory cultures of European nations, where the international context in particular the USA and Israel will also be taken into consideration. The starting point is the transformations in Holocaust memory: after 1945, in the era of European postwar myths, the Holocaust was on the periphery of historical thinking, of scholarly and public interest. Today the Holocaust is acknowledged as a 'break in civilization', a watershed event in human history. This approach has only evolved since the 1980s.

Same as: HISTORY 303D, JEWISHST 283D, JEWISHST 383D

HISTORY 203E. Global Catholicism. 5 Units.

The rise of Catholicism as a global phenomenon, and its multiple transformations as it spread to the Americas, Asia, and Africa. Topics include the Reformation, Tridentine reform and the Jesuits, the underground churches in England and the Dutch Republic, the missions to Asia, the Spanish conquest of Latin America, conversion and indigenous religions, missionary imperialism and new religious movements in the non-European world.

Same as: INTNLREL 103E

HISTORY 203K. Trauma and History: Intergenerational suffering and collective healing. 1 Unit.

This course will examine trauma as a historical process, following the intergenerational impacts of history's darker dramas, analyzing collective strategies for coping and healing after trauma, and asking whether we can speak of "traumatized societies." Readings for graduate students will include Ben Shephard's *A War of Nerves*, Didier Fassin and Richard Rechtman's *The Empire of Trauma*, and selections from Yael Danieli, ed., *Intergenerational Handbook of Multigenerational Legacies of Trauma*. Colloquium will be discussion-oriented, but will also include guest discussants from around the world. The course will culminate in a conference to be held at Stanford, June 4-6: "Soul Wounds: Trauma and Healing Across Generations." Undergraduate requirements for 1 credit: Attend weekly "Mind, Body, and Culture" workshop and first hour of Wednesday morning discussion, attend some part of conference on June 4-6. Graduate requirements for 4-5 credits: Attend workshop, read weekly, discussion on Wednesday mornings, write a paper and if desired present at conference.

HISTORY 204. What is History?. 5 Units.

An introduction to the discipline of history, designed for current or prospective History majors. Focusing on methods and theories of historical inquiry, students will learn how historians frame problems, collect and analyze evidence, and contribute to on-going debates. Through a series of case studies or exemplary works of historical study, the course will also explore different genres of historical writing (such as narrative, biography, social history) and different methodological approaches to history (such as Annales school, microhistory, and cultural history).

HISTORY 204E. Totalitarianism. 4-5 Units.

Modern revolutionary and totalitarian politics. Sources include monographs on the medieval, Reformation, French Revolutionary, and Great War eras. Topics: the essence of modern ideology, the concept of the body national, state terror, charismatic leadership, gender assignments, private and public spheres, and identities.

Same as: HISTORY 307E

HISTORY 204G. War and Society. 5 Units.

How Western societies and cultures have responded to modern warfare. The relationship between its destructive capacity and effects on those who produce, are subject to, and must come to terms with its aftermath. Literary representations of WW I; destructive psychological effects of modern warfare including those who take pleasure in killing; changes in relations between the genders; consequences of genocidal ideology and racial prejudice; the theory of just war and its practical implementation; and how wars are commemorated.
Same as: HISTORY 304G

HISTORY 205F. Digital History: Concepts, Methods, Problems. 5 Units.

Students will study the development of the relationship between the discipline of history and computing tools through a combination of theoretical and hands-on activities, and readings. Students will read leading critical works, examine seminal digital projects, and examine the works of leading digital humanities scholars. The course will introduce students to concepts and methods within digital history, including text analysis, spatial history, data visualization, and digital scholarship. The end product of the course will be a born-digital scholarly product.

HISTORY 205G. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolo Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources.
Same as: HISTORY 305G, POLISCI 235J, POLISCI 335J

HISTORY 206A. City, Society, Literature- 19th Century Histories. 4 Units.

This course examines the rise of modern cities through an analysis of urban society and the imaginative literature of the 1800s.
Same as: HISTORY 306A, URBANST 106

HISTORY 207. Biography and History. 4-5 Units.

The relationship between biographical and historical writing, primarily in Europe and America. Problems of methodology, evidence, dispassion, and empathy. Texts: biographies, critical literature on biographical work, and novels (A. S. Byatt's *Possession*, Bernard Malamud's *Dubin's Lives*) that illuminate the intellectual underpinnings of biographical labor.
Same as: HISTORY 308

HISTORY 207B. Environment, Technology and Revolution in World History. 4-5 Units.

Exploration of historiographical and interdisciplinary methodologies and approaches to intersections among environmental, technological, and revolutionary social change in diverse geographical and temporal contexts. Readings include broad theoretical and synthetic works as well as case studies of American, French, Mexican, Russian, Chinese, and Hungarian revolutions.

HISTORY 207C. The Global Early Modern. 4-5 Units.

In what sense can we speak of "globalization" before modernity? What are the characteristics and origins of the economic system we know as "capitalism"? When and why did European economies begin to diverge from those of other Eurasian societies? With these big questions in mind, the primary focus will be on the history of Europe and European empires, but substantial readings deal with other parts of the world, particularly China and the Indian Ocean.
Same as: HISTORY 307C

HISTORY 208. Private Lives, Public Stories: Autobiography in Women's History. 5 Units.

Changing contexts of women's lives and how women's actions have shaped and responded to those contexts.

HISTORY 208B. Women Activists' Response to War. 4-5 Units.

Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.
Same as: FEMGEN 208B, HISTORY 308B

HISTORY 208S. Facing the Past: The Politics of Retrospective Justice. 5 Units.

Forms of injustice in history including slavery, genocide, ethnic cleansing, mass rape, forced religious conversion, and torture of prisoners. Mechanisms developed over the last century to define, deter, and alleviate the effects of such offenses, including war crimes tribunals, truth commissions, national apologies, and monetary reparations. Case studies chart the international field of retrospective justice, exploring the legal, political, and moral implications of confronting traumatic pasts.

HISTORY 209B. The Idea of Politics. 4-5 Units.

Can we live without politics? Is politics indispensable for humanity and vice-versa? The idea of politics is that it must transform, through human action, conditions of collective life. But the 20th century produced colliding beliefs about what that life might be and what the human being itself might look like. Explore whether, after the century, we might still think of politics as an ethical idea and the "human" as foundational political category.
Keywords: Civility, Cruelty, Friendship, Empire, Democracy, Humanism, Animals.
Same as: HISTORY 309B

HISTORY 209C. Liberalism and Violence. 5 Units.

Does Liberalism have a theory of violence? What does modern political thought, in privileging humanity and rights, share with "terrorists" and "rogue states"? How is liberalism transformed by the use of religion and death for political ends? We read key thinkers of modern life- Adorno, Arendt, Agamben, Benjamin, Derrida, Fanon, Foucault, Gandhi, Heidegger, and Schmitt- to interrogate the relationship between religion, sacrifice, and democracy. At the center are connections between war and modern life, and between violence and non-violence.
Same as: HISTORY 309C

HISTORY 209D. Postcolonialism and Universalism. 4-5 Units.

Key texts and motifs from postcolonial theory: empire, class, exile, suffering, textuality, archive in juxtaposition to 20th-century philosophical questions about universal history and the relevance of humanist inquiry.
Same as: HISTORY 309A

HISTORY 209S. Research Seminar for Majors. 5 Units.

Required of History majors. How to conduct original, historical research and analysis, including methods such as using the libraries and archives at Stanford and elsewhere, and working collaboratively to frame topics, identify sources, and develop analyses. Autumn quarter focuses on European Lit and Arts; winter quarter on U.S. History and Colonialism; spring quarter on modern Europe, ancient China and early modern Europe.

HISTORY 212. Knights, Monks, and Nobles: Masculinity in the Middle Ages. 4-5 Units.

This course considers masculinity as historically and culturally contingent, focusing on the experiences and representations of medieval men as heroes, eunuchs, fathers, priests, husbands, boys, and fighting men. Recognizing that the lives of men, like those of women, were governed by gendered rules and expectations, we will explore a wide range of medieval masculinities, paying close attention to the processes by which manhood could be achieved (e.g. martial, spiritual, sexual), and to competing versions of manliness, from the warrior hero of the early middle ages to the suffering Christ of late medieval religion.
Same as: HISTORY 312

HISTORY 214D. Mediterranean Crossroads: Power, Culture, and Religion in Medieval Sicily. 5 Units.

Sicily in the Middle Ages was a Mediterranean crossroads, a dynamic and diverse kingdom in which Muslim and Christian, Viking and African, European and Eastern Cultures all came together. Explores the life and times of Frederick II (1194-1250). He claimed universal authority as a Christian emperor, yet ruled multireligious Sicily as king. He promoted crusading, yet was accused of being a heretic and a crypto Muslim. He spoke six languages and actively patronized the arts and sciences. Topics include: structures and influences that made such a figure possible; how he managed the tensions of governing a diverse and disparate empire; how religion and cultural production created and maintained his authority; how contemporaries and later generations reacted to this enigmatic emperor; why has he continued to generate such polarizing reactions; and how did Frederick become a figure revered by Nazis and multiculturalists alike. Same as: HISTORY 314D

HISTORY 216. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's quest for book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's quest for authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation.

Same as: ARTHIST 206H, FEMGEN 216, HISTORY 316

HISTORY 217S. Minorities In Medieval Europe. 5 Units.

This course examines attitudes towards outsider groups within medieval society and the treatment of these groups by medieval Christians. Heretics, Jews, Muslims, homosexuals, prostitutes and usurers occupied ambivalent and at times dangerous positions within a society that increasingly defined itself as Christian. Differences in the treatment of these various 'outcast' groups, their depiction in art, their legal segregation, and their presumed association with demonic activity are addressed through discussion, and readings from primary and secondary source material.

Same as: RELIGST 217X

HISTORY 219C. Science, Technology, and Modernity in the Soviet Union. 5 Units.

Science and technology were integral to the Soviet claim to offer a vision of modernity superior to that of Western capitalism. Science and technology would flourish; society would develop on a scientific basis. The results were more complex than the vision. Topics to be covered: science and Marxism-Leninism; the Lysenko affair; the R&D system; the role of the secret police; the atomic project; the space race; missile development; Andrei Sakharov; technology and innovation.

Same as: HISTORY 319C

HISTORY 221A. Men, Women, and Power in Early Modern Russia, 1500-1800. 5 Units.

Social values, gender relations, and social change in an era of rapid change; challenges to established norms by new constructions of deviance (witchcraft, religious reform, and revolt) and new standards of civility; encounters with non-Russians and the construction of national consciousness. Social values as political ethos: patrimonial autocracy and the reality of female rule in the late 17th and 18th century.

HISTORY 221B. The 'Woman Question' in Modern Russia. 5 Units.

Russian radicals believed that the status of women provided the measure of freedom in a society and argued for the extension of rights to women as a basic principle of social progress. The social status and cultural representations of Russian women from the mid-19th century to the present. The arguments and actions of those who fought for women's emancipation in the 19th century, theories and policies of the Bolsheviks, and the reality of women's lives under them. How the status of women today reflects on the measure of freedom in post-Communist Russia.

Same as: FEMGEN 221B

HISTORY 222. Crime and Punishment in Early Modern Europe and Russia. 5 Units.

Explores criminal law in early modern Europe and Russia, ca 1500-1800, in law and in practice. Engages debates about use of exemplary public executions as tactic of governance, and about gradual decline in "violence" in Europe over this time. Explores practice of accusatory and inquisitory judicial procedures, judicial torture, forms of punishment, concepts of justice.

HISTORY 223. Art and Ideas in Imperial Russia. 4-5 Units.

Poetry, novels, symphonic music, theater, opera, painting, design, and architecture: what they reveal about the politics and culture of tsarist Russia.

Same as: HISTORY 323

HISTORY 224A. The Soviet Civilization. 4-5 Units.

Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

Same as: HISTORY 424A, REES 224A

HISTORY 224C. Genocide and Humanitarian Intervention. 3 Units.

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 324C, JEWISHST 284C, JEWISHST 384C, PEDS 224

HISTORY 224D. The Soviet Civilization, Part 2. 4-5 Units.

Prerequisite: HISTORY 224A/424A.

Same as: HISTORY 424B

HISTORY 226E. Famine in the Modern World. 3 Units.

Open to medical students, graduate students, and undergraduate students. Examines the major famines of modern history, the controversies surrounding them, and the reasons that famine persists in our increasingly globalized world. Focus is on the relative importance of natural, economic, and political factors as causes of famine in the modern world. Case studies include the Great Irish Famine of the 1840s; the Bengal famine of 1943-44; the Soviet famines of 1921-22 and 1932-33; China's Great Famine of 1959-61; the Ethiopian famines of the 1970s and 80s, and the Somalia famines of the 1990s and of 2011.

Same as: HISTORY 326E, PEDS 226

HISTORY 227D. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.
Same as: HISTORY 327D, REES 227, REES 327

HISTORY 228. Circles of Hell: Poland in World War II. 5 Units.

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.
Same as: HISTORY 328, JEWISHST 282, JEWISHST 382

HISTORY 230A. The Witness in Modern History: Memoir, Reportage, Image. 5 Units.

The rise of the witness as icon and debates about its reliability as a historical source. The power of eyewitness accounts to convict accused criminals, inspire indignation about war and genocide, and attract attention to humanitarian crises. Their notorious unreliability due to exaggeration and misapprehension. Sources include reportage, photography, and documentary film. Case studies include criminal cases, war, poverty, and natural disasters.

HISTORY 230D. Europe in the World, 1789-Present. 4-5 Units.

The European conquest of parts of Africa, Asia, and the South Pacific by European merchants, missionaries, armies, and administrators had significant, and often cataclysmic, effects on indigenous political alliances, cultural practices, and belief systems. But were the effects of expansion entirely one-sided? What impact did the experiences of colonialism have on European politics, culture, and Europe's relations with the rest of the world? Explores how interaction between Europe and the rest of the world redefined the political, racial, sexual, and religious boundaries of both Europe and its colonies and gave rise to the more "globalized" society we live in today.
Same as: HISTORY 330D

HISTORY 230F. Surveillance in Modern Europe. 4-5 Units.

We will investigate the role of surveillance in modern societies -- the motives, pressures, and consequences of informal and formal systems of control from the French Revolution to the present day. Students will encounter a variety of sources and situations, analyzing the tensions between social stability and individual pursuits, and the circumstances under which these tensions can lead to state repression and violence.
Same as: HISTORY 330F

HISTORY 231C. The Great War: WWI in Literature, Film, Art, and Memory. 3-5 Units.

This course concerns how writers, artists, and other cultural producers understood and represented the traumas of the First World War and its aftermath. Rather than tracing a political or military history of the conflict, we'll focus on how the horrors of War (both in the trenches and on the home front) fostered broader social and cultural shifts, as people questioned the very foundations of European civilization. Most specifically, we'll explore the connections between the War and the emergence of post-War modernist movements, as writers and artists created new works to help them make sense of the catastrophe and the new world it wrought. Though France provides our starting point, we'll also travel beyond the Hexagon to incorporate other views and major works. Course readings will be in English, though students may elect to read works in French if they wish.
Same as: FRENCH 258, FRENCH 358, HISTORY 332C

HISTORY 231E. Paper, Printing, and Digital Revolutions: Transformations of the Book. 4-5 Units.

What is a book? This seminar explores the conceptual implications of approximately two millennia of transformations in the physical and material properties of books. How have the meaning and authority we assign the written word changed as technologies of book production and dissemination have evolved, and how have they remained continuous? Topics covered include the rise of the medieval manuscript codex, the emergence of print culture in early modern Europe, and current debates over the nature of text in the digital age.
Same as: HISTORY 331E

HISTORY 232B. Heretics, Prostitutes and Merchants: The Venetian Empire. 5 Units.

Between 1200-1600, Venice created a powerful empire at the boundary between East and West that controlled much of the Mediterranean, with a merchant society that allowed social groups, religions, and ethnicities to coexist. Topics include the features of Venetian society, the relationship between center and periphery, order and disorder, orthodoxy and heresy, the role of politics, art, and culture in the Venetian Renaissance, and the empire's decline as a political power and reinvention as a tourist site and living museum.
Same as: ITALIAN 232B

HISTORY 232D. Rome: The City and the World, 1350-1750. 4-5 Units.

What lies beyond the ruins of an ancient city? The history of Rome from the Renaissance to the age of the grand tour. Topics include: the political, diplomatic, and religious history of the papacy; society and cultural life; the everyday world of Roman citizens; the relationship between the city and the surrounding countryside; the material transformation of Rome as a city; and its meaning for foreigners.
Same as: HISTORY 332D

HISTORY 232F. The Scientific Revolution. 5 Units.

Was there a scientific revolution in the sixteenth and seventeenth centuries? How did modern science emerge as a distinctive kind of knowledge and practices? Explores changing ideas of nature and knowledge during the age of Copernicus, Galileo, Descartes, Bacon, and Newton. Examines the contexts in which western science emerged, issues of scientific methodology (e.g. induction, deduction, probability, and the rise of experimentation), the development of scientific institutions, and the emergence of the scientist as a historical figure.

HISTORY 233C. Two British Revolutions. 4-5 Units.

Current scholarship on Britain, 1640-1700, focusing on political and religious history. Topics include: causes and consequences of the English civil war and revolution; rise and fall of revolutionary Puritanism; the Restoration; popular politics in the late 17th century; changing contours of religious life; the crisis leading to the Glorious Revolution; and the new order that emerged after the deposing of James II.
Same as: HISTORY 333C

HISTORY 233F. Political Thought in Early Modern Britain. 5 Units. 1500 to 1700. Theorists include Hobbes, Locke, Harrington, the Levellers, and lesser known writers and schools. Foundational ideas and problems underlying modern British and American political thought and life.

HISTORY 233G. Catholic Politics in Europe, 1789-1992. 5 Units. What led to the creation of a specifically Catholic mass politics? How did these parties and movements interact with the Vatican and the wider Church? What accounts for political Catholicism's involvement in clerical-fascist states and its important role in shaping the EU? Sources focus on monographs. Research paper using primary sources.

HISTORY 233K. The Invention of the Modern Republic. 4-5 Units. Examines the history of republican thinking in the Atlantic World from the Renaissance to the French Revolution. Same as: HISTORY 333K

HISTORY 234. The Enlightenment. 3-5 Units. The Enlightenment as a philosophical, literary, and political movement. Themes include the nature and limits of philosophy, the grounds for critical intellectual engagement, the institution of society and the public, and freedom, equality and human progress. Authors include Voltaire, Montesquieu, Rousseau, Hume, Diderot, and Condorcet. Same as: DLCL 324, HISTORY 334, HISTORY 432A, HUMNTIES 324

HISTORY 234G. Narrating the British Empire. 4-5 Units. This course will explore the historical and cultural reality of the British Empire in a global and comparative context, through works of fiction and non-fiction, history, memoir and a range of cultural chronicles. What relationship did British colonialism have with modernity and the European Enlightenment, and with neoliberalism and globalization that followed decolonization? Texts: CLR James's *Beyond a Boundary*, Jamaica Kincaid's *A Small Place*, Nirad Chaudhuri's *The Autobiography of an Unknown Indian*, Alan Paton's *Cry, The Beloved Country*, Witi Ihimaera's *Dear Miss Mansfield*. Same as: ENGLISH 234G, HISTORY 334G

HISTORY 235. The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy. 5 Units. The dynamic societies of the Italian Peninsula of the 14th to 16th centuries "prosperous, astonishingly creative, politically fractious, and endemically violent" produced sweeping, deeply consequential changes. Among these were new developments in the theory and practice of war, politics, and diplomacy that laid the foundations for the modern state system and European military power. The class covers: new diplomatic practice; the Military Revolution; state-building; war finance; court culture; and the intersection of these with the shimmering brilliance of Renaissance culture.

HISTORY 235C. Readings in the Supernatural. 4-5 Units. Class will read and discuss a selection of monographs, scholarly essays, and primary sources on the rich supernatural world of early modern Europe. We will discuss how fairies, werewolves, nightmares, and trolls all became witches, how the binary of angels and demons figured in European thought, and how the marginalized imaginary was reconstituted in theatre and fiction. Same as: HISTORY 335C

HISTORY 236. The Ethics of Imperialism. 5 Units. Can a commitment to liberty, progress, and universal rights be reconciled with imperialism? The ethical underpinnings of empire; how modern Europeans provided ethical and political justifications for colonial expansion. How European ideals were used to defend and justify inequality, violence, and genocide. The ethics of American-driven globalization and humanitarianism. Texts include primary sources, philosophical treatises, and historical studies.

HISTORY 236B. Hobbes to Habermas: The Idea of Society in Modern Thought. 4-5 Units. Classic texts in social theory from the seventeenth century to the present. Readings include Locke, Smith, Hegel, Comte, and Durkheim, and Weber. Same as: HISTORY 336B

HISTORY 236F. The End of the World As They Knew It: Culture, Cafés, and Crisis in Europe, 1880-1918. 4-5 Units. The years stretching from roughly 1880 to end of the First World War were marked by profound social upheaval and an intense burst of creativity. This seminar will focus on the major cultural movements and big ideas of the period. Topics covered include the rise of mass culture and cinema, the origins of psychoanalysis, anti-Semitism and Zionism, new anxieties about sexuality and the iquest;New Woman,iquest; anarchism, decadence, degeneration, and Dada iquest; with cameos from Bernhardt, Freud, Klimt, Nietzsche, Toulouse-Lautrec, Wilde, Zola, and other luminaries of the age. Same as: HISTORY 336F

HISTORY 237K. Speed and Power in Twentieth-Century Europe. 4-5 Units. Europeans living in the 20th century witnessed an unprecedented (and, to many observers, frightening) acceleration in the pace of everyday life, wrought by the introduction of a host of new travel technologies. Focusing on the metropolises of Europe, this seminar will explore the various ways that trains, planes, and automobiles have shaped modern urban life. We'll also look at how 20th-century artists and writers have treated the interrelated themes of speed and power in their work. Same as: HISTORY 337K

HISTORY 238E. European Legal History. 5 Units. (Same as LAW 441.) This seminar will explore major topics in European legal history from ancient Rome through the present: Roman law, canon law, feudalism, sixteenth- and seventeenth-century constitutionalism, modern natural law, the age of absolutism and the rise of the centralized, administrative state, the structure of Old Regime law and society and the radical changes brought about by revolution, the German historical school of jurisprudence, and the rise of the European Union and a new culture of international human rights. In exploring these topics, we will focus on certain core, recurring themes that continue profoundly to shape the world in which we live. These include the sources and nature of law (positive law vs. custom), the relationship between law and society, and the relationship between law and history. Classroom discussion will focus on selected primary- and secondary-source texts that we will read as a group. This course is cross-listed with LAW441. The course will be limited to 12 SLS students with 10 additional slots held for students enrolling in HISTORY338E. Same as: HISTORY 338E

HISTORY 238G. Ethnography of the Late Middle Ages: Social history and popular culture in the age of the plague. 4-5 Units. During the late Middle Ages, as Europe was recovering from the devastation of the Black Death, political reorganization contributed to a burst of archival documentation that allows historians richly detailed glimpses of societies in transition. We will be reading selected scholarly articles and monographs covering such topics as persecution, prechristian cultural remnants, folk theologies, festival cultures, peasant revolts, heresy, and the advent of the diabolic witch. Same as: HISTORY 338G

HISTORY 239E. Paris: The Making of a Modern Icon. 3-5 Units. Few places have been as heavily romanticized and mythologized as Paris. To many observers, Paris and its attractions serve as icons of modernity itself. By engaging with fiction, film, journalism, painting, photography, poetry, song, and other media, we will trace how different people at different times have used Paris as both backdrop and main protagonist, and we'll consider how the city itself has incorporated and rebelled against such representations. The scope of our inquiry will stretch from the late 18th century to the present, covering a host of topics, figures, and sites: from the French Revolution to the protests of May '68, from Baudelaire to Hemingway, from the Impressionists to the Situationists. Taught in English. Same as: FRENCH 227, URBANST 142

HISTORY 239F. Empire and Information. 4-5 Units.

How do states see? How do they know what they know about their subjects, citizens, economies, and geographies? How does that knowledge shape society, politics, identity, freedom, and modernity? Focus is on the British imperial state activities in S. Asia and Britain: surveillance technologies and information-gathering systems, including mapping, statistics, cultural schemata, and intelligence systems, to render geographies and social bodies legible, visible, and governable.

Same as: HISTORY 339F

HISTORY 239H. Colonialism and Empire in Modern Europe. 5 Units.

To better understand the history of modern Europe within a global context, explores the following questions: What impact did more than a century of colonialism have on the social lives, cultural attitudes, political loyalties, and intellectual world views of European women and men during the nineteenth century? What accounts for the resiliency of empire during a period of rapid global change that witnessed the rise of modern democracy, economic liberalism, ethnic nationalism, and international socialism?.

HISTORY 239K. Revolutionary Moments in French Thought. 3-5 Units.

French intellectual and political culture has often been associated with revolutionary attempts to break free from the hold of tradition. Indeed, the concept of "revolution" has itself become a French tradition of sorts. Over the last 500 years, these revolutions have taken place in a number of arenas. In philosophy, Reneacute; Descartes challenged all traditional learning and defined new principles that were central to the so-called iquest;Revolution of the Mind.iquest; In religion, Enlightenment thinkers not only advocated the toleration of different faiths but also questioned the veracity of Christianity and of all theistic worldviews. In politics, the French Revolution redefined the very concept of a political revolution and set the stage for modern conceptions of sovereignty. French socialist thinkers of the 19th century, in turn, reshaped the ways their contemporaries thought about socio-economic arrangements. Finally, 20th-century existentialists have attempted to rethink the very purpose of human existence. In this course, we will explore these and other seminal revolutionary moments that not only transformed French society, but that also had implications for European and, indeed, global culture. Taught in English, readings in English.

Same as: FRENCH 128

HISTORY 240. The History of Evolution. 4-5 Units.

This course examines the history of evolutionary biology from its emergence around the middle of the eighteenth century. We will consider the continual engagement of evolutionary theories of life with a larger, transforming context: philosophical, political, social, economic, institutional, aesthetic, artistic, literary. Our goal will be to achieve a historical rich and nuanced understanding of how evolutionary thinking about life has developed to its current form.

Same as: HISTORY 340

HISTORY 241E. Hearing and Seeing in the Long Nineteenth Century. 3-4 Units.

Ideas about vision and hearing in science and culture from 1790 through 1910. The development of sensory physiology in the wake of Kant's *Critique of Pure Reason*, including Maine de Biran, Goethe, Helmholtz. Treatments of the senses in different spheres of culture and the arts: Baudelaire's *flacirc;neur*, Impressionist painting, sound-reproduction technologies, the musical avant-garde, early cinema. Case studies include Ceacute;zanne, Debussy, and Russolo. Focus is on the complex relationships between science and culture and the role of the senses in the formation of the 'modern' subject. HISTORY241E/341E must be taken for 4 units.

Same as: HISTORY 341E, MUSIC 186D, MUSIC 286D

HISTORY 243G. Tobacco and Health in World History. 4-5 Units.

Cigarettes are the world's leading cause of death--but how did we come into this world, where 6 trillion cigarettes are smoked every year? Here we explore the political, cultural, and technological origins of the cigarette and cigarette epidemic, using the tobacco industry's 80 million pages of secret documents. Topics include the history of cigarette advertising and cigarette design, the role of the tobacco industry in fomenting climate change denial, and questions raised by the testimony of experts in court.

Same as: HISTORY 343G

HISTORY 243S. Human Origins: History, Evidence, and Controversy. 4-5 Units.

Research seminar. Debates and controversies include: theories of human origins; interpretations of fossils, early art, and the oldest tools; the origin and fate of the Neanderthals; evolutionary themes in literature and film; visual rhetoric and clichacute; in anthropological dioramas and phyletic diagrams; the significance of hunting, gathering, and grandmothering; climatological theories and neocatastrophic geologies; molecular anthropology; the impact of racial theories on human origins discourse. Background in human evolution not required.

Same as: HISTORY 443A

HISTORY 244. Egyptomania! The Allure of Ancient Egypt Over the Past 3,500 Years. 5 Units.

Why does Egypt fascinate us? From Napoleoniquest;s invasion to Katy Perryiquest;s latest music video, we have interpreted ancient Egyptian history and mythology for centuries; in fact, this obsession dates back to the Egyptians themselves. This seminar explores Egyptomania from the Pharaonic period to the 20th century. Topics include: ancient Egypt, Greek historians, medieval Arabic scholars, hieroglyphic decipherment, 19th century travel, 20th century pop culture, and how historians have interpreted this past over the centuries.

Same as: CLASSICS 87

HISTORY 244C. The History of the Body in Science, Medicine, and Culture. 4-5 Units.

The human body as a natural and cultural object, historicized. The crosscultural history of the body from the 18th century to the present. Topics include: sciences of sex and race; medical discovery of particular body parts; human experimentation, foot binding, veiling, and other bodily coverings; thinness and obesity; notions of the body politic.

Same as: HISTORY 444C

HISTORY 245. Violence and Identity in the African Great Lakes Region. 5 Units.

Untangles current crises through exploring debates on migration, autochthony, ethnicity and nationalism from the pre-colonial era to the present. While the majority of the course focuses on the region's `center' (Rwanda, Burundi and the Democratic Republic of the Congo), we will also examine continuities and differences within the larger geographic region. Topics include the historical roots and perspectives that inform genocide, gender based violence, mineral exploitation, reconciliation, development and controversies around homosexuality in Uganda and the wider region.

HISTORY 246E. Refugees and the Making of the Modern World: 1945-Present. 4-5 Units.

Following the mass popular displacements of WWII, a group of diplomats came together to create the United Nations High Commissioner for Refugees (UNHCR) and the 1951 Convention Relating to the Status of Refugees-- the bases of the international refugee regime that has endured to the present. We will explore the processes that led to the creation of the modern international refugee regime, and how international refugee law has evolved in response to conflicts and emergencies "on the ground." Throughout, we will question the category of the "refugee," and interrogate the methods by which refugees, as individuals and as groups, have sought to control and alter their positions under national and international authorities. Topics will include notions of migration and asylum, the creation and evolution of international refugee law, refugees, stateless people, economic migrants, and decolonization. We will have case studies of post-WWII European, Palestinian, Thai, Ethiopian, Haitian, and Cuban "refugees," among others.

Same as: HISTORY 346E

HISTORY 247. Violence in African History: Conflict and Healing in sub-Saharan Africa. 4-5 Units.

This course questions what constitutes "violence" in African history, and why it occurred when it did. We will examine the subtleties of "violence" in African history, which have sometimes led to conflicts, and sometimes to rich strategies of healing and improvisation. These include ecological crises, domestic violence, corruption, economic exploitation, and demographic crises (including urbanization and diseases such as HIV-AIDS). While we begin by examining ideas about conflict in pre-colonial Africa, the course focuses on the colonial and post-colonial eras in African history.

Same as: HISTORY 347

HISTORY 248S. Colonial States and African Societies, Part I. 4-5 Units.

Colonialism set in motion profound transformations of African societies. These transformations did not occur immediately following military conquest, nor did they occur uniformly throughout the continent. This research seminar will focus directly on the encounter between the colonial state and African societies. The seminar will examine problems of social transformation, the role of the colonial state, and the actions of Africans. Following four weeks of colloquium style discussion, students then embark on independent research on the encounter between one colonial state and its constituent African societies.

Same as: HISTORY 448A

HISTORY 249S. Colonial States and African Societies, Part II. 4-5 Units.

Second part of the research seminar offered in the Winter. Students continue their research and present their penultimate drafts in week 8.

Same as: HISTORY 448B

HISTORY 250A. History of California Indians. 5 Units.

Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system.

Same as: CSRE 117S

HISTORY 250E. Taxing America: From the Puritans to Prop. 13. 5 Units.

Taxes have shaped American society and politics since before the Revolution. And they've been extremely controversial just as long. In this course we'll try to understand American society and government by looking at the politics of taxation from the colonial period to the twentieth century. Topics include the legitimacy of taxation, the constitution, economic development, inequality, gender, and race.

HISTORY 252B. Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country. 5 Units.

The tragic death of Ambassador Chris Stevens has recently highlighted the dangers of diplomacy in the modern era. This class will look at how Americans in embassies have historically confronted questions such as authoritarian rule, human rights abuses, violent changes of government, and covert action. Case studies will include the Berlin embassy in the 1930s, Tehran in 1979, and George Kennan's experiences in Moscow, among others. Recommended for students contemplating careers in diplomatic service.

Same as: INTNLREL 174

HISTORY 252K. America as a World Power: U.S. Foreign Relations, 1914 to Present. 5 Units.

This course will examine the modern history of American foreign relations, from 1914 to the present. Beginning with the fateful decision to intervene in the First World War, it will examine the major crises and choices that have defined the American Century. Our study of U.S. foreign relations will consider such key factors as geopolitics, domestic politics, bureaucracy, psychology, race, and culture. Students will be expected to undertake their own substantial examination of a critical episode in the era studied.

Same as: INTNLREL 168

HISTORY 254. Popular Culture and American Nature. 5 Units.

Despite John Muir, Aldo Leopold, and Rachel Carson, it is arguable that the Disney studios have more to do with molding popular attitudes toward the natural world than politicians, ecologists, and activists. Disney as the central figure in the 20th-century American creation of nature. How Disney, the products of his studio, and other primary and secondary texts see environmentalism, science, popular culture, and their interrelationships.

HISTORY 254D. Law, Slavery, and Race. 5 Units.

(Same as LAW 747.) This course will explore the interaction of law, slavery and race in the United States, as well as from a comparative perspective. We will read original documents, including excerpts of trial transcripts, appellate opinions, treatises, codes, and first-person narratives. We will study the way law, politics and culture interacted to shape the institution of slavery and the development of modern conceptions of race. Course lectures and discussions will focus on questions such as: Did different legal regimes (Spanish, French, British) foster different systems of race and slavery in the Americas? How did/does law work "on the ground" to shape the production of racial hierarchy and creation of racial identities? In what ways did slavery influence the U.S. Constitution? How has race shaped citizenship in the U.S., and how can we compare it to other constitutional regimes? The course will begin with the origins of New World slavery, race and racism, and move chronologically to the present day.

Same as: AFRICAAM 254D, CSRE 154D, HISTORY 354

HISTORY 254G. The Causes and Consequences of the American Revolution. 5 Units.

Why did Britain's North American colonies declare independence from an empire they had long revered? What did the American Revolution mean for the people who experienced it? In this course we will explore the explosive origins of the American republic. Topics: revolutionary ideology, empire, the federal constitution, slavery, social conflict, and the international consequences of the American Revolution.

HISTORY 255. Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice. 5 Units.

The religious and political thought of Martin Luther King, Jr., using the documentary resources of the King Institute at Stanford. His social gospel Christianity and prophetic message of radical social transformation. Readings include the forthcoming *The Papers of Martin Luther King, Jr., Volume VI: Advocate of the Social Gospel*.

HISTORY 255E. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: AFRICAAM 116, CSRE 216X, EDUC 216

HISTORY 256. America- China Relations. 4-5 Units.

The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past.

Same as: AMSTUD 256, HISTORY 356

HISTORY 256G. Constructing Race and Religion in America. 4-5 Units.

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: CSRE 246, HISTORY 356G, RELIGST 246, RELIGST 346

HISTORY 257C. LGBT/Queer Life in the United States. 4-5 Units.

An introductory course on LGBT social, cultural, and political history in the United States. This course explores how categories of sexuality have changed over time, with particular emphasis on the relationship among homosexuality, heterosexuality, and transgenderism. Students will analyze how the intersections of race, class, and sexuality influenced the constitution of these categories and the politics of social relations. Historical and literary sources will be used to examine changes in LGBT experiences and identities, primarily in the twentieth century.

Same as: FEMGEN 140D, FEMGEN 240D

HISTORY 258. Topics in the History of Sexuality: Sexual Violence in America. 4-5 Units.

This undergraduate/graduate colloquium explores recent historical interpretations of the history of sexuality, with a focus on sexual violence. The readings cover changing definitions and laws, cultural representations, and the role of gender, race, and age in the construction of rape and other forms of sexual violence. Topics include slavery; incest, seduction, and statutory rape reform; the racialization of rape and the anti-lynching movement; street harassment; men and boys as victims; war and conquest; and feminist responses to rape.

Same as: AMSTUD 258, CSRE 192E, FEMGEN 258, FEMGEN 358, HISTORY 358

HISTORY 258E. History of School Reform: Origins, Policies, Outcomes, and Explanations. 3-5 Units.

Required for students in the POLS M.A. program; others welcome. Focus is on 20th-century U.S. Intended and unintended patterns in school change; the paradox of reform that schools are often reforming but never seem to change much; rhetorics of reform and factors that inhibit change. Case studies emphasize the American high school. This course is required for POLS students pursuing the PreK-12 concentration.

Same as: EDUC 220D

HISTORY 259A. Poverty and Homelessness in America. 4-5 Units.

Service learning. Students participate in a two quarter internship at a local shelter for homeless individuals or families. Readings include historical, social science, and social commentary literature. Service Learning Course (certified by Haas Center).

HISTORY 260. California's Minority-Majority Cities. 4-5 Units.

Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center).

Same as: CSRE 260

HISTORY 261. Race, Gender, and Class in Jim Crow America. 5 Units.

How African American life and labor were redefined from 1890-1954. Topics include family life, work, leisure patterns, transnational relations, cultural expressions emphasizing literature and music, resistance and social activism. Primary sources including visual materials, literature, and film; historical interpretations of the period.

HISTORY 261G. Presidents and Foreign Policy in Modern History. 5 Units.

Nothing better illustrates the evolution of the modern presidency than the arena of foreign policy. This class will examine the changing role and choices of successive presidential administrations over the past century, examining such factors as geopolitics, domestic politics, the bureaucracy, ideology, psychology, and culture. Students will be encouraged to think historically about the institution of the presidency, while examining specific case studies, from the First World War to the conflicts of the 21st century.

Same as: INTNLREL 173

HISTORY 264G. Madness in American Society: The Social History of Mental Illness in the United States. 5 Units.

(Formerly HPS 158.) Explores the variety of meanings of mental illness in the past, and the diagnostic, therapeutic, cultural and policy challenges historically posed by mental illness. Focus is on the U.S. but is not limited to it. How has mental illness been defined in history? How has the mind been medicalized and managed? Topics include the rise of institutions for the mentally ill, the growth of the psychiatric profession and the relationship between psychiatry, deviance and anti-psychiatry, and gender and psychiatric norms.

HISTORY 265. Writing Asian American History. 5 Units.

Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

Same as: AMSTUD 265, ASNAMST 265, HISTORY 365

HISTORY 266C. The Cold War: An International History. 5 Units.

Though it ended twenty years ago, we still live in a world shaped by the Cold War. Beginning with its origins in the mid-1940s, this course will trace the evolution of the global struggle, until its culmination at the end of the 1980s. Students will be asked to ponder the fundamental nature of the Cold War, what kept it alive for nearly fifty years, how it ended, and its long term legacy for the world.

Same as: INTNLREL 154

HISTORY 267E. Martin Luther King, Jr. - His Life, Ideas, and Legacy. 4-5 Units.

Using the unique documentary resources and publications of Stanford's King Research and Education Institute, this course will provide a general introduction to King's life, visionary ideas, and historical significance. In addition to lectures and discussions, the course will include presentations of documentaries such as *Eyes on the Prize*. Students will be expected to read the required texts, participate in class discussions, and submit a research paper or an audio-visual project developed in consultation with the professor.

Same as: AFRICAAM 267E, AMSTUD 267E

HISTORY 271. Mexicans in the United States. 5 Units.

This course explores the lives and experiences of Mexicans living in the United States, from 1848 to the present. Themes and topics include: the legacies of colonialism, the Mexican-American War, transnational migration, the effects of economic stratification, race and racialization, and the impact of sexual and gender ideologies on the lives of Mexicans residing north of the border.

Same as: AMSTUD 271, CHILATST 171, CSRE 171H

HISTORY 272E. Theories of Citizenship and Sovereignty in a Transnational Context. 4-5 Units.

This course explores the multiple meanings of citizenship and the ways in which they change when examined using different geographic scales (from the local to the transnational). The course will pair theoretical readings on citizenship with case studies that focus on North America. Topics include: definitions of citizenship; the interrelation of ideas of citizenship with those of race, ethnicity, gender, and sexuality; the relationship between sovereignty and territoriality; human and civil rights; and immigration. Same as: AMSTUD 272E, CHILATST 172, CSRE 172H, FEMGEN 272E, HISTORY 372E

HISTORY 273. The European Expansion. 4-5 Units.

The relationship between European monarchies and their colonial domains from the 16th-18th centuries. Reasons for expansion, methods, and results. Case studies include the Spanish, Portuguese, Dutch, French, and English domains in Africa, Asia, and the Americas. Readings include primary and secondary sources.

Same as: HISTORY 373A

HISTORY 274. Mexico Since 1876: History of a "Failed State"?. 5 Units.

This course is an introduction to the history and diverse peoples of modern Mexico from 1876 to the present. Through discussions, primary and secondary readings, short documentaries, and written assignments, students will critically explore and analyze the multiplicity of historical processes, events and trends that shaped and were shaped by Mexicans over the course of a century. The course will cover some of the social and political dimensions of rural social change, urbanization and industrialization, technological innovation and misuse, environmental degradation and conservation, education, ideology, culture and media, migration, and the drug trade.

HISTORY 274E. Urban Poverty and Inequality in Latin America. 5 Units.

We examine historical issues of social inequality, poverty, crime, industrialization, globalization, and environment in major Latin American cities.

HISTORY 278S. The Ethical Challenges of Climate Change. 4-5 Units.

This course explores the ethical challenges of climate change from historical, social, economic, political, cultural and scientific perspectives. These include the discovery of global warming over two centuries, the rise of secular and religious denialism and skepticism toward the scientific consensus on it, the dispute between developed and developing countries over how to forge a binding global agreement to mitigate it, and the "role morality" of various actors (scientists, politicians, fossil fuel companies, the media and ordinary individuals) in the US in assessing ethical responsibility for the problem and its solutions.

Same as: HISTORY 478

HISTORY 279. Latin American Development: Economy and Society, 1800-2014. 4-5 Units.

The newly independent nations of Latin America began the 19th century with economies roughly equal to the U.S. and Canada. What explains the economic gap that developed since 1800? Why are some Latin American nations rich and others poor and how have societies changed over time? Marxist, dependency, neoclassical, and institutionalist interpretive frameworks are explored. The effects of globalization on Latin American economic growth, autonomy, and potential for social justice are examined and debated.

Same as: HISTORY 379

HISTORY 279D. Modern Brazil: Economy, Society & Culture. 4-5 Units.

This course addresses the history of modern Brazil from independence in 1822 to the present day. The class focuses on theories of economic development, social structure and change, and cultural life in Brazil's diverse regions.

Same as: HISTORY 379D

HISTORY 281A. Twentieth-Century Iraq: A Political and Social History. 5 Units.

The colonial experience, creation of the modern Iraqi state, and transition to military dictatorship. Political movements, religious and tribal elements, and their relation to the state. Geopolitical context.

HISTORY 282. The United States and the Middle East since 1945. 4-5 Units.

Since the end of WW II, U.S. interests in the Middle East have traditionally been defined as access to oil at a reasonable price, trade and markets, containing the influence of the Soviet Union, and the security of Israel. Is this the full range of U.S. interests? How has the pursuit of these interests changed over time? What forces have shaped U.S. policy? What is the impact of U.S. policy on the region itself?.

Same as: HISTORY 382

HISTORY 282F. History of Modern Turkey. 5 Units.

Social, political and cultural history of Modern Turkey from the last decades of the Ottoman Empire in the late 19th century until Today. Themes include transformation from a multi-national empire to a national republic; Islam, secularism and radical modernism; military, bureaucracy and democratic experience; economic development, underdevelopment and class; Istanbul, Ankara and provincial Turkey; socialism, conservatism(s), and Kurdish challenge; Turkey in Europe, the Middle East and Central Asia; gender, sexuality and family; recent political crises.

HISTORY 283. The New Global Economy, Oil and Origins of the Arab Spring. 4-5 Units.

This class uses the methods of political economy to study the trajectory of global capitalism from the end of World War II to the current phase of neoliberal globalization. The argument is that the role of oil, and its primary repository " the Middle East " has been central in the global capitalist order and that neoliberalism and the oil economy are closely linked to the eruption of the Arab uprisings of 2011.

Same as: HISTORY 383

HISTORY 284F. Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800. 4-5 Units.

Focuses on political regimes, economic interactions and sociocultural formations in the early modern Balkans and Middle East to Central and South Asia. Topics include complex political systems of the Ottoman, Safavid and Mughal empires; experiences of various Muslim, Christian, Jewish and Hindu, as well as urban, rural and nomadic communities; consolidation of transregional commerce and cultural exchange; incorporation of the Islamic world in the global economy; transimperial networks of the Muslim and Non-Muslim merchants, scholars and sufis. Same as: HISTORY 384F

HISTORY 286. Jews Among Muslims in Modern Times. 4-5 Units.

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 386, JEWISHST 286, JEWISHST 386

HISTORY 287C. Zionism and its Critics. 4-5 Units.

Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

HISTORY 288. Palestine and the Arab-Israeli Conflict. 4-5 Units.

This course examines some salient issues of the Israeli-Palestinian conflict from the late 19th century to the present. At the end of the course you should be able to articulate the positions of the major parties to the conflict, with the understanding that there is no single, unified Zionist (or Jewish) or Palestinian (or Arab) position. One quarter does not allow sufficient time to cover even all of the important topics comprehensively (for example, the role of the Arab states, the USA and the USSR, and the internal history of Israel receive less attention than is desirable). Some prior knowledge of Middle East history is desirable, but not required. Vigorous debate and criticism are strongly encouraged. Criticism and response expressed in a civil tone is an important way to get a fuller and more truthful picture of something. This is not only a fundamental democratic right and a basic citizenship skill, but it is essential to interpreting information and making good policy. Rights not used are easily lost.

Same as: JEWISHST 288, JEWISHST 388

HISTORY 288D. American Jewish History: Learning to be Jewish in America. 2-4 Units.

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience.

History students must take course for at least 3 units.

Same as: AMSTUD 279X, EDUC 279X, JEWISHST 297X, RELIGST 279X

HISTORY 291A. Archaeology and Modernity in Asia: The Excavation of Ancient Civilizations in Modern Times. 4-5 Units.

The interplay in Asia between antiquity and modernity, civilization and nation state, and national versus colonial science. The recent excavation of artifacts and places associated with Asian civilization such as the terracotta warriors in China and Angkor Wat in Cambodia. How Asian states have grappled with modernity and colonialism as they simultaneously dug up their ancient pasts.

Same as: HISTORY 391A

HISTORY 292D. Japan in Asia, Asia in Japan. 4-5 Units.

How Japan and Asia mutually shaped each other in the late 19th and 20th centuries. Focus is on Japanese imperialism in Asia and its postwar legacies. Topics include: pan-Asianism and orientalism; colonial modernization in Korea and Taiwan; collaboration and resistance; popular imperialism in Manchuria; total war and empire; comfort women and the politics of apology; the issue of resident Koreans; and economic and cultural integration of postwar Asia.

Same as: HISTORY 392D

HISTORY 292F. Culture and Religions in Korean History. 4-5 Units.

This colloquium explores the major themes of Korean history before 1800 and the role of culture and religions in shaping the everyday life of Chosŏn-dynasty Koreans. Themes include the aristocracy and military in the Koryŏ-dynasty, Buddhism and Confucianism in the making of Chosŏn-dynasty Korea, kingship and court culture, slavery and women, family and rituals, death and punishment, and the Korean alphabet (Hangul) and print culture.

Same as: HISTORY 392F

HISTORY 293B. Queer History in Comparative Perspective. 4-5 Units.

Comparative history of homoerotic desire, relations, and identity through scholarship on different historical periods and parts of the world: the classical Mediterranean, early modern European cities, late imperial and modern China, Tokugawa and modern Japan, and the U.S.

Same as: FEMGEN 293B, FEMGEN 393B, HISTORY 393B

HISTORY 293D. Global Intellectual History. 4-5 Units.

Ideas have circulated globally for millennia but relatively recently have thinkers begun to conceptualize the global. Like "humanity" and "universalism," or what Marx called "international," the "global" too has complex genealogies. It is associated, often simultaneously, with empire and freedom, war and equality, commitment and treason, piracy and justice, homelessness and cosmopolitanism. Working with key 20th century texts from Italy, Britain, India, Israel, Palestine, Germany, France, and Algeria, course explores how thinking "globally" impacts the very foundations of modern political thought.

Same as: HISTORY 393D

HISTORY 293E. Female Divinities in China. 4-5 Units.

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: HISTORY 393E, RELIGST 257X, RELIGST 357X

HISTORY 294D. Manchuria: Cradle of Conflict, Cockpit of Asia. 4-5 Units.

How did Manchuria become Chinese? This course utilizes the dual waves of early twentieth-century writings and a wide array of recent scholarship dealing with Manchuria to explore the formation of nation-states out of the Qing and Japanese empires in Northeast Asia through the lenses of opium, migration, cities, warlords, and memoir. This course will be of interest to students concerned with developing transcultural understandings of Northeast Asian history.

Same as: HISTORY 394D

HISTORY 295F. Race and Ethnicity in East Asia. 4-5 Units.

Intensive exploration of major issues in the history of race and ethnicity in China, Japan, and Korea from the early modern period to the present day.

Same as: ASNAMST 295F, HISTORY 395F

HISTORY 296. Communism and Revolution in China. 5 Units.

From the formation of the Chinese Communist Party (CCP) in 1921 through the 1949 founding of the People's Republic of China (PRC). Topics include: early theories of socialism in China; the relationship between Chinese communism and the Communist International and Soviet Union; agrarian reformulation of communism by Mao; the communist-nationalist civil war; the Communist Revolution of 1949; and the consolidation of communist power in the PRC.

HISTORY 296F. Short Stories from India and Pakistan. 3-5 Units.

The course introduces the main periods and trends of 20th- and 21st-century Urdu short story: Progressive Writers' Movement, Partition literature, Modernism, contemporary fiction. Classes include close reading and discussion of selected short stories, with special focus on prominent themes such as social problems; personal loss, exile, displacement, alienation, and questions of identity; gender and sexuality; history, memory, and nostalgia; myth and imagination. Readings include: Premchand, Manto, Ismat Chughtai, Qurratulain Hyder, Intizar Husain, Naiyer Masud. All readings are in English.

Same as: ICA 296F

HISTORY 297. The Cold War and East Asia. 5 Units.

Explores how East Asia negotiated superpower rivalry and global ideological competition during the Cold War. Considers the ways in which China, Japan, and Korea were more than battlegrounds for US-Soviet contestation and played active roles in defining the nature and dynamics of the conflict. Re-examines conventional narratives and periodizations against alternative conceptual models and interpretive frameworks highlighting the constructed nature of the struggle as well as the role of historical and cultural factors in shaping the East Asian experience.

Same as: HISTORY 397

HISTORY 297F. Religion and Power in the Making of Modern South Asia. 3-5 Units.

This course examines the diverse ways that religious traditions have been involved in the brokering of power in South Asia from the late seventeenth century to the present day. We will examine the intersection of religion and power in different arenas, including historical memory, religious festivals, language politics, and violent actions. At the core of our inquiry is how religion is invoked in political contexts (and vice-versa), public displays of religiosity, and the complex dynamics of religion and the state. Among other issues, we will particularly engage with questions of religious identity, knowledge, and violence. HISTORY297F must be taken for 4-5 units.

Same as: RELIGST 255, RELIGST 355

HISTORY 299A. Senior Research I. 1-5 Unit.

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HISTORY 299B. Senior Research II. 1-5 Unit.

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HISTORY 299C. Senior Research III. 1-5 Unit.

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HISTORY 299D. Tooling Up for Digital Humanities. 1 Unit.

What are the digital humanities? The twenty-first century presents new opportunities in the humanities, such as unprecedented access to millions upon millions of digitized sources along with powerful technological tools to study those sources. Yet it also raises new challenges, such as the responsible and effective use of technology, and defining the nature of digital scholarship and communication. This workshop offers an introduction to fundamental concepts, methods, and issues within the growing field of digital humanities, including managing your online identity, digitizing sources, managing databases, text mining, spatial analysis, visualization, and pedagogy.

HISTORY 299H. Junior Honors Colloquium. 1 Unit.

Required of junior History majors planning to write a History honors thesis during senior year. Meets four times during the quarter.

HISTORY 299M. Undergraduate Directed Research: Martin Luther King, Jr., Research and Education Institute. 1-4 Unit.

May be repeated for credit.

HISTORY 299P. Undergraduate Directed Research: Pioneering Women. 1 Unit.

May be repeated for credit.

HISTORY 299S. Undergraduate Directed Research and Writing. 1-5 Unit.

May be repeated for credit.

HISTORY 299X. Preparing for International Field Work: Public Service or Research. 1 Unit.

Open to students in all classes, those planning internships abroad and those planning research, from juniors with honors theses and sophomores with Chappell Lougee grants to freshmen thinking ahead. Introduces resources on campus for planning international research and service. Raises issues that need to be considered in advance of going abroad: ethical concerns, Human Subjects Protocol, networking, personal safety and gender issues, confronting cultural differences. Exposes students to research methods: case studies, interviewing, working in foreign libraries and archives.

Same as: HISTORY 399A

HISTORY 301. Introduction to Public History and Public Service. 4-5 Units.

Gateway course for the History and Public Service interdisciplinary track. Topics include the production, presentation, and practice of public history through narratives, exhibits, web sites, and events in museums, historical sites, parks, and public service settings in nonprofit organizations, government agencies, and educational institutions. Service Learning Course (certified by Haas Center).

Same as: AFRICAAM 102, CSRE 201, HISTORY 201

HISTORY 301A. The Global Drug Wars. 4-5 Units.

Explores the global story of the struggle over drugs from the nineteenth century to the present. Topics include the history of the opium wars in China, controversies over wine and tobacco in Iran, narco-trafficking and civil war in Lebanon, the Afghan 'narco-state,' Andean cocaine as a global commodity, the politics of U.S.- Mexico drug trafficking, incarceration, drugs, and race in the U.S., and the globalization of the American 'war on drugs.'

Same as: HISTORY 201A

HISTORY 302G. Peoples, Armies and Governments of the Second World War. 4-5 Units.

Clausewitz conceptualized war as always consisting of a trinity of passion, chance, and reason, mirrored, respectively, in the people, army and government. Following Clausewitz, this course examines the peoples, armies, and governments that shaped World War II. Analyzes the ideological, political, diplomatic and economic motivations and constraints of the belligerents and their resulting strategies, military planning and fighting. Explores the new realities of everyday life on the home fronts and the experiences of non-combatants during the war, the final destruction of National Socialist Germany and Imperial Japan, and the emerging conflict between the victors. How the peoples, armies and governments involved perceived their possibilities and choices as a means to understand the origins, events, dynamics and implications of the greatest war in history.

Same as: HISTORY 202G

HISTORY 303. Premodern Economic Cultures. 5 Units.

A comparative survey of premodern economies and the value systems that supported them. Students will read and discuss theories of economic culture as well as historical monographs about specific regions. Discussions will focus on the comparison and conceptualization of premodern economic cultures. Students will be required to research the literature on a particular premodern society of their choosing, compile an annotated bibliography of that literature, and compose an essay analyzing the problems and possibilities presented therein.

Same as: HISTORY 203

HISTORY 303C. History of Ignorance. 4-5 Units.

Scholars pay a lot of attention to knowledge--how it arises and impacts society--but much less attention has been given to ignorance, even though its impacts are equally profound. Here we explore the political history of ignorance, through case studies including: corporate denials of harms from particular products (tobacco, asbestos), climate change denialism, and creationist rejections of Darwinian evolution. Students will be expected to produce a research paper tracing the origins and impact of a particular form of ignorance.

HISTORY 303D. The Holocaust in Recent Memory: Conflicts - Commemorations - Challenges. 5 Units.

This course offers an in-depth approach to the study of the Holocaust as a historical point of reference for European memory, or for the memory cultures of European nations, where the international context in particular the USA and Israel will also be taken into consideration. The starting point is the transformations in Holocaust memory: after 1945, in the era of European postwar myths, the Holocaust was on the periphery of historical thinking, of scholarly and public interest. Today the Holocaust is acknowledged as a 'break in civilization', a watershed event in human history. This approach has only evolved since the 1980s.

Same as: HISTORY 203D, JEWISHST 283D, JEWISHST 383D

HISTORY 303F. Words and Things in the History of Classical Scholarship. 4-5 Units.

How have scholars used ancient texts and objects since the revival of the classical tradition? How did antiquarians study and depict objects and relate them to texts and reconstructions of the past? What changed and what stayed the same as humanist scholarship gave way to professional archaeologists, historians, and philologists? Focus is on key works in the history of classics, such as Erasmus and Winckelmann, in their scholarly, cultural, and political contexts, and recent critical trends in intellectual history and the history of disciplines.

Same as: CLASSICS 331

HISTORY 303K. Trauma and History: Intergenerational suffering and collective healing. 4-5 Units.

This course will examine trauma as a historical process, following the intergenerational impacts of history's darker dramas, analyzing collective strategies for coping and healing after trauma, and asking whether we can speak of "traumatized societies." Readings for graduate students will include Ben Shephard's *A War of Nerves*, Didier Fassin and Richard Rechtman's *The Empire of Trauma*, and selections from Yael Danieli, ed., *Intergenerational Handbook of Multigenerational Legacies of Trauma*. Colloquium will be discussion-oriented, but will also include guest discussants from around the world. The course will culminate in a conference to be held at Stanford, June 4-6: "Soul Wounds: Trauma and Healing Across Generations." Undergraduate requirements for 1 credit: Attend weekly "Mind, Body, and Culture" workshop and first hour of Wednesday morning discussion, attend some part of conference on June 4-6. Graduate requirements for 4-5 credits: Attend workshop, read weekly, discussion on Wednesday mornings, write a paper and if desired present at conference.

HISTORY 304. Approaches to History. 5 Units.

Required of first-year History Ph.D. students. This course explores ideas and debates that have animated historical discourse and shaped historiographical practice over the past half-century or so. The works we will be discussing raise fundamental questions about how historians imagine the past as they try to write about it, how they constitute it as a domain of study, how they can claim to know it, and how (and why) they argue about it.

HISTORY 304G. War and Society. 5 Units.

How Western societies and cultures have responded to modern warfare. The relationship between its destructive capacity and effects on those who produce, are subject to, and must come to terms with its aftermath. Literary representations of WW I; destructive psychological effects of modern warfare including those who take pleasure in killing; changes in relations between the genders; consequences of genocidal ideology and racial prejudice; the theory of just war and its practical implementation; and how wars are commemorated.

Same as: HISTORY 204G

HISTORY 305. Graduate Pedagogy Workshop. 1 Unit.

Required of first-year History Ph.D. students. Perspectives on pedagogy for historians: course design, lecturing, leading discussion, evaluation of student learning, use of technology in teaching lectures and seminars. Addressing today's classroom: sexual harassment issues, integrating diversity, designing syllabi to include students with disabilities.

HISTORY 305C. Graduate Workshop Series. 1 Unit.

This is a 1-credit course for which only regular attendance is required, and graduate students may audit any or all of the sessions as they find useful. The majority of the course addresses questions of research, grant writing, and professionalization, while the last few sessions offer general guidance on preparing for the job market.

HISTORY 305G. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolo Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources.

Same as: HISTORY 205G, POLISCI 235J, POLISCI 335J

HISTORY 306A. City, Society, Literature- 19th Century Histories. 4 Units.

This course examines the rise of modern cities through an analysis of urban society and the imaginative literature of the 1800s.

Same as: HISTORY 206A, URBANST 106

HISTORY 306D. World History: Graduate Colloquium. 4 Units.

How do historians engage the global scale in the classroom as well as in research? The world history canon including Toynbee, McNeill, Braudel, Wolf, and Wallerstein; contrasting approaches, recent research, and resources for teaching. Recommended: concurrent enrollment in HISTORY 306K.

HISTORY 306E. International History and International Relations Theory. 5 Units.

The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system.

Same as: HISTORY 202, POLISCI 216E, POLISCI 316

HISTORY 306F. Identities and Identification in the Atlantic World. 4-5 Units.

How identities and processes of identification changed in Europe, Africa, and the Americas during the early modern period and as a result of the engagement of the inhabitants of these three continents in the Atlantic world.

HISTORY 306G. Colonial Law. 4-5 Units.

Examines the relationship between law and colonialism in Latin America, Africa and Asia during both the early modern and the modern period. By reading some of the seminal works that have been published on this issue, we will seek to understand how law both facilitated and limited colonialism and how colonialism, in turn, had modified the legal systems that had existed previously. Attention will also be given to law as an acculturating agent and to the legal arena as a sphere for conflict resolution, negotiation, and identity formation.

HISTORY 306K. World History Pedagogy Workshop. 1 Unit.

Students draft a syllabus and create a curriculum module for use in a world history lecture course. Corequisite: HISTORY 306D, recommended.

HISTORY 307A. Legal History Workshop. 4-5 Units.

(Same as LAW 372.) The Legal History Workshop is designed as a forum in which faculty and students from both the Law School and the History Department can discuss some of the best work now being done in the field of legal history. Every other week, an invited speaker will present his or her current research for discussion. This year the theme of the Workshop will be Conservative Legal Movements from 1950 to the Present. Speakers will include Reva Siegel, the Nicholas deB. Katzenbach Professor of Law at Yale Law School, and Thomas Sgrue, the David Boies Professor of History and Sociology at the University of Pennsylvania, as well several other scholars of law, the social sciences and humanities writing about this topic. In the week prior to a given speaker's presentation, the class will meet as a group to discuss secondary literature relevant to understanding and critiquing the speaker's research. Students will then read the speaker's paper in advance of the following week's workshop presentation. Special Instructions: Students are required to write a brief response to each speaker's paper. There will be a total of four speakers, and thus four papers. Guidance will be provided concerning how to frame these response papers, which will be due every two weeks - i.e., on the day before speaker presents and students will receive "W" writing credit. Students taking the course to receive "R" research credit are required to write a research paper on a legal history topic that they choose (in consultation with the professor). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation, attendance, assignments and final paper. This course is open to first-year Law School students. Writing (W) credit is for students entering prior to Autumn 2012.

HISTORY 307C. The Global Early Modern. 4-5 Units.

In what sense can we speak of "globalization" before modernity? What are the characteristics and origins of the economic system we know as "capitalism"? When and why did European economies begin to diverge from those of other Eurasian societies? With these big questions in mind, the primary focus will be on the history of Europe and European empires, but substantial readings deal with other parts of the world, particularly China and the Indian Ocean.

Same as: HISTORY 207C

HISTORY 307E. Totalitarianism. 4-5 Units.

Modern revolutionary and totalitarian politics. Sources include monographs on the medieval, Reformation, French Revolutionary, and Great War eras. Topics: the essence of modern ideology, the concept of the body national, state terror, charismatic leadership, gender assignments, private and public spheres, and identities.

Same as: HISTORY 204E

HISTORY 308. Biography and History. 4-5 Units.

The relationship between biographical and historical writing, primarily in Europe and America. Problems of methodology, evidence, dispassion, and empathy. Texts: biographies, critical literature on biographical work, and novels (A. S. Byatt's *Possession*, Bernard Malamud's *Dubin's Lives*) that illuminate the intellectual underpinnings of biographical labor.

Same as: HISTORY 207

HISTORY 308B. Women Activists' Response to War. 4-5 Units.

Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.

Same as: FEMGEN 208B, HISTORY 208B

HISTORY 309A. Postcolonialism and Universalism. 4-5 Units.

Key texts and motifs from postcolonial theory: empire, class, exile, suffering, textuality, archive in juxtaposition to 20th-century philosophical questions about universal history and the relevance of humanist inquiry.

Same as: HISTORY 209D

HISTORY 309B. The Idea of Politics. 4-5 Units.

Can we live without politics? Is politics indispensable for humanity and vice-versa? The idea of politics is that it must transform, through human action, conditions of collective life. But the 20th century produced colliding beliefs about what that life might be and what the human being itself might look like. Explore whether, after the century, we might still think of politics as an ethical idea and the "human" as foundational political category.

Keywords: Civility, Cruelty, Friendship, Empire, Democracy, Humanism, Animals.

Same as: HISTORY 209B

HISTORY 309C. Liberalism and Violence. 5 Units.

Does Liberalism have a theory of violence? What does modern political thought, in privileging humanity and rights, share with "terrorists" and "rogue states?" How is liberalism transformed by the use of religion and death for political ends? We read key thinkers of modern life- Adorno, Arendt, Agamben, Benjamin, Derrida, Fanon, Foucault, Gandhi, Heidegger, and Schmitt- to interrogate the relationship between religion, sacrifice, and democracy. At the center are connections between war and modern life, and between violence and non-violence.

Same as: HISTORY 209C

HISTORY 309E. History Meets Geography. 4-5 Units.

Focus is on developing competence in GIS computer applications and applying it to historical problems. Previous experience with GIS not required. Recommended: complete the GIS tutorial in Branner Library before the course starts.

HISTORY 309F. Historical Geography Colloquium: Maps in the Early Modern World. 4-5 Units.

The significance of cartographic enterprise across the early modern world. Political, economic, and epistemological imperatives that drove the proliferation of nautical charts, domain surveys, city plans, atlases, and globes; the types of work such artifacts performed for their patrons, viewers, and subjects. Contributions of indigenous knowledge to imperial maps; the career of the map in commerce, surveillance, diplomacy, conquest, and indoctrination. Sources include recent research from Asia, Europe, and the Americas.

HISTORY 309G. Paleography of Medieval and Early Modern Manuscripts. 3-5 Units.

Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.

Same as: CLASSICS 215, DLCL 209, RELIGST 204

HISTORY 311A. Family, Gender, and Production in Ancient Rome. 4-5 Units.

Seminar. The household as the basic unit of production in Rome in the context of family relations and ideologies of gender. Methodological challenges of doing social and economic history from literary, epigraphic, and literary texts. Demography of family and kinship in ancient Rome. Ideologies of gender and family roles and their influence on economic production. Economic theories of the family and human capital.

HISTORY 311G. Big Ancient History. 4-5 Units.

How the shift away from thinking about European history in terms of a western civilization model toward embedding it in stories of how global history affects research and teaching on ancient Greece and Rome. Conventional, evolutionary, and global history narratives of the past 5,000 to 15,000 years and some new ideas about how Greco-Roman history might fit into different storylines.

HISTORY 312. Knights, Monks, and Nobles: Masculinity in the Middle Ages. 4-5 Units.

This course considers masculinity as historically and culturally contingent, focusing on the experiences and representations of medieval men as heroes, eunuchs, fathers, priests, husbands, boys, and fighting men. Recognizing that the lives of men, like those of women, were governed by gendered rules and expectations, we will explore a wide range of medieval masculinities, paying close attention to the processes by which manhood could be achieved (e.g. martial, spiritual, sexual), and to competing versions of manliness, from the warrior hero of the early middle ages to the suffering Christ of late medieval religion.

Same as: HISTORY 212

HISTORY 314D. Mediterranean Crossroads: Power, Culture, and Religion in Medieval Sicily. 5 Units.

Sicily in the Middle Ages was a Mediterranean crossroads, a dynamic and diverse kingdom in which Muslim and Christian, Viking and African, European and Eastern Cultures all came together. Explores the life and times of Frederick II (1194-1250). He claimed universal authority as a Christian emperor, yet ruled multireligious Sicily as king. He promoted crusading, yet was accused of being a heretic and a crypto Muslim. He spoke six languages and actively patronized the arts and sciences. Topics include: structures and influences that made such a figure possible; how he managed the tensions of governing a diverse and disparate empire; how religion and cultural production created and maintained his authority; how contemporaries and later generations reacted to this enigmatic emperor; why has he continued to generate such polarizing reactions; and how did Frederick become a figure revered by Nazis and multiculturalists alike.

Same as: HISTORY 214D

HISTORY 315. Advanced Paleography. 5 Units.

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment.

Same as: CLASSICS 216, ENGLISH 300A, RELIGST 329X

HISTORY 316. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation.

Same as: ARTHIST 206H, FEMGEN 216, HISTORY 216

HISTORY 319B. Secularity. 4-5 Units.

Classic theories of secularity. Is a secular world possible? How does, historically seen, the notion of the secular emerge, impose itself, and get challenged? Readings include Max Weber, E. Durkheim, R.A. Markus, Carl Schmitt, and Hans Blumenberg, and studies bearing on the Middle Ages, English monastic secularization, the French Revolution, and 20th-century political religions.

HISTORY 319C. Science, Technology, and Modernity in the Soviet Union. 5 Units.

Science and technology were integral to the Soviet claim to offer a vision of modernity superior to that of Western capitalism. Science and technology would flourish; society would develop on a scientific basis. The results were more complex than the vision. Topics to be covered: science and Marxism-Leninism; the Lysenko affair; the R&D system; the role of the secret police; the atomic project; the space race; missile development; Andrei Sakharov; technology and innovation.

Same as: HISTORY 219C

HISTORY 321A. State, Society and Nation in Modern Russian Historiography. 4-5 Units.

Main trends of Russian intellectual history as seen through major historians' treatment of Muscovy: Romanticism, Slavophilism, Hegelianism, Populism, Social Democracy, New Idealism, and Marxism-Leninism.

HISTORY 321B. Imperial Russian Historiography. 4-5 Units.

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HISTORY 323. Art and Ideas in Imperial Russia. 4-5 Units.

Poetry, novels, symphonic music, theater, opera, painting, design, and architecture: what they reveal about the politics and culture of tsarist Russia.

Same as: HISTORY 223

HISTORY 323B. Research Methodologies in Early Modern Russian History. 4-5 Units.

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HISTORY 324C. Genocide and Humanitarian Intervention. 3 Units.

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 224C, JEWISHST 284C, JEWISHST 384C, PEDS 224

HISTORY 324F. The Caucasus and the Muslim World. 4-5 Units.

The linkages connecting the societies of the Caucasus to Muslim communities in Iran, Russia, the Ottoman Empire and Turkey, S. Asia, and the Middle East.

HISTORY 326A. Modern Europe: Society and Politics. 5 Units.

The goal of this course is to introduce graduate students to major works of history and literature in the field of nineteenth and early-twentieth century history. A colloquia will be given in tandem with a research seminar.

HISTORY 326C. Graduate Colloquium on Balkan History. 4-5 Units.

Designed for History Ph.D. students to develop competence in the history and historiography of the modern Balkans, from the French Revolution to the present. Areas of study include the influence of empires on the region, the rise of nationalism and nation states, the dilemmas of independence, the emergence and decline of communism in the region, and the recurrence of war and ethnic conflict.

HISTORY 326E. Famine in the Modern World. 3 Units.

Open to medical students, graduate students, and undergraduate students. Examines the major famines of modern history, the controversies surrounding them, and the reasons that famine persists in our increasingly globalized world. Focus is on the relative importance of natural, economic, and political factors as causes of famine in the modern world. Case studies include the Great Irish Famine of the 1840s; the Bengal famine of 1943-44; the Soviet famines of 1921-22 and 1932-33; China's Great Famine of 1959-61; the Ethiopian famines of the 1970s and 80s, and the Somalia famines of the 1990s and of 2011.

Same as: HISTORY 226E, PEDS 226

HISTORY 327D. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.

Same as: HISTORY 227D, REES 227, REES 327

HISTORY 328. Circles of Hell: Poland in World War II. 5 Units.

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.

Same as: HISTORY 228, JEWISHST 282, JEWISHST 382

HISTORY 330. Core Colloquium on Early Modern Europe: Ancien Regime. 4-5 Units.

Topics in the social, political, and religious history of Western Europe, 1550-1789, with an emphasis on France. May be repeated for credit.

HISTORY 330A. Early Modern Colloquium. 4-5 Units.

Historiographical survey from the Renaissance to the Enlightenment. Topics include Renaissance, Reformation, European expansion, state and nation building, printing, military, and scientific revolutions, origins of Enlightenment. Designed to prepare students doing either a primary or secondary graduate field in early modern European history.

HISTORY 330D. Europe in the World, 1789-Present. 4-5 Units.

The European conquest of parts of Africa, Asia, and the South Pacific by European merchants, missionaries, armies, and administrators had significant, and often cataclysmic, effects on indigenous political alliances, cultural practices, and belief systems. But were the effects of expansion entirely one-sided? What impact did the experiences of colonialism have on European politics, culture, and Europe's relations with the rest of the world? Explores how interaction between Europe and the rest of the world redefined the political, racial, sexual, and religious boundaries of both Europe and its colonies and gave rise to the more "globalized" society we live in today.

Same as: HISTORY 230D

HISTORY 330F. Surveillance in Modern Europe. 4-5 Units.

We will investigate the role of surveillance in modern societies -- the motives, pressures, and consequences of informal and formal systems of control from the French Revolution to the present day. Students will encounter a variety of sources and situations, analyzing the tensions between social stability and individual pursuits, and the circumstances under which these tensions can lead to state repression and violence.

Same as: HISTORY 230F

HISTORY 331D. Core Colloquium on Modern Europe: Intellectual History. 4-5 Units.**HISTORY 331E. Paper, Printing, and Digital Revolutions: Transformations of the Book. 4-5 Units.**

What is a book? This seminar explores the conceptual implications of approximately two millennia of transformations in the physical and material properties of books. How have the meaning and authority we assign the written word changed as technologies of book production and dissemination have evolved, and how have they remained continuous? Topics covered include the rise of the medieval manuscript codex, the emergence of print culture in early modern Europe, and current debates over the nature of text in the digital age.

Same as: HISTORY 231E

HISTORY 332B. Heretics, Prostitutes and Merchants: The Venetian Empire. 4-5 Units.

Between 1200-1600, Venice created a powerful empire at the boundary between East and West that controlled much of the Mediterranean, with a merchant society that allowed social groups, religions, and ethnicities to coexist. Topics include the features of Venetian society, the relationship between center and periphery, order and disorder, orthodoxy and heresy, the role of politics, art, and culture in the Venetian Renaissance, and the empire's decline as a political power and reinvention as a tourist site and living museum.

Same as: ITALIAN 332B

HISTORY 332C. The Great War: WWI in Literature, Film, Art, and Memory. 3-5 Units.

This course concerns how writers, artists, and other cultural producers understood and represented the traumas of the First World War and its aftermath. Rather than tracing a political or military history of the conflict, we'll focus on how the horrors of War (both in the trenches and on the home front) fostered broader social and cultural shifts, as people questioned the very foundations of European civilization. Most specifically, we'll explore the connections between the War and the emergence of post-War modernist movements, as writers and artists created new works to help them make sense of the catastrophe and the new world it wrought. Though France provides our starting point, we'll also travel beyond the Hexagon to incorporate other views and major works. Course readings will be in English, though students may elect to read works in French if they wish.

Same as: FRENCH 258, FRENCH 358, HISTORY 231C

HISTORY 332D. Rome: The City and the World, 1350-1750. 4-5 Units.

What lies beyond the ruins of an ancient city? The history of Rome from the Renaissance to the age of the grand tour. Topics include: the political, diplomatic, and religious history of the papacy; society and cultural life; the everyday world of Roman citizens; the relationship between the city and the surrounding countryside; the material transformation of Rome as a city; and its meaning for foreigners.

Same as: HISTORY 232D

HISTORY 332F. The Scientific Revolution. 5 Units.

What do people know and how do they know it? What counts as scientific knowledge? In the 16th and 17th centuries, understanding the nature of knowledge engaged the attention of individuals and institutions including Copernicus, Galileo, Descartes, Newton, the early Royal Society, and less well-known contemporaries. New meanings of observing, collecting, experimenting, and philosophizing, and political, religious, and cultural ramifications in early modern Europe.

HISTORY 332G. When Worlds Collide: The Trial of Galileo. 4-5 Units.

In 1633, the Italian mathematician Galileo was tried and condemned for advocating that the sun, not the earth, was the center of the cosmos. The Catholic Church did not formally admit that Galileo was right until 1992. Examines the many factors that led to the trial of Galileo and looks at multiple perspectives on this signal event in the history of science and religion. Considers the nature and definition of intellectual heresy in the sixteenth and early seventeenth centuries, and examines the writings of Galileo's infamous predecessor Giordano Bruno (burned at the stake in 1600). Looks closely at documents surrounding the trial and related literature on Renaissance and Reformation Italy in order to understand the perspectives of various participants in this famous event. Focal point of seminar involves the examination of the many different histories that can be produced from Galileo's trial. What, in the end, were the crimes of Galileo?.

HISTORY 333C. Two British Revolutions. 4-5 Units.

Current scholarship on Britain, 1640-1700, focusing on political and religious history. Topics include: causes and consequences of the English civil war and revolution; rise and fall of revolutionary Puritanism; the Restoration; popular politics in the late 17th century; changing contours of religious life; the crisis leading to the Glorious Revolution; and the new order that emerged after the deposing of James II.

Same as: HISTORY 233C

HISTORY 333K. The Invention of the Modern Republic. 4-5 Units.

Examines the history of republican thinking in the Atlantic World from the Renaissance to the French Revolution.

Same as: HISTORY 233K

HISTORY 334. The Enlightenment. 3-5 Units.

The Enlightenment as a philosophical, literary, and political movement. Themes include the nature and limits of philosophy, the grounds for critical intellectual engagement, the institution of society and the public, and freedom, equality and human progress. Authors include Voltaire, Montesquieu, Rousseau, Hume, Diderot, and Condorcet.

Same as: DLCL 324, HISTORY 234, HISTORY 432A, HUMNTIES 324

HISTORY 334F. Science, Technology, and Empire. 4-5 Units.

How modern Europe came to be connected to the wider world through repeated cycles of expansion, circulation, and exchange from the nineteenth century to the present. Using weekly themes and in-depth discussions of watershed moments, the roles played by colonialism, migration, commerce, warfare, telecommunications, and popular culture in redefining the place of Europe in a changing global landscape will be explored.

HISTORY 334G. Narrating the British Empire. 4-5 Units.

This course will explore the historical and cultural reality of the British Empire in a global and comparative context, through works of fiction and non-fiction, history, memoir and a range of cultural chronicles. What relationship did British colonialism have with modernity and the European Enlightenment, and with neoliberalism and globalization that followed decolonization? Texts: CLR James's *Beyond a Boundary*, Jamaica Kincaid's *A Small Place*, Nirad Chaudhuri's *The Autobiography of an Unknown Indian*, Alan Paton's *Cry, The Beloved Country*, Witi Ihimaera's *Dear Miss Mansfield*.

Same as: ENGLISH 234G, HISTORY 234G

HISTORY 335. The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy. 4-5 Units.

The dynamic societies of the Italian Peninsula of the 14th to 16th centuries "prosperous, astonishingly creative, politically fractious, and endemically violent" produced sweeping, deeply consequential changes. Among these were new developments in the theory and practice of war, politics, and diplomacy that laid the foundations for the modern state system and European military power. The class covers: new diplomatic practice; the Military Revolution; state-building; war finance; court culture; and the intersection of these with the shimmering brilliance of Renaissance culture.

HISTORY 335C. Readings in the Supernatural. 4-5 Units.

Class will read and discuss a selection of monographs, scholarly essays, and primary sources on the rich supernatural world of early modern Europe. We will discuss how fairies, werewolves, nightmares, and trolls all became witches, how the binary of angels and demons figured in European thought, and how the marginalized imaginary was reconstituted in theatre and fiction.

Same as: HISTORY 235C

HISTORY 336. Modern France. 4-5 Units.

(Daughton).

HISTORY 336B. Hobbes to Habermas: The Idea of Society in Modern Thought. 4-5 Units.

Classic texts in social theory from the seventeenth century to the present. Readings include Locke, Smith, Hegel, Comte, and Durkheim, and Weber.

Same as: HISTORY 236B

HISTORY 336E. Humanities+Design: Visualizing the Grand Tour. 4-5 Units.

Study of the eighteenth-century Grand Tour of Italy through visualization tools of the digital age. Critical readings in both visual epistemology and current Grand Tour studies; interrogating the relationship between quantitative and qualitative approaches in digital humanities; what new insights in eighteenth-century British travel to Italy does data visualization offer us? Students will transform traditional texts and documents into digital datasets, developing individual data analysis projects using text mining, data capture and visualization techniques.

Same as: CLASSICS 396, DLCL 396

HISTORY 336F. The End of the World As They Knew It: Culture, Cafés, and Crisis in Europe, 1880-1918. 4-5 Units.

The years stretching from roughly 1880 to end of the First World War were marked by profound social upheaval and an intense burst of creativity. This seminar will focus on the major cultural movements and big ideas of the period. Topics covered include the rise of mass culture and cinema, the origins of psychoanalysis, anti-Semitism and Zionism, new anxieties about sexuality and the New Woman, anarchism, decadence, degeneration, and Dada; with cameos from Bernhardt, Freud, Klimt, Nietzsche, Toulouse-Lautrec, Wilde, Zola, and other luminaries of the age.

Same as: HISTORY 236F

HISTORY 337. The Holocaust. 4 Units.

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 137, JEWISHST 183, JEWISHST 383

HISTORY 337C. Street History: Learning the Past in School and Out. 3-5 Units.

Interdisciplinary. Since Herodotus, history and memory have competed to shape minds: history cultivates doubt and demands interpretation; memory seeks certainty and detests that which thwarts its aims. History and memory collide in modern society, often violently. How do young people become historical amidst these forces; how do school, family, nation, and mass media contribute to the process?.

Same as: EDUC 356

HISTORY 337K. Speed and Power in Twentieth-Century Europe. 4-5 Units.

Europeans living in the 20th century witnessed an unprecedented (and, to many observers, frightening) acceleration in the pace of everyday life, wrought by the introduction of a host of new travel technologies. Focusing on the metropolises of Europe, this seminar will explore the various ways that trains, planes, and automobiles have shaped modern urban life. We'll also look at how 20th-century artists and writers have treated the interrelated themes of speed and power in their work.

Same as: HISTORY 237K

HISTORY 338A. Graduate Colloquium in Modern British History, Part I. 4-5 Units.

Influential approaches to problems in British, European, and imperial history. The 19th-century British experience and its relationship to Europe and empire. National identity, the industrial revolution, class formation, gender, liberalism, and state building. Goal is to prepare specialists and non-specialists for oral exams.

HISTORY 338E. European Legal History. 5 Units.

(Same as LAW 441.) This seminar will explore major topics in European legal history from ancient Rome through the present: Roman law, canon law, feudalism, sixteenth- and seventeenth-century constitutionalism, modern natural law, the age of absolutism and the rise of the centralized, administrative state, the structure of Old Regime law and society and the radical changes brought about by revolution, the German historical school of jurisprudence, and the rise of the European Union and a new culture of international human rights. In exploring these topics, we will focus on certain core, recurring themes that continue profoundly to shape the world in which we live. These include the sources and nature of law (positive law vs. custom), the relationship between law and society, and the relationship between law and history. Classroom discussion will focus on selected primary- and secondary-source texts that we will read as a group. This course is cross-listed with LAW441. The course will be limited to 12 SLS students with 10 additional slots held for students enrolling in HISTORY338E.

Same as: HISTORY 238E

HISTORY 338G. Ethnography of the Late Middle Ages: Social history and popular culture in the age of the plague. 4-5 Units.

During the late Middle Ages, as Europe was recovering from the devastation of the Black Death, political reorganization contributed to a burst of archival documentation that allows historians richly detailed glimpses of societies in transition. We will be reading selected scholarly articles and monographs covering such topics as persecution, prechristian cultural remnants, folk theologies, festival cultures, peasant revolts, heresy, and the advent of the diabolic witch.

Same as: HISTORY 238G

HISTORY 339F. Empire and Information. 4-5 Units.

How do states see? How do they know what they know about their subjects, citizens, economies, and geographies? How does that knowledge shape society, politics, identity, freedom, and modernity? Focus is on the British imperial state activities in S. Asia and Britain: surveillance technologies and information-gathering systems, including mapping, statistics, cultural schemata, and intelligence systems, to render geographies and social bodies legible, visible, and governable.

Same as: HISTORY 239F

HISTORY 339H. Modern European History in a Global Age. 4-5 Units.

How scholars can write the history of modern Europe in a way that integrates global and transnational perspectives. Discussed the methodological challenges and merits of various approaches and reviews relevant theoretical and interdisciplinary models for how this can best be done. Topics include globalization, migration, internationalism, colonialism, post-colonialism, modern warfare, and the media.

HISTORY 340. The History of Evolution. 4-5 Units.

This course examines the history of evolutionary biology from its emergence around the middle of the eighteenth century. We will consider the continual engagement of evolutionary theories of life with a larger, transforming context: philosophical, political, social, economic, institutional, aesthetic, artistic, literary. Our goal will be to achieve a historical rich and nuanced understanding of how evolutionary thinking about life has developed to its current form.

Same as: HISTORY 240

HISTORY 341E. Hearing and Seeing in the Long Nineteenth Century. 3-4 Units.

Ideas about vision and hearing in science and culture from 1790 through 1910. The development of sensory physiology in the wake of Kant's *Critique of Pure Reason*, including Maine de Biran, Goethe, Helmholtz. Treatments of the senses in different spheres of culture and the arts: Baudelaire's *flacirc;neur*, Impressionist painting, sound-reproduction technologies, the musical avant-garde, early cinema. Case studies include Ceacute;zanne, Debussy, and Russolo. Focus is on the complex relationships between science and culture and the role of the senses in the formation of the 'modern' subject. HISTORY241E/341E must be taken for 4 units.

Same as: HISTORY 241E, MUSIC 186D, MUSIC 286D

HISTORY 342. Darwin in the History of Life. 4-5 Units.

Origins and impact of evolutionary theory from the nineteenth century to the present. Early theories of fossils, the discovery of deep time and uniformitarian geology, debates over evolution vs. extinction, the origin of life, and human origins; the rise of anthropology and racial theory; the changing challenge of creationism, the abuse of evolution in eugenics and Nazi racial hygiene; and new discoveries in the realm of extreme life, evo-devo, neocatastrophism, and the new technological frontier of biomimicry. Attendance at the lectures of HISTORY 142 is required.

HISTORY 343G. Tobacco and Health in World History. 4-5 Units.

Cigarettes are the world's leading cause of death--but how did we come into this world, where 6 trillion cigarettes are smoked every year? Here we explore the political, cultural, and technological origins of the cigarette and cigarette epidemic, using the tobacco industry's 80 million pages of secret documents. Topics include the history of cigarette advertising and cigarette design, the role of the tobacco industry in fomenting climate change denial, and questions raised by the testimony of experts in court.

Same as: HISTORY 243G

HISTORY 344. Narrative Knowing. 1-2 Unit.

Philosophers and historians have been debating the status of narrative explanation for well over 50 years. Until quite recently, a supposed dichotomy between natural science and history has shaped the discussion. Beginning from the origins, history, and limitations of the dichotomy, this seminar will explore how claims for narrative understanding and explanation have come to occupy an increasingly important role in the natural sciences as well as the social sciences. Some classic contributors are Hempel, Danto, Mink, Kuhn, White, Ricouer, Geertz, and Ginzburg. Current authors include Roth, Rheinberger, Kitcher, Beatty, Morgan, and (yes) Wise.

Same as: PHIL 344

HISTORY 345A. Africa in the Era of the Slave Trade. 4-5 Units.

The slave trade, including the trans-Saharan, Indian Ocean, and trans-Atlantic trades, constituted nearly a millennium of interaction with the wider world and set in motion transformations in African societies, politics, and cultures. Topics include the debates about slavery in Africa, the impact of the slave trade on African societies, state formation, economic change, religious change, and household change in the period before the scramble for Africa in the late 19th century.

HISTORY 345B. African Encounters with Colonialism. 4-5 Units.

This colloquium is a broad sweep of some of the main themes in the history of the colonial period for Africa. A course of this nature can not help but be a selective sample of the field. For example, topics on the end of slavery in Africa, on the social history of law in colonial Africa, Islam and religious conversion, nationalism and decolonization are not included here because they are covered by more specialized courses. This course is designed to let students sample different approaches to the history of the colonial period.

HISTORY 346. The Dynamics of Change in Africa. 4-5 Units.

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: AFRICAST 301A, POLISCI 246P, POLISCI 346P

HISTORY 346E. Refugees and the Making of the Modern World: 1945-Present. 4-5 Units.

Following the mass popular displacements of WWII, a group of diplomats came together to create the United Nations High Commissioner for Refugees (UNHCR) and the 1951 Convention Relating to the Status of Refugees-- the bases of the international refugee regime that has endured to the present. We will explore the processes that led to the creation of the modern international refugee regime, and how international refugee law has evolved in response to conflicts and emergencies "on the ground." Throughout, we will question the category of the "refugee," and interrogate the methods by which refugees, as individuals and as groups, have sought to control and alter their positions under national and international authorities. Topics will include notions of migration and asylum, the creation and evolution of international refugee law, refugees, stateless people, economic migrants, and decolonization. We will have case studies of post-WWII European, Palestinian, Thai, Ethiopian, Haitian, and Cuban "refugees," among others.

Same as: HISTORY 246E

HISTORY 347. Violence in African History: Conflict and Healing in sub-Saharan Africa. 4-5 Units.

This course questions what constitutes "violence" in African history, and why it occurred when it did. We will examine the subtleties of "violence" in African history, which have sometimes led to conflicts, and sometimes to rich strategies of healing and improvisation. These include ecological crises, domestic violence, corruption, economic exploitation, and demographic crises (including urbanization and diseases such as HIV-AIDS). While we begin by examining ideas about conflict in pre-colonial Africa, the course focuses on the colonial and post-colonial eras in African history.

Same as: HISTORY 247

HISTORY 351B. Core in American History, Part II. 4-5 Units.

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HISTORY 351C. Core in American History, Part III. 4-5 Units.

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HISTORY 351D. Core in American History, Part IV. 4-5 Units.

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HISTORY 351E. Core in American History, Part V. 4-5 Units.

Required of all first-year United States History Ph.D. students. Topics in Twentieth Century United States History.

HISTORY 351F. Core in American History, Part VI. 4-5 Units.

Required of all first-year Ph.D. students in U.S. History.

HISTORY 352B. History of American Law. 5 Units.

(Same as LAW 318.) Modern history of American law, legal thought, legal institutions and the legal profession. Topics include law and regulation of corporate organizations and labor relations in the age of enterprise, law of race relations in the South and North, development of classical legalism, critiques of classical legalism, modern administrative state, organized legal profession, New Deal legal thought and legislation, legal order of the 50s, expansion of enterprise liability, civil rights movements from 1940, rights revolution of the Warren Court and Great Society.

Same as: HISTORY 152

HISTORY 353D. Approaches to American Legal History. 4-5 Units.

(Same as LAW 651.) Legal history may once have been primarily devoted to exploring legal doctrines and key judicial opinions, and thus to be of interest mainly to legal scholars and lawyers. Now, the best writing in legal history resembles historical writing more generally, and the study of legal ideas and practices is increasingly integrated with social, intellectual, cultural, and political history. Examines recent writings in American legal history, ranging broadly across time and space to ask how the field reflects developments in historical writing more generally, and how the use of legal materials affects our understanding of major aspects of American history.

HISTORY 354. Law, Slavery, and Race. 5 Units.

(Same as LAW 747.) This course will explore the interaction of law, slavery and race in the United States, as well as from a comparative perspective. We will read original documents, including excerpts of trial transcripts, appellate opinions, treatises, codes, and first-person narratives. We will study the way law, politics and culture interacted to shape the institution of slavery and the development of modern conceptions of race. Course lectures and discussions will focus on questions such as: Did different legal regimes (Spanish, French, British) foster different systems of race and slavery in the Americas? How did/does law work "on the ground" to shape the production of racial hierarchy and creation of racial identities? In what ways did slavery influence the U.S. Constitution? How has race shaped citizenship in the U.S., and how can we compare it to other constitutional regimes? The course will begin with the origins of New World slavery, race and racism, and move chronologically to the present day.

Same as: AFRICAAM 254D, CSRE 154D, HISTORY 254D

HISTORY 355. Decision Making in International Crises: The A-Bomb, the Korean War, and the Cuban Missile Crisis. 4-5 Units.

For advanced undergraduates and graduate students. Primary documents and secondary literature. Topics include: the decision to use the atomic bomb on Japan, the Korean War, and the Cuban missile crisis.

HISTORY 356. America- China Relations. 4-5 Units.

The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past.

Same as: AMSTUD 256, HISTORY 256

HISTORY 356G. Constructing Race and Religion in America. 4-5 Units.

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: CSRE 246, HISTORY 256G, RELIGST 246, RELIGST 346

HISTORY 358. Topics in the History of Sexuality: Sexual Violence in America. 4-5 Units.

This undergraduate/graduate colloquium explores recent historical interpretations of the history of sexuality, with a focus on sexual violence. The readings cover changing definitions and laws, cultural representations, and the role of gender, race, and age in the construction of rape and other forms of sexual violence. Topics include slavery; incest, seduction, and statutory rape reform; the racialization of rape and the anti-lynching movement; street harassment; men and boys as victims; war and conquest; and feminist responses to rape.

Same as: AMSTUD 258, CSRE 192E, FEMGEN 258, FEMGEN 358, HISTORY 258

HISTORY 362G. The Pivotal Decade in U.S. History: 1960's or 1970's?. 4-5 Units.

Which had more lasting impact, the civil war of the 1960s or the conservative revolt of the 1970s? Should the 1970s supersede the 1960s as a pivotal moment when something happened of considerable importance to historians? Considers this debate of the decades comparatively and thematically, addressing topics including civil rights, foreign policy, electoral politics, popular culture, law, economics, labor, and social movement organizing.

HISTORY 365. Writing Asian American History. 5 Units.

Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

Same as: AMSTUD 265, ASNAMST 265, HISTORY 265

HISTORY 366B. Immigration Debates in America, Past and Present. 3-5 Units.

Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. Part Two considers new immigration patterns after 1965, including those of refugees, and investigates the contemporary debate over immigration and immigration policy in the post 9/11 era as well as inequalities within the system and the impact of foreign policy on exclusions and inclusions.

Same as: CSRE 166B, HISTORY 166B

HISTORY 370. Graduate Colloquium on Colonial Latin American History. 4-5 Units.

Sixteenth to nineteenth centuries. Indigenous cultures. The arrival of Europeans and its impact on native and European societies. Culture, religion and institutions, and everyday life. The independence period and the formation of new nations.

HISTORY 372A. Mexico: From Colony to Nation or the History of an Impossible Republic?. 5 Units.

Was a republican form of government even possible in 19th-century Mexico after 300 years of colonial rule under the Spanish monarchy? Was the Spanish colonial heritage a positive or a negative legacy according to 19th-century Mexican politicians? How were they to forge a new national identity with so many ethnically and culturally diverse peoples throughout the territory? Just how iquest;traditionalquest; was, in fact, the colonial period? These are some of the questions we will explore in this course. Journeying from the late colonial period (c.1700) to the 35-year dictatorship known as El Porfiriato (1876-1911) we will examine how Mexicoiquest;s diverse indigenous peoples adapted to both colonial and postcolonial rule, how they actively participated in politics and political discourse to preserve their cultures, customs and colonial privileges, and how after independence in 1821, a new republican political culture was forged. Mexico was not an impossible republic, but rather another kind of republic.

HISTORY 372E. Theories of Citizenship and Sovereignty in a Transnational Context. 4-5 Units.

This course explores the multiple meanings of citizenship and the ways in which they change when examined using different geographic scales (from the local to the transnational). The course will pair theoretical readings on citizenship with case studies that focus on North America. Topics include: definitions of citizenship; the interrelation of ideas of citizenship with those of race, ethnicity, gender, and sexuality; the relationship between sovereignty and territoriality; human and civil rights; and immigration. Same as: AMSTUD 272E, CHILATST 172, CSRE 172H, FEMGEN 272E, HISTORY 272E

HISTORY 373A. The European Expansion. 4-5 Units.

The relationship between European monarchies and their colonial domains from the 16th-18th centuries. Reasons for expansion, methods, and results. Case studies include the Spanish, Portuguese, Dutch, French, and English domains in Africa, Asia, and the Americas. Readings include primary and secondary sources.

Same as: HISTORY 273

HISTORY 374. Mexico Since 1876: History of a "Failed State"?. 5 Units.

(Same as History 174.) This course is an introduction to the history and diverse peoples of modern Mexico from 1876 to the present. Through lectures, discussions, primary and secondary readings, short documentaries, and written assignments, students will critically explore and analyze the multiplicity of historical processes, events and trends that shaped and were shaped by Mexicans over the course of a century. The course will cover some of the social and political dimensions of rural social change, urbanization and industrialization, technological innovation and misuse, environmental degradation and conservation, education, ideology, culture and media, migration, and the drug trade.

HISTORY 375B. Borders and Borderlands in Modern Mexico. 4-5 Units.

Surveys the history of Mexico's borders and borderlands from the nineteenth century to the present. Examines theoretical conceptualizations of the borderlands as well as the historical development of identities and geographic borders within and around Mexico. Topics include the legacies of war, map making, the construction of lo Mexicano, the politics of culture, and migrations to, from, and through Mexico. Analyzes the prevailing trends in Mexicanist historiography.

HISTORY 376. Modern Brazil. 4-5 Units.

From independence in 1822 to the present. Social and cultural history. Literary and historical sources.

HISTORY 378A. The Logic of Authoritarian Government, Ancient and Modern. 5 Units.

If authoritarianism is less economically efficient than democracy, and if authoritarianism is a less stable form of political organization than democracy, then why are there more authoritarian governments than democracies? To address this paradox, focus is on theoretical and empirical literature on authoritarian governments, and related literatures on the microeconomic analysis of property rights and credible commitments.

HISTORY 379. Latin American Development: Economy and Society, 1800-2014. 4-5 Units.

The newly independent nations of Latin America began the 19th century with economies roughly equal to the U.S. and Canada. What explains the economic gap that developed since 1800? Why are some Latin American nations rich and others poor and how have societies changed over time? Marxist, dependency, neoclassical, and institutionalist interpretive frameworks are explored. The effects of globalization on Latin American economic growth, autonomy, and potential for social justice are examined and debated.

Same as: HISTORY 279

HISTORY 379D. Modern Brazil: Economy, Society & Culture. 4-5 Units.

This course addresses the history of modern Brazil from independence in 1822 to the present day. The class focuses on theories of economic development, social structure and change, and cultural life in Brazil's diverse regions.

Same as: HISTORY 279D

HISTORY 381. Economic and Social History of the Modern Middle East. 4-5 Units.

The integration of the Middle East into the world capitalist market on a subordinate basis and the impact on economic development, class formation, and politics. Alternative theoretical perspectives on the rise and expansion of the international capitalist market are combined with possible case studies of Egypt, Iraq, and Palestine.

HISTORY 382. The United States and the Middle East since 1945. 4-5 Units.

Since the end of WW II, U.S. interests in the Middle East have traditionally been defined as access to oil at a reasonable price, trade and markets, containing the influence of the Soviet Union, and the security of Israel. Is this the full range of U.S. interests? How has the pursuit of these interests changed over time? What forces have shaped U.S. policy? What is the impact of U.S. policy on the region itself?.

Same as: HISTORY 282

HISTORY 382F. History of Modern Turkey. 4-5 Units.

Social, political and cultural history of Modern Turkey from the last decades of the Ottoman Empire in the late 19th century until Today. Themes include transformation from a multi-national empire to a national republic; Islam, secularism and radical modernism; military, bureaucracy and democratic experience; economic development, underdevelopment and class; Istanbul, Ankara and provincial Turkey; socialism, conservatism(s), and Kurdish challenge; Turkey in Europe, the Middle East and Central Asia; gender, sexuality and family; popular culture, soccer, and film industry; Post-Modernism, Neo-Ottomanism, and the New-Turkey; The class also include reading works of Turkish literature and watching movies by Turkish directors.

HISTORY 382G. Israel from the Margins. 4-5 Units.

Although secular, European Jews form a minority of the population of the State of Israel, and its history is typically narrated and interpreted from that perspective. Israel looks like a rather different place if it is seen and understood from the point of view of Middle Eastern and North African Jews, including those indigenous to the country before the advent of the modern Zionist movement, orthodox and ultra-orthodox Jews, Palestinian Arabs (nearly twenty percent of Israel's population today), migrant workers (about 200,000), and women. This course does not suggest that their perspectives are necessarily more real or true, only that an understanding of Israel that does not adequately consider them is necessarily false.

HISTORY 383. The New Global Economy, Oil and Origins of the Arab Spring. 4-5 Units.

This class uses the methods of political economy to study the trajectory of global capitalism from the end of World War II to the current phase of neoliberal globalization. The argument is that the role of oil, and its primary repository " the Middle East " has been central in the global capitalist order and that neoliberalism and the oil economy are closely linked to the eruption of the Arab uprisings of 2011.

Same as: HISTORY 283

HISTORY 384F. Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800. 4-5 Units.

Focuses on political regimes, economic interactions and sociocultural formations in the early modern Balkans and Middle East to Central and South Asia. Topics include complex political systems of the Ottoman, Safavid and Mughal empires; experiences of various Muslim, Christian, Jewish and Hindu, as well as urban, rural and nomadic communities; consolidation of transregional commerce and cultural exchange; incorporation of the Islamic world in the global economy; transimperial networks of the Muslim and Non-Muslim merchants, scholars and sufis.

Same as: HISTORY 284F

HISTORY 385A. Core Colloquium in Jewish History, 17th-19th Centuries. 4-5 Units.

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Same as: JEWISHST 385A

HISTORY 385B. Core in Jewish History, 20th Century. 4-5 Units.

Instructor consent required.

Same as: JEWISHST 385B

HISTORY 385K. History of Modern Antisemitism: Nineteenth and Twentieth Centuries. 4-5 Units.

The articulations of anti-Jewish hatred from the advent of Jewish emancipation in Europe. The legacy of premodern Christian demonization and its modern protean transformations as they penetrated and annexed new currents of ideology, notions of identity (social, national, racial), taste, and aesthetics. A history of ideas, representations, and stereotypes, and their relation to historical experience, action, and mobilization. Europe is the focus; case studies also include the Middle East and elsewhere.

HISTORY 386. Jews Among Muslims in Modern Times. 4-5 Units.

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 286, JEWISHST 286, JEWISHST 386

HISTORY 386B. The Ottoman Empire in the Age of Revolutions, 1750-1850. 4-5 Units.

Investigates the Ottoman World (the Balkans and the Middle East under the Ottoman Empire) in the Age of Revolutions in the global context. While the Ottoman World is the primary interest, developments in Europe, India and China are also discussed in a comparative perspective. Topics include military and fiscal transformation; regionalism; urban life and formations of public spheres; political crisis, social disturbances and political violence; transformation in the ethnoreligious structures, gender relations and family life; protonationalism in the Balkans and Egypt.

HISTORY 387C. Zionism and Its Critics. 4-5 Units.

Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

HISTORY 387K. Gentlemen and Jews: History of the Jews of England. 4-5 Units.

Focuses on key chapters in the cultural and political histories of Britain and its Jews, between 1650 and 1950 and examines the advantages, as well as possible difficulties, that emerge when connecting Anglo-Jewish history to mainstream British history. What is unique about Jewish emancipation in England, and what are its connections to the formation of British national identity? Is there unique path in which Jewish Enlightenment developed in England? What was the contribution of Jews to British Imperialism? Is there a cultural affinity between English philosemitism and liberalism?.

HISTORY 390. Han Chinese and the Global White: The Production of Ethnoracial Majorities, East and West. 4-5 Units.**HISTORY 390A. Major Topics in Modern Chinese History: Qing/Republican Transition. 4-5 Units.**

Continuities and discontinuities in society, economy, politics, culture, and thought during the transition from the Qing dynasty to the republic. May be repeated for credit.

HISTORY 391. East Asia in the Early Buddhist Age. 4-5 Units.

Evolution of cities in imperial China through early imperial, medieval, and early modern periods. Topics include physical structure, social order, cultural forms, economic roles, relations to rural hinterlands, and the contrast between imperial capitals and other cities. Comparative examination of cases from European history.

HISTORY 391A. Archaeology and Modernity in Asia: The Excavation of Ancient Civilizations in Modern Times. 4-5 Units.

The interplay in Asia between antiquity and modernity, civilization and nation state, and national versus colonial science. The recent excavation of artifacts and places associated with Asian civilization such as the terracotta warriors in China and Angkor Wat in Cambodia. How Asian states have grappled with modernity and colonialism as they simultaneously dug up their ancient pasts.

Same as: HISTORY 291A

HISTORY 391B. The City in Imperial China. 5 Units.

The evolution of cities in the early imperial, medieval, and early modern periods. Topics include physical structure, social order, cultural forms, economic roles, relations to rural hinterlands, and the contrast between imperial capitals and other cities. Comparative cases from European history. Readings include primary and secondary sources, and visual materials.

HISTORY 391C. Early Imperial China. 4-5 Units.

The first millennium of imperial China, what endured over the centuries, and the major changes that took place in the political, social, and intellectual realms. Topics include the evolving geographic and environmental background, cities, the countryside, kinship, relations with the outer world, religion, philosophy, and literature. Also examines the nature of empire as a distinctive political form.

HISTORY 392B. Law and Society in Late Imperial China. 4-5 Units.

(Same as LAW 773.) Connections between legal and social history. Ideology and practice, center and periphery, and state-society tensions and interactions. Readings introduce the work of major historians on concepts and problems in Ming-Qing history.

Same as: CHINLIT 392B

HISTORY 392D. Japan in Asia, Asia in Japan. 4-5 Units.

How Japan and Asia mutually shaped each other in the late 19th and 20th centuries. Focus is on Japanese imperialism in Asia and its postwar legacies. Topics include: pan-Asianism and orientalism; colonial modernization in Korea and Taiwan; collaboration and resistance; popular imperialism in Manchuria; total war and empire; comfort women and the politics of apology; the issue of resident Koreans; and economic and cultural integration of postwar Asia.

Same as: HISTORY 292D

HISTORY 392E. The Historical Roots of Modern East Asia. 4-5 Units.

Focus is on China and Japan before and during their transition to modernity. The populous, urbanized, economically advanced, and culturally sophisticated Ming empire and Muromachi shogunate in the 16th century when Europeans first arrived. How the status quo had turned on its head by the early 20th century when European and American steamships dominated the Pacific, China was in social and political upheaval, and Japan had begun its march to empire.

Same as: HISTORY 92A

HISTORY 392F. Culture and Religions in Korean History. 4-5 Units.

This colloquium explores the major themes of Korean history before 1800 and the role of culture and religions in shaping the everyday life of Chosocirc;n-dynasty Koreans. Themes include the aristocracy and military in the Koryocirc; dynasty, Buddhism and Confucianism in the making of Chosocirc;n Korea, kingship and court culture, slavery and women, family and rituals, death and punishment, and the Korean alphabet (Hangucirc;l) and print culture.

Same as: HISTORY 292F

HISTORY 392G. Modern Korea. 4-5 Units.

Examines seminal works and major historical debates in the study of modern Korea. Topics include the state and society in the Choson dynasty, reform and rebellion in the nineteenth century, colonization, gender and colonial modernity, national identity and assimilation, wartime colonial Korea, decolonization and the North Korean revolution, the Korean War and its aftermath, the Pak Chung Hee regime and labor relations, and democratization.

HISTORY 393B. Queer History in Comparative Perspective. 4-5 Units.

Comparative history of homoerotic desire, relations, and identity through scholarship on different historical periods and parts of the world: the classical Mediterranean, early modern European cities, late imperial and modern China, Tokugawa and modern Japan, and the U.S.

Same as: FEMGEN 293B, FEMGEN 393B, HISTORY 293B

HISTORY 393C. Late Imperial China. 4-5 Units.

A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

HISTORY 393D. Global Intellectual History. 4-5 Units.

Ideas have circulated globally for millennia but relatively recently have thinkers begun to conceptualize the global. Like "humanity" and "universalism," or what Marx called "international," the "global" too has complex genealogies. It is associated, often simultaneously, with empire and freedom, war and equality, commitment and treason, piracy and justice, homelessness and cosmopolitanism. Working with key 20th century texts from Italy, Britain, India, Israel, Palestine, Germany, France, and Algeria, course explores how thinking "globally" impacts the very foundations of modern political thought.

Same as: HISTORY 293D

HISTORY 393E. Female Divinities in China. 4-5 Units.

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: HISTORY 293E, RELIGST 257X, RELIGST 357X

HISTORY 394D. Manchuria: Cradle of Conflict, Cockpit of Asia. 4-5 Units.

How did Manchuria become Chinese? This course utilizes the dual waves of early twentieth-century writings and a wide array of recent scholarship dealing with Manchuria to explore the formation of nation-states out of the Qing and Japanese empires in Northeast Asia through the lenses of opium, migration, cities, warlords, and memoir. This course will be of interest to students concerned with developing transcultural understandings of Northeast Asian history.

Same as: HISTORY 294D

HISTORY 395. Modern Korean History. 5 Units.

(Same as HISTORY 95. History majors and others taking 5 units, register for 195.) This lecture course provides a general introduction to the history of modern Korea. Themes include the characteristics of the Chosŏn dynasty, reforms and rebellions in the nineteenth century, Korean nationalism; Japanese colonial rule and Korean identities; decolonization and the Korean War; and the different state-building processes in North and South, South Korean democratization in 1980s, and the current North Korean crisis.

Same as: HISTORY 195

HISTORY 395F. Race and Ethnicity in East Asia. 4-5 Units.

Intensive exploration of major issues in the history of race and ethnicity in China, Japan, and Korea from the early modern period to the present day. Same as: ASNAMST 295F, HISTORY 295F

HISTORY 395J. Gender and Sexuality in Chinese History. 4-5 Units.**HISTORY 396D. Modern Japan. 4-5 Units.**

Introduces students to the major historical problems and historiographic trends in the study of modern Japan from the Meiji period to the present. Themes include approaches to late Meiji culture and politics, the formation of imperial subjects and citizens, agrarian society and politics, gender in modern Japan, empire and modernity, total war and transwar state and society, U.S. occupation, and postwar Japan.

HISTORY 397. The Cold War and East Asia. 5 Units.

Explores how East Asia negotiated superpower rivalry and global ideological competition during the Cold War. Considers the ways in which China, Japan, and Korea were more than battlegrounds for US-Soviet contestation and played active roles in defining the nature and dynamics of the conflict. Re-examines conventional narratives and periodizations against alternative conceptual models and interpretive frameworks highlighting the constructed nature of the struggle as well as the role of historical and cultural factors in shaping the East Asian experience.

Same as: HISTORY 297

HISTORY 398. Major Topics in Modern Chinese History. 4-5 Units.

Advanced graduate colloquium in modern Chinese history.

HISTORY 399A. Preparing for International Field Work: Public Service or Research. 1 Unit.

Open to students in all classes, those planning internships abroad and those planning research, from juniors with honors theses and sophomores with Chappell Lougee grants to freshmen thinking ahead. Introduces resources on campus for planning international research and service. Raises issues that need to be considered in advance of going abroad: ethical concerns, Human Subjects Protocol, networking, personal safety and gender issues, confronting cultural differences. Exposes students to research methods: case studies, interviewing, working in foreign libraries and archives.

Same as: HISTORY 299X

HISTORY 399E. Preparing for International Field Research: Public Svc or Research, Electronic Version. 1 Unit.

Restricted to students studying at a Stanford Overseas Studies campus; same course content as HISTORY 299X. Problems involved in research abroad: ethical issues; safety; security and conduct; human subjects protocol. Methodologies of research: interviewing, networking, case studies, participant observation, large surveys. Prerequisite: consent of instructor.

HISTORY 399W. Graduate Directed Reading. 1-10 Unit.**HISTORY 401A. Spatial History: Concepts, Methods, Problems. 4-5 Units.**

Technical training in GIS, with modules taught by Stanford Spatial History Lab staff; conceptual work in the use of these techniques in spatial historical analysis. Students develop their own spatial history projects and produce beta versions of dynamic visualizations.

HISTORY 401B. Spatial History, Part II. 4-5 Units.

Prerequisite: 401A.

HISTORY 406. Graduate Research Seminar on Colonial Law. 4-5 Units.

Prerequisite: HISTORY 306G.

HISTORY 414A. Medieval History. 4-5 Units.**HISTORY 414B. Medieval History. 4-5 Units.****HISTORY 421A. Early Modern Russia. 4-5 Units.****HISTORY 422A. Research Seminar on the History of the Russian Empire. 4-5 Units.****HISTORY 422B. Research Seminar in Imperial Russia. 4-5 Units.****HISTORY 424A. The Soviet Civilization. 4-5 Units.**

Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

Same as: HISTORY 224A, REES 224A

HISTORY 424B. The Soviet Civilization, Part 2. 4-5 Units.

Prerequisite: HISTORY 224A/424A.

Same as: HISTORY 224D

HISTORY 424C. The End of Communism in Europe. 4-5 Units.

Causes, course, and consequences.

HISTORY 430. Graduate Research Seminar: Early Modern Europe. 4-5 Units.

Prerequisite: Students wishing to take this seminar must enroll in HISTORY 332B in Winter 2015. Students may research any aspect of late medieval, Renaissance, and early modern history, 1300-1800.

HISTORY 430A. Graduate Research Seminar: Early Modern Europe. 3-5 Units.

Students will begin a research project on any aspect of early modern European history, 1400-1800, by taking HISTORY 430A in winter quarter as the first quarter of this two-quarter sequence. Enrollment by permission of instructor.

HISTORY 431. Early Modern Things. 4-5 Units.

How do objects reveal their histories? What can be learned about the past by studying things? The material culture of early modern Europe, ca 1450-1750. Recent work on the circulation, use, and consumption of things, starting with the Columbian exchange which expanded the material horizons of the early modern world in the late 15th century, exploring challenges to the meaning of things in the age of the Reformation and Scientific Revolution, and ending with the birth of consumer society in the 18th century How did the meaning of things and people's relationships to them change over these centuries? What objects, ordinary and extraordinary, secular and sacred, natural and man-made, came to define the emerging features of the early modern world?.

HISTORY 432A. The Enlightenment. 3-5 Units.

The Enlightenment as a philosophical, literary, and political movement. Themes include the nature and limits of philosophy, the grounds for critical intellectual engagement, the institution of society and the public, and freedom, equality and human progress. Authors include Voltaire, Montesquieu, Rousseau, Hume, Diderot, and Condorcet.

Same as: DLCL 324, HISTORY 234, HISTORY 334, HUMNTIES 324

HISTORY 432B. Grad Research Seminar: The Enlightenment, Pt. II. 4-5 Units.

Prerequisite: Completion of HISTORY 234, 334 or 432A.

HISTORY 433A. Modern Europe: Society and Politics. 5 Units.

The goal of this course is to introduce graduate students to major works of history and literature in the field of nineteenth and early-twentieth century history. A colloquia will be given in tandem with a research seminar. nMay be repeated for credit.

HISTORY 433B. European History. 4-5 Units.

Prerequisite: HISTORY 433A.

HISTORY 438. European History Workshop. 1 Unit.

All European history graduate students in residence register for this weekly workshop, at which dissertation chapters and prospectuses, papers, and grant proposals by students and faculty are read and discussed.

HISTORY 439A. Graduate Research Seminar: Modern Britain and the British Empire. 4-5 Units.**HISTORY 439B. Graduate Research Seminar: Modern Britain and the British Empire II. 4-5 Units.****HISTORY 443A. Human Origins: History, Evidence, and Controversy. 4-5 Units.**

Research seminar. Debates and controversies include: theories of human origins; interpretations of fossils, early art, and the oldest tools; the origin and fate of the Neanderthals; evolutionary themes in literature and film; visual rhetoric and cliché; in anthropological dioramas and phyletic diagrams; the significance of hunting, gathering, and grandmothering; climatological theories and neocatastrophic geologies; molecular anthropology; the impact of racial theories on human origins discourse. Background in human evolution not required.

Same as: HISTORY 243S

HISTORY 444. Graduate Research Seminar: Gender in Science, Medicine, and Engineering. 5 Units.

Theory and practice of gender in STEM. 1. "Fix the Numbers of Women" focuses on increasing women's participation; 2. "Fix the Institutions" promotes gender equality in careers through structural change in research organizations; 3. "Fix the Knowledge" or "gendered innovations" stimulates excellence in science and technology by integrating gender analysis into research. Seminar explores harnessing the creative power of gender analysis to enhance knowledge and spark innovation.

Same as: FEMGEN 444

HISTORY 444C. The History of the Body in Science, Medicine, and Culture. 4-5 Units.

The human body as a natural and cultural object, historicized. The crosscultural history of the body from the 18th century to the present. Topics include: sciences of sex and race; medical discovery of particular body parts; human experimentation, foot binding, veiling, and other bodily coverings; thinness and obesity; notions of the body politic.

Same as: HISTORY 244C

HISTORY 445A. Research Seminar in African History. 4-5 Units.

Primary sources such as government records and missionary archives. Students present work in progress. Prerequisite: consent of instructor.

HISTORY 445B. Research Seminar in African History. 4-5 Units.

Primary sources such as government records and missionary archives. Students present work in progress. Prerequisite: consent of instructor.

HISTORY 448A. Colonial States and African Societies, Part I. 4-5 Units.

Colonialism set in motion profound transformations of African societies. These transformations did not occur immediately following military conquest, nor did they occur uniformly throughout the continent. This research seminar will focus directly on the encounter between the colonial state and African societies. The seminar will examine problems of social transformation, the role of the colonial state, and the actions of Africans. Following four weeks of colloquium style discussion, students then embark on independent research on the encounter between one colonial state and its constituent African societies.

Same as: HISTORY 248S

HISTORY 448B. Colonial States and African Societies, Part II. 4-5 Units.

Second part of the research seminar offered in the Winter. Students continue their research and present their penultimate drafts in week 8.

Same as: HISTORY 249S

HISTORY 459A. Grad Research Seminar in U.S. History. 4-5 Units.**HISTORY 461A. Research Seminar on the Histories of Women, the Family, and Sexuality. 4-5 Units.**

Research design, research methods, and historical writing on topics in the histories of women, the family, or sexuality in the U.S. Prepares graduate students for dissertation work. Workshop model involves exchanging preliminary prospectus, outline, writing sample, and draft for peer responses. Article-length original paper based on primary sources, to be completed by the end of Spring Quarter.

HISTORY 461B. Research Seminar on the Histories of Women, the Family, and Sexuality, Part II. 4-5 Units.

Prerequisite: 461A.

HISTORY 464E. Research in History and Social Science Education. 3-5 Units.

For doctoral students. Literature on historical learning and teaching and corresponding social sciences research designs, assessment, and curriculum evaluation.

Same as: EDUC 496

HISTORY 470. Graduate Colloquium: Explorations in Latin American Social History. 4-5 Units.

How to use primary sources such as government records, estate inventories, and parish records for social history.

HISTORY 471A. Environmental History of Latin America. 5 Units.

What role did the natural environment play in the emergence of Latin America as a distinct geographical and socio-cultural world region? How do we analyze the historical relationship between the region's rich and seemingly abundant natural resources and its status as underdeveloped? What historical consequences did this relationship have and what alternative, more sustainable developmental paths can we envision for the future in light of the past that we will study? In this course, students will become familiar with the historiography on Brazil, Mexico, Peru, Cuba and Honduras that has explored these questions through a variety of approaches, methodologies and points of view.

HISTORY 471B. Environmental History of Latin America. 5 Units.

What role did the natural environment play in the emergence of Latin America as a distinct geographical and socio-cultural world region? How do we analyze the historical relationship between the region's rich and seemingly abundant natural resources and its status as 'underdeveloped'? What historical consequences did this relationship have and what alternative, more sustainable developmental paths can we envision for the future in light of the past that we will study? In this course, students will become familiar with the historiography on Brazil, Mexico, Peru, Cuba and Honduras that has explored these questions through a variety of approaches, methodologies and points of view.

HISTORY 477. Transnational Latina/o History. 4-5 Units.

The course explores the major trends in Latin American migration to the United States. We examine the impact of transnational migration on identity formation, economic relations, and policy debates in Latin America and the United States. Topics include citizenship debates, struggles over immigration reform, transnational identity formation, refugee migration and Cold War politics, Latino alliances in the United States, and the effects of gender and sexuality on Latina/o communities.

HISTORY 477B. Transnational Latina/o History, Part 2. 4-5 Units.

The course explores the major trends in Latin American migration to the United States. We examine the impact of transnational migration on identity formation, economic relations, and policy debates in Latin America and the United States. Topics include citizenship debates, struggles over immigration reform, transnational identity formation, refugee migration and Cold War politics, Latino alliances in the United States, and the effects of gender and sexuality on Latina/o communities. Prerequisite: History 477.

HISTORY 478. The Ethical Challenges of Climate Change. 4-5 Units.

This course explores the ethical challenges of climate change from historical, social, economic, political, cultural and scientific perspectives. These include the discovery of global warming over two centuries, the rise of secular and religious denialism and skepticism toward the scientific consensus on it, the dispute between developed and developing countries over how to forge a binding global agreement to mitigate it, and the "role morality" of various actors (scientists, politicians, fossil fuel companies, the media and ordinary individuals) in the US in assessing ethical responsibility for the problem and its solutions.

Same as: HISTORY 278S

HISTORY 481. Research Seminar in Middle East History. 4-5 Units.

Student-selected research topics.

Same as: JEWISHST 287S, JEWISHST 481

HISTORY 481A. Research Seminar in Middle East History. 4-5 Units.**HISTORY 486A. Graduate Research Seminar in Jewish History. 4-5 Units.**

Same as: JEWISHST 486A

HISTORY 486B. Graduate Research Seminar in Jewish History. 4-5 Units.

Prerequisite: HISTORY 486A.

Same as: JEWISHST 486B

HISTORY 491A. Modern Korea Research Seminar. 4-5 Units.

This graduate seminar prepares students to undertake research using Korean-language sources on a variety of themes in modern Korea. Students will identify characteristics of major online and offline archives in Korean studies, learn essential skills in investigating primary sources, and analyze selected sample documents in class.

HISTORY 491B. Modern Korea Research Seminar. 4-5 Units.

This graduate seminar prepares students to undertake research using Korean-language sources on a variety of themes in modern Korea. Students will identify characteristics of major online and offline archives in Korean studies, learn essential skills in investigating primary sources, and analyze selected sample documents in class.

HISTORY 492B. Origins of Technical Medicine in the Han Dynasty. 4-5 Units.

How medicine as a technical, text-based art monopolized by specialists was established under the Han Dynasty in competition with practices aimed at nourishing life and securing longevity.

HISTORY 493. Graduate Seminar on South Asia. 4-5 Units.

A series of texts and documents that form the heart of what Marx and Engels called "the colonial question". Discussions center on specific themes relating to each student's research topic and/or interests. The seminar will be organized around a set of core common readings and weekly discussions, supplemented by a designed list of secondary texts and primary materials. Themes include: secularism, religion, state, capital, empire, anticolonialism, gender, democracy, textual and print cultures, cinema, political and legal theory, and history of economic thought. 400-level options allows students to do a two-quarter sequence, with the Summer devoted to writing up the research paper.

HISTORY 495A. Qing Legal Documents. 4-5 Units.

How to use Qing legal documents for research. Winter: sample documents that introduce the main genres including: the Qing code and commentaries; magistrates' handbooks and published case collections; and case records from Chinese archives. Spring: class meets occasionally; students complete research papers. Prerequisite: advanced reading ability in Chinese.

HISTORY 495B. Qing Legal Documents. 4-5 Units.

How to use Qing legal documents for research. Winter: sample documents that introduce the main genres including: the Qing code and commentaries; magistrates' handbooks and published case collections; and case records from Chinese archives. Spring: class meets occasionally; students complete research papers. Prerequisite: advanced reading ability in Chinese.

HISTORY 497A. Maps and Gazetteers as Sources for East Asian History. 4-5 Units.

For graduate students of early modern or modern East Asia. Includes weekend workshop on Chinese historical GIS with Harvard's Peter Bol. Students work with the Stanford Spatial History Lab to develop analytical techniques. Prerequisite: background in GIS.

HISTORY 497B. Maps and Gazetteers as Sources for East Asian History, Part 2. 4-5 Units.

Prerequisite: HISTORY 497A.

HISTORY 498C. Japanese Imperial Archives, Part 1. 4-5 Units.

First part of a two-quarter research graduate seminar on Japanese imperialism in Asia. Students explore different types of archives, from national and research libraries to online databases; learn various methods of research including oral history; and translate and analyze sample documents including government publications, company histories, police records, and media sources. Prerequisite: advanced reading ability in Japanese.

HISTORY 498D. Japanese Imperial Archives, Part 2. 4-5 Units.

Second part of a two-quarter research graduate seminar on Japanese imperialism in Asia. Students complete research papers based on research conducted for History 498C; the class meets occasionally to report on progress and discuss working drafts. Prerequisite: History 498C.

HISTORY 499X. Graduate Research. 1-10 Unit.

Units by arrangement. May be repeated for credit.

HISTORY 802. TGR Dissertation. 0 Units.

Units by arrangement.

History Philosophy of Science Courses

HPS 60. Introduction to Philosophy of Science. 5 Units.

The nature of scientific knowledge: evidence and confirmation; scientific explanation; models and theories; objectivity; science, society, and values. Same as: PHIL 60

HPS 61. Science, Religion, and the Birth of Modern Philosophy. 5 Units.

Galileo's defense of the Copernican world-system that initiated the scientific revolution of the 17th century, led to conflict between science and religion, and influenced the development of modern philosophy. Readings focus on Galileo and Descartes.

Same as: PHIL 61

HPS 199. Directed Reading. 1-15 Unit.

May be repeated for credit.

HPS 299. Graduate Individual Work. 1-15 Unit.

May be repeated for credit.

Human Biology Courses

HUMBIO 2A. Genetics, Evolution, and Ecology. 5 Units.

Introduction to the principles of classical and modern genetics, evolutionary theory, and population biology. Topics: micro- and macro-evolution, population and molecular genetics, biodiversity, and ecology, emphasizing the genetics and ecology of the evolutionary process and applications to human populations. HUMBIO 2A and 2B must be taken concurrently.

HUMBIO 2B. Culture, Evolution, and Society. 5 Units.

Introduction to the evolutionary study of human diversity. Hominid evolution, the origins of social complexity, social theory, and the emergence of the modern world system, emphasizing the concept of culture and its influence on human differences. HUMBIO 2A and 2B must be taken concurrently.

HUMBIO 3A. Cell and Developmental Biology. 5 Units.

The principles of the biology of cells: principles of human developmental biology, biochemistry of energetics and metabolism, the nature of membranes and organelles, hormone action and signal transduction in normal and diseased states (diabetes, cancer, autoimmune diseases), drug discovery, immunology, and drug addiction. HUMBIO 3A and 3B must be taken concurrently. Prerequisite: college chemistry or completion of the HumBio chemistry lecture series during the fall quarter.

HUMBIO 3B. Behavior, Health, and Development. 5 Units.

Research and theory on human behavior, health, and life span development. How biological factors and cultural practices influence cognition, emotion, motivation, personality, and health in childhood, adolescence, and adulthood. HUMBIO 3A and 3B must be taken concurrently.

HUMBIO 3Y. Practicum in Child Development. 1 Unit.

Practicum experience at Bing Nursery School for 1 1/4 hours of observation per week, class meeting every other week for 1 hour. Pre- or corequisite: 3B.

HUMBIO 4A. The Human Organism. 5 Units.

Organ system physiology: the principles of neurobiology and endocrinology, and the functions of body organs. The mechanisms of control, regulation, and integration of organ systems function. HUMBIO 4A and 4B must be taken concurrently.

HUMBIO 4B. Environmental and Health Policy Analysis. 5 Units.

Connections among the life sciences, social sciences, public health, and public policy. The economic, social, and institutional factors that underlie environmental degradation, the incidence of disease, and inequalities in health status and access to health care. Public policies to address these problems. Topics include pollution regulation, climate change policy, biodiversity protection, health care reform, health disparities, and women's health policy. HUMBIO 4A and 4B must be taken concurrently.

HUMBIO 5E. Science Education in Human Biology. 1 Unit.

In this seminar, students will become familiar with current research on science education. They will use this knowledge to create and analyze teaching material such as section plans, exams, and problem sets. Material produced in this course will be related to the topics covered in the core course of the Program in Human Biology. Students will experience and practice various teaching styles. Prerequisite: HumBio Core or equivalent.

HUMBIO 6. Human Origins. 5 Units.

The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

Same as: ANTHRO 6, ANTHRO 206

HUMBIO 11SI. Health and Wellness for Generation Y: A post-college Survival. 1 Unit.

After living in the Stanford Bubble for 4 years, the thought of the rest of our lives can be a bit daunting. This 10-week seminar will cover key topics for a successful transition into the "real world" such as personal finance, health and nutrition, relationships, careers, and mindfulness, all through the interdisciplinary lens of Human Biology.

HUMBIO 12SI. The Right to Health: Frameworks for Advocacy and Action. 1 Unit.

Interactive dialogue on the right to health, beginning with general frameworks on human rights instruments and then applying them to case studies of global health disparities. Features weekly guest lectures by experts in global health, health policy, and human rights. Topics include: global health governance, maternal and child health, and global mental health. Students will use lectures and dialogues as frameworks for their own advocacy projects. Classes will be held in the Arrillaga Study Room.

HUMBIO 16SC. The Stanford Safari: Field Observations in Our Own Backyard. 2 Units.

Although Stanford is renowned as a place of learning and research, the goal of this class is to approach Stanford University as a subject worthy of study in and of itself. Students will study Stanford in terms of the built environment (e.g. architecture; how buildings and styles interact; how the landscape shapes the flow of people, plants, and animals), the human interactions (e.g. sociology of tourism, the politics of land use), and the ecology (flora, fauna, geology, climatology, and pest control) of campus. The students in this course will defamiliarize themselves with their campus environment and approach Stanford with new eyes—the eyes of the anthropologist, the photographer, the historian, the artist, and the tourist. We will explore its edifices, gardens, sculptures, open spaces, and commercial areas. Moreover, we will use Stanford as a lens to discuss a variety of disciplines: architecture, educational theory, California history, climatology, and natural history. But more than anything, we will focus on the human component, including the vision, drive, and serendipity that shaped the University. In taking the course students will hone their skills in field observation that will carry over to future field work in more distant locales, develop an interdisciplinary approach to analyzing complex institutions, and gain a deeper appreciation for the complexity and richness of Stanford that will enhance all aspects of their remaining time as undergraduates. On a daily basis, the class will consist of three components: class presentations and discussions, formal and informal talks by many of the local experts at Stanford, and topical field trips. Students will select a theme that is of personal interest and develop field observation techniques useful for their particular topics. Course assignments will be to give two presentations on specific aspects of Stanford. In addition, each student will keep a field note-book with daily observations and field notes, post a collection of photographic observations, and complete pertinent readings. Plan to work intensely and have a great time in the process.

HUMBIO 17SC. Darwin, Evolution, and Galapagos. 2 Units.

The tiny remote islands of Galapagos have played a large and central role in the study of evolution. Not surprisingly, they have also been central to the study of conservation. The fascinating adaptations of organisms to the unique ecosystems of the archipelago have left them particularly vulnerable to outside introductions. This seminar explores evolution, conservation, and their connection in the Galapagos. Using case-study material on finches, iguanas, tortoises, cacti, Scalesia plants, and more, we will explore current theory and debate about adaptation, sexual selection, speciation, adaptive radiation, and other topics in evolution. Similarly, we will explore the special challenges Galapagos poses today for conservation, owing to both its unusual biota and the increasing human impact on the archipelago. The first week is held on-campus, followed by an intensive eleven-day expedition to Galapagos to observe firsthand evolutionary phenomena and conservation issues. A chartered ship will serve as our floating classroom, dormitory, and dining hall as we work our way around the archipelago to visit as many as ten islands. For this portion of the class, undergraduates will be joined by a group of Stanford alumni and friends in a format called a Stanford "Field Seminar." Students are required to complete all course readings over the summer. Students will be asked to lead discussions and carry out literature research on the evolutionary and conservation biology of particular Galapagos species. The final assignment is a seven- to ten-page paper and class presentation as we travel in Galapagos. Travel to Galapagos will be provided and paid by Sophomore College (except incidentals) and is made possible by the support of the Stanford Alumni Association Travel/Study Program and generous donors. Students will return to campus late afternoon Sunday, September 20.

Same as: ANTHRO 10SC

HUMBIO 18SC. Conservation and Development Dilemmas in the Amazon. 2 Units.

This course explores the human dimensions of conservation efforts under way in the Amazon Basin of South America. It has two specific goals: (1) to introduce the human ecology of Amazonia; and (2) to assess the prospects for joint efforts at biodiversity conservation and community development. We will draw on case studies to investigate such topics as the causes and consequences of deforestation, the social impact of parks and protected areas, and the potential for "Integrated Conservation and Development Projects" (ICDPs) such as extractive reserves, natural forest management, biodiversity prospecting, and community-based ecotourism. The course views Amazonia as a microcosm of the challenges facing conservation and development efforts today in the Third World. Part of the course is an intensive 11-day expedition to the Peruvian Amazon, at no extra cost, to observe firsthand the conservation and development dilemmas discussed in class. We will visit ecologies in the rainforest, walking miles of trails to learn about local flora, fauna, and conservation efforts. We will also visit Machu Picchu in the upper reaches of the rainforest. For the travel portion of the class, undergraduates will be joined by a group of Stanford alumni and friends. Student contributions and presentations are emphasized throughout the course. Students are expected to come well-prepared to each session, to lead discussions, and to carry out literature research. The final assignment is a 6 to 8 page paper on a case study of your own choosing; or an equivalent piece of a longer collaborative paper that offers a critical assessment of one particular conservation and/or development project in or near the region we will visit. Students will present the main findings of their papers in a joint seminar of undergraduates and alumni as we travel in the Peruvian Amazon. Note: Students will arrive on campus and will be housed at Stanford until we leave for the Amazon. Travel to and from Peru is organized by the Travel/Study Program of the Stanford Alumni Association; is included; costs are defrayed by the Stanford Field Seminar Fund and generous donors.

Same as: ANTHRO 11SC

HUMBIO 19SC. Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa. 2 Units.

The world-famous landscapes of East Africa, including Serengeti National Park, Ngorongoro Conservation Area, and the Rift Valley lakes of Tanzania, form the backdrop for this special course on protected area conservation. The course is designed to explore the pros and cons of parks and protected areas as they impact flora, fauna, and human inhabitants, and to address the dilemma of how to achieve conservation in a manner that creates local community benefits and is socially just. We will use a case study approach to ask: (1) What approach to protected area (PA) conservation has been taken in each case? Who are the key proponents and what are their main objectives? (2) How successful has the protected area been at achieving its conservation goals? (3) What are the benefits of the PA to people and who receives them? (4) What are the costs of the PA to people and who pays them? (5) Where benefits are not commensurate to costs, what, if anything, is being done to address the imbalance? How well is it working? (6) Are there alternatives or variations on the theme of protected area conservation that would be more realistic and beneficial? How could the interests of parks and people be made more compatible in each case? Is there any chance for an "integrated conservation-development project" (ICDP), or is that just "wishful thinking," as some critics insist? This course includes an intensive 12-day expedition to Tanzania to observe firsthand the dilemmas of parks and peoples we have discussed in class. We are scheduled to visit Tarangire, Lake Manyara, Mt. Meru, and Serengeti National Parks, as well as the Ngorongoro Conservation Area. Both on campus and in Tanzania, the course emphasizes student contributions and presentations. Students are expected to come well-prepared to each and every session, and will be asked to lead discussions plus carry out literature research on particular protected areas or conservation issues of interest to them, or on alternative conservation strategies. The final assignment for the seminar is to complete a 5- to 7-page paper on some aspect of conservation dilemmas in East Africa, preferably Tanzania, and to present the main findings of that paper in a joint seminar of undergrads and alumni as we travel in East Africa. Note: Students will arrive on campus and will be housed at Stanford until we leave for the travel portion. Travel to Tanzania will be provided and paid by Sophomore College (except incidentals) and is made possible by the support of the Stanford Alumni Association Travel/Study Program and generous Stanford donors.

HUMBIO 21. Introduction to Brain and Behavior. 3 Units.

Evolutionary principles to understand how the brain regulates behavior physiologically, and is also influenced by behavioral interactions. Topics include neuron structure and function, transmission of neural information, anatomy and physiology of sensory and motor systems, regulation of body states, the biological basis of learning and memory, and behavioral abnormalities.

Same as: BIO 20

HUMBIO 25SI. Diverse Perspectives on Disabilities. 1-2 Unit.

This class investigates definitions and the complexities of life with a disability through discussion and panel based learning. Through student and parent panels, speakers, professors, and professionals in the field of disability, this class looks at the different perspectives and ways that disability interacts with the world. In addition to learning about the scientific, social and legal backgrounds students can also participate in a community volunteering project for an additional unit through Kids with Dreams or another community or student organization.

HUMBIO 26. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 135X, EDUC 335X, MED 235

HUMBIO 27. Traditional Chinese Medicine. 1 Unit.

The philosophy and history behind traditional Chinese medicine. Concepts such as Qi, Yin/Yang, meridians, Chinese organs, and the 5 elements. How these concepts are applied through techniques such as acupuncture, herbal medicine, Qi gong, and massage. How traditional Chinese medicine is understood from a scientific standpoint. Political and socioeconomic implications. Observation of an acupuncturist. Readings on the integration of Eastern and Western medicine and on traditional Chinese medicine.

HUMBIO 29A. Well-Being in Immigrant Children & Youth: A Service Learning Course. 3 Units.

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177A, CSRE 177E, EDUC 177A

HUMBIO 74. Ethics in a Human Life. 4 Units.

Ethical questions pervade a human life from before a person is conceived until after she dies, and at every point in between. This course raises a series of ethical questions, following along the path of a person's life; questions that arise before, during, and after she lives it. We will explore distinctive questions that a life presents at each of several familiar stages: prior to birth, childhood, adulthood, death, and even beyond. We will consider how some philosophers have tried to answer these questions, and we will think about how answering them might help us form a better understanding of the ethical shape of a human life as a whole. Seminar for Juniors and Seniors in Philosophy or Humbio - others by permission.

Same as: PHIL 74A

HUMBIO 79Q. Sexuality and Society. 3 Units.

This course will explore how sexual identity, attitudes, and behaviors are shaped by the messages sent by the various agents of society such as schools, family, peers, media, and religious, medical, and political institutions. The interaction of biology, psychology, and socio-cultural factors, such as gender roles and sexual/relationship scripts will be discussed, as will the intersection of sexuality and notions of love, romance, and commitment. Critical developmental periods, such as adolescence and emerging adulthood will be examined in depth. Students will explore their own values and feelings about sexuality and come to an understanding of how their beliefs were formed. We will discuss how information about sexuality is disseminated in our society and what we can do to help ensure that such information is used in a way that promotes healthy self-conceptions, behavior, and relationships.

HUMBIO 81Q. Introduction to Child Nutrition. 3 Units.

This course examines contemporary child nutrition in America, from the level of the intestinal villus to the food marketing directed at children, as well as the diseases associated with inappropriate nutrition. Students will obtain an understanding of what constitutes a healthy diet for growth and how dietary needs change throughout childhood and adolescence. We will review existing community and school-based nutrition interventions as well as pertinent literature on child nutrition. Students will also gain practical experience in healthy food preparation, emphasizing a seed-to-table approach.

HUMBIO 82A. Qualitative Research Methodology. 3 Units.

Goal is to develop knowledge and skills for designing and conducting qualitative research studies including purposes, conceptual contexts, research questions, methods, validity issues, and interactions among these facets. Each student designs a qualitative research study.

HUMBIO 82B. Advanced Data Analysis in Qualitative Research. 3 Units.

For students writing up their own qualitative research. Students prepare a complete draft presenting their own qualitative research study including results, with reports drafted section by section, week by week. Class provides feedback, guidance, support.

HUMBIO 84. Practical Analysis of Epidemiologic and Biological Data. 3 Units.

This course will teach students how to think about and analyze quantitative data. Students will learn to apply univariate and multivariable methods (using Stata software) to either their own data or data from publicly available sources. A central part of the course will consist of the joint planning and execution of an epidemiologic analysis of real-world data and the production of a manuscript for submission to a scientific journal. This course focuses on health-related data, although these methods can be applied much more broadly.

HUMBIO 85A. Essential Statistics for Human Biology. 4 Units.

Introduction to statistical concepts and methods that are essential to the study of questions in biology, environment, health, epidemiology and related areas. The course will teach and use the computer language R. Topics include distributions, probabilities, likelihood, linear models; illustrations will be based on recent research.

Same as: BIO 108

HUMBIO 86Q. Love as a Force for Social Justice. 3 Units.

Preference to sophomores. Biological, psychological, religious, social and cultural perspectives on the concept of agape love. How love is conceptualized across cultures; agape love as the basis of many religions; different kinds of love; the biology of love; love in action for social justice; the languages of love, including art, literature, music, and poetry. Emphasis is on blog writing, participation, and oral presentation.

Same as: FEMGEN 86Q

HUMBIO 87Q. Women and Aging. 5 Units.

Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. Service Learning Course (certified by Haas Center).

Same as: MED 87Q

HUMBIO 88. Introduction to Statistics for the Health Sciences. 3 Units.

Students will learn the statistical tools used to describe and analyze data in the fields of medicine and epidemiology. This very applied course will rely on current research questions and publicly available data. Students will gain proficiency with Stata to do basic analyses of health-related data, including linear and logistic regression, and will become sophisticated consumers of health-related statistical results.

HUMBIO 89. Statistics in the Health Sciences. 3 Units.

This course aims to provide a firm grounding in the foundations of probability and statistics, with a focus on analyzing data from the health sciences. Students will learn how to read, interpret, and critically evaluate the statistics in medical and biological studies. The course also prepares students to be able to analyze their own data, guiding them on how to choose the correct statistical test, avoid common statistical pitfalls, and perform basic functions in R deducer.

HUMBIO 91Q. Neuroethology: The Neural Control of Behavior. 3 Units.

Preference to sophomores. Animal behavior offers insights about evolutionary adaptations and this seminar will discuss the origins of the study of animal behavior and its development to the present. How does the nervous system control behavior and how is it changed by behavior? We will analyze and discuss original research papers about the neural basis of behavior. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat.

HUMBIO 92Q. Health and Security. 3 Units.

In this course, we explore the interconnections between health and three types of security: human, national, and international. Health is obviously a component of human security, but is it also a concern of national security or international security? Should it be? What are the potential benefits, costs, and risks or treating health as a national or international security issue? The course will provide a broad overview of key policy issues concerning global health, and will assess how global governance is addressing these issues.

HUMBIO 94Q. Law, Lawyers and Justice in Cinema. 4 Units.

Examination of how the law, justice and lawyers are depicted in film, how real the depictions are, and the social issues that are the subjects of the film and the effect of film on change, attitudes and policy.

HUMBIO 96Q. Injustice, Advocacy and Courage: The Path of Everyday Heroes. 3 Units.

This course will study the paradigms of people of courage, action and energy who have fought against injustice by advocating for causes against great odds and at personal risk. The focus will be on everyday people who have taken action, often at great personal risk, not for ambition, but because of their convictions and steadfast commitment to their beliefs.

HUMBIO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine. 3 Units.

Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.

Same as: ORTHO 97Q

HUMBIO 99Q. Becoming a Doctor: Readings from Medical School, Medical Training, Medical Practice. 3 Units.

Preference to sophomores. For students considering medicine as a career. Goal is to acquaint students with medical school, training in medicine and surgery, and the practice of medicine and surgery using stories to illustrate the topics: how to pick a medical school and a residency; how medicine affects family life, especially children; the differences between surgical and medical specialties; the advantages and disadvantages among academic/teaching, pure research, group practice, HMO, hospital staff, or private practice; malpractice concerns; financial considerations; and the importance of empathy.

HUMBIO 111. Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice. 3 Units.

The complexity of social and political issues surrounding global environmental change. Emphasis is on synergies precipitated by human-induced climatic change. Case studies and scenarios to explore the vulnerability and resilience in households, communities, regions, and nation-states most affected by extreme weather conditions. Their concerns, livelihood changes, and diverse responses of rural smallholders, indigenous communities, the state, and local and regional migrants. Central theme is environmental justice.

Same as: ANTHRO 173

HUMBIO 111M. Marine Resource Economics and Conservation. 5 Units.

Economic and ecological frameworks to understand the causes of and potential solutions to marine resource degradation. Focus on conservation of marine biodiversity and ecosystem-based management. Applications include: commercial and recreational fisheries, marine reserves, and offshore energy production.

Same as: EARTHYSYS 156M, ECON 156

HUMBIO 112. Conservation Biology: A Latin American Perspective. 3 Units.

Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class.

Same as: BIO 144, BIO 234

HUMBIO 113. The Human-Plant Connection. 3 Units.

The intertwined biologies of humans and plants, particularly the ways in which people and plants have imposed selection pressures and ecological change on one another. Topics include evolution and basic plant structure; plant domestication; effects of agriculture on human health and physiology; plants in traditional and contemporary diets; and human influences on plant biology through genetic manipulation and environmental change. Class meetings center on journal articles. Final project includes written and multimedia presentations.

HUMBIO 113S. Healthy/Sustainable Food Systems: Maximum Sustainability across Health, Economics, and Environment. 4 Units.

Discussion-based seminar. Focus on problems with and systems-based solutions to food system issues. Four particular settings are addressed: University, worksite, hospital, and school food. Traditional vs. disruptive food system models compared and contrasted. The goal is to determine how best to maximize sustainability across several dimensions, including health, economics, and the environment. Underlying class themes include social justice and the potential for changing social norms around food production and consumption.

HUMBIO 114. Environmental Change and Emerging Infectious Diseases. 3-5 Units.

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 177, ANTHRO 277

HUMBIO 115. Human Health and Global Environmental Change. 3 Units.

Climate change, biodiversity loss, and other forms of global environmental change matter profoundly to human health. This class will bridge the fundamental science that informs our understanding of global environmental changes to health outcomes and challenge students to rigorously assess proposed remedies to the causes and consequences of global environmental changes.

HUMBIO 117H. Human Behavioral Ecology. 3-5 Units.

Theory, method, and application in anthropology. How theory in behavioral ecology developed to understand animal behavior is applied to questions about human economic decision making in ecological and evolutionary contexts. Topics include decisions about foraging and subsistence, competition and cooperation, mating, and reproduction and parenting. Same as: ANTHRO 161, ANTHRO 261

HUMBIO 118. Theory of Ecological and Environmental Anthropology. 5 Units.

Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies from Australia, Melanesia, Africa, and S. America.

Same as: ANTHRO 90C

HUMBIO 119. Demography: Health, Development, Environment. 3 Units.

Demographic methods and their application to understanding and projecting changes in human infant, child, and adult mortality and health, fertility, population, sex ratios, and demographic transitions. Progress in human development, capabilities, and freedoms. Relationships between population and environment. Prerequisites: numeracy and basic statistics; Biology or Human Biology core; or consent of instructor.

Same as: BIO 102

HUMBIO 120. Health Care in America: An Introduction to U.S. Health Policy. 4 Units.

Health policy and health care delivery from a historical and a current policy perspective. Introduces cost, quality, and access as measures of health system performance. Considers institutional aspects of health care reform.

HUMBIO 120A. American Health Policy. 3 Units.

Issues in health care reform and the policy making process, the evolution of current systems, and theories underlying efforts for change. The national search for solutions to the problems of the uninsured, and the feasibility, options, and ramifications of alternative proposals for health care reform. Student presentations. Prerequisite: Human Biology core or equivalent, Human Biology 120, or consent of instructor.

HUMBIO 121. Critical Issues in Child Health. 4 Units.

Integrated picture of the physical and psychosocial health factors that result in a healthy child building on principles taught in the Human Biology core. Students apply basic human physiology to the physiology of the child to develop perspective on global pediatric health challenges and how the cultural context influences and defines the child living within it.

HUMBIO 121E. Ethnicity and Medicine. 1-3 Unit.

Weekly lecture series. Examines the linguistic, social class, and cultural factors that impact patient care. Presentations promote culturally sensitive health care services and review contemporary research issues involving minority and underserved populations. Topics include health care inequities and medical practices of African Americans, Asians, Latinos, Native Americans, immigrants, and refugees in both urban and rural settings. 1 unit requires weekly lecture attendance, completion of required readings, completion of response questions; 2 units requires weekly lecture attendance and discussion session, completion of required readings and weekly response questions; additional requirement for 3 units (HUMBIO only) is completion of a significant term paper Only students taking the course for 3 units may request a letter grade.

Same as: FAMMED 244

HUMBIO 122. Beyond Health Care: Seeking Health in Society. 3 Units.

Available evidence at the national and cross-country level linking social welfare interventions and health outcomes. If and how non-health programs and policies could have an impact on positive health outcomes. Evaluation of social programs and policies that buffer the negative health impact of economic instability and unemployment among adult workers and their children. Examination of safety nets, including public health insurance, income maintenance programs, and disability insurance. Prerequisites: HUMBIO 4B or equivalent, and background in research methods and statistics.

Same as: PEDS 222

HUMBIO 122M. Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations. 3 Units.

An emerging area of inquiry. Topics include: global migration trends, health Issues/aspects of migration, healthcare and the needs of immigrants in the US, and migrants as healthcare providers: a new area of inquiry in the US. Class is structured to include: lectures lead by the instructor and possible guest speakers; seminar, discussion and case study sessions led by students.

Same as: PEDS 212

HUMBIO 122S. Social Class, Race, Ethnicity, and Health. 4 Units.

Examines health disparities in the U.S., looking at the patterns of those disparities and their root causes. Explores the intersection of lower social class and ethnic minority status in affecting health status and access to health care. Compares social and biological conceptualizations of race and ethnicity.

HUMBIO 123. Obesity in America: Clinical and Public Health Implications. 3-4 Units.

Interdisciplinary clinical, research, and policy approaches. The prevalence, predictors, and consequences of obesity and diabetes; biological and physiological mechanisms; clinical treatments including medications and surgery; and the relevance of behavioral, environmental, economic, and policy approaches to obesity prevention and control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 124C. Global Child Health. 4 Units.

This course will introduce key challenges to the health and wellbeing of children worldwide, with a particular focus on children in low- and middle-income countries. It will review the leading causes of morbidity and mortality, identify interventions to address some of the biggest child health problems, and provide an overview of the roles of culture, gender, and civil society on child health and health policy.

HUMBIO 124E. Economics of Infectious Disease and Global Health. 3 Units.

Introduction to global health topics such as childhood health, hygiene, drug resistance, and pharmaceutical industries from an economic development perspective. Introduces economic concepts including decision-making over time, externalities, and incentives as they relate to health.

Same as: MED 236

HUMBIO 125. Current Controversies in Women's Health. 2-3 Units. Interdisciplinary. Focus is primarily on the U.S., with selected global women's health topics. Topics include: leading causes of morbidity and mortality across the life course; reproductive (e.g. gynecologic & obstetric) health issues; sexual function; importance of lifestyle (e.g. diet, exercise, weight control), including eating disorders; mental health; sexual and relationship abuse; issues for special populations. In-class Student Debates on key controversies in women's health. Guest lecturers. Undergraduates must enroll in HumBio 125 for 3 units. PhD minor in FGSS, enroll in FEMGEN 256 for 3 units and for a letter grade. Med students enroll in OBGYN 256 for 2 units. Spring.
Same as: FEMGEN 256, OBGYN 256

HUMBIO 126. Promoting Health Over the Life Course: Multidisciplinary Perspectives. 3 Units. Disease prevention and health promotion topics pertinent to different stages of the life span emphasizing healthy lifestyle and reducing risk factors in both individuals and communities. Focus is on scientific investigation, the application of behavioral science to risk reduction strategies, and the importance of health promotion as a social and economic imperative. Topics include: epidemiology of chronic diseases; social determinants of health, behavior change; obesity, nutrition, and stress; children, young adult, mid-life and aging health issues; health care delivery and public health system; workplace wellness programs; and other additional issues. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 127A. Community Health: Assessment and Planning I. 4 Units. Major determinants of health in a community. Working with community partners to identify health issues and plan programs and policies to prevent disease and promote health. Service learning component involving students in community health assessment techniques. Final grade given upon completion of HUMBIO 127B. Service Learning Course (certified by Haas Center). Prerequisite: 4B or equivalent, or consent of instructor.

HUMBIO 127B. Community Health: Assessment and Planning II. 4 Units. Continuation of 127A. Service learning course with emphasis on conducting community health assessment and planning projects in collaboration with community-based organizations. Service Learning Course (certified by Haas Center). Prerequisite: 4B or equivalent, 127A, or consent of instructor.

HUMBIO 128. Community Health Psychology. 4 Units. Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent. Same as: PSYCH 101

HUMBIO 129. Critical Issues in International Women's Health. 4 Units. Women's lives, from childhood through adolescence, reproductive years, and aging. Economic, social, and human rights factors, and the importance of women's capacities to have good health and manage their lives in the face of societal pressures and obstacles. Emphasis is on life or death issues of women's health that depend on women's capacity to exercise their human rights including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. A requirement of this class is participation in public blogs. Prerequisites: Human Biology core or equivalent or consent of instructor.
Same as: FEMGEN 129

HUMBIO 129M. Measuring Global Health. 4 Units. Open to MD, graduate, and undergraduate students. Assessing the global burden of disease, its distribution among and within countries, its causes, and appropriate interventions requires rigorous quantitative approaches. This course develops skills in these areas by critically examining questions like: How do we know who is sick and where? How are risk factors incorporated into our projections of future disease trends? How do we combine mortality and morbidity in a meaningful way? What works for improving health efficiently? Workshops build familiarity with relevant data and their analysis. Prerequisite: coursework in statistics, biostatistics, quantitative epidemiology, econometrics, or equivalent.
Same as: HRP 241, MED 231

HUMBIO 129S. Global Public Health. 4 Units. The class is an introduction to the fields of international public health and global medicine. It focuses on resource poor areas of the world and explores major global health problems and their relation to policy, economic development and human rights. The course is intended for students interested in global health, development studies, or international relations, and provides opportunities for in-depth discussion and interaction with experts in the field. .

HUMBIO 129W. Health Care Systems Around the World. 4 Units. This course will explore the role of health care systems in societies around the world, identifying the common challenges facing health care systems and how different institutional structures in different countries perform in response to these challenges. We will structure the course around general conceptual frameworks related to key health system institutions (including financing, insurance, provider payment, patient cost-sharing, and the regulation of medical technology). From this foundation, we will draw on the experience of individual countries (high and low income, with heavy chronic disease and infectious disease burdens) to illustrate the function of these institutions under real-world circumstances observed around the globe.

HUMBIO 130. Human Nutrition. 4 Units. The study of food, and the nutrients and substances therein. Their action, interaction, and balance in relation to health and disease. Emphasis is on the biological, chemical, and physiological processes by which humans ingest, digest, absorb, transport, utilize, and excrete food. Dietary composition and individual choices are discussed in relationship to the food supply, and to population and cultural, race, ethnic, religious, and social economic diversity. The relationships between nutrition and disease; ethnic diets; vegetarianism; nutritional deficiencies; nutritional supplementation; phytochemicals.

HUMBIO 133. Human Physiology. 4 Units. Human physiology will be examined by organ systems: respiratory, cardiovascular, renal, and gastrointestinal. Concepts of cell and molecular biology that underlie organ development, pathophysiology and opportunities for regenerative medicine will be introduced. Signaling and integrative control by the endocrine, autonomic and central nervous systems will be introduced. Prerequisite: Biology or Human Biology core.
Same as: BIO 112

HUMBIO 135. Exercise Physiology. 4 Units. How body systems respond to the stress of acute exercise and adapt to chronic exercise training. How the cardiovascular system adapts to optimize oxygen delivery and utilization, how muscles generate force and hypertrophy in response to training, how metabolic/biochemical pathways are regulated to support the increased energy demand of exercise. Theories on the causes of fatigue and muscle soreness, and on what limits human performance. Applied topics such as the effects of aging, gender, and environmental conditions (high altitude, heat, cold, microgravity) on exercise capacity will also be discussed. Portions of the class will be flipped with some lectures online and others in class. Heavy emphasis on practical physiology in the second half of the course. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

HUMBIO 135S. Applied Topics in Exercise Physiology and Metabolism. 3 Units.

Discussions of controversial topics related to exercise physiology, sports performance, impacts of aging and environmental physiology. Special focus on how to get science out of the lab via novel training programs, medical device development, and science communication. Students will learn the fundamentals of science storytelling and mixed media presentation of ideas. A requirement of this class is participation in blogs, participation in discussions and evaluations of physiology research, and creation of a science-based story to share with the class. If class is full, contact instructor for an application. Enrollment limited to 10. Prerequisites: B+ or higher in HB135 and/or consent of instructor.

HUMBIO 136. Human Physiology Laboratory. 4 Units.

This laboratory course is inquiry based, so the subject matter of the course will change in successive years. In 2015, the two questions to be researched concurrently in Spring will be (1) Can heat-related performance decrements incurred by individuals clad in impermeable attire (e.g., biohazard personal protective suits) be mitigated?; and (2) Can the sensation of thermal comfort be affected by regional skin temperature manipulations? Students will participate both as experimenters and as subjects. The laboratory work will focus on exercise and temperature. Thus, participants must be in good physical condition and be willing to participate in strenuous exercise routines under adverse environmental conditions. Varsity athletes currently participating in a spring sport should first talk with Prof. Heller before applying. Combined Lab/Discussion sessions will be Tue and Thurs 1:15 - 5:05. You must attend both days each week, with no conflicts with other courses. Prerequisite is Bio 42 or HumBio 4A. Satisfies WIM for majors in biology. Enrollment for Spring 2015 course is limited to 16 students by permission. See: sites.stanford.edu/bio107 for the link to online application form.

Same as: BIO 107

HUMBIO 139E. Sport and Exercise Medicine. 3 Units.

This is an upper division lecture course taught by the course directors and guest lecturers (experts from the field of sports and exercise medicine) who will cover a range of topics within sports medicine; ethical issues in return-to-play decisions, the balance point between health and harm in sport, the role of sports medicine in the prevention of chronic disease through exercise, common sports injuries, exercise physiology, and diseases common to athletes. Students will develop critical reading, thinking and writing skills as well as oral presentation skills and the confidence to engage in verbal exchange.

HUMBIO 140. Sex and Gender in Human Physiology and Disease. 2-3 Units.

Chromosomal, hormonal and environmental influences that lead to male and female reproductive systems and neuroendocrine regulation and intersex variants. Masculinizing and feminizing effects of endogenous and exogenous sex hormones and other factors, in particular gender, on the musculoskeletal, neurological, cardiovascular, immunological and other systems and tissues, e.g. adipose, skin, etc. over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women, and with aging in both sexes). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor. Undergraduate students must enroll for 3 units.

Same as: FEMGEN 241, MED 240

HUMBIO 141. Disability, Gender, & Identity. 5 Units.

Course explores visible and invisible disabilities, focusing on issues of gender and identity. The course emphasizes psychological as well as physical health, cross-cultural variables, diversity of disability experiences, legal and political aspects, work and home accommodations, self-labeling, caretaking, stigma and passing, and the difference gender makes to how disabilities are experienced. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of physical assistance.

Same as: AMSTUD 260, FEMGEN 260, FEMGEN 360

HUMBIO 142. Adolescent Development. 4 Units.

Underlying changes and their consequences in everyday functioning. Physical, cognitive, social, and sexual development; how these changes influence the emerging sense of identity, autonomy, and intimacy. Contexts in which adolescents move such as family, friends and peers, school, and workplace. Focus is on normal development of boys and girls; attention to problem outcomes including eating disorders, depression, and teen pregnancy. Prerequisite: 3B or PSYCH 1, or consent of instructor.

HUMBIO 142M. Special Topics in Adolescent Mental Health. 4 Units.

Includes the study of aspects of common disorders seen in adolescent populations, such as prevalence, developmental course, gender differences, theoretical explanations, and therapeutic interventions. Topics will include mood/anxiety disorders, eating disorders, learning disabilities and ADHD, sexual risk behaviors, developmental disorders, substance abuse, and self-harm. Goals of this course include getting students to think critically about the unique mental health needs of adolescents, collaborating on devising ways to improve the way our society meets those needs, and strengthening writing and communication skills applicable to this area of inquiry.

HUMBIO 143. Adolescent Sexuality. 4 Units.

Developmental perspective. Issues related to scientific, historical, and cultural perceptions; social influences on sexual development; sexual risk; and the limitations and future directions of research. Sexual identity and behavior, sexually transmitted diseases including HIV, pregnancy, abortion, gay and lesbian youth, sex education and condom availability in schools, mass media, exploitative sexual activity, and difficulties and limitations in studying adolescent sexuality. Legal and policy issues, gender differences, and international and historical trends. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 144. Boys' Psychosocial Development. 3 Units.

From early childhood through adolescence. Emphasis is on how boys' lives and experiences are embedded within their interpersonal relationships and social and cultural contexts. Interdisciplinary approach including perspectives from fields such as psychology, sociology, and education. Prerequisite: Human Biology core, or Developmental Psychology, or consent of instructor.

HUMBIO 145L. The Biology and Evolution of Language. 4-5 Units.

Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 171, ANTHRO 271

HUMBIO 146D. Developmental Disabilities: From Biology to Policy. 3 Units.

Fifteen percent of US children have disabilities. While advances in medicine and technology have increased life expectancy for these children, health care delivery, education, and public attitudes have not kept pace. Students in this course will learn the possibilities and limitations of new biomedical treatments of Down syndrome, cerebral palsy, and autism. Students will also evaluate the impact of public policy initiatives, such as the Individuals with Disabilities Education Act and Americans with Disabilities Act on inclusion and participation in society.

Same as: PEDS 246

HUMBIO 148W. Women, Fertility, and Work. 5 Units.

How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using crosscultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places.

Same as: ANTHRO 151, ANTHRO 251

HUMBIO 149. Psychological and Educational Resilience Among Children and Youth. 4 Units.

Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations.
Same as: EDUC 256

HUMBIO 149L. Longevity. 4 Units.

Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.
Same as: NENS 202, PSYCH 102

HUMBIO 150A. Assisted Reproductive Technologies. 1-3 Unit.

Primary and current literature in basic and clinical science aspects of assisted reproductive technologies (ART), and demonstrations of current ART techniques including in vitro fertilization and embryo culture, and micromanipulation procedures such as intracytoplasmic sperm injection and embryo biopsy and cryopreservation. Class only may be taken for 1 unit. 2 units includes papers and attendance at clinical demonstrations. 3 units includes a term paper. Recommended: DBIO 201, or consent of instructors.
Same as: OBGYN 202

HUMBIO 151R. Biology, Health and Big Data. 3 Units.

We are living in the midst of a revolution in the accessibility and availability of biological and medical data. How can all this data be used to improve human health? In this course, students will look at case studies from diabetes and cancer research to learn how to access publicly available data ranging from gene or protein level datasets to information about clinical trials. Students will apply what they learn from the case studies to develop a research proposal and presentation on a biology-related topic of their choice. The class will have a small group workshop-type format. Students will gain skills in research methods including accessing, analyzing and presenting data. There will be exercises using the statistical package R. Prior programming experience is not required. Prerequisites: HumBio 2A, 3A or equivalent.

HUMBIO 152. Viral Lifestyles. 3 Units.

Viral lifestyle is a seminar devoted to exploring contemporary topics in microbiology with a focus on the global microbiome. The course includes lectures and will provide an opportunity for students to interact with each other, the instructor and guest lecturers to explore novel research areas in microbiology that are still being formed. The course will begin with lectures on topics such as cross-species transmission of microbes and human microbiome and will transition to presentation and discussion led by student groups. A significant percentage of class will be devoted to presentation and discussion focused on group projects.

HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges. 4 Units.

Parasitic and other pestilence of public health importance. Pathogenesis, clinical syndromes, complex life cycles, and the interplay among environment, vectors, hosts, and reservoirs in historical context. Public health policy initiatives aimed at halting disease transmission. World Health Organization tropical disease targets including river blindness, sleeping sickness, leishmaniasis, schistosomiasis, mycobacterial disease (tuberculosis and leprosy), malaria, toxoplasmosis, dracunculiasis, and intestinal helminthes. Guest lecturers with expertise in disease control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 154A. Outbreaks, Epidemics, & Disease Control Systems. 4 Units.

This course teaches skills in disease control epidemiology. Students will engage in in-depth interdisciplinary study of disease detection and control strategies from a "systems science" perspective, which addresses classical public health dilemmas, such as how to allocate limited resources, investigate disease outbreaks, and analyze common problems at the intersection of social policy and public health. Lectures and problem sets will focus on developing quantitative skills essential to public health practice, emphasizing the use of common mathematical techniques for disease control. Readings will complement the lectures and problem sets by offering critical perspectives from the sociology of public health. In-depth case studies from non-governmental organizations, departments of public health, and international agencies will drive the course. Human Biology 154 courses can be taken separately or as a series.
Same as: SOMGEN 254

HUMBIO 154B. Principles of Epidemiology. 3 Units.

Epidemiology is the study of the distribution and determinants of health and disease in human populations. This course introduces students to observational epidemiology through major study designs along with measures of association and their computation. The course also covers how error, bias, and confounding can affect analytic findings, and how to detect and interpret interaction effects. Students will learn through lectures, problem sets, and critical appraisal of both classic and contemporary research articles. Human Biology 154 courses can be taken separately or as a series.

HUMBIO 154C. Cancer Epidemiology. 4 Units.

Clinical epidemiological methods relevant to human research in cancer will be the focus. The concepts of risk; case control, cohort, and cross-sectional studies; clinical trials; bias; confounding; interaction; screening; and causal inference will be introduced and applied. Social, political, economic, and ethical controversies surrounding cancer screening, prevention, and research will be considered. Human Biology 154 courses can be taken separately or as a series.

HUMBIO 155B. The Vaccine Revolution. 6 Units.

Advanced seminar. Human aspects of viral disease, focusing on recent discoveries in vaccine development and emerging infections. Journal club format: students choose articles from primary scientific literature, write formal summaries, and synthesize them into a literature review. Emphasis is on analysis, experimental design, and interpretation of data. Oral presentations. Enrollment limited to 8. Prerequisite: prior enrollment in HumBio 155H Humans and Viruses or MI 116, The Human Virosphere.
Same as: MI 115B

HUMBIO 155H. Humans and Viruses I. 6 Units.

Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis is on host pathogen interactions and policy issues. Topics: polio and vaccination, smallpox and eradication, yellow fever and history, influenza and genomic diversity, rubella and childhood infections, adenovirus and viral morphology, ebola and emerging infection, lassa fever and immune response.
Same as: MI 155H

HUMBIO 157. The Biology of Stem Cells. 3 Units.

The role of stem cells in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites: HumBio 2A and 3A, or the equivalent in the BioCore in Biological Sciences.
Same as: DBIO 257

HUMBIO 158. The Human Genome and Disease. 3 Units.

The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both.

Same as: BIO 109A, BIOC 109A, BIOC 209A

HUMBIO 158G. Genomics, Bioinformatics and Medicine. 3 Units.

Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIOC 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>.

Same as: BIOC 158, BIOC 258, BIOMEDIN 258

HUMBIO 159. Genes and Environment in Disease Causation: Implications for Medicine and Public Health. 2-3 Units.

The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor.

Same as: HRP 238

HUMBIO 160. Human Behavioral Biology. 5 Units.

Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness.

Same as: BIO 150, BIO 250

HUMBIO 161. The Neurobiology of Sleep. 4 Units.

Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.

Same as: BIO 149, BIO 249

HUMBIO 162. The Nervous Age: Neurosis, Neurology, and Nineteenth-century Theatre. 5 Units.

The nineteenth century witnessed profound developments in neurological and psychological sciences, developments that fundamentally altered conceptions of embodiment, agency, and mind. This course will place these scientific shifts in conversation with theatrical transformations of the period. We will read nineteenth-century neuropsychologists such as Charles Bell, Johannes Müllner, George Miller Beard, Jean-Martin Charcot, and Hippolyte Bernheim alongside artists such as Percy Shelley, George Büchner, Richard Wagner, Eadweard M. Muybridge, and August Strindberg.

Same as: GERMAN 284, TAPS 354

HUMBIO 162H. Hysteria and Modern Culture. 3-5 Units.

The term "hysteria" has been used for centuries to categorize the mysterious ailments of others. This course will focus on the history of hysteria's representation and production from the late nineteenth century through WWI. Readings will include medical writings (Charcot, Bernheim, Freud), plays (Ibsen, Strindberg, Toller), and feminist theory (Cixous, Cleavage, Diamond). We will also devote some attention to the ongoing influence of the discourse of hysteria on contemporary medical and popular cultures.

Same as: GERMAN 137, TAPS 169

HUMBIO 163. Neural Systems and Behavior. 4 Units.

The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A.

Same as: BIO 163, BIO 263

HUMBIO 164. Autism Spectrum Disorders. 3 Units.

Abnormal social deficits, language development and repetitive behaviors, are the core symptoms of Autism Spectrum Disorders (ASD), a group of neurodevelopmental disorders that affect about 1% of all children and cost society an estimated \$35B annually. This interactive new seminar will provide an overview of our understanding of ASD, from genetics through epidemiology, biology and treatment, and the many implications for society, including the principles and problems of diagnosis, its impact upon family and lifespan, and controversies regarding its etiology, perception and care.

HUMBIO 165. Early Roots of Human Behavior. 3 Units.

A growing body of evidence suggests that the roots of human behavior are to be found in early childhood. These early behaviors have a direct effect on the quality of a child's educational experience. The educational experience, in turn, is a principal determinant of many adult outcomes that affect well-being. This course will explore how early social forces, psychological influences, and biological systems combine to affect human behavior in early childhood, in the educational experience, and throughout the life course.

HUMBIO 166. Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context. 4 Units.

The class examines the array of forces that affect the foods human beings eat, and when, where, and how we eat them, including human labor, agriculture, environmental sustainability, politics, animal rights/welfare, ethics, policy, culture, economics, business, law, trade, and ideology, and psychology. The class addresses the impact of current policies and actions that might be taken to improve human nutrition and health; macro-scale influences on food, nutrition, and eating behavior.

HUMBIO 167. The Art of Vision. 3 Units.

This course concerns eyes and art. It asks how eyes are built, how they process visual information, and how they are affected by diseases that are major problems in our society. These topics are illustrated through fine art and famous artists, and we explore the implications of both normal and abnormal vision for art. There are short diversions into animal eyes and the role of vision in music, literature, and sports.

HUMBIO 168. Multidisciplinary Perspectives on Guilt. 3 Units.

The seminar encompasses the personal and cultural components of guilt. It explores the behaviors that induce guilt; its relational aspects; genesis in evolutionary and developmental terms; and its normal and pathological manifestations. The cultural section includes crosscultural perspectives on guilt and its conceptions in Christianity, Judaism, Islam, Hinduism, Buddhism, and Confucianism; as well as in the philosophy of Aristotle, Kant, J. S. Mill and Nietzsche, and culpability and the law. The course consists of lectures, and discussion in class and sections.

HUMBIO 170. Justice, Policy, and Science. 5 Units.

The role of science in civil rights, justice, policy, criminal justice, evidence, education, and disabled rights.

HUMBIO 170A. Sex and the Law. 4 Units.

This course uses an interdisciplinary approach to examine the laws and regulation of sex in the United States by considering the legal, policy, social, political and scientific bases (or lack thereof) of such laws, the context and objectives of sex regulation, and the political dynamics of contemporary and controversial issues presented by this subject. Some laws reflect policies to protect persons from harm related to sexual conduct, such as rape, assault and pedophilia. Other laws impose notions of morality, such as sodomy, incest or polygamy, or homosexuality, or reflect policy or social judgments regarding abortion, contraceptives, and sexual activity of minors. Regulation often concern consensual conduct. This course will consider these topics from varying perspectives and policy objectives, and in the context of Constitutional and other liberty interests.

HUMBIO 172B. Children, Youth, and the Law. 5 Units.

How the legal rights of children and adolescents in America are defined, protected, and enforced through the legal process within the context of their developmental needs and competing societal interests. Topics: origins and definitions of children's rights; adoption; custody; the juvenile justice system; education; informed consent; health care; protection from harm and child welfare; due process; and privacy and freedom of expression. Interactive, using hypotheticals for discussion and analysis. A and B alternate annually; students may take one or both. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 173. Science, Innovation and the Law. 3 Units.

The interaction of science, business and law: how scientific ideas are protected by law; the rights of those who invent, develop, and finance scientific discovery; and how ideas are commercialized and brought to market. What kinds of research, discovery, and innovation are protected; who has rights that can be protected; what kinds of rights can be protected, and the kinds of protections that apply; how inventions are commercialized; and the success and failure of businesses based on scientific discovery. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 174. Foundations of Bioethics. 3 Units.

Classic articles, legal cases, and foundational concepts. Theoretical approaches derived from philosophy. The ethics of medicine and research on human subjects, assisted reproductive technologies, genetics, cloning, and stem cell research. Ethical issues at the end of life. Prerequisite: Human Biology core or equivalent, or consent of instructor.

HUMBIO 175. Health Care as Seen Through Medical History, Literature, and the Arts. 3 Units.

The differences between disease as pathology and as the patient's experience. Topics include: patient-doctor relationships; medical technology; the changing focus on illness; gender issues; love, sex, and illness; mental illness; sick children; and death and dying. Limited enrollment.

HUMBIO 175H. Literature and Human Experimentation. 3-5 Units.

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann and Vivien Spitz's Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care.

Same as: AFRICAAM 223, COMPLIT 223, CSRE 123B, MED 220

HUMBIO 175L. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer.

Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, CSRE 129B, FRENCH 229, MED 234

HUMBIO 175S. Novels and Theater of Illness. 3 Units.

Illness and disease through novels and plays by authors including Shakespeare, Miller, Sophocles, Hemingway, and Camus. How sickness involves the patient, family, community, and state. Limited enrollment.

HUMBIO 176. Impact of Infectious Diseases on Human History. 3 Units.

Impact of infectious diseases on human society. Some topics include: Plague of Justinian and 14th century; impact on exploration, trade and conquest; how slavery, malaria and yellow fever conspired to alter the New World; Microbes and war; diseases of poverty, tuberculosis and others; Cholera and public health; pandemic influenza; diseases of human progress. Students give a 30 minute presentation on a topic of their choosing that exemplifies an aspect of the impact of politics, societal influences, religion or other forces on infectious diseases.

Same as: MED 176

HUMBIO 176A. Medical Anthropology. 4 Units.

Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

Same as: ANTHRO 82, ANTHRO 282

HUMBIO 177C. Culture, Narrative, and Medicine. 5 Units.

This course examines the ways in which medicine is practiced in diverse cultural contexts with narrative skills of recognizing, interpreting and being moved by the stories of illness. It is an examination of the human experience of illness and healing through narratives as presented in literature, film, and storytelling. We explore how cultural resources enable and empower healing and how narrative medicine can guide the practice of culturally competent medical care.

Same as: ANTHRO 178A

HUMBIO 178. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.]

Same as: CSRE 178, ETHICSOC 133, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

HUMBIO 178T. Human Trafficking: Historical, Legal, and Medical Perspectives. 3 Units.

(Same as History 105C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.

Same as: FEMGEN 5C, HISTORY 5C, SOMGEN 205

HUMBIO 179S. Spirituality and Healing. 3-5 Units.

The puzzle of symbolic healing. How have societies without the resources of modern medicine approached healing? Why do these rituals have common features around the world? Shamanism, spirit possession, prayer, and the role of placebos in modern biomedicine. Students do ethnographic work and practical explorations along with more traditional scholarly approaches to learning.

Same as: ANTHRO 184

HUMBIO 180. Human Skeletal Anatomy. 5 Units.

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, ANTHRO 275, BIO 174, BIO 274

HUMBIO 186. Biological Clocks. 3 Units.

The biological basis for endogenous timekeeping in organisms from flies to human beings. How biological clocks are constructed at the molecular, tissue, and behavioral levels; how these clocks interact with other physiological systems and allow animals to anticipate changes in their environment. Applications of circadian rhythm principles to treating human disorders and diseases such as cancer. Prerequisite: Biology or Human Biology core, or consent of instructor.

HUMBIO 192. Capstone. 1-5 Unit.

Completion of the capstone project, normally taken in the student's final quarter. A senior year capstone experience is a mentored project that builds upon or extends work or a theme already established in the Area of Concentration (AC). Requirements include participation in the capstone symposium, which would involve a presentation followed by a brief question and answer session. Enrollment strictly by permission of instructor. May be taken for a maximum 3 quarters of credit. Total of units not to exceed 9.

HUMBIO 193. Research in Human Biology. 1-5 Unit.

Independent research conducted under faculty supervision, in junior or senior year, normally but not necessarily in pursuit of an honors project. May be taken for a maximum 3 quarters of credit. Prerequisite: Faculty approval; application available in student services office.

HUMBIO 194. Honors. 1-10 Unit.

Completion of the honors project, normally taken in the student's final quarter. First component: the honors thesis, a final paper providing evidence of rigorous research, fully referenced, and written in an accepted scientific style. Second component: participation in the honors symposium, including a 10-minute oral presentation followed by a brief question and answer session. Prerequisites: 193 or 199, and acceptance into the honors program.

HUMBIO 197. Human Biology Internship. 1-4 Unit.

Limited to and required of Human Biology majors. A supervised field, community, or lab experience of student's choosing, pre-approved by Human Biology faculty and student advisers, and initiated at least three quarters prior to graduation. Participation in a poster session on the internship experience is required during the first quarter that the student is in residence at Stanford after completion of the internship. May be repeated for credit and a total of 4 units accumulatively. Prerequisite: Human Biology core.

HUMBIO 198. Senior Tutorial in Human Biology. 1-5 Unit.

Reading for Human Biology majors in exceptional circumstances and under sponsorship of Human Biology associated faculty. Students must apply through Human Biology student services before registering. Reading list, paper, and evaluation required. May be repeated for credit.

HUMBIO 199. Directed Reading/Special Projects. 1-4 Unit.

Human Biology majors must obtain a sponsor from the Human Biology associated faculty or the Academic Council. Non-majors and students who have not declared must obtain a sponsor only from the Human Biology associated faculty. Students must complete application in student services office.

HUMBIO 200. Teaching of Human Biology. 1-5 Unit.

For upper division undergraduates and graduate students. Practical experience in teaching Human Biology or serving as an assistant in a lecture course. May be repeated for credit.

Human Resource Management Courses

HRMGT 280. Human Resource Management. 2 Units.

An organization's human resources are very often a key, even the key, to the organization's success. Human resource management (HRM) is therefore of strategic importance. We begin by surveying the fundamentals of human resource management from the perspective of the organization's overall strategy, relying on concepts and theories from your previous economics and organizational behavior courses. Then we focus on the question of motivation and, in particular, how organizations can successfully motivate their employees to provide "efforts" that go above and beyond the nominal specs of the particular job.

HRMGT 282. HR for Startups. 2 Units.

This course focuses attention on human resource strategies for startups. It discusses recruitment, incentives, design of jobs, development of talent, leadership and empowerment challenges in startups. We will deal with questions ranging from equity splits to founding team dynamics, hiring talent to the sequencing of hires. We will use a mix of "live cases" from the field, and lectures.

HRMGT 284. Organizational Strategy. 2 Units.

HRMGT 284 will focus on the organization strategy of the firm. The success of a firm depends not just on a well-designed product market strategy, but on how well that strategy is executed to align the goals of the employees with those of the firm. Topics covered include meeting strategic objectives, hiring, pay, training, teamwork, promotions, performance evaluation, pay for top executives, management practices in startups, and organizational transformation. While the general theme is the management of the firm, the topics also lend themselves to developing perspectives on how you manage your personal career.

HRMGT 289. Sloan: Talent Management Strategy. 4 Units.

Everyone manages people; how can it be done better? How can it be done to facilitate your overall strategy, for your company and your career? This class covers the standard topics of people management: recruitment and selection; performance evaluation; incentives and compensation; promotions; job design; training; teamwork; and layoffs and retention. Each topic is covered through case studies and then analytical models for choosing and using best practices. The class content is aimed at managers who recognize that people management is important, but who typically want to spend less time managing people and more time doing what they really enjoy.

HRMGT 302. Incentives and Productivity. 4 Units.

This course is designed to teach the student how to use economics to solve practical personnel problems that affect worker productivity. Topics include: selecting the best workers to hire, training workers, turnover, setting compensation strategically, structuring salespersons' commissions, downsizing, using promotions as an incentive mechanism, and other topics. Examples and cases will be presented to demonstrate the importance of using economic techniques to structure human resources programs. The course will appeal most to the student who expects to be a general manager or who hopes to run his or her own business. Although the human resources specialist may benefit from this course, the emphasis will be on decisions that affect personnel, but are made primarily by general managers. The class format is somewhat unusual. Most classes consist of lecture with questions, but two are class workshops. The lecture will present a theoretical development of a topic. The questions discussed during the last part of the lecture period will involve practical business application of the theory presented in lecture. This course is more technical than other human resources courses, but should be accessible to anyone who has successfully completed the economics and statistics courses in the MBA core. Every student is expected to know calculus and basic probability and statistics. Although I will not emphasize the technical aspects on the final exam, the problem sets will require some knowledge of mathematics. To ease your fears, many "poets" have taken variants of this course in the past and have done well. There will be graded team problem sets and a final exam.

HRMGT 512. Changing How We Manage People. 1 Unit.

This course is designed for individuals interested in changing how people are managed—to dispel flawed assumptions about human resource strategies and develop new techniques. In the past, human resource practices rarely served as a source of innovation in organizations. Rather, when establishing guidelines, policies, and rules, most companies chose to follow the norm, which often was unsatisfying and frustrating for their employees. These same firms chose not to focus on their human resource practices as a source of competitive advantage that could be used to hire the best talent, perform at the highest level, and weather the most difficult times. More recently, new ideas about the optimal approach to managing the firm's most important asset—its human capital—have flourished. As a result, a debate has surfaced in the corporate world about the best ways to get work done—from the allocation of job tasks to the structure of financial incentives. We tackle many of these fundamental questions in this course—what is the best way to hire people, to give performance feedback, to foster collaboration—but we look at these problems through a new lens, one informed more by evidence and analysis than by tradition and intuition. This class is an exercise in collaboration: a joint effort by a practitioner and an academic who are both hopelessly optimistic about how the management of human resources can be improved. In each session, we will tackle a novel and important topic (e.g., engagement surveys?) from three distinct points of view, first describing what is currently done, then identifying alternative approaches in other firms, and finally considering what a bold and creative approach might look like. After taking this course, you will be better able to: (1) identify misconceptions that undermine the effectiveness of human resource strategies; (2) learn new insights about human motivation in the workplace and (3) design new tools that can improve the working lives of your employees. We believe this perspective will be invaluable to you throughout your career.

HRMGT 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

HRMGT 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

HRMGT 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

Humanities Sciences Courses

HUMSCI 201. Graduate Environment of Support. 1 Unit.

Psychosocial, financial, and career issues in adapting graduate students to Stanford; how these issues relate to diversity, resources, policies, and procedures. Discussions among faculty, advanced graduate students, campus resource people, and the dean's office. (Thomas).

Iberian Latin American Cultures Courses

ILAC 10SC. Spanish Immersion. 2 Units.

Wouldn't it be great if you could quickly increase your Spanish proficiency through an intensive immersion experience right here at Stanford? Wouldn't you love to gain the cultural and historical knowledge necessary to begin taking film, literature, and culture courses generally reserved for advanced students? This intensive Spanish immersion course is designed to help students who have completed a year of Spanish to move forward quickly toward greater linguistic and cultural competence. After a year of Spanish, students tend to be able to handle straightforward interactions related to basic needs and personal information, but they generally lack the ability to handle more abstract discussions or to combine short utterances into longer presentations of their ideas. Most students likewise have little knowledge of the rich and complex history that surrounds the Spanish language or the central role that Spanish has played in the cultural, artistic, and political life of California. In this course, a team of experienced instructors will help students improve their Spanish through intensive lessons that incorporate film, literature, and social issues. Through a focused discussion of the themes of immigration and democracy in Latin America, Spain, and the United States, as well as excursions and guest lectures by Stanford faculty and community leaders, this course will immerse students in Spanish and help them to gain advanced proficiency much more quickly. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

ILAC 103N. The Millennium Novel in Latin America. 3 Units.

Between 2000 and 2012, a young Spanish American novel emerges, taking at times a minimalist point of view to narrate individual stories with a subjective tone, or continuing a tradition of the historical panorama to present national tragedies that occurred in the last two or three decades. Focus is on this new type of novel from different countries, with such titles as "El cuerpo en que nací" by Guadalupe Entel; "Las teorías" by Pola Oloixarac; "El ruido de las cosas al caer" by Juan Gabriel Vazquez; and "Bonsai" by Alejandro Zambra, among others. Taught in Spanish.

ILAC 107N. 3D Modeling, Virtual Media, and the Poetics of the Self: The Art and Lives of Fernando Pessoa. 3-5 Units.

Preference to freshmen. The poetry and prose of Fernando Pessoa, Portugal's greatest modern poet. As famous for his written work (in Portuguese and English) as for his complex understanding of selfhood (he would divide his own subjectivity into 106 different, autonomous selves), Pessoa remains a towering and largely perplexing figure even today. Class discussions will focus on close readings of Pessoa's work along with the implications of his theory of subjectivity for our understanding of modernity, art, and the self. Class field trip to San Francisco. Written assignments include a journal, blog posts, and a final paper written as someone else. Taught in English.

ILAC 108N. Masterpieces: García Márquez. 3-5 Units.

Extensive and detailed reading of the major works and a selection of the most significant critical texts about the author. Secondary readings by Vargas Llosa, Ludmer, Moretti, and Bloom. Topics include: *macondismo*, magical realism, canonicity, representations of violence, and autobiography.

ILAC 110. Spanish Society in the 21st Century Through Film. 3-5 Units.

Open to undergraduates with an interest in 21st Century Film and the social reality of Spain nowadays. Explores how Spain has evolved from being one of the most undeveloped European countries to become a first mover in social issues such as gay marriage or women's public role. Topics include racism, migration, the reconstruction of the past and the vision of the other. Themes are analyzed through movies directed by Spanish and American filmmakers such as: Cesc Gay, Bollaín, Bigas-Luna, Gonzálezález-Intillde; and Woody Allen. Class taught in Spanish, readings both in Spanish and English.

ILAC 111Q. Spanish-English Literary Translation Workshop. 3 Units.

This course introduces students to the theoretical knowledge and practical skills necessary to translate literary texts from Spanish to English and English to Spanish. Topics may include comparative syntaxes, morphologies, and semantic systems; register and tone; audience; the role of translation in the development of languages and cultures; and the ideological and socio-cultural forces that shape translations. Students will workshop and revise an original translation project throughout the quarter. Same as: DLCL 111Q

ILAC 114N. Introduction to Lyric Poetry. 3-5 Units.

A basic introduction to the elements of lyric poetry--image, metaphor, symbol, connotation, denotation, irony, rhyme and meter - drawing upon a selection of poems from major poets of the Hispanic World, including, G. A. Beacutecquer, Rosalíacutede Castro, Rubenacutecortázar, Miguel de Unamuno, Antonio Machado, Juan Ramoacutemoreno, Jimeacutenez, García Lorca, Pablo Neruda, and Gabriela Mistral. This is a bilingual course, taught both in English, and Spanish, with an emphasis on Spanish.

ILAC 116. Approaches to Spanish and Spanish American Literature. 3-5 Units.

Short stories, poetry, and theater. What analytical tools do the "grammars" of different genres call for? What contact zones exist between these genres? How have ideologies, the power of patronage, and shifting poetics shaped their production over time? Authors may include Arrabal, Borges, Cortaacutezar, Cernuda, Garcíaacutea Maacutequez, Lorca, Neruda, Rivas. Taught in Spanish. Prerequisite: SpanLang 13C.

ILAC 120. Advanced Critical Reading in Spanish. 3-5 Units.

Research and writing in the humanities; focus is on culture, literature, and society of the Spanish-speaking world. Students will learn how to conduct research online and in the library while developing archive skills. Emphasis is on skill-building while exploring topics of interest to each student from various historical periods and global locations. Taught in Spanish. Prerequisite: SPANLANG 13 or equivalent. Meets Writing-in-the-Major requirement.

ILAC 122. Literature and Politics - Two Mediterranean Cases: Catalonia and Italy. 3-5 Units.

A comparison between the different roles played by writers as members of the intellectual establishment in Catalonia, Spain and Italy. Focus on the relation between intellectuals and politics in shaping national identity. We will give especially consideration to the role played by intellectuals during the Fascist and Francoist dictatorships and during Spain's transition to democracy. Taught in English. Same as: ITALIAN 136

ILAC 130. Introduction to Iberia: Cultural Perspectives. 3-5 Units.

The purpose of this course is to study major figures and historical trends in modern Iberia against the background of the linguistic plurality and social and cultural complexity of the Iberian world. We will study the fundamental issues of empire, the Napoleonic occupation of Spain, Latin American independence, recurring civil wars, federal republicanism, and the historic nationalisms (Galician, Basque, and Catalan), all leading up to the Spanish Civil War (1936-1939), which is a defining moment in modern Spanish and European history, with ongoing consequences still felt and debated painfully today in contemporary Spain. This course is designed to help prepare students for their participation in the Stanford overseas study programs in Barcelona and Madrid. Taught in Spanish.

ILAC 131. Introduction to Latin America: Cultural Perspectives. 3-5 Units.

Part of the Gateways to the World program, this is an introductory course for all things Latin American: culture, history, literature, and current events. By combining lecture and seminar formats, the class prepares you for all subsequent research on, and learning about, the region. Comparative discussion of independence movements in Mexico, Central America, the Caribbean, the Andean Region, Brazil, and the Southern Cone. Other topics vary yearly, including: representations of ethnicity and class, the Cold War, popular culture, as well as major thinkers and writers. Open to all. Recommended for students who want to study abroad in Santiago, Chile. Required for majors in Spanish or Iberian and Latin American Cultures (ILAC). In Spanish.

ILAC 133N. The Animal Within: Animal Presence in Latin American Narrative. 3 Units.

How does the criterion for the division between the human and the animal take part on contemporary Latin American narrative? To what extent is this divide challenged or contested? The course combines a discussion of the literary works of authors like Jorge Luis Borges, Horacio Quiroga, Julio Cortázar, Mario Bellatin, Clarice Lispector, and José María Arguedas with a reflection on the animal and animality in the writings of Bataille, Derrida and Deleuze. Taught in English.

ILAC 134. In the First Person: Representation of the Self in Modern Latin America. 3-5 Units.

This course examines different expressions of self-portrayal in Latin America from 1920s to the present. The course explores different models of self-shaping and forms of expression that draw contours on self and identity in Latin America. After a brief consideration of the Inca Garcilaso, Sor Juana, J.F. Sarmiento, we examine the works of José Vasconcelos, Norah Lange, Victoria Ocampo, Frida Kahlo, José María Arguedas, Rosario Castellanos, Mario Bellatin, Tununa Mercado, Marcela Trujillo, Fernando Vallejo, among others. Taught in Spanish; Spanish proficiency required.

ILAC 135. From Book to Screen: Brazilian Novels and Their Film Adaptations. 3-5 Units.

Can the study of cinematographic adaptation of novels help us understand better the specific nature of literature and that of film? Addressing this central question, the course combines an introduction to Brazilian narrative (Euclides Da Cunha, Mário de Andrade, João Guimarães Rosa, Graciliano Ramos, Rubem Fonseca, Clarice Lispector) and a panorama of Brazilian cinematography (from Cinema Novo to contemporary productions). The course offers a space for reflection on the multifaceted relationship between the literary and the cinematographic. Taught in English.

ILAC 136. Modern Iberian Literatures. 3-5 Units.

1800 to the mid 20th century. Topics include: romanticism; realism and its variants; the turn of the century; modernism and the avant garde; the Civil War; and the first half of the 20th century. Authors may include Mariano José de Larra, Gustavo Adolfo Becquer, Rosalía de Castro, Benito Pérez Galdós, Jacint Verdaguer, Eça de Queiroz, Miguel de Unamuno, Ramón del Valle-Inclán, Antonio Machado, and Federico García Lorca. Taught in Spanish. Prerequisites: SPANLANG 13 or equivalent.

ILAC 137. Latin American Heroes and Heroines. 3-5 Units.

This course will focus on artists, writers, and political leaders in Latin America whose work would change Latin American history. The historical significance of some of these individuals is polemical, but their influence in Latin American culture is nevertheless of great importance. The heroes and heroines to be studied include: Eva Perón, Frida Kahlo, Ernesto Guevara, Anthony Quinn, Evo Morales, Michelle Bachelet, Fidel Castro, José Mujica, Carlos Fuentes, German Valdes Tin Tan, Mario Moreno Cantinflas, Gabriel García Lorca, Marshall.

ILAC 138. From National Angst to Incipient Modernity: Spanish Literature After Empire. 3-5 Units.

This course focuses on the most predominant and influential Spanish writers from 1836 to 1936, exploring the emergence of a new political and social conscience in Spain and its transition from global empire to a nation that questions the ideas behind its world decline and eventual Civil War. The writers chosen portray a nation trying to find a new political order after the failure of various forms of government. Readings include the nonfiction and narrative of Larra, Espronceda, Galdós, and subsequently analyzing the innovative thinking and actions of Generation of 1898 philosopher Unamuno and the poets Machado and García Lorca. Taught in Spanish.

ILAC 140. Migration in 21st Century Latin American Film. 3-5 Units.

Focus on how images and narratives of migration are depicted in recent Latin American film. It compares migration as it takes place within Latin America to migration from Latin America to Europe and to the U.S. We will analyze these films, and their making, in the global context of an evergrowing tension between "inside" and "outside"; we consider how these films represent or explore precariousness and exclusion; visibility and invisibility; racial and gender dynamics; national and social boundaries; new subjectivities and cultural practices. Films include: *El nintilde;opez*, *Bolivia*, *Ulises*, *Faustino*, *Mayta visita a su prima*, *Copacabana*, *Chico y Rita*, *Sin nombre*, *Los que se quedan*, *Amador*, and *En la puta calle*. Films in Spanish, with English subtitles. Discussions and assignments in Spanish. Same as: CHILATST 140

ILAC 145. Poets, Journalists and Collectors: Latin American Modernismo. 3-5 Units.

Discusses the different artistic avatars exercised by Latin American modernistas at the turn of the 19th Century in the context of growing capitalism, technological innovation and social transformation. We focus on how modernistas as poets, journalists and collectors explored and transgressed the limits of the individual and his/her situation. We consider topics like cosmopolitanism, dandysm, autonomy of art, and the aesthetic cultivation of the self. Authors include: Delmira Agustini, Rubén Darío, Julia de Casal, Leopoldo Lugones, José Martí, Manuel Gutiérrez Nájera, Enrique Rodó, José Asunción Silva, and Abraham Valdelomar. Spanish proficiency required.

ILAC 157. Medieval and Early Modern Iberian Literatures. 3-5 Units.

Survey of Iberian literature from the medieval and early modern periods. When covering texts in languages other than Spanish, translations into English or Spanish will be made available. Taught in Spanish; prerequisite: SPANLANG 13 or equivalent.

ILAC 161. Modern Latin American Literature. 3-5 Units.

From independence to the present. Topics include romantic allegories of the nation; modernism and postmodernism; avant-garde poetry; regionalism versus cosmopolitanism; indigenous and indigenist literature; magical realism and the literature of the boom; Afro-Hispanic literature; and testimonial narrative. Authors may include: Boliacutivar, Bello, Goacutemez de Avellaneda, Isaacs, Sarmiento, Machado de Assis, Darío, Martíacuteshy, Agustini, Vallejo, Huidobro, Borges, Cortácutezar, Neruda, Guillón, Rulfo, Ramos, Garcíacuteshy; a Marquez, Lispector, and Bolantilde; o. Taught in Spanish.

ILAC 175. Daydreaming in Portugal and Brazil. 3-5 Units.

This course explores the role of the imagination in 19th and 20th century Portuguese and Brazilian literature. We will read 4-5 novels, short stories and articles analyzing how and why authors recreate imaginary processes in their characters, and what these processes reveal about the socio-cultural contexts of their period. Authors include Raul Brandão, Machado de Assis, Antonio Lobo Antunes, Raduan Nassar, and Ivano Cardoso Gomes, with complementary short pieces by Fernando Pessoa, Saramago, Mario de Andrade, Guimarães Rosa, and Clarice Lispector. Readings available in English and Portuguese. In English.

ILAC 193. The Cinema of Pedro Almodovar. 3-5 Units.

Pedro Almodovar is one of the most recognizable auteur directors in the world today. His films express a hybrid and eclectic visual style and the blurring of frontiers between mass and high culture. Special attention is paid to questions of sexuality and the centering of usually marginalized characters. This course studies Pedro Almodovar's development from his directorial debut to the present, from the "shocking" value of the early films to the award-winning mastery of the later ones. Prerequisite: ability to understand spoken Spanish. Readings in English. Midterm and final paper can be in English. Majors should write in Spanish.

Same as: ILAC 393

ILAC 193Q. Spaces and Voices of Brazil through Film. 3-4 Units.

The manners in which a country is perceived and defines itself is a result of many complex forces, and involves the reproduction of social relations and complex social constructions both on the part of those who live there and those who see it from a distance. The perceptions of what Brazil is and what defines the country has changed throughout times, but has conserved some clear pervasive defining traits. This course is an introduction to the history, culture, politics and artistic production of Brazil as seen through feature films, documentaries and some complementary readings. Movies include, among others, *Banana is my Business*, *Black Orpheus*, *Olga*, *They Don't Use Black-Tie*, *City of God*, *Central Station*, *Gaijin*, and *Four Days in September*—among others. In English.

Same as: PORTLANG 193Q

ILAC 199. Individual Work. 1-12 Unit.

Open only to students in the department, or by consent of instructor.

ILAC 207E. RENAISSANCE PASTORALISMS. 3-5 Units.

Major works of Iberian pastoral lyric poetry and narrative fiction. What made this classical mode so popular during the Renaissance and beyond? What are its essential characteristics? What does it tell us about early modern theories of humanity's relation to nature? Was it merely a form of erotic escapism or is something darker and more troubling lurking between its lines? What can it teach us today about nature, eros, ethics, death, and love? Authors include: Theocritus; Virgil; Sannazaro; Garcilaso de la Vega; Montemayor; Ribeiro; Camotilde; Cervantes. Readings in English, Portuguese, and Spanish. Discussion in English.

ILAC 210. Queer Almodovar. 3-5 Units.

Focus on the representation of non-normative sexualities and genders in films by Pedro Almodovar, one of the most recognizable auteur directors in Europe today. Analysis of his hybrid and eclectic visual style complemented by critical and theoretical readings in queer studies. Taught in English.

Same as: FEMST 210

ILAC 216. Comparative Cities: Travel Literature as Urban Experience in Catalan Culture. 3-5 Units.

Comparative reflection on travel literature, focused on some major Western cities, taking as a starting point the reflections on travel by some of the most prominent Catalan writers in the 20th century. Catalan travel literature, whether autobiographical or in essay form, is often related to literary journalism and exile. The foremost Catalan authors take notice of cities like Paris, Berlin, Madrid, Venice, Buenos Aires and New York, at historically decisive times: the two World Wars, the rise of fascism in Italy, Spain and Germany, the Cold War, the emergence of the United States as a world power. In this sense, travel writers offer a double comparative vantage point: on the one hand, between their own literature and that of other European travel writers; on the other hand, between Barcelona and some of the greatest cities in the world. These contrasts, perceived through the literary lens, help us understand the cosmopolitanism and modernity of Catalan culture. Taught in Spanish; all readings available both in Catalan and Spanish, some readings also available in English.

ILAC 218. Anticlericalism in the Iberian Novel of the 19th Century. 3-5 Units.

The rapid social and cultural changes in which 19th-century novelists wrote; the anti-clerical stance as marker of society's attempts to modernize. Why were monks and priests reviled by many Spanish novelists? How and why did they re-write Spanish history around these figures? What was the role of the church and religious men in modern society? Questions of individualism, property, and labor in novels by major Iberian prose realists. In Spanish.

ILAC 223. The Generation of 1898 and Beyond. 3-5 Units.

Preference for graduate students, majors are welcome. Course will focus on six major authors (Unamuno, Baroja, A. Machado, J. R. Jimenez, Valle-Inclan, Garcia Lorca) and representative works, written between 1898 and 1930, dealing with an historical period of crisis and transition, and displaying major aesthetic innovations in both poetry and theater. Fundamental themes include the decline of feudal Galicia, the Spanish-American War of 1898, the emergence and social activism of new social forces, and the struggle for and betrayal of democracy, expressed through the various genres of the novel, poetry, and theater. Major works of Antonio Machado, Juan Ramo Jimenez, and Federico Garcia Lorca will be examined, with special emphasis on the historical context of the first three decades of the 20th century and their contributions to the development of 20th century Spanish lyric poetry. Taught in either English or Spanish, depending on course enrollment.

ILAC 224. Literature Inspired by the Spanish Republic and the Spanish Civil War. 3-5 Units.

This course will deal with the significance of the Spanish Civil War in Iberian, European, and world history, through the literary works (poetry, theater, and novel) of major Spanish and Latin American writers. The war is anticipated in the poetry of Antonio Machado and in the theater of Garcia Lorca, dealt with directly in the poetry of Alberti and Hernandez, of Neruda (Chile), Vallejo (Peru), and N. Guillen (Cuba), and treated in the aftermath during the Franco dictatorship in the novels of Cela and Sender. Taught in English.

ILAC 235. Critique of Technology. 3-5 Units.

Informed citizens living in today's world, and especially in Silicon Valley, should be able to formulate their own, articulate positions about the role of technology in culture. The course gives students the tools to do so. Against the trend towards the thoughtless celebration of all things technological, we will engage in critique in the two senses of the term: as careful study of the cultural implications of technology and as balanced, argumentative criticism. Can technology make life more meaningful, society more fair, people smarter, and the world smaller? Selections by fiction writers, philosophers and thinkers (such as Heidegger and Beller), as well as recent popular works of social commentary, such as *You are not a Gadget*, *The Shallows*, *24/7*, and *Present Shock*.

ILAC 239. Borges and Translation. 3-5 Units.

Borges's creative process and practice as seen through the lens of translation. How do Borges's texts articulate the relationships between reading, writing, and translation? Topics include authorship, fidelity, irreverence, and innovation. Readings will draw on Borges's short stories, translations, and essays. Taught in Spanish. Prerequisite: 100-level course in Spanish or permission of instructor.

ILAC 240E. Borges and Philosophy. 3-5 Units.

Analysis of the Argentine author's literary renditions of philosophical ideas. Topics may include: time, free will, infinitude, authorship and self, nominalism vs. realism, empiricism vs. idealism, skepticism, peripheral modernities, postmodernism, and Eastern thought. Close reading of short stories, poems, and essays from *Labyrinths* paired with selections by authors such as Augustine, Berkeley, James, and Lao Tzu. The course will be conducted in English; Spanish originals will be available. Satisfies the capstone seminar requirement for the major in Philosophy and Literature.

ILAC 241. Fiction Workshop in Spanish. 3-5 Units.

Spanish and Spanish American short stories approached through narrative theory and craft. Assignments are creative in nature and focus on the formal elements of fiction (e.g. character and plot development, point of view, creating a scene, etc.). Students will write, workshop, and revise an original short story throughout the term. No previous experience with creative writing is required. Readings may include works by Ayala, Bolantilde;o, Borges, Clariacute;n, Cortaacute;zar, Garciacute;a Maacute;rquez, Piglia, Rodoreda, and others. Enrollment limited.

ILAC 242. Poetry Workshop in Spanish. 3-5 Units.

Latin American and Spanish poetry approached through elements of craft. Assignments are creative in nature and focus on lyric subgenres (e.g. ode, elegy, prose poetry) and formal elements of poetry (e.g. meter, rhythm, rhetorical figures, and tropes). Students write original poems over the course of the quarter. No previous experience with creative writing is required. Authors include Darishy;o, Machado, Jimenez, Vallejo, Huidobro, Salinas, Pales Matos, Lorca, Alexandre, Cernuda, Neruda, Girondo. Course is offered every other year. Taught in Spanish. Prerequisite: 100-level course taught in Spanish, or equivalent. Enrollment limited to 10 students.

ILAC 243. The Millenium Novel in Latin America. 3-5 Units.

Between 2000 and 2012, a young Spanish American novel emerges, taking at times a minimalist point of view to narrate individual stories with a subjective tone, or continuing a tradition of the historical panorama to present national tragedies that occurred in the last two or three decades. Focus is on this new type of novel from different countries, with such titles as "El cuerpo en que naciacute;" by Guadalupe Entel; "Las teoriacute;as salvajes" by Pola Oloixarac; "El ruido de las cosas al caer" by Juan Gabriel Vazquez; and "Bonsai" by Alejandro Zambra, among others.

ILAC 245. Brazil's Rhythm and Songs. 3-5 Units.

Audiovisual introduction to Brazilian popular music. Chorinho, Samba, Frevo, Forro, Bossa Nova, Tropicalia, Pagode, Repente, Hip-Hop, Axe. Candomble and Capoeira rhythms. Amerindian Songs. Dances and Rituals: Bumba meu Boi, Congada, Caterete, Carnaval. Drama Performances and Musical Films. Final visual-sonorous exhibition created by students. In English. Special sections for Portuguese learners.

ILAC 248. Distant Borders: Hispanic Migrations. 3-5 Units.

During the last half a century, different people from Africa, Eastern Europe, have been moving from one area to another, looking for a better habitat. This has been a world wide phenomenon that has changed hundreds of thousands of lives, producing imperfect utopias. This course will focus on the assimilation of families and individuals to different cultures, as well as how the new country deals with this, many time rejecting the "other". Cinema and literature have been a great source to understand the drama of migration, and the course will use extensively these forms of artistic representation. Authors include Aacute;ngel Vaacute;quez, Jorge Sempruacute;n, Mahi Binebine, Ariel Dorfman, Alberto Fuguet, Zoeacute; Valdeacute;s, and Julia Aacute;lvarez.

ILAC 251. Latin American Literary Theory. 3-5 Units.

Latin American literary theory through the works of Joseacute; Carlos Mariaacute;tegui, Joseacute; Enrique Rodoacute;, Alfonso Reyes, Antonio Candido, Roberto Schwartz, Angel Rama, Roberto Fernaacute;ndez Retamar, Antonio Cornejo Polar, Josefina Ludmer, Flora Sussekind. This course will focus on the concepts of "the lettered city", "hybridization", "psychoanalysis", "marxist theory", "class struggle", "literary politics", "latinamericanism". In sum: Literary theory from the inside of Latin American culture, considering also its Western influences. Taught in Spanish.

ILAC 252. Guerillas. 3-5 Units.

The modern strategic response to state dictatorships in Latin America has its origins in Ernesto Che Guevara's "Guerra de guerrillas". This course will focus on how those irregular military groups were formed in Chile, Mexico, Argentina, and Uruguay during the 20th Century. We will give particular attention to the "invisible" guerrillas" (the women) in revolutionary moments. That view will be enhanced by films and literature on this subject. Authors include Palau, Ignacio Taibo II, Tort, Gibler, Guevara, Gilio, Caula, and Cavallo.

ILAC 253. Poverty, Redemption and Writing: Franciscanism in Latin America. 3-5 Units.

How are theories of poverty reflected in literary writing? What is the relationship between writing and redemption? Addressing these central questions, the course examines the heritage of Catholic thought and aesthetics in prominent colonial and post-colonial Latin America through the figure of Francis of Assisi. Franciscan writing allows us to explore the notions of subjectivity, solidarity, exception, animality, and capital. In Spanish.

ILAC 254. Surrealism in Latin America and Spain. 3-5 Units.

This course focuses on the legacy of Surrealism in the Hispanic transatlantic traditions, both in literature and the visual arts (film and paintings). We will study and analyze two aesthetic paths: on one hand, the embracing of Surrealism to enrich one's own poetics; on the other, that of other groups and authors' orthodox approach to the principles established by Andreacute; Breton and his cohort in the aesthetic adventure. The course will study and assess Surrealism's lasting echoes in recent literary manifestations (among them Roberto Bolantilde;o's works). Taught in Spanish.

Same as: Poetry and Fiction

ILAC 257. Dictatorships in Latin America through testimonies and film. 3-5 Units.

Focus on Pinochet coup, the Falkland Islands, the prison Libertad in Uruguay, the "Plan Condor." How literature, journalism and cinema denounced and revisited the worst political times in Latin America. Taught in Spanish.

Same as: Argentina, Chile, Uruguay in the 70s

ILAC 261. Voices in Brazilian Fiction. 3-5 Units.

Brazilian Literary canon. Novels and short stories from independence to the present. Topics include romanticism and realism; regionalism; modernism and postmodernism. Authors may include: Joseacute; de Alencar, Machado de Assis, Oswald de Andrade, Graciliano Ramos, Guimaratilde;es Rosa, Lispector, Hilda Hilst, Silviano Santiago. Readings in Portuguese; Class discussions in English; Assignments in Portuguese or in English.

ILAC 263. Visions of the Andes. 3-5 Units.

What visions of the Andes circulate in Latin American literature, photography and painting? How are they constructed? How is their value accrued? The course focuses on visual and written images of Andean landscapes. Beginning with 19th century technical photography, the course explores the visual economy of the Andes in representative texts and images from Peru, Bolivia and Chile, vis-a-vis critical discourses about Andean culture. In Spanish.

Same as: ILAC 363

ILAC 276. Aesthetics, Revolutionaries and Terrorists. 3-5 Units.

Who is a terrorist and who is a revolutionary? With surge of Anarchism in the XXth Century, the "culture of fear" has been one of the axes of political activism. This course will explore the difference between the desire to correct injustice in society (Revolution) and the desire to destroy society (Terrorism) using literary texts and films. Readings will include novels and testimonies of the protagonists in various social struggles, as well as journalistic and academic papers about these social movements.

Same as: ILAC 376

ILAC 277. Spanish and Society: Rock en Español. 3-5 Units.

Can music be a medium to study how a society communicates? This course wants to answer this question by paying attention to how has Spanish changed and adapted in recent history. Taking rock and pop as a global musical phenomenon, the focus of the course will be the most prominent bands and songs in Spanish language. Emphasis is on the analysis of the use of Spanish in real-world contexts. In Spanish.

ILAC 278. Senior Seminar: Monsters of Modern Spanish Empire. 3-5 Units.

Focus is on debates over the morality of empire and slavery in literary works from modern Spain and Cuba. Taught in Spanish.

ILAC 278A. Senior Seminar: Pau-Brazil from Modernism to Concretism. 3-5 Units.

From the historical Linguas people in Colonial Portuguese America to the Modern Galactic vision of Haroldo de Campos and his theory of translation as transcreation. A Cultural and Literary immersion in Brazilian history, in Luso-Afro-European-Amerindian plurilingualism and ethnic diversity. Authors include Pero Vaz de Caminha, Jean de Lery, Antonio Vieira, Oswald de Andrade, Mario de Andrade, Tarsila do Amaral, Augusto de Campos, Haroldo de Campos, Decio Pignatari, Helio Oiticica, Eduardo Viveiros de Castro, Andre Vallias, and Josely Vianna Baptista. Taught in Spanish.

ILAC 280. Latin@ Literature. 3-5 Units.

Examines a diverse set of narratives by U.S. Latin@s of Mexican, Puerto Rican, Cuban, Guatemalan, and Dominican heritage through the lens of latinidad. All share the historical experience of Spanish colonization and U.S. imperialism, yet their immigration patterns differ, affecting social, cultural, and political trajectories in the US and relationships to "home" and "homeland," nation, diaspora, history, and memory. Explores how racialization informs genders as well as sexualities. Emphasis on textual analysis. Taught in English.

Same as: CHILATST 200, CSRE 200, ILAC 382

ILAC 281. Fernando Pessoa's Five forms of Anxiety. 3-5 Units.

Ethics, politics, and philosophy in the poetry of Fernando Pessoa. A close analysis of five forms of anxiety that pervade Pessoa's poetry: 1) that you are a person; 2) that you are one person; 3) that you are yourself; 4) that your life can be wasted; and 5) that others may fail to understand you. How do these forms of anxiety shape Pessoa's style(s), his system of heteronyms, his interest in certain literary forms (such as esoteric and prophetic literature), and his perception of the Portuguese cultural and geohistorical context? Readings available in English and Portuguese. Taught in English.

ILAC 287. Queer Raza. 3-5 Units.

Examination of cultural representations by U.S. Latin@s that explore the following questions: How is the mutual constitution of race/sex/class/gender theorized and represented? How is desire racialized? How is racial difference produced through sex acts and what is the function of sex in racial (self)formation? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and other structures of power? How do these texts reinforce or contest stereotypes and the "ideal" bodies of national identity? How do these texts produce queerness as a web of social relations?.

Same as: CHILATST 120, FEMGEN 120

ILAC 299. Individual Work. 1-12 Unit.

Open to department advanced undergraduates or graduate students by consent of professor. May be repeated for credit.

ILAC 305. Rhythm: Ethics and Poetics of the Premodern. 3-5 Units.

Focus is on the notion of rhythm as a theoretical frame for the analysis of medieval and early modern Iberian poetry. Topics include Ancient Greek and modern conceptions of rhythm and the links between poetics and ethics in the medieval period and beyond. Authors include: Aeschylus, Plato, Aristoxenus, Maurice Blanchot, Paul Celan, Emmanuel Levinas, Arcipreste de Hita, Ausiarius March, Garcilaso de la Vega, and Lucretius. Taught in English.

ILAC 309. First Year Writing Workshop. 1 Unit.

This course enables students to develop the writing skills necessary in their academic careers. Course topics include writing in the discipline, critiques, and literature reviews.

ILAC 316. Realism and Surrealism in the Cinema of Luis Bunuel. 3-5 Units.

Surrealism, realism, dark comedy, film genres transformed by Spanish director, Luis Bunuel in Spain, France and Mexico during the second half of the XX century. An examination of Bunuel's work from his Surrealist beginnings (*Age of Or*, *Un Chien Andalou*), subsequent realistic films in Mexico (*Los Olvidados*, *Nazarin*), and a mixture of Surrealism and Realism (*Viridiana*, *Exterminating Angel*, *Simon del Desierto*), as well his work with dark comedy (*Archibaldo de la Cruz*, *Belle de Jour*, *Le charme discret de la bourgeoisie*). In Spanish.

ILAC 329. Luis de Camoes - Epic. 3-5 Units.

Focus is on Camoes's epic masterpiece, *Os Lusíadas*. Topics include empire, intertextuality, Indian Ocean Studies, history, prophecy, and poetics. Readings in English and Portuguese.

ILAC 332. Race and Slavery in Nineteenth Century Spain. 3-5 Units.

An analysis of the literature written in Spain during the nineteenth and twentieth centuries dealing with the empire post 1808. Authors discussed include Blanco White, Baroja, Avellaneda, and Rusintilde, among others.

ILAC 333. Spain and the Transatlantic. 3-5 Units.

Course will address a variety of literary works from the 19th century to today, current debates on transatlantic studies, review of recent scholarship, and history. Taught in Spanish.

ILAC 335. Materialism and Literature. 3-5 Units.

Exploration of vibrant materialism (Bennet, Latour) and historical materialism (critical theory) as a basis to approach Latin American commodity novels, i.e., those that revolve around bananas, coffee, etc. Literary works by J.E. Rivera, Garcia Maacureque, Asturias, Neruda, Magnus, and others. Taught in Spanish.

Same as: COMPLIT 335A

ILAC 336. Early 20th Century Iberian Poetry. 3-5 Units.

This course will study the development of the dominant trends of early Iberian 20th-century lyric poetry, against the background of Restoration Spain (1875-1930), and the forces of resistance and opposition to its oligarchical and archaic social and political structure. We will concentrate on the major works of the three most important poets: Antonio Machado, Juan Ramoacutenez, and Federico Garciaacutela Lorca. Symbolist-modernist poetry, the creation of symbolic systems, and the brief appearance of surrealism all define key aspects of this avant-garde during the first three decades. Special attention will be given to close stylistic analysis and to the historical and social conditions out of which arose the progressive intellectual and educational movement that gave rise to this renaissance of brilliant lyric poetry. Taught in either English or Spanish depending on class enrollment.

ILAC 341. Roberto Bolaño. 3-5 Units.

The most universally acclaimed Latin American writer since the Boom, Roberto Bolaño has recently joined transnational literary canons. But what does that tell us about the phenomenon of World Literature itself? The class will provide an overview of Bolaño's vast oeuvre by considering *Novelas*, selected short stories, and sections of the long novels *The Savage Detectives* and *2666*. The focus will be on exploring the multifarious relationship of Bolaño and the world. Up-to-date critical bibliography includes readings by Sarah Pollack, Gareth Williams, Sergio Villalobos, and others. Taught in Spanish.

ILAC 345. Biopolitics and Sovereignty in Andean Culture, 1920-1940. 3-5 Units.

What is productive life? How is life aesthetically and politically valued? This course explores the inscription of life in changing political and aesthetic regimes of the Andean South in the turbulent decades of the 1920s-1940s. Based on theories of biopower and sovereignty, we explore topics such as domination, domestication, appropriation, exclusion, facism, solidarity, tellurism, race, mestizaje, and human/nature relations. We will consider poetry, narrative, journals, and the visual arts. Authors include: Gabriela Mistral, Pablo Neruda, Pablo de Rokha, Alcides Arguedas, Augusto Ceacut;spedes, Franz Tamayo, Leopoldo Marechal, Roberto Arlt, Jorge Luis Borges, Ceacut;sar Vallejo, Joseacut; Carlos Mariaacut;tegui, Ciro Alegriacut;a, and Joseacut; Mariacut;a Arguedas. Spanish proficiency required.

ILAC 363. Visions of the Andes. 3-5 Units.

What visions of the Andes circulate in Latin American literature, photography and painting? How are they constructed? How is their value accrued? The course focuses on visual and written images of Andean landscapes. Beginning with 19th century technical photography, the course explores the visual economy of the Andes in representative texts and images from Peru, Bolivia and Chile, vis-a-vis critical discourses about Andean culture. In Spanish.
Same as: ILAC 263

ILAC 367. João/Joyce: Guimarães Rosa and the World Novel. 3-5 Units.

A comparative analysis of Joatilde;o Guimaratilde;es Rosa's (1908-1967) work, with special attention to the novel Grande Sertao-Veredas, translated by a Stanford professor, launched by A. Knopf in 1963. Rosa's fiction disturbs gender, racial, and literary divisions by the creation of a Babelic Brazilian Portuguese language from the sertao. Students increase their literary vocabulary with new terms, nonada and con conversa, and a gallery of Indigenous, Afro-Americans, mestizos, and foreigners' characters. Discussions in English; readings in Portuguese and Spanish.
Same as: COMPLIT 317

ILAC 376. Aesthetics, Revolutionaries and Terrorists. 3-5 Units.

Who is a terrorist and who is a revolutionary? With surge of Anarchism in the XXth Century, the "culture of fear" has been one of the axes of political activism. This course will explore the difference between the desire to correct injustice in society (Revolution) and the desire to destroy society (Terrorism) using literary texts and films. Readings will include novels and testimonies of the protagonists in various social struggles, as well as journalistic and academic papers about these social movements.
Same as: ILAC 276

ILAC 380E. Critical Concepts in Chican@ Literature. 3-5 Units.

Combines primary texts of Chican@ literature with a metacritical interrogation of key concepts informing Chican@ literary criticism, the construction of Chican@ literary history, and a Chican@ literary canon. Interrogates the resistance paradigm and the "proper" subject of this literature, and critiques established genealogies and foundational authors and texts, as well as issues of periodization, including the notion of "emergence" (e.g. of feminist voices or dissident sexualities). Considers texts, authors and subjects that present alternatives to the resistance paradigm.
Same as: CHILATST 201C, CSRE 201C

ILAC 382. Latin@ Literature. 3-5 Units.

Examines a diverse set of narratives by U.S. Latin@s of Mexican, Puerto Rican, Cuban, Guatemalan, and Dominican heritage through the lens of latinidad. All share the historical experience of Spanish colonization and U.S. imperialism, yet their im/migration patterns differ, affecting social, cultural, and political trajectories in the US and relationships to "home" and "homeland," nation, diaspora, history, and memory. Explores how racialization informs genders as well as sexualities. Emphasis on textual analysis. Taught in English.
Same as: CHILATST 200, CSRE 200, ILAC 280

ILAC 389E. Queer of Color Critique: Race, Sex, Gender in Cultural Representations. 3-5 Units.

Examines major questions and issues that arise in considering race, sex, and gender together. Focus on critical and theoretical texts queering ethnic and diaspora studies and bringing race and ethnicity into queer studies. Close reading of texts in a variety of media negotiating racialized sexualities and sexualized identities. How is desire racialized? How is racial difference produced through sex acts? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and structures of power? Same as: CSRE 289E, FEMGEN 389E

ILAC 393. The Cinema of Pedro Almodovar. 3-5 Units.

Pedro Almodovar is one of the most recognizable auteur directors in the world today. His films express a hybrid and eclectic visual style and the blurring of frontiers between mass and high culture. Special attention is paid to questions of sexuality and the centering of usually marginalized characters. This course studies Pedro Almodovar's development from his directorial debut to the present, from the "shocking" value of the early films to the award-winning mastery of the later ones. Prerequisite: ability to understand spoken Spanish. Readings in English. Midterm and final paper can be in English. Majors should write in Spanish.
Same as: ILAC 193

ILAC 399. Individual Work. 1-12 Unit.

For Spanish and Portuguese department graduate students only. Prerequisite: consent of instructor.

ILAC 801. TGR Project. 0 Units.

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ILAC 802. TGR Dissertation. 0 Units.

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Iberian Languages Courses

Immersion in the Arts Courses

ITALIC 91. Immersion in the Arts: Living in Culture. 4 Units.

ITALIC is a new residence-based program built around a series of big questions about the historical, critical and practical purposes of art and its unique capacities for intellectual creativity, communication, and expression. This year-long program fosters close exchanges among faculty, students and guest artists and scholars in class, over meals and during excursions to arts events. We trace the challenges that works of art have presented to categories of knowledge (quest; history, politics, culture, science, medicine, law (quest; by turning reality upside-down or inside-out, or just by altering one's perspective on the world. The arts become a model for engaging with problem-solving: uncertainty and ambiguity confront art makers and viewers all the time; artworks are experiments that work by different sets of rules. Students will begin to understand and use the arts to create new frameworks for exploring our (and others' quest;) experience.

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ITALIC 95W. Immersion in the Arts: Living in Culture, Writing Section. 4 Units.

ITALIC is a new residence-based program built around a series of big questions about the historical, critical and practical purposes of art and its unique capacities for intellectual creativity, communication, and expression. This year-long program fosters close exchanges among faculty, students and guest artists and scholars in class, over meals and during excursions to arts events. We trace the challenges that works of art have presented to categories of knowledge; history, politics, culture, science, medicine, law; by turning reality upside-down or inside-out, or just by altering one's perspective on the world. The arts become a model for engaging with problem-solving; uncertainty and ambiguity confront art makers and viewers all the time; artworks are experiments that work by different sets of rules. Students will begin to understand and use the arts to create new frameworks for exploring our (and others') experience.

Immunology Courses

IMMUNOL 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

IMMUNOL 201. Advanced Immunology I. 3 Units.

For graduate students, medical students and advanced undergraduates. Topics include the innate and adaptive immune systems; genetics, structure, and function of immune molecules; lymphocyte activation and regulation of immune responses. Prerequisites: undergraduate course in Immunology and familiarity with experimental approaches in biochemistry, molecular biology, and cell biology.

Same as: MI 211

IMMUNOL 202. Advanced Immunology II. 3 Units.

Readings of immunological literature. Classic problems and emerging areas based on primary literature. Student and faculty presentations. Prerequisite: IMMUNOL 201/MI 211.

Same as: MCP 202

IMMUNOL 203. Advanced Immunology III. 2 Units.

Key experiments and papers in immunology. Course focuses on the history of Immunology and how current research fits into the historical context. Students work on developing effective presentation skills.

IMMUNOL 204. Innate Immunology. 3 Units.

Innate immune mechanisms as the only defenses used by the majority of multicellular organisms. Topics include Toll signaling, NK cells, complement, antimicrobial peptides, phagocytes, neuroimmunity, community responses to infection, and the role of native flora in immunity. How microbes induce and defeat innate immune reactions, including examples from vertebrates, invertebrates, and plants.

Same as: MI 104, MI 204

IMMUNOL 205. Immunology in Health and Disease. 4 Units.

Concepts and application of adaptive and innate immunology and the role of the immune system in human diseases. Case presentations of diseases including autoimmune diseases, infectious disease and vaccination, hematopoietic and solid organ transplantation, genetic and acquired immunodeficiencies, hypersensitivity reactions, and allergic diseases. Problem sets based on lectures and current clinical literature. Laboratory in acute and chronic inflammation.

IMMUNOL 206. Introduction to Applied Computational Tools in Immunology. 1-2 Unit.

Introduction to the major underpinnings of systems immunology: first principles of development of computational approaches to immunological questions and research; aspects of study design and analysis of data sets; literature and quantifying effects sizes as applied to clinical trial design. Final projects: individual and team reviewed grant proposals (1 unit); individual or team development of grant proposals into projects and journal articles (2 units).

IMMUNOL 206B. Directed Projects in Systems and Computational Immunology. 3-10 Units.

Independent and team grant proposals, developed in Immunol 206A, will continue on as projects and contribute to ongoing research. Number of units assigned dependent upon the difficulty of and time spent on the project. May be repeated for credit.

IMMUNOL 207. Essential Methods in Computational and Systems Immunology. 3 Units.

Introduction to the major underpinnings of systems immunology: first principles of development of computational approaches to immunological questions and research; details of the algorithms and statistical principles underlying commonly used tools; aspects of study design and analysis of data sets. Prerequisites: CS106a and CS161 strongly recommended.

IMMUNOL 209. Translational Immunology. 1 Unit.

(Open to medical students in the Immunology concentration, graduate students, undergraduates by consent of instructor) Journal style format focusing on current basic immunology research and how it is translated into immunotherapies and clinical trials. Topics include hematopoiesis, transplantation, tolerance, immune monitoring, vaccination, autoimmunity and antibodies, rheumatoid arthritis, chronic pulmonary disease, and asthma. May be repeated for credit.

IMMUNOL 210. Immunology Research Seminars for Medical Students. 2 Units.

Required for medical students selecting the Immunology Concentration. Attendance at a minimum of ten seminars related to immunology outside of required medical school classes. A one-page essay on each seminar, what was presented and how it relates to a clinical immunologic problem, is required.

IMMUNOL 215. Principles of Biological Technologies. 3 Units.

The principles underlying novel as well as commonly utilized techniques to answer biological questions. Lectures and primary literature critiques on topics such as fluorescence microscopy, including applications such as FRET and single-cell analysis; human and murine genetic analysis; FACS; proteomics and analysis of noncoding RNAs. Class participation is emphasized. Prerequisite: biochemistry. Required of first-year graduate students in Microbiology and Immunology and the Immunology program. Same as: MI 215

IMMUNOL 231. Medicine for Innovators and Entrepreneurs. 3-4 Units.

Interdisciplinary, project-based course in which bioscience, bioinformatics, biodesign, bioengineering students learn concepts and principles to understand human disease and work together to propose solutions to medical problems. Diabetes mellitus is used as a paradigm for understanding human disease. Guest medical school and outside faculty. Field trips to Stanford clinics and biotechnology companies. Prerequisite: college level biology.

Same as: PEDS 231

IMMUNOL 260. HIV: The Virus, the Disease, the Research. 3-4 Units.

Open to medical students, graduate students in biological sciences, undergraduates with strong biological background. Topics: immunopathogenesis immune deficits, opportunistic infections including TB, and malignancies; genomics viral genetic analyses that have traced the origin of HIV-1 and HIV-2 to primates, dated the spread of infection in humans, and characterized the evolution of the virus within infected individuals; antiretroviral drug development identification of drug targets, structure-based drug design, overcoming drug resistance, pivotal clinical trials, and role of community activism; clinical management solutions in high- and low-income countries; vaccine development learning from past failures and the future of engineering the human immune response. 4 units includes a final project assigned in consultation with the instructor to fit the individual student's background and area of HIV interest. Same as: MED 260

IMMUNOL 275. Tumor Immunology. 3 Units.

Focuses on the ability of innate and adaptive immune responses to recognize and control tumor growth. Topics include: tumor antigens, tumor immunosurveillance and immunoeediting, tumor immunotherapy, cancer vaccines and dendritic cell therapy. Tracks the historical developments of our understanding of modulating tumor immune response and discusses their relative significance in the light of current research findings. Prerequisite: for undergraduates, human biology or biology core. Same as: C BIO 275

IMMUNOL 280. Early Clinical Experience in Immunology. 1-3 Unit.

Clinical observation experience for medical students in the Immunology Scholarly Concentration. At the end of the observation period, which may span over one to two quarters, the student submits a case observation paper to his/her faculty sponsor. Prerequisite: IMMUNOL 205.

IMMUNOL 290. Teaching in Immunology. 1-15 Unit.

Practical experience in teaching by serving as a teaching assistant in an immunology course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student. May be repeated for credit.

IMMUNOL 299. Directed Reading in Immunology. 1-18 Unit.

Prerequisite: consent of instructor.

IMMUNOL 305. Immunology Journal Club. 1 Unit.

Required of first- to fourth-year graduate students. Graduate students present and discuss recent papers in the literature. May be repeated for credit.

IMMUNOL 310. Seminars in Computational and Systems Immunology. 1 Unit.

Presentation of CSI technologies from recent literature. Discussion of emerging application areas and limitations. Dissemination of computational resources.

IMMUNOL 311. Seminar in Immunology. 1 Unit.

Enrollment limited to Ph.D., M.D./Ph.D., and medical students whose scholarly concentrations are in Immunology. Current research topics.

IMMUNOL 311A. Discussions in Immunology. 1 Unit.

Students discuss papers of speakers in 311, and meet with the speakers. Corequisite: 311.

IMMUNOL 315. Special Topics in Immunology. 1 Unit.

Format for 2014-15 is a year long (three quarter) lecture series comprising directed readings and survey study of these topics in human and mouse immunology: cells of the immune system; innate and adaptive immunity; antibodies and antigens; histocompatibility complex; lymphocyte development and the rearrangement and expression of antigen receptor genes; T-cell and B-cell signaling and activation; immunological tolerance; transplantation; diseases caused by immune responses; allergy; congenital and acquired immunodeficiencies. Graduate students outside immunology and Postdoctoral fellows and clinical fellows are welcome.

IMMUNOL 399. Graduate Research. 1-15 Unit.

For Ph.D., M.D./Ph.D. students, and medical students whose scholarly concentrations are in Immunology.

IMMUNOL 801. TGR Project. 0 Units.

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IMMUNOL 802. TGR Dissertation. 0 Units.

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Institute for International Studies Courses

IIS 199. Interschool Honors Program in International Security Studies. 1-5 Unit.

Students from different schools meet in a year-long seminar to discuss, analyze, and conduct research on international security. Combines research methods, policy evaluation, oral presentation, and preparation of an honors thesis by each student. May be repeated for credit.

Interdisciplinary Studies in the Humanities Courses

HUMNTIES 175. BELIEF-UNBEL. 0-60 Units.

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HUMNTIES 324. The Enlightenment. 3-5 Units.

The Enlightenment as a philosophical, literary, and political movement. Themes include the nature and limits of philosophy, the grounds for critical intellectual engagement, the institution of society and the public, and freedom, equality and human progress. Authors include Voltaire, Montesquieu, Rousseau, Hume, Diderot, and Condorcet. Same as: DLCL 324, HISTORY 234, HISTORY 334, HISTORY 432A

International Policy Studies Courses

IPS 201. Managing Global Complexity. 3 Units.

Is international relations theory valuable for policy makers? The first half of the course will provide students with a foundation in theory by introducing the dominant theoretical traditions and insights in international relations. The second half of the course focuses on several complex global problems that cut across policy specializations and impact multiple policy dimensions. Students will assess the value of major theories and concepts in international relations for analyzing and addressing such complex global policy issues.

IPS 202. Topics in International Macroeconomics. 5 Units.

Topics: standard theories of open economy macroeconomics, exchange rate regimes, causes and consequences of current account imbalances, the economics of monetary unification and the European Monetary Union, recent financial and currency crises, the International Monetary Fund and the reform of the international financial architecture. Prerequisites: Econ 52 and Econ 165.

IPS 203. Issues in International Economics. 5 Units.

Topics in international trade and international trade policy: trade, growth and poverty, the World Trade Organization (WTO), regionalism versus multilateralism, the political economy of trade policy, trade and labor, trade and the environment, and trade policies for developing economies. Prerequisite: ECON 51, ECON 166.

IPS 204A. Microeconomics. 4 Units.

Microeconomic concepts relevant to decision making. Topics include: competitive market clearing, price discrimination; general equilibrium; risk aversion and sharing, capital market theory, Nash equilibrium; welfare analysis; public choice; externalities and public goods; hidden information and market signaling; moral hazard and incentives; auction theory; game theory; oligopoly; reputation and credibility. Prerequisites: ECON 50 and MATH 51 or equiv.

Same as: PUBLPOL 301A

IPS 204B. Cost-Benefit Analysis and Evaluation. 4-5 Units.

This class provides the economic and institutional background necessary to use "cost-benefit analysis" or CBA to evaluate public policy. We will examine the economic justification for government intervention and apply these concepts in different policy contexts. We will also examine the theoretical foundations and the practical challenges of implementing CBA. The goal of the course is to provide you with the conceptual foundations and practical skills you will need to be thoughtful consumers or producers of CBA. Prerequisites: ECON 102B or PUBLPOL 303D.

Same as: PUBLPOL 301B

IPS 205. Introductory Statistics for Policy. 5 Units.

Introduction to key elements of probability statistical analysis focusing on international and public policy relevant applications. Topics will include the algebra of events and probability, discrete and continuous random variables, exploratory data analysis and elements of mathematical statistics. The two lectures per week will be structured such that they will involve both theoretical and practical components. Students will be introduced to R statistical programming and LaTeX.

IPS 206. Applied Statistics for Policy. 5 Units.

Introduction to the use of statistical models, as relevant for decision making and data interpretation in policy contexts. Emphasis on regression analysis, as the most frequently used tool in quantitative policy analysis. The purpose of the course is to enable students to become intelligent consumers of regression analysis. Applied experience in both consuming and producing regression analyses, as well as knowledge of the underlying statistical theory.

IPS 207. Governance, Corruption, and Development. 3-5 Units.

The role of governance in the growth and development experience of countries with a focus on the economics of corruption. Topics covered: the concept and measurement of governance; theory and evidence on the impact of corruption on growth and development outcomes, including investment, financial flows, human capital accumulation, poverty and income inequality; the link between governance and financial crises with a focus on the recent global crisis; the cultural, economic, and political determinants of corruption; and policy implications for improving governance. Prerequisite: ECON 50.

IPS 207A. Problem Solving and Decision Making for Public Policy and Social Change. 4-5 Units.

This course introduces skills and bodies of knowledge useful for careers in law, public policy, and achieving social change at scale. These include framing problems; designing, implementing and evaluating strategies; systems design; cost-benefit analysis; decision making under uncertainty; heuristics and biases that affect empirical judgments and decision making; methods for influencing people's behavior ranging from incentives and penalties to "nudges"; and human-centered design. The course will be taught through problems, cases, and a field project to solve real-world problems on or near the Stanford campus, with the goal of integrating strategic thinking and behavioral insights with human-centered design and systems design. Enrollment: Limited to 30 students, with priority given to students in the Law School, the MPP program, and the IPS program, in that order. This course is cross-listed with the Law School (LAW 333) and International Policy Studies (IPS 207A).

Same as: PUBLPOL 305A

IPS 207B. Public Policy and Social Psychology: Implications and Applications. 4 Units.

Theories, insights, and concerns of social psychology relevant to how people perceive issues, events, and each other, and links between beliefs and individual and collective behavior will be discussed with reference to a range of public policy issues including education, public health, income and wealth inequalities, and climate change. Specific topics include: situationist and subjectivist traditions of applied and theoretical social psychology; social comparison, dissonance, and attribution theories; stereotyping and stereotype threat, and sources of intergroup conflict and misunderstanding; challenges to universality assumptions regarding human motivation, emotion, and perception of self and others; also the general problem of producing individual and collective changes in norms and behavior.

Same as: PSYCH 216, PUBLPOL 305B

IPS 208. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

IPS 208A. International Justice. 4-5 Units.

This course will examine the arc of an atrocity. It begins with an introduction to the interdisciplinary scholarship on the causes and enablers of mass violence; genocide, war crimes, terrorism, and state repression. It then considers political and legal responses ranging from humanitarian intervention (within and without the Responsibility to Protect framework), sanctions, commissions of inquiry, and accountability mechanisms, including criminal trials before international and domestic tribunals. The course will also explore the range of transitional justice mechanisms available to policymakers as societies emerge from periods of violence and repression, including truth commissions, lustrations, and amnesties. Coming full circle, the course will evaluate current efforts aimed at atrocity prevention, rather than response, including President Obama's atrocities prevention initiative. Readings address the philosophical underpinnings of justice, questions of institutional design, and the way in which different societies have balanced competing policy imperatives.

IPS 209. Practicum. 1-8 Unit.

Applied policy exercises in various fields. Multidisciplinary student teams apply skills to a contemporary problem in a major international policy exercise with a public sector client such as a government agency. Problem analysis, interaction with the client and experts, and presentations. Emphasis is on effective written and oral communication to lay audiences of recommendations based on policy analysis. May be repeated for credit for a total of 10 units.

IPS 209A. IPS Master's Thesis. 1-10 Unit.

For IPS M.A. students only (by petition). Regular meetings with thesis advisers required.

IPS 210. The Politics of International Humanitarian Action. 3-5 Units.

The relationship between humanitarianism and politics in international responses to civil conflicts and forced displacement. Focus is on policy dilemmas and choices, and the consequences of action or inaction. Case studies include northern Iraq (Kurdistan), Bosnia, Rwanda, Kosovo, and Darfur.

IPS 211. The Transition from War to Peace: Peacebuilding Strategies. 3-5 Units.

How to find sustainable solutions to intractable internal conflicts that lead to peace settlements. How institutions such as the UN, regional organizations, and international financial agencies attempt to support a peace process. Case studies include Bosnia, East Timor, Kosovo, Burundi, Liberia, and Afghanistan.

IPS 213. International Mediation and Civil Wars. 3-5 Units.

This graduate seminar will examine international mediation efforts to achieve negotiated settlements for civil wars over the last two decades. Contending approaches to explain the success or failure of international mediation efforts will be examined in a number of cases from Africa (Sudan, Sierra Leone, Burundi), the Balkans (Bosnia, Macedonia), and Asia (Cambodia, Indonesia/Aceh).

IPS 219. Intelligence and National Security. 3-4 Units.

How intelligence supports U.S. national security and foreign policies. How it has been used by U.S. presidents to become what it is today; organizational strengths and weaknesses; how it is monitored and held accountable to the goals of a democratic society; and successes and failures. Current intelligence analyses and national intelligence estimates are produced in support of simulated policy deliberations.

IPS 224. Economic Growth, Development, and Challenges of East Asia. 3-5 Units.

This course explores economic growth and development in East Asia and the region's current economic policy issues. For the purpose of this course, we will largely focus on China, Japan, and Korea. However, we will incorporate Southeast Asia when relevant. The first part of the course examines economic growth in East Asia and the development strategies pursued. Cross country comparisons will help draw similarities but also differences in the development processes. We will also discuss the validity of an East Asian model for economic growth. The second part of the course focuses on the specific factors relating to economic development, e.g., human capital, firms, infrastructure, institutions, democracy, political leaders, etc. We will also discuss the current challenges and policy issues. Readings will come from books, journal articles, reports, news articles, and case studies. Many of the readings will have an empirical component and students will be able to develop their understanding of how empirical evidence is presented in articles.

IPS 225. Innovation-Based Economic Growth: Silicon Valley and Japan. 4 Units.

Innovation is essential for the growth of a matured economy. An important reason for Japan's economic stagnation over the past two decades was its failure to transform its economic system from one suited for catch-up growth to one that supports innovation-based economic growth. This course examines the institutional factors that support innovation-based economic growth and explores policies that may encourage innovation-based growth in Japan. The course is a part of a bigger policy implementation project that aims to examine the institutional foundations of innovation-based economic growth, to suggest government policies that encourage innovation-based growth in Japan, and to help implement such policies. The central part of the course will be several group research projects conducted by the students. Each student research project evaluates a concrete innovation policy idea. Each student research group is to report the findings to the class and prepare the final paper.

Same as: EASTASN 151, EASTASN 251

IPS 230. Democracy, Development, and the Rule of Law. 5 Units.

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts. Same as: INTNLREL 114D, POLISCI 114D, POLISCI 314D

IPS 231. Russia, the West and the Rest. 4 Units.

Focus on understanding the diversity of political, social, and economic outcomes in Russia since the collapse of the Soviet Union. Exploration of questions, including: Is Russia still a global power? Where does it have influence internationally, how much, and why? Developmentally, what is the relevant comparison set of countries? Is Russia's economic growth over the last decade truly similar to Brazil, China, and India or is it more comparable to Kazakhstan, Nigeria, and Kenya? How has Russia's domestic political trajectory from liberalizing country to increasingly autocratic affected its foreign policy toward Ukraine, Georgia, and other formerly Soviet states? Finally, is Russia's reemergence as an important global actor more apparent than real?.

Same as: REES 231

IPS 233. Civil Society, Protest, and Revolution. 3-5 Units.

Study of the role of civil society in protest movements and revolutions which result in either regime change or regime continuity. The course will examine why some protest movements result in change while others do not, and what happens after the protests die out. The course will examine three periods of revolutionary movements in very recent history: Eastern/Central Europe around 1989, some former Soviet Republics in the early 2000s, as well as the Arab Spring countries. We will also compare and contrast these episodes in terms of the actors, environments and ultimate results.

IPS 236. The Politics of Private Sector Development. 3-5 Units.

This is a case-based course on how to achieve public policy reform with the aim of promoting private sector development in developing countries. It will deal with issues like privatization, reducing informality, infrastructure development, trade promotion, and combatting corruption.

IPS 237. Religion and Politics in Comparative Perspective. 4-5 Units.

Israeli democracy lost the historical moment for the establishment of a constitution. A prominent factor affecting the vulnerability of this democracy has been the unbearable tension between State and Religion. Can religion co-exist with politics in a democracy? The research seminar endeavors to establish the comparative dimension for exploring this fundamental issue, particularly in Israeli democracy. Course will include opportunities for applied, team-based research.

IPS 238. Overcoming Practical Obstacles to Policy Implementation. 3-5 Units.

Many of the obstacles to effective governance lie less in the proper formulation of public policies than in their implementation. Modern government is complex, multilayered, and often highly politicized. This course will focus on problems of implementation based on the practical experiences of policy practitioners. This will be a team-taught course utilizing faculty from across the Freeman Spogli Institute for International Studies (FSI), and will encompass diverse policy areas including national security, foreign policy, crime, health, food safety, and environment.

IPS 241. International Security in a Changing World. 5 Units.

This class surveys the most pressing international security issues facing the world today and includes an award-winning two-day international crisis simulation led by Stanford faculty and former policymakers. Guest lecturers have included former Secretary of Defense William Perry, former U.S. Ambassador to Afghanistan Gen. Karl Eikenberry, and former Secretary of State Condoleezza Rice. Major topics covered: cyber security, nuclear proliferation, insurgency and intervention, terrorism, the Arab Spring, and the future of U.S. leadership in the world. No prior background in international relations is necessary.

Same as: HISTORY 104D, POLISCI 114S

IPS 242. American Foreign Policy: Interests, Values, and Process. 5 Units.

This seminar will examine the tension in American foreign policy between pursuing U.S. security and economic interests and promoting American values abroad. The course will retrace the theoretical and ideological debates about values versus interests, with a particular focus on realism versus liberalism. The course will examine the evolution of these debates over time, starting with the French revolution, but with special attention given to the Cold War, American foreign policy after September 11th, and the Obama administration. The course also will examine how these contending theories and ideologies are mediated through the U.S. bureaucracy that shapes the making of foreign policy. ** NOTE: Initial registration for this course does not guarantee enrollment. All interested students should attend the first class. Final enrollment criteria will be detailed on the first day of class. There will be 10 seats for graduate students and 10 seats for undergraduate students.

Same as: GLOBAL 220, POLISCI 217A

IPS 244. U.S. Policy toward Northeast Asia. 5 Units.

Case study approach to the study of contemporary U.S. policy towards Japan, Korea, and China. Historical evolution of U.S. foreign policy and the impact of issues such as democratization, human rights, trade, security relations, military modernization, and rising nationalism on U.S. policy. Case studies include U.S.-Japan trade tensions, anti-Americanism in Korea, and cross-straits relations between China and Taiwan.

IPS 246. China on the World Stage. 3-5 Units.

China's reemergence as a global player is transforming both China and the international system. Other nations view China's rise with a mixture of admiration, anxiety, and opportunism. Some welcome China's rise as a potential counterweight to US preeminence; others fear the potential consequences of Sino-American rivalry and erosion of the US-led international system that has fostered unprecedented peace and prosperity. This course provides an overview of China's engagement with countries in all regions and on a wide range of issues since it launched the policy of opening and reform in 1978. The goal is to provide a broad overview and systematic comparisons across regions and issues, and to examine how China's global engagement has changed over time.

IPS 247. Organized Crime and Democracy in Latin America. 5 Units.

Scholars and policy analysts have long emphasized the strength of the rule of law as a key determinant of economic development and social opportunity. They also agree that the rule of law requires an effective and accountable legal system. The growth of transnational organized crime is a major impediment, however, to the creation of effective and accountable legal systems. This seminar examines how and why transnational criminal organizations have developed in Latin America, explores why they constitute a major challenge to the consolidation of democratic societies, economic development and individual rights. It also examines the efforts of governments to combat them, with a focus on the experiences of Mexico, Colombia, and Brazil. The course examines these cases in order to draw lessons; by pointing to both successes and failures; of use to policy analysts, legal scholars, and practitioners.

Same as: INTNLREL 152, POLISCI 244T

IPS 248. America's War in Afghanistan: Multiple Actors and Divergent Strategies. 4 Units.

Establishing clear and consistent political-military objectives when waging limited wars is an essential but difficult task. Efforts to develop coherent campaign strategies are complicated by competing interests among US government actors (diplomatic, development, military and intelligence), members of the coalition intervention force, and relevant international organizations. This course will examine post-9/11 efforts to defeat Al Qaeda and stabilize Afghanistan from the perspectives of key US, international, and Afghan actors including the White House, State Department, Defense Department, Central Intelligence Agency, United Nations, NATO, Pakistan, and Afghan political elite and civil society. Classes will include presentations by individuals with firsthand diplomatic and military experience in Afghanistan and Pakistan.

IPS 249. Living at the Nuclear Brink: Yesterday and Today. 3 Units.

The development, testing, and proliferation of nuclear weapons will be covered, from World War II through the Cold War to the present. Emphasis will be placed on understanding the evolving role of these weapons, both militarily and politically. It will also examine controversies and opposition movements to nuclear weapons and their use. The course will feature numerous guest speakers from Stanford and beyond. Students will be required to write in-depth analyses of specific nuclear weapons policy questions. Following this course, students are expected to have a deeper understanding of the profound dangers these weapons continue to present to the world today.

Same as: POLISCI 115, POLISCI 315

IPS 250. International Conflict Resolution. 3 Units.

(Same as LAW 656) This seminar examines the challenges of managing and resolving violent inter-group and international conflicts. Employing an interdisciplinary approach drawing on social psychology, political science, game theory, and international law, the course identifies various tactical, psychological, and structural barriers that can impede the achievement of efficient solutions to conflicts. We will explore a conceptual framework for conflict management and resolution that draws not only on theoretical insights, but also builds on historical examples and practical experience in the realm of conflict resolution. This approach focuses on the following questions: (1) how can the parties to conflict develop a vision of a mutually bearable shared future; (2) how can parties develop trust in the enemy; (3) how can each side be persuaded, as part of a negotiated settlement, to accept losses that it will find very painful; and (4) how do we overcome the perceptions of injustice that each side are likely to have towards any compromise solution? Among the conceptual issues we will examine include the problem of spoilers who seek to sabotage agreements, the role of mediators, the role international legal rules can play in facilitating or impeding conflict resolution, and the advantages and disadvantages of unilateral versus reciprocal measures in advancing conflict resolution efforts. Particular conflicts we will explore include the Northern Ireland conflict, the Israeli-Palestinian conflict, and the U.S.-Soviet Cold War rivalry. Prerequisite for undergraduates: consent of instructor.

Same as: PSYCH 383

IPS 250A. International Conflict Resolution Colloquium. 1 Unit.

(Same as LAW 611.) Sponsored by the Stanford Center on International Conflict and Negotiation (SCICN). Conflict, negotiation, and dispute resolution with emphasis on conflicts and disputes with an international dimension, including conflicts involving states, peoples, and political factions such as the Middle East and Northern Ireland. Guest speakers. Issues including international law, psychology, and political science, economics, anthropology, and criminology.

Same as: PSYCH 283

IPS 252. Implications of Post-1994 Conflicts in Great Lakes Region of Africa: an American Perspective. 3 Units.

Seminar will explore the post-1994 conflicts in the Great Lakes Region from the perspective of the former US Special Envoy to the region. Particular emphasis will be placed on the intensified regional and international efforts to resolve these conflicts since the M23 rebellion of 2012. It will consider the implications these activities have for the region, legal accountability, international peacekeeping and the conduct of American foreign policy. The seminar will include the following segments: 1) the origins and nature of the post-1994 conflicts and recent efforts to resolve them with particular attention to the relationship between modern Congolese history and the Rwandan genocide and the peace-making efforts initiated by the Peace, Security and Cooperation Framework agreement of February 2013; 2) accountability for conflict-related crimes committed in the region including sex and gender-based crimes and the legal and other regimes established to address conflict minerals; and 3) the broader implications of the conflict for American foreign policy in Africa (in particular and in general, and lessons learned about the way in which such policy is formulated) as well as the implications of this conflict for international peace-making and peace-keeping efforts. The course is cross-listed for IPS and law school students.

IPS 264. Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia. 3-5 Units.

Introduction to India, Af-Pak and China. Analyzes historical forces that shaped the region, recent history and current state of key countries: the economic and political rise of India and China; rise of the Taliban and Al Qaeda in Afghanistan; Pakistan's government, military, and mullahs; and China's impact on the region. Explores U.S. policy in depth: U.S. intervention in- and upcoming withdrawal from Afghanistan, U.S. relations with Pakistan and India, the "pivot to Asia" and its implications for US-China relations and the strategic balance in Asia. Satisfies the IPS policy writing requirement.

IPS 266. Managing Nuclear Waste: Technical, Political and Organizational Challenges. 3 Units.

The essential technical and scientific elements of the nuclear fuel cycle, focusing on the sources, types, and characteristics of the nuclear waste generated, as well as various strategies for the disposition of spent nuclear fuel - including reprocessing, transmutation, and direct geologic disposal. Policy and organizational issues, such as: options for the characteristics and structure of a new federal nuclear waste management organization, options for a consent-based process for locating nuclear facilities, and the regulatory framework for a geologic repository. A technical background in the nuclear fuel cycle, while desirable, is not required.

Same as: GES 266

IPS 270. The Geopolitics of Energy. 3-5 Units.

The global energy landscape is undergoing seismic shifts with game-changing economic, political and environmental ramifications. Technological breakthroughs are expanding the realms of production, reshuffling the competition among different sources of energy and altering the relative balance of power between energy exporters and importers. The US shale oil and gas bonanza is replacing worries about foreign oil dependence with an exuberance about the domestic resurgence of energy-intensive sectors. China's roaring appetite for energy imports propels its national oil companies to global prominence. Middle Eastern nations that used to reap power from oil wealth are bracing for a struggle for political relevance. Many African energy exporters are adopting promising strategies to break with a history dominated by the resource curse. This course provides students with the knowledge, skill set and professional network to analyze how the present and past upheavals in oil and gas markets affect energy exporters and importers, their policymaking, and their relative power. Students will gain a truly global perspective thanks to a series of exciting international guest speakers and the opportunity to have an impact by working on a burning issue for a real world client.

IPS 271A. U.S. Human Rights NGOs and International Human Rights. 1 Unit.

(Same as LAW 782) Many US human rights non-government organizations, including the US philanthropic sector, work on international human rights. The US government also engages with the private sector in "partnerships" that twins US foreign aid human rights action with corporate expertise. This weekly series will feature speakers who lead these human rights NGOs, philanthropic enterprises, and corporate partnerships, and also policy experts and scholars, to explore the pro's and con's of this scenario. Same as: ETHICSOC 15R, MED 225, POLISCI 203

IPS 274. International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development. 4-5 Units.

Comparative approach to sustainable cities, with focus on international practices and applicability to China. Tradeoffs regarding land use, infrastructure, energy and water, and the need to balance economic vitality, environmental quality, cultural heritage, and social equity. Student teams collaborate with Chinese faculty and students partners to support urban sustainability projects. Limited enrollment via application; see internationalurbanization.org for details. Prerequisites: consent of the instructor(s).

Same as: EARTHSYS 138, URBANST 145

IPS 280. Transitional Justice, Human Rights, and International Criminal Tribunals. 3-5 Units.

Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

Same as: ETHICSOC 280, INTNLREL 180A

IPS 290. Practical Approaches to Global Health Research. 3 Units.

Enrollment limited to graduate students; undergraduates in their junior or senior year may enroll with consent of instructor only. Introduces research methods for conducting studies involving health in low-income context. Focuses on developing a concept note to support a funding proposal. Addressing research question of student's interest. Skills developed include developing a compelling research question; synthesizing a focused literature review; selecting and adapting appropriate study design, target population, sampling methods, data collection and analysis; addressing human subject issues; developing productive cross-collaboration.

Same as: HRP 237, MED 226

IPS 298. Practical Training. 1-3 Unit.

Students obtain internship in a relevant research or industrial activity to enhance their professional experience consistent with their degree program and area of concentration. Prior to enrolling students must get internship approved by associate director. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own internship. Limited to International Policy Studies students only. May be repeated for credit.

IPS 299. Directed Reading. 1-5 Unit.

IPS students only. May be repeated for credit.

IPS 300. Issues in International Policy Studies. 1 Unit.

Presentations of techniques and applications of international policy analysis by students, faculty, and guests, including policy analysis practitioners.

IPS 316S. Decision Making in U.S. Foreign Policy. 5 Units.

Formal and informal processes involved in U.S. foreign policy decision making. The formation, conduct, and implementation of policy, emphasizing the role of the President and executive branch agencies. Theoretical and analytical perspectives; case studies. Interested students should attend the first day of class. Admission will be by permission of the instructor. Priority to IPS students.
Same as: POLISCI 316S

IPS 802. TGR Dissertation. 0 Units.

International Relations Courses

INTNLREL 1. Introduction to International Relations. 5 Units.

Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth.

Same as: POLISCI 1

INTNLREL 12. The Human Rights Fad? International Human Rights Advocacy and the Ethics of Humanitarianism. 1 Unit.

This 1-unit Alternative Spring Break course and trip will explore the world of international human rights advocacy, and the ethics of humanitarianism in the 21st Century. The course will examine the history of human rights and the international system that has been created to promote them. By looking at case studies of historical and current human rights violations, specifically those associated with mass atrocities, we hope to develop our understanding of the term human rights and how it is applied in our world today. We will critically analyze the strategies employed by governments and NGOs to address these crimes committed against humanity.

INTNLREL 13. Not For Sale: Human Trafficking in the Bay Area. 1 Unit.

When we hear the phrase, "human trafficking", we usually envision brothels in India or red light districts in Nepal. Yet, trafficking is a worldwide phenomenon that is occurring right in our backyard, from the massage parlors of San Francisco to the small night clubs of Gilroy. Throughout our course and trip, we will shed light on the impact of trafficking in our daily lives, and why this billion dollar industry is occurring right here in the Bay Area. We will examine trafficking as an intersection of issues, and how topics such as gender, politics, immigration, and, even, economics fuel this dangerous industry. Through arming ourselves with awareness, we, as students, can equip ourselves with knowledge to identify and fight trafficking in our own community.

INTNLREL 40N. World War 1: Ongoing and New Controversies. 3 Units.

This seminar will examine controversies surrounding World War 1. Was Britain's decision to enter the war, the biggest error in modern history? Was Germany responsible for the war? Did the German army commit mass atrocities as was alleged by British propaganda? By studying the arguments and evidence that undergird the controversies, we hope to understand why many older controversies have defied resolution, how new evidence and interpretations may shed light on them, and why new controversies continue to arise.

INTNLREL 60Q. United Nations Peacekeeping. 3 Units.

Focus is on an examination of United Nations peacekeeping, from its inception in 1956 in the wake of the Suez Crisis, to its increasingly important role as an enforcer of political stability in sub-Saharan Africa. Examines the practice of "classic" peacekeeping as it developed during the Cold War, the rise and fall of "second-generation" peacekeeping, and the reemergence of a muscular form of peacekeeping in sub-Saharan Africa more recently. Topics include the basic history of the United Nations since 1945, the fundamentals of the United Nations Charter, and the historical trajectory of U.N. peacekeeping and the evolving arguments of its proponents and critics over the years.

INTNLREL 61Q. Food and security. 3 Units.

The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

Same as: EARTH SYS 61Q, EESS 61Q

INTNLREL 71Q. Aesthetics of Dissent: the Case of Islamic Iran. 2 Units.

Censorship, Borges tells us, is the mother of metaphors. The Islamic regime in Iran censors all aesthetic production in the country. But Iranian dissident artists, from film-makers and fiction writers to composers in a thriving under-ground musical scene, have cleverly found ways to fight these draconian measures. They have developed an impressive body of work that is as sophisticated in style as it is rich in its discourse of democracy and dissent. The purpose of the seminar is to understand the aesthetic tropes of dissent in Iran, and the social and theological roots of rules of censorship. Masterpieces of post-revolutionary film, fiction, and music will be discussed in the context of tumultuous history of dissent in Islamic Iran.
Same as: COMPLIT 40Q

INTNLREL 102. History of the International System. 5 Units.

After defining the characteristics of the international system at the beginning of the twentieth century, this course reviews the primary developments in its functioning in the century that followed. Topics include the major wars and peace settlements; the emergence of Nazism and Communism; the development of the Cold War and nuclear weapons; the rise of China, India, and the EU; and the impact of Islamic terrorism. The role of international institutions and international society will also be a focus as will the challenge of environment, health, poverty, and climate issues to the functioning of the system.

Same as: HISTORY 102

INTNLREL 103E. Global Catholicism. 5 Units.

The rise of Catholicism as a global phenomenon, and its multiple transformations as it spread to the Americas, Asia, and Africa. Topics include the Reformation, Tridentine reform and the Jesuits, the underground churches in England and the Dutch Republic, the missions to Asia, the Spanish conquest of Latin America, conversion and indigenous religions, missionary imperialism and new religious movements in the non-European world.

Same as: HISTORY 203E

INTNLREL 105C. Human Trafficking: Historical, Legal, and Medical Perspectives. 5 Units.

(Same as HISTORY 5C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.

Same as: FEMGEN 105C, HISTORY 105C

INTNLREL 110C. America and the World Economy. 5 Units.

Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. Enroll in PoliSci 110C for WIM credit.

Same as: POLISCI 110C, POLISCI 110X

INTNLREL 110D. War and Peace in American Foreign Policy. 5 Units.

(Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period.

Same as: POLISCI 110D, POLISCI 110Y

INTNLREL 112. Micro Finance, Impact Investment and Gender. 1-2 Unit.

Introduction to microfinance and impact investment as important development efforts in the war against poverty. Why and how microfinance operations have grown to provide financial services to poor and low-income people on a sustainable basis. Advice and best practices from successful practitioners and institutions around the world as well as new technology startups targeting industry. Faculty and student led discussions concerning assigned articles and readings.

INTNLREL 114D. Democracy, Development, and the Rule of Law. 5 Units.

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts.

Same as: IPS 230, POLISCI 114D, POLISCI 314D

INTNLREL 118S. Political Economy of International Trade and Investment. 5 Units.

How domestic and international politics influence the economic relations between countries. Why do governments promote or oppose globalization? Why do countries cooperate economically in some situations but not others? Why do countries adopt bad economic policies? Focus on the politics of international trade and investment. Course approaches each topic by examining alternative theoretical approaches and evaluate these theories using historical and contemporary evidence from many geographical regions around the world. Prerequisites: ECON 1A, ECON 1B, and a statistics course.

Same as: POLISCI 218S

INTNLREL 119. The International Human Rights Movement; Assessing its History, Work and Current Challenges. 4 Units.

This course critically examines the origins of the human rights movement, its present and its future. We will address the limits, challenges and principal dilemmas facing human rights advocates as well as their role in other global agendas such as economic development, humanitarian law and peace-building. In what circumstances is human rights advocacy most and least effective? Can advocacy be counterproductive? The course will examine these questions through critical readings, class discussion and consideration of case studies of rights advocacy.

INTNLREL 122. Introduction to European Studies. 5 Units.

This course offers an introduction to major topics in the study of historical and contemporary Europe. We focus on European politics, economics and culture. First, we study what makes Europe special, and how its distinct identity has been influenced by its history. Next, we analyze Europe's politics. We study parliamentary government and proportional representation electoral systems, and how they affect policy. Subsequently, we examine the challenges the European economy faces. We further study the European Union and transatlantic relations.

Same as: POLISCI 213E

INTNLREL 122A. The Political Economy of the European Union. 5 Units.

EU institutions, the legislative process, policies, relations with the U.S., and enlargement and the future of the EU. History and theories of EU integration. Democratic accountability of the institutions, and the emerging party system. Principal policies in agriculture, regional development, the internal market, single currency, and competition. Emphasis is on policies that affect the relations with the U.S. including trade and security. Results of the EU's constitutional convention.

INTNLREL 123. The Future of the European Union: Challenges and Opportunities. 5 Units.

First, this course analyzes the EU's greatest challenge, preserving the monetary union, and discusses the political and economic reforms needed to achieve that goal. In this context the course also studies the fiscal and budgetary policies of the EU. Second, the course discusses the EU's role in global politics, its desire to play a more prominent role, and the ways to reach that objective. Third, the course analyzes the EU's institutional challenges in its efforts to enhance its democratic character.

INTNLREL 128B. International Problem-Solving Through NGOs: Policy, Players, Strategies, and Ethics. 2 Units.

This course will focus on advanced international problem-solving through the lens of international NGOs, while integrating other relevant players that address global issues within a lens of ethics and accountability. Particular aspects of NGOs that will be assessed are: policy, business, strategy, and engagement with other players. Students will consider the major issues that international NGOs face in their effort to effect positive change in an increasingly complex global environment. The course draws heavily on a series of sophisticated case studies involving a variety of NGOs, areas of specialization, and geographic regions. Topics may include: poverty and famine; the natural resources curse; terrorism; HIV/Aids and other epidemics and neglected diseases; natural disasters and emergencies; climate change; and contagion of unethical behavior. A final project tailored to each student's interest will be in lieu of a final exam. Students will have the opportunity to work with several internationally prominent guests.

Same as: PUBLPOL 128, PUBLPOL 228

INTNLREL 135A. International Environmental Law and Policy. 5 Units.

This course addresses the nature, content, and structure of international environmental law. We will discuss its sources (formal and informal) and general principles, along with the emerging principles (sustainable development, precautionary principle, etc.) We will evaluate the role of international and non-governmental organizations, as well as examine the negotiation, conclusion, and implementation of international environmental agreements. Problem areas to be examined include global warming, stratospheric ozone depletion, exports of hazardous substances, transboundary pollution, trade and environment, and development and environment. RECOMMENDED PREREQ: students have completed INTNLREL 1 and/or INTNLREL 140A.

INTNLREL 136. History of International Relations Thought. 5 Units.

In this course, we will examine the intellectual origins of contemporary theories and approaches to international politics. In particular, we will trace the classical and early modern roots of contemporary realism, idealism, and cosmopolitanism. We will also address some of the enduring normative and empirical questions about international politics: (1) What is the basis of political power and authority? (2) What rights and obligations do individuals have? (3) What rights and obligations do states have? (4) What are the causes of conflict? (5) What are the prospects for enduring peace? Thinkers covered may include: Thucydides, Cicero, Augustine, Aquinas, Grotius, Hobbes, Kant, Morgenthau, and Waltz.

Same as: POLISCI 238T

INTNLREL 136R. Introduction to Global Justice. 4 Units.

Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

Same as: ETHICSOC 136R, PHIL 76, POLISCI 136R, POLISCI 336

INTNLREL 140A. International Law and International Relations. 5 Units.

What is the character of international legal rules? Do they matter in international politics, and if so, to what degree? How effective can they really be? What should we expect from international law in shaping international relations? This seminar will provide introductory knowledge of the foundational principles and sources of public international law and a brief review of the most prominent IR-theories. Besides exploring how these theories address the role of IL in international politics, we will also consider a set of practical problems, where IL and IR intersect most dramatically, such as intervention by force, human rights, and enforcement of criminal law. * Notice to students- registration for this course is not finalized until confirmed by the instructor during the first week of class. All interested students (registered or not) must attend the first class meeting for an in-depth discussion of the syllabus and other course policies. At that (mandatory) meeting a selection process will be conducted to determine final course enrollment.

INTNLREL 140C. The U.S., U.N. Peacekeeping, and Humanitarian War. 5 Units.

The involvement of U.S. and the UN in major wars and international interventions since the 1991 Gulf War. The UN Charter's provisions on the use of force, the origins and evolution of peacekeeping, the reasons for the breakthrough to peacemaking and peace enforcement in the 90s, and the ongoing debates over the legality and wisdom of humanitarian intervention. Case studies include Croatia and Bosnia, Somalia, Rwanda, Kosovo, East Timor, and Afghanistan.

Same as: HISTORY 201C

INTNLREL 141A. Camera as Witness: International Human Rights Documentaries. 5 Units.

Rarely screened documentary films, focusing on global problems, human rights issues, and aesthetic challenges in making documentaries on international topics. Meetings with filmmakers.

INTNLREL 142. Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice. 3-5 Units.

This seminar is part of a broader program on Social Entrepreneurship at CDDRL in partnership with the Haas Center for Public Service. It will use practice to better inform theory. Working with three visiting social entrepreneurs from developing and developed country contexts students will use case studies of successful and failed social change strategies to explore relationships between social entrepreneurship, gender, democracy, development and justice. It interrogates current definitions of democracy and development and explores how they can become more inclusive of marginalized populations. This is a service learning class in which students will learn by working on projects that support the social entrepreneurs' efforts to promote social change. Students should register for either 3 OR 5 units only. Students enrolled in the full 5 units will have a service-learning component along with the course. Students enrolled for 3 units will not complete the service-learning component. Limited enrollment. Attendance at the first class is mandatory in order to participate in service learning. Same as: AFRICAST 142

INTNLREL 143. State and Society in Korea. 4 Units.

20th-century Korea from a comparative historical perspective. Colonialism, nationalism, development, state-society relations, democratization, and globalization with reference to the Korean experience. Same as: SOC 111, SOC 211

INTNLREL 144. New Global Human Rights. 3 Units.

Examination of emerging trends in international human rights with an analysis of new categories of human rights victims, human rights actors, and human rights technologies.

INTNLREL 145. Genocide and Humanitarian Intervention. 5 Units.

The course, a colloquium, traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo, and Sudan. The final session of the course will be devoted to a discussion of the International Criminal Court and the separate criminal tribunals that have been tasked with investigating and punishing the perpetrators of genocide.

INTNLREL 149. The Economics and Political Economy of the Multilateral Trade System. 5 Units.

The historical development of the multilateral trade system, the current agenda of the World Trade Organization, and prospects for trade liberalization. Emphasis is on the economic rationale for multilateral trade rules, the political problems facing countries in supporting further liberalization, and the challenges to the legitimacy of WTO procedures and practices. Issues include the greater participation of developing countries, the impact of new members, and the relationship between the WTO and other multilateral bodies. Guest speakers; student research paper presentations.

INTNLREL 151. Decoding the Arab Spring and the Future of the Middle East. 5 Units.

The seminar will focus on events of the Arab Spring and the future of the Middle East under new political players. The course will explore themes such as: the issues that forged the identity of the Arab Spring; common features among the Arab Spring countries; mechanisms of street protests against police states, history and current relationship between the military and new political powers; differences and similarities between secularists and Islamists towards public policy; why the Islamists are winning in public polls; scenarios for the region and some countries under new constitutions and parties.

INTNLREL 152. Organized Crime and Democracy in Latin America. 5 Units.

Scholars and policy analysts have long emphasized the strength of the rule of law as a key determinant of economic development and social opportunity. They also agree that the rule of law requires an effective and accountable legal system. The growth of transnational organized crime is a major impediment, however, to the creation of effective and accountable legal systems. This seminar examines how and why transnational criminal organizations have developed in Latin America, explores why they constitute a major challenge to the consolidation of democratic societies, economic development and individual rights. It also examines the efforts of governments to combat them, with a focus on the experiences of Mexico, Colombia, and Brazil. The course examines these cases in order to draw lessons; by pointing to both successes and failures; of use to policy analysts, legal scholars, and practitioners.

Same as: IPS 247, POLISCI 244T

INTNLREL 154. The Cold War: An International History. 5 Units.

Though it ended twenty years ago, we still live in a world shaped by the Cold War. Beginning with its origins in the mid-1940s, this course will trace the evolution of the global struggle, until its culmination at the end of the 1980s. Students will be asked to ponder the fundamental nature of the Cold War, what kept it alive for nearly fifty years, how it ended, and its long term legacy for the world.

Same as: HISTORY 266C

INTNLREL 157. The Political Economy of the Arab Revolutions. 5 Units.

Many observers prefer to interpret the popular uprisings that swept through the Middle East in 2011 as a mere reaction to decades of authoritarian rule and human rights abuses. Conversely, others have underlined the deeper and more structural socio-economic drivers of revolt. This course aims at providing an in-depth analysis of Arab revolutions by employing the tools of political economy and departing from the conviction that revolts are the culmination of lengthy and complex processes rather than just occasional breakdown of authoritarian regimes.

INTNLREL 159. Political Economy of East Asia. 3-5 Units.

(Formerly 117.) Comparative and international political economy of E. and S.E. Asia. Industrial development and the Asian miracle, economic integration, regional cooperation, the Asian financial crisis, and contemporary challenges.

Same as: POLISCI 211

INTNLREL 163. Introduction to Israeli Politics. 5 Units.

This course aims to introduce students to Israel's political system and its major actors. We will survey Israel's political landscape, both chronologically and thematically, covering the major issues and conflicts which have dominated Israeli politics since its inception.

Same as: JEWISHST 279P, POLISCI 249P

INTNLREL 168. America as a World Power: U.S. Foreign Relations, 1914 to Present. 5 Units.

This course will examine the modern history of American foreign relations, from 1914 to the present. Beginning with the fateful decision to intervene in the First World War, it will examine the major crises and choices that have defined the American Century. Our study of U.S. foreign relations will consider such key factors as geopolitics, domestic politics, bureaucracy, psychology, race, and culture. Students will be expected to undertake their own substantial examination of a critical episode in the era studied.

Same as: HISTORY 252K

INTNLREL 173. Presidents and Foreign Policy in Modern History. 5 Units.

Nothing better illustrates the evolution of the modern presidency than the arena of foreign policy. This class will examine the changing role and choices of successive presidential administrations over the past century, examining such factors as geopolitics, domestic politics, the bureaucracy, ideology, psychology, and culture. Students will be encouraged to think historically about the institution of the presidency, while examining specific case studies, from the First World War to the conflicts of the 21st century.

Same as: HISTORY 261G

INTNLREL 174. Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country. 5 Units.

The tragic death of Ambassador Chris Stevens has recently highlighted the dangers of diplomacy in the modern era. This class will look at how Americans in embassies have historically confronted questions such as authoritarian rule, human rights abuses, violent changes of government, and covert action. Case studies will include the Berlin embassy in the 1930s, Tehran in 1979, and George Kennan's experiences in Moscow, among others. Recommended for students contemplating careers in diplomatic service.

Same as: HISTORY 252B

INTNLREL 177. Bridging the Divide: Civil-Military Relations and Military Service as Public Service. 1 Unit.

How does society conceive of a soldier, a sailor, an airman, a marine? Today fewer than 0.5 percent of Americans serve in the military, as compared to roughly 12 percent during the second World War. This has led to a widening gap in knowledge about the military and its members. This course is intended to introduce students to the notion of military service as public service and explore how misperceptions on both sides affect the civil-military divide.

INTNLREL 180A. Transitional Justice, Human Rights, and International Criminal Tribunals. 3-5 Units.

Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

Same as: ETHICSOC 280, IPS 280

INTNLREL 182. World War I: Three Perspectives. 2 Units.

Required for students participating in the BOSP Overseas Seminar, "Europe 1914 and the Origins of World War I." This course provides historical background on World War I and the events and processes leading up to the war. Taught in three-week segments from the perspectives of military history, political science, and literature, the course aims to help students formulate possible research topics for the Overseas Seminar. Prerequisite application and acceptance/waitlisted statuses into Europe 1914 and the Origins of World War I.

INTNLREL 189. PRACTICAL TRAINING. 1-3 Unit.

Students obtain internship in a relevant research or industrial activity to enhance their professional experience consistent with their degree program and area of concentration. Prior to enrolling students must get internship approved by the director. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own internship. Limited to International Relations students only. May be repeated for credit.

INTNLREL 191. IR Journal. 1 Unit.
(Staff).**INTNLREL 197. Directed Reading in International Relations. 1-5 Unit.**
Open only to declared International Relations majors.n (Staff).**INTNLREL 198. Senior Thesis. 2-10 Units.**

Open only to declared International Relations majors with approved senior thesis proposals.

INTNLREL 200A. International Relations Honors Field Research. 3 Units.

For juniors planning to write an honors thesis during senior year. Initial steps to prepare for independent research. Professional tools for conceptualizing a research agenda and developing a research strategy. Preparation for field research through skills such as data management and statistics, references and library searches, and fellowship and grant writing. Creating a work schedule for the summer break and first steps in writing. Prerequisite: acceptance to IR honors program.

INTNLREL 200B. International Relations Honors Seminar. 3 Units.

Second of two-part sequence. For seniors working on their honors theses. Professional tools, analysis of research findings, and initial steps in writing of thesis. How to write a literature review, formulate a chapter structure, and set a timeline and work schedule for the senior year. Skills such as data analysis and presentation, and writing strategies. Prerequisites: acceptance to IR honors program, and 199 or 200A.

INTNLREL 200C. IR Honors Thesis Writing. 1 Unit.

Mandatory seminar for International Relations Honors Students who are writing their Honors Thesis. INTNLREL 200A and 200B are prerequisites.

INTNLREL 206. Palestinian Nationalism, Past and Present. 5 Units.

The Palestinian national movement and its role in the Arab-Israeli conflict. The roots of the movement in the Ottoman Empire, its growth through the British Mandate, the 1948 and 1967 wars, the Intifada, and the Israeli-Palestinian peace process. Emphasis is on components which contributed to or delayed the growth of a distinct Palestinian identity, including Zionism.

INTNLREL 207. Tribe, State, and Society in the Modern Middle East. 5 Units.

The staying power of tribal identities and values in the Middle East. Examples include the Iraqi Sunni tribal insurgency against the U.S. The role of tribes in the formation of Middle Eastern states and how tribal values continue to impact social, political, and economic issues today.

Introduction to the Humanities Courses

Italian General Courses

Italian Language Courses

ITALLANG 1. First-Year Italian, First Quarter. 5 Units.

All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities.

ITALLANG 1A. Accelerated First-Year Italian, Part 1. 5 Units.

Accelerated sequence that completes first-year Italian in two rather than three quarters. For students with previous knowledge of Italian or with a strong background in another Romance language. Prerequisite: advanced-level proficiency in another Romance language or placement test.

ITALLANG 2. First-Year Italian, Second Quarter. 5 Units.

Continuation of ITALLANG 1. All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. Prerequisite: Itallang 1 or placement test.

ITALLANG 2A. Accelerated First-Year Italian, Part 2. 5 Units.

Continuation of ITALLANG 1A. Accelerated sequence that completes first-year Italian in two rather than three quarters. For students with previous knowledge of Italian or with a strong background in another Romance language. Prerequisite: Placement Test or ITALLANG 1A. Fulfills the University language requirement.

ITALLANG 3. First-Year Italian, Third Quarter. 5 Units.

Continuation of ITALLANG 2. All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. Prerequisite: Itallang 2 or placement test. Fulfills the University language requirement.

ITALLANG 5A. Intensive First-Year Italian, Part A. 5 Units.

Same as ITALLANG 1. Accelerated. Covers 1 quarter of Italian. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C.

ITALLANG 5B. Intensive First-Year Italian, Part B. 5 Units.

Same as ITALLANG 2. Continuation of 5A. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

ITALLANG 5C. Intensive First-Year Italian, Part C. 5 Units.

Same as ITALLANG 3. Continuation of 5B. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 2 or 5B. Fulfills the University language requirement.

ITALLANG 15S. Intermediate Italian Oral Conversation. 3 Units.
May be repeated once for credit.**ITALLANG 20. Intermediate Oral Communication: Italy Today. 3 Units.**

Second-year conversational and presentational skills developed through exposure to based on movie clips, slide shows, and other authentic multimedia materials. Guest lectures on Italian culture including opera, pop music, wine, and food culture. Preview of the Florentine experience with Florence returnees sharing their experiences in Italy. Prerequisite: ITALLANG 2A, ITALLANG 3. Repeatable for credit twice.

ITALLANG 21. Second Year Italian, First Quarter. 3-4 Units.

Continuation of 3. Second-Year Italian, First Quarter - Sequence integrating culture and language in the development of socioculturally appropriate discourse. Authentic materials include news and film clips, video and audio files, and short stories. Reading, writing, listening, and speaking competence based on cross cultural understanding. Prerequisite: Placement Test, ITALLANG 3.

ITALLANG 21A. Accelerated Second-Year Italian, Part 1. 4-5 Units.
Continuation of ITALLANG 2A. For students going to Florence. Completes second-year sequence in two rather than three quarters. Prerequisite: placement test, ITALLANG 2A, ITALLANG 3.

ITALLANG 22. Second-Year Italian, Second Quarter. 3-4 Units.
Continuation of ITALLANG 21. Sequence integrating culture and language in the development of socioculturally appropriate discourse. Authentic materials include news and film clips, video and audio files, and excerpts from short stories. Reading, writing, listening, and speaking competence based on cross-cultural understanding. Prerequisite: Placement Test, ITALLANG 21 or equivalent.

ITALLANG 22A. Accelerated Second-Year Italian, Part 2. 4-5 Units.
Continuation of ITALLANG 21A or OSPFLOR 21F (for Florence returnees). Part A of a second-year sequence in two rather than three quarters. Satisfies the foreign language requirement for International Relations majors. Prerequisite: Placement Test, ITALLANG 21A or OSPFLOR 21F.

ITALLANG 23. Second-Year Italian, Third Quarter. 3-4 Units.
Continuation of ITALLANG 22. Sequence integrating culture and language in the development of socioculturally appropriate discourse. Authentic materials include news and film clips, video and audio files, and short stories. Reading, writing, listening, and speaking competence based on cross cultural understanding. Prerequisite: Placement Test, ITALLANG 22 or equivalent. Satisfies the foreign language requirement for International Relations majors.

ITALLANG 99. Language Specials. 1-5 Unit.
Prerequisite: consent of instructor.

ITALLANG 101. Advanced Oral Communication: Italian Opera. 3 Units.
For Florence returnees or those who have completed second-year Italian. Use of opera excerpts by Leoncavallo, Puccini, Rossini, and Verdi to improve communication skills and review language functions. Emphasis is on presentation, conversation, and debate. Prerequisites: Placement Test, second-year Italian or equivalent.

ITALLANG 102. Advanced Oral Communication: Modern Cinema. 3 Units.
For Florence returnees or those who have completed second-year Italian. Use of movie sequences by Italian film directors such as Benigni, Moretti, Salvatores, Soldini, and Tornatore to improve communication skills and review language functions. Emphasis is on presentation, conversation, and debate. Prerequisite: placement test, 101.

ITALLANG 103. Advanced Oral Communication: Italian Classic Cinema. 3 Units.
For Florence returnees or those who have completed second-year Italian. Use of classical movie sequences by Italian film directors such as Antonioni, De Sica, Fellini, Rossellini, and Visconti to improve communication skills and review language functions. Emphasis is on presentation, conversation, and debate. Prerequisite: second-year Italian.

ITALLANG 113. Italian Cultural Studies. 3 Units.
Literary texts, news reports, comic books, film reviews, music lyrics, and sociological surveys used to examine Italy's language, culture, and society today. Advanced grammatical analysis and reading comprehension. Prerequisite: second-year Italian or equivalent.

ITALLANG 114. Advanced Stylistics and Composition. 3-4 Units.
Goal is advanced proficiency in written Italian. Textual and grammatical analysis of literary and non-literary texts, oral reports, translations, and writing assignments. Prerequisite: Placement Test, second-year Italian or equivalent.

ITALLANG 115. Academic and Creative Writing. 3-4 Units.
Continuation of 114. Academic prose: formal structures and academic terminology. Creative prose: short stories, expressive language, and when and how to break the rules for effect. Prerequisite: second-year Italian or equivalent.

ITALLANG 126. Italy and Italians Today. 2 Units.
May be repeated for credit.

ITALLANG 205A. Intensive First-Year Italian for Stanford Grads, Part A. 3-5 Units.
Equivalent to ITALLANG 5A. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C or 2 of the courses for a total of 9 units.

ITALLANG 205B. Intensive First-Year Italian for Stanford Grads, Part B. 3-5 Units.
Equivalent to ITALLANG 5B. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C or 2 of the courses for a total of 9 units Prerequisite 205A or equivalent.

ITALLANG 205C. Intensive First-Year Italian for Stanford Grads, Part C. 3-5 Units.
Equivalent to ITALLANG 5C. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C or 2 of the courses for a total of 9 units Prerequisite 205B or equivalent.

ITALLANG 250. Reading Italian. 4 Units.
For seniors or graduate students seeking to meet the University reading requirement for advanced degrees. Reading strategies for comprehension of secondary literature for academic research. Fulfills the University foreign language requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year of Italian or reading proficiency in another Romance language.

ITALLANG 394. Graduate Studies in Italian Conversation. 1-3 Unit.
Prerequisite: consent of instructor.nn (Staff).

ITALLANG 395. Graduate Studies in Italian. 2-5 Units.
Prerequisite: consent of instructor.nn (Staff).

Italian Literature Courses

Italian Literature Courses

ITALIAN 41N. Imagining Italy. 3 Units.
Preference to freshmen. To the English and American literary imagination, Italy has long been a source of fascination. During the past hundred years, writers from Nathaniel Hawthorne to Frances Mayes have explored the broad range of contradictory resonances of the Italian setting, in fiction, travel essays, and memoirs. While some writers have celebrated the sensuality of Italian culture and landscape, others have imagined Italy as a more dangerous place -- as dangerous as the erotic love with which it is often identified. The range of literary responses to Italy by writers in English during the past hundred years will be examined, and the ways in which our culture has continued to construct myths of Italy will be explored. We will also see how these myths have been transformed into commodities in today's consumer culture, making "Italy" one of the most profitable fictions in the marketplace. Taught in English.

ITALIAN 52N. Life is a Play: Identity, Persona, and Improvisation in Luigi Pirandello. 3 Units.

Stanford Introductory Seminar. Preference to freshmen. For Pirandello (1867-1936; Nobel Prize, 1934), to suddenly realize your entire life has been a performance is a moment of utmost horror, comedy, and opportunity for self-awareness. In a quintessentially modern fashion, he claims that the performance cannot be stopped, that authenticity is a mirage, and that learning to laugh at oneself is the only liberation. Materials include Pirandello's existential "theater within the theater," his novels, and their film adaptations, which we will study in their cultural context.

ITALIAN 75N. Narrative Medicine and Near-Death Experiences. 3 Units.

Even if many of us don't fully believe in an afterlife, we remain fascinated by visions of it. This course focuses on Near-Death Experiences and the stories around them, investigating them from the many perspectives pertinent to the growing field of narrative medicine: medical, neurological, cognitive, psychological, sociological, literary, and filmic. The goal is not to understand whether the stories are veridical but what they do for us, as individuals, and as a culture, and in particular how they seek to reshape the patient-doctor relationship. Materials will span the 20th century and come into the present. Taught in English.

Same as: FRENCH 75N

ITALIAN 100. Masterpieces: Dante. 3-5 Units.

An exploration of Dante's "Inferno" (the first of the three canticles of The Divine Comedy). The aim is to learn how to read the poem in detail and in depth, through both slow reading and ongoing reconstruction of Dante's world. We will also ask to what extent Dante's civic identity as a Florentine, especially his exile from Florence, gave momentum to his literary career and helped him become the author of one of the masterpieces of Western literature. Special emphasis is placed on Dante's ethical world view and his representation of character. Taught in English.

ITALIAN 101. Italy: The Good, the Bad and the Ugly. 3-5 Units.

Renowned for its rich cultural tradition, Italy is also one of the most problematic nations in Europe. This course explores the contradictions at the heart of Italy, focusing key phenomena, such as art, corruption, migration, and crises of all kinds. Through the study of historical and literary texts, films, and news media, the course seeks to examine Italy's present and future trajectory by looking to its past as a point of comparison. Taught in English.

ITALIAN 104. La dolce vita: Italian Stereotypes in Film. 3-5 Units.

Passion, nostalgia, mafia, women. What has it meant to be Italian in the past hundred years? How are these stereotypes invented, portrayed and dismantled by filmmakers such as Fellini, Scola, Giordana, Benigni and Torre? This course will address the problem of Italianity; its anomalies and contradictions, and look at how Italians have imagined themselves on the big screen, from the figure of the hopeless romantic to the mafioso. Films will be in Italian with English subtitles. Taught in Italian.

ITALIAN 120. Love Italian Style. 4 Units.

Gateway course for Italian studies. An examination of representations of love and sexuality in Italian literature, art, film, and popular culture from the Italian Renaissance to the current period. Beginning with the figure of Silvio Berlusconi and ending with Dante's love for Beatrice, the course considers differences in social practices and mores over time, the role of literary and artistic representations in establishing cultural expectations about love, the question of gender roles and identity in Italian society, as well as contemporary stereotypes about love in Italy and Italians in love. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent.

ITALIAN 127. Inventing Italian Literature. 4 Units.

An introduction to the study of literature in Italian, especially short prose fiction and poetry. Attention will be given to building a vocabulary and critical tool-set for the interpretation of literary texts from the Middle Ages to the contemporary period. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent (2 years of Italian).

ITALIAN 128. The Italian Renaissance: Power and Perspective. 4 Units.

The literature, art, and history of the Renaissance in Italy. Topics vary year to year. In 2015, the course will address the question of perspective in art, history, politics, literature, and philosophy, with a focus on the Florentine Renaissance. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent (2 years of Italian).

ITALIAN 129. Modern Italian Culture: Literary Landscapes. 4 Units.

Italian national and cultural identity in the 19th and 20th centuries. Topics vary from year to year. In 2015, the course will address the importance of landscape, geography, and regional traditions and languages in modern Italian history and literature. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent (2 years of Italian).

ITALIAN 136. Literature and Politics - Two Mediterranean Cases: Catalonia and Italy. 3-5 Units.

A comparison between the different roles played by writers as members of the intellectual establishment in Catalonia, Spain and Italy. Focus on the relation between intellectuals and politics in shaping national identity. We will give especially consideration to the role played by intellectuals during the Fascist and Francoist dictatorships and during Spain's transition to democracy. Taught in English.

Same as: ILAC 122

ITALIAN 152. Boccaccio's Decameron: The Ethics of Storytelling. 3-5 Units.

This course involves an in-depth study of Boccaccio's Decameron in the context of medieval theories of poetry and interpretation. The goal is to understand more fully the relationship between literature and lived experience implied by Boccaccio's fictions. We will address key critical issues and theoretical approaches related to the text. Taught in English translation, there will be an optional supplementary Italian discussion section during weeks 2-9.

Same as: ITALIAN 352

ITALIAN 154. Film & Philosophy. 4 Units.

Issues of freedom, morality, faith, knowledge, personal identity, and the value of truth explored through film; philosophical investigation of the filmic medium itself. Screenings to include Twelve Monkeys (Gilliam), Ordet (Dreyer), The Dark Knight (Nolan), Vicky Cristina Barcelona (Allen), and Eternal Sunshine of the Spotless Mind (Kaufman). Taught in English.

Same as: COMPLIT 154A, FRENCH 154, PHIL 193C, PHIL 293C

ITALIAN 155. The Mafia in Society, Film, and Fiction. 4 Units.

The mafia has become a global problem through its infiltration of international business, and its model of organized crime has spread all over the world from its origins in Sicily. At the same time, film and fiction remain fascinated by a romantic, heroic vision of the mafia. Compares both Italian and American fantasies of the Mafia to its history and impact on Italian and global culture. Taught in English.

ITALIAN 181. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English.

Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, PHIL 81, SLAVIC 181

ITALIAN 199. Individual Work. 1-12 Unit.

ITALIAN 214. Pirandello, Sartre, and Beckett. 3-5 Units.

In this course we will read the main novels and plays of Pirandello, Sartre, and Beckett, with special emphasis on the existentialist themes of their work. Readings include *The Late Mattia Pascal*, *Six Characters in Search of an Author*, *Henry IV*; *Nausea*, *No Exit*, "Existentialism is a Humanism"; *Molloy*, *Endgame*, *Krapp's Last Tape*, *Waiting for Godot*. Taught in English.

Same as: COMPLIT 281E, COMPLIT 381E, FRENCH 214, FRENCH 314, ITALIAN 314

ITALIAN 215. Italian Film, Fashion, and Design, 1950-1968. 3-5 Units.

In a close analysis of films by Fellini, Antonioni, Rossellini, Pasolini, and Bertolucci, we will explore the various contradictions that fueled the Italian cultural imagination in the 50s and 60s: minimalism and multiplicity, male and female, industrial and archaic, comic and tragic, wealth and poverty. Special emphasis placed on fashion, design, and modernist art. Taught in English, with the option of an additional discussion section in Italian. Occasional screenings Monday evenings at 7pm.

Same as: ITALIAN 315

ITALIAN 220. Early Modern Seminar. 3-5 Units.

Explores some of the key texts of European early modernity and the critical paradigms according to which the idea of the "Renaissance" has been formed, analyzed, and questioned since the 19th century. Will aim to provide a broad introduction to Early Modern studies from the point of view of the Italian Renaissance and its reception in different European contexts. Taught in English.

Same as: DLCL 323

ITALIAN 221. Italo Calvino: Literature, Science, Philosophy. 3-5 Units.

The course will follow the development of Italo Calvino's literary career, with a particular focus on his interest in fantastical and meta-fictional forms of narrative. Readings of Calvino's literary works, such as *Cosmicomics*, *Invisible Cities*, and *Mr. Palomar*, will be supplemented by readings from his critical prose, collected in the volumes *The Uses of Literature* and *Six Memos for the Next Millennium*. Taught in English.

ITALIAN 224. Leopardi, Baudelaire, and Modernity. 3-5 Units.

A close reading of Giacomo Leopardi's *Canti* and Charles Baudelaire's *Flowers of Evil* and *Paris Spleen* in the context of 19th-century Europe. Discussion of the poetry will be enriched by selections from their essays on literature and art and by notes from the *Zibaldone* and *Mon coeur mis a nu*. Key themes and concepts include language, imagination, "noia," "spleen," and the oppositions between nature and civilization, modernity and antiquity. Taught in English.

Same as: FRENCH 224, FRENCH 324, ITALIAN 324

ITALIAN 225. Petrarch & Petrarchism: Fragments of the Self. 3-5 Units.

In this course we will examine Francis Petrarch's book of Italian lyric poems, *Rerum vulgarium fragmenta*, and its reception in early modern France, England, and Spain. Readings from Petrarch's epistolary and ethical writings will contextualize historically and intellectually the aesthetics and ethics of the fragment in his poetry. With this foundation, we will investigate the long-lasting impact of Petrarch's work on Renaissance poetry and humanism, with attention to both the literary and the material aspects of its reception. Taught in English.

Same as: COMPLIT 225E, COMPLIT 325E, ITALIAN 325

ITALIAN 226. Modern Italian Poetry and Ultimate Questions. 3-5 Units.

More than in any other tradition, Italian poets of the twentieth century focus on "ultimate questions," and look all the way back to Dante in doing so: why do we die? is there a God? what does it mean to love? are we responsible for our neighbors? is beauty related to truth? what do we learn from the past? what makes life meaningful? Poets include Ungaretti, Montale, Caproni, Sereni, Rosselli, Pasolini, Luzi, Merini, and Zanzotto. Taught in Italian. Prerequisites: Second-year Italian minimum.

ITALIAN 227. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.

An intensive reading of Vico's *New Science* with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Lévi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's *New Science* and Lévi-Strauss's "The Structural Study of Myth", and the first chapters of his book *The Savage Mind*. Taught in English.

Same as: FRENCH 230, FRENCH 330, ITALIAN 327

ITALIAN 228. Science, Technology, and Society in the Face of the Looming Disaster. 3-5 Units.

The major topic will be the indeterminacy regarding the survival of humankind. With the advent of the atomic bomb humankind became potentially the maker of its own demise. Will combine a number of significant case studies (environmental disasters, industrial catastrophes, threat of nuclear devastation, technological risks) with the lessons drawn from a form of literature that is at the intersection of STS and the Humanities, in particular the early warnings made by such thinkers as Ivan Illich, Martin Heidegger, Hans Jonas, Günther Anders, and Hannah Arendt.

Same as: FRENCH 228, POLISCI 233F

ITALIAN 232B. Heretics, Prostitutes and Merchants: The Venetian Empire. 5 Units.

Between 1200-1600, Venice created a powerful empire at the boundary between East and West that controlled much of the Mediterranean, with a merchant society that allowed social groups, religions, and ethnicities to coexist. Topics include the features of Venetian society, the relationship between center and periphery, order and disorder, orthodoxy and heresy, the role of politics, art, and culture in the Venetian Renaissance, and the empire's decline as a political power and reinvention as a tourist site and living museum.

Same as: HISTORY 232B

ITALIAN 234. Courtly Love: Deceit and Desire in the Middle Ages. 3-5 Units.

A comparative seminar on medieval love books and their reception. We will examine and question the notion of "amour courtois," which arose in the lyrics and romances of medieval France and was codified in Romantic-era criticism. Primary readings will be enriched by thinking about this notion through the lens of modern theories of desire, such as those of Girard, Lacan, and Žižek. Conducted in English with readings in translation.

Same as: COMPLIT 221A, FRENCH 234

ITALIAN 235E. Dante's "Inferno". 3-5 Units.

Intensive reading of Dante's "Inferno" (the first canticle of his three canticle poem *The Divine Comedy*). Main objective: to learn how to read the *Inferno* in detail and in depth, which entails both close textual analysis as well as a systematic reconstruction of the Christian doctrines that subtend the poem. The other main objective is to understand how Dante's civic and political identity as a Florentine, and especially his exile from Florence, determined his literary career and turned him into the author of the poem. Special emphasis on Dante's moral world view and his representation of character. Taught in English.

ITALIAN 236E. Dante's "Purgatorio and Paradiso". 4-5 Units.

Reading the second and third canticles of Dante's *Divine Comedy*. Prerequisite: students must have read Dante's *Inferno* in a course or on their own. Taught in English. Recommended: reading knowledge of Italian.

ITALIAN 247. Shakespeare and Italy. 3-5 Units.

Focus on Italy's presence in Shakespeare's corpus; his use of Italian literary sources, and the Italian settings of some of his plays. It will also look at the reception of Shakespeare in Italy, especially in Italian opera and film. Readings will include Petrarch, Boccaccio, Bandello and Machiavelli; Shakespeare's sonnets and some of his major plays that are set in Italy. We will also discuss Verdi's opera, *Otello*, and Zeffirelli's movie *Romeo and Juliette*, among others Italian renditions of Shakespeare's plays. Taught in English.

ITALIAN 251. Writing, Memory, and Self-Fashioning. 3-5 Units.

Writing is not a mere recording of the past, but a selection and reinvention of our experiences. We will look at how writing is central to the philosophical project of fashioning the self, even as it reveals that much of what we call the self is a fictional construct. Materials include fiction and memoirs (Primo Levi, Michel Tournier, Melania Mazzucco, Jonathan Littell), and theoretical works in philosophy (Bergson, James, Freud, Jung, Derrida, Wyschogrod, Nehamas), psycholinguistics, and neuroscience. Taught in English.

Same as: FRENCH 251

ITALIAN 256. North/South in Contemporary Italy. 4 Units.

One of the most difficult tasks of Italian unification was to negotiate the many differences between North and South -- economic, social, cultural, and linguistic. The phenomenal growth of regional and even separatist sentiment exemplified in the Northern League shows that Italian integration is far from complete. In this course we will explore the history of conflict between North and South from the Risorgimento to the present day, with a primary focus on prose fiction and film. Taught in English.

ITALIAN 260. Italy, France, and Postcolonialism. 3-5 Units.

The starting point for our seminar is the question of how postcolonial thought enhances our possible understandings of Italy - as a nation, as a territorial unit coalescing cultural parts that remain disparate to this day, and as a population that has not come fully to terms with its fascist history, its crimes in World War II, or the atrocities it perpetrated as a colonizing state. The Italian case is unusual compared to others, in that the country's colonial past in north and east Africa is still being uncovered after a long period of public silence and government suppression; and what might be called the postcolonial Italian project has begun only recently, driven by a distinct minority of scholars, 'migrant' authors, and activists. French cultural politics and history are often taken as a point of reference from which to analyze Italian phenomena. In this case, we will make use of the French postcolonial tradition as a point of both comparison and differentiation. Among other things, we will focus on the different meanings of 'postcolonial' in a country that is strongly centralized (France) and another which is unremittingly fragmented (Italy). As just one example, we will scrutinize how Gramsci's work has been understood in Anglophone and Francophone criticism (cultural studies, Subaltern studies, and so on), as opposed to how it may be read in its original Italian context, where it concerned subalterns within the nation-state. Asking what is postcolonial, for whom, when, and where?, ultimately our goal is to discern the specific contours of Italy's postcolonialism by juxtaposing it with France's, and to simultaneously ask what light can be shed on French postcolonial particularities by placing it in this dialogue. Beginning with fundamental historical readings (Gramsci, Fanon, Memmi) and touching on some early Anglophone postcolonial critics (Said, Bhabha), the seminar will then be structured around key literary and theoretical readings from Italy and France. Ideally, readings will be in the original language, but as often as possible they will be selected such that they will be accessible in English translation as well. Taught in English.

Same as: FRENCH 260

ITALIAN 266. Women's Voices in Contemporary Italian Literature. 3-5 Units.

The traditional canon of Italian literature consists almost exclusively of male authors. Yet Italian women writers have been active since the time of Dante. This presents an overview of women's prose fiction of the last 100 years, from Sibilla Aleramo's groundbreaking feminist novel **Una donna** (1906) to novels from the 80's and 90's. We will examine such issues as the central issue of sexual violence in many female autobiographies; the experience of motherhood; the conflict between maternal love and the desire for self-determination and autonomy; paths to political awareness; reinventing the historical novel. Taught in English.

ITALIAN 281. Novels into Film. 4-5 Units.

Some critics claim that film has displaced the novel as the most popular narrative form of contemporary culture. What is the relationship between the two media? Which novels are chosen for adaptation and why? What are the relative strengths and limitations of literature and film as media? What are the specific pleasures of adaptations? In this course we will read five Italian novels and analyze their film versions, viewing adaptation as a legitimate creative response to a work of literature. We will first read the novel and consider the particular challenges it presents to transposition into film. We will follow this discussion with a close reading of the film version. The goal of the course is to examine cinematic adaptation as a cultural process by introducing a group of significant texts from the Italian tradition. Taught in English.

ITALIAN 314. Pirandello, Sartre, and Beckett. 3-5 Units.

In this course we will read the main novels and plays of Pirandello, Sartre, and Beckett, with special emphasis on the existentialist themes of their work. Readings include *The Late Mattia Pascal*, *Six Characters in Search of an Author*, *Henry IV*; *Nausea*, *No Exit*, "Existentialism is a Humanism"; *Molloy*, *Endgame*, *Krapp's Last Tape*, *Waiting for Godot*. Taught in English.

Same as: COMPLIT 281E, COMPLIT 381E, FRENCH 214, FRENCH 314, ITALIAN 214

ITALIAN 315. Italian Film, Fashion, and Design, 1950-1968. 3-5 Units.

In a close analysis of films by Fellini, Antonioni, Rossellini, Pasolini, and Bertolucci, we will explore the various contradictions that fueled the Italian cultural imagination in the 50s and 60s: minimalism and multiplicity, male and female, industrial and archaic, comic and tragic, wealth and poverty. Special emphasis placed on fashion, design, and modernist art. Taught in English, with the option of an additional discussion section in Italian. Occasional screenings Monday evenings at 7pm.

Same as: ITALIAN 215

ITALIAN 324. Leopardi, Baudelaire, and Modernity. 3-5 Units.

A close reading of Giacomo Leopardi's *Canti* and Charles Baudelaire's *Flowers of Evil* and *Paris Spleen* in the context of 19th-century Europe. Discussion of the poetry will be enriched by selections from their essays on literature and art and by notes from the *Zibaldone* and *Mon coeur mis a nu*. Key themes and concepts include language, imagination, "noia," "spleen," and the oppositions between nature and civilization, modernity and antiquity. Taught in English.

Same as: FRENCH 224, FRENCH 324, ITALIAN 224

ITALIAN 325. Petrarch & Petrarchism: Fragments of the Self. 3-5 Units.

In this course we will examine Francis Petrarch's book of Italian lyric poems, *Rerum vulgarium fragmenta*, and its reception in early modern France, England, and Spain. Readings from Petrarch's epistolary and ethical writings will contextualize historically and intellectually the aesthetics and ethics of the fragment in his poetry. With this foundation, we will investigate the long-lasting impact of Petrarch's work on Renaissance poetry and humanism, with attention to both the literary and the material aspects of its reception. Taught in English.

Same as: COMPLIT 225E, COMPLIT 325E, ITALIAN 225

ITALIAN 327. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.

An intensive reading of Vico's *New Science* with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Lévi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's *New Science* and Lévi-Strauss's "The Structural Study of Myth", and the first chapters of his book *The Savage Mind*. Taught in English.

Same as: FRENCH 230, FRENCH 330, ITALIAN 227

ITALIAN 328. Literature, Narrative, and the Self. 3-5 Units.

The role of narrative in the well-lived life. Are narratives necessary? Can they, and should they, be literary? When might non-narrative approaches, whether literary or otherwise, be more relevant? Is unity of self something given, something to be achieved, or something to be overcome? Readings from Aristotle, Montaigne, Schopenhauer, Nietzsche, Camus, Sartre, MacIntyre, G. Strawson, Velleman; Ricoeur, Brooks; Shakespeare, Stendhal, Musil, Levi, Beckett, Morrison; film. Taught in English. Same as: COMPLIT 328, FRENCH 328

ITALIAN 332B. Heretics, Prostitutes and Merchants: The Venetian Empire. 4-5 Units.

Between 1200-1600, Venice created a powerful empire at the boundary between East and West that controlled much of the Mediterranean, with a merchant society that allowed social groups, religions, and ethnicities to coexist. Topics include the features of Venetian society, the relationship between center and periphery, order and disorder, orthodoxy and heresy, the role of politics, art, and culture in the Venetian Renaissance, and the empire's decline as a political power and reinvention as a tourist site and living museum.

Same as: HISTORY 332B

ITALIAN 352. Boccaccio's Decameron: The Ethics of Storytelling. 3-5 Units.

This course involves an in-depth study of Boccaccio's Decameron in the context of medieval theories of poetry and interpretation. The goal is to understand more fully the relationship between literature and lived experience implied by Boccaccio's fictions. We will address key critical issues and theoretical approaches related to the text. Taught in English translation, there will be an optional supplementary Italian discussion section during weeks 2-9.

Same as: ITALIAN 152

ITALIAN 369. Introduction to Graduate Studies: Criticism as Profession. 3 Units.

A history of literary theory for entering graduate students in national literature departments and comparative literature.

Same as: COMPLIT 369, DLCL 369, FRENCH 369, GERMAN 369

ITALIAN 395. Philosophical Reading Group. 1 Unit.

Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit. Taught in English.

Same as: COMPLIT 359A, FRENCH 395

ITALIAN 398. Intensive Reading in French/Italian. 10 Units.

Enrollment is limited to French/Italian Ph.D. students. Course is designed for French/Italian Ph.D. students to prepare for department milestone exams.

Same as: FRENCH 398

ITALIAN 399. Individual Work. 1-12 Unit.

Repeatable for Credit.

ITALIAN 802. TGR Dissertation. 0 Units.

Japanese General Courses

JAPANGEN 51. Japanese Business Culture and Systems. 3-5 Units.

Japanese sociocultural dynamics in industrial and corporate structures, negotiating styles, decision making, and crisis management. Practicum on Japan market strategies.

Same as: JAPANGEN 251

JAPANGEN 57. How to Find Modern Japan: A Gateway Course. 4 Units.

An introduction to key locales in the cultural production of modern Japanese identity, offering a virtual tour of Japan and its significant others through major works of Japanese literature and film. Particular attention to sociohistorical context.

Same as: JAPANGEN 157

JAPANGEN 60. Asian Arts and Cultures. 5 Units.

An introduction to major monuments, themes, styles, and media of East and South Asian visual arts, in their social, literary, religious, and political contexts. Through close study of primary monuments of architectural, pictorial, and sculptural arts and related texts, this course will explore ritual and mortuary arts; Buddhist arts across Asia; narrative and landscape images; and courtly, urban, monastic, and studio environments for art from Bronze Age to modern eras.

Same as: ARTHIST 2

JAPANGEN 75N. Around the World in Seventeen Syllables: Haiku in Japan, the U.S., and the Digital World. 3-4 Units.

Preference to freshmen. Origins of the haiku form in Japan, its place in the discourse of Orientalism during the 19th and early 20th centuries in the West, its appropriation by U.S. devotees of Zen and the beat poets after WW II, and its current transformation into a global form through the Internet.

JAPANGEN 79. Japanese Ghosts: The Supernatural in Japanese Art and Entertainment. 4 Units.

The complex meanings of ghosts in Japanese culture. Representations of the supernatural in images, drama, oral narratives, prose, film, comics and animation at different moments in Japanese history.

Same as: JAPANGEN 179

JAPANGEN 82N. Joys and Pains of Growing Up and Older in Japan. 3 Units.

What do old and young people share in common? With a focus on Japan, a country with a large long-living population, this seminar spotlights older people's lives as a reflection of culture and society, history, and current social and personal changes. Through discussion of multidisciplinary studies on age, analysis of narratives, and films, we will gain a closer understanding of Japanese society and the multiple meanings of growing up and older. Students will also create a short video/audio profile of an older individual, and we will explore cross-cultural comparisons. Held in Knight Bldg. Rm. 201.

JAPANGEN 92. Introduction to Japan. 5 Units.

Required Japanese majors. Introduction to Japanese culture in historical context. Previous topics include: shifting paradigms of gender relations and performance, ancient mythology, court poetry and romance, medieval war tales, and the theaters of Noh, Bunraku, and Kabuki.

JAPANGEN 121. Translating Japan, Translating the West. 3-4 Units.

Translation lies at the heart of all intercultural exchange. This course introduces students to the specific ways in which translation has shaped the image of Japan in the West, the image of the West in Japan, and Japan's self-image in the modern period. What texts and concepts were translated by each side, how, and to what effect? No prior knowledge of Japanese language necessary.

Same as: COMPLIT 142B, JAPANGEN 221

JAPANGEN 124. Manga as Literature. 3-5 Units.

Analysis of representative manga as narratives that combine verbal and visual elements, with attention to historical and cultural background. Representative manga by Tezuka Osamu, Tatsumi Yoshihiro, Koike Kazuo, Taniguchi Jiro, Natsume Ono, Kono Fumiyo, and others. All readings in English.

JAPANGEN 126. The Vampire in Anime. 3-4 Units.

Analysis of anime where vampires play central roles as characters and/or in plot development. Comparison of character and plot development within anime series and Western vampire literature will be the main focus; attention will also be paid to the development of the vampire as a literary and film character in the West, the conception of the supernatural in Japanese culture, and the points of similarity and difference between the two.

JAPANGEN 127. JAPANimals: Fauna in the Cultural History of Japan. 3-5 Units.

Multifarious roles played by animals throughout Japanese art and culture. Signs of the zodiac; shape-changers and tricksters; fabulous beasts and sacred animals; the notorious "Dog Shogun" and animal satires; commodification of animals, representation of animals in anime. Same as: JAPANGEN 227

JAPANGEN 133. Japanese Media Culture. 2-4 Units.

Focuses on the intertwined histories of the postwar Japanese television, anime, music, and video game industries, and how their development intersects with wider trends in Japanese society. We will pay particular attention to questions of affect, labor, and environment in media production, consumption, and style.

Same as: JAPANGEN 233

JAPANGEN 137. Classical Japanese Literature in Translation. 4 Units.

Prose, poetry, and drama from the 10th-19th centuries. Historical, intellectual, and cultural context. Works vary each year. May be repeated for credit with consent of instructor.

Same as: JAPANGEN 237

JAPANGEN 138. Introduction to Modern Japanese Literature and Culture. 3-4 Units.

This class introduces key literary texts from Japan's modern era (1868-present), locating these works in the larger political, social, and cultural trends of the period. Primary texts include: Futabatei Shimei's *Floating Clouds*, Higuchi Ichiyō's *Child's Play*, Natsume Sōseki's *Kokoro*, Kobayashi Takiji's *Cannery Boat*, Ōe Kenzaburo's *The Catch*, and Yoshimoto Banana's *Kitchen*. Examination of these literary works will be contextualized within larger political trends (e.g., the modernization program of the Meiji regime, the policies of Japan's wartime government, and postwar Japanese responses to the cold war), social developments (e.g., changing notions of social class, the women's rights movement, and the social effects of the postwar economic expansion), and cultural movements (e.g., literary reform movement of the 1890s, modernism of the 1920s and 30s, and postmodernism of the 1980s). The goal of the class is to use literary texts as a point of entry to understand the grand narrative of Japan's journey from its tentative re-entry into the international community in the 1850s, through the cataclysm of the Pacific War, to the remarkable prosperity of the bubble years in the 1980s.

Same as: JAPANGEN 238

JAPANGEN 141. Japanese Performance Traditions. 3-4 Units.

Major paradigms of gender in Japanese performance traditions from ancient to modern times, covering Noh, Kabuki, Bunraku, and Takarazuka.

Same as: JAPANGEN 241

JAPANGEN 142. Gender, Sex, and Text in Early Modern Japan. 3-4 Units.

The early modern period in Japan (1600-1868) was a vibrant time when popular culture flourished, cities expanded, and people enjoyed a 'floating world' of transient, sensual delights. Reading popular literature from the time (in translation), including novels and poetry, and looking at explicit erotic imagery in woodblock prints as well as other visual media, we will discuss topics related to gender, sex, and sexuality. Critical scholarship by historians, art historians and scholars of literature will add to students' own readings of these primary sources.

Same as: JAPANGEN 242

JAPANGEN 148. Modern Japanese Narratives: Literature and Film. 3-5 Units.

Central issues in modern Japanese visual and written narrative. Focus is on competing views of modernity, war, and crises of individual and collective identity and responsibility. Directors and authors include Kurosawa, Mizoguchi, Ozu, Ōgai, Akutagawa, Tanizaki, Abe, and Ōe.

Same as: JAPANGEN 248

JAPANGEN 149. Screening Japan: Issues in Crosscultural Interpretation. 3-4 Units.

Is the cinematic language of moving images universal? How have cultural differences, political interests, and genre expectations affected the ways in which Japanese cinema makes meaning across national borders? Sources include the works of major Japanese directors and seminal works of Japanese film criticism, theory, and scholarship in English. No Japanese language skills required.

Same as: JAPANGEN 249

JAPANGEN 152. Art Animation. 2-4 Units.

While anime has spread around the world, Japanese art animators have been busy developing a parallel tradition, built from a more personal, experimental, and idiosyncratic approach to the medium. Looking closely at key works from major artists in the field, this course explores art animation from a variety of perspectives: animation scene; philosophical attempts to account for animated movement; and art animation's unique perspective on Japanese culture.

Same as: FILMSTUD 146, JAPANGEN 252

JAPANGEN 157. How to Find Modern Japan: A Gateway Course. 4 Units.

An introduction to key locales in the cultural production of modern Japanese identity, offering a virtual tour of Japan and its significant others through major works of Japanese literature and film. Particular attention to sociohistorical context.

Same as: JAPANGEN 57

JAPANGEN 160. Early Modern Japan: The Floating World of Chikamatsu. 4 Units.

Early modern Japan as dramatized in the puppet theater of Chikamatsu Monzaemon (1653-1725), Japan's leading dramatist, who depicted militarization, commercialization, and urbanization in the Tokugawa period (1603-1868). Emperors, shogun, daimyo, samurai, merchants, monks, geisha, and masterless ronin in his bunraku plays as denizens of a floating world. Themes of loyalty, love, heroism, suicide, and renunciation in the early modern world. In English.

Same as: JAPANGEN 260

JAPANGEN 179. Japanese Ghosts: The Supernatural in Japanese Art and Entertainment. 4 Units.

The complex meanings of ghosts in Japanese culture. Representations of the supernatural in images, drama, oral narratives, prose, film, comics and animation at different moments in Japanese history.

Same as: JAPANGEN 79

JAPANGEN 184. Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting. 4 Units.

Changes marking the transition from medieval to early modern Japanese society that generated a revolution in visual culture, as exemplified in subjects deemed fit for representation; how commoners joined elites in pictorializing their world, catalyzed by interactions with the Dutch.

Same as: ARTHIST 184, ARTHIST 384, JAPANGEN 384

JAPANGEN 185. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868. 4 Units.

Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty through visual culture during the change of episteme from late medieval to early modern, 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tensions between the old and the new leading to the modernization of Japan.

Same as: ARTHIST 187, ARTHIST 387

JAPANGEN 186. Theme and Style in Japanese Art. 4 Units.

A mixture of lecture and discussion, this course presents a chronological introduction to some of the defining monuments in the history of Japanese visual culture from prehistory to the mid-19th century. This introductory class presumes no prior knowledge of art history or of Japan. We will emphasize certain overarching themes like religious life; notions of decorum appropriate to various classes (court, warrior, and commoner); the relationship between and among the arts, such as the visual and the verbal, or the symphonic assemblage arts as seen in the tea ceremony; pervasive cultural tropes like nostalgia, seasonality, or the sense of place; and broader issues such as censorship, patronage, gender issues, and the encounters between Japanese and foreign cultures.

Same as: ARTHIST 186, ARTHIST 386, JAPANGEN 286

JAPANGEN 187. Romance, Desire, and Sexuality in Modern Japanese Literature. 3-4 Units.

This class is structured around three motifs: love suicide (as a romantic ideal), female desire, and same-sex sexuality. Over the course of the quarter we will look at how these motifs are treated in the art and entertainment from three different moments of Japanese history: the Edo period (1615-1868), the modern period (1920-65), and the contemporary period (1965-present). We will start by focusing on the most traditional representations of these topics. Subsequently, we will consider how later artists and entertainers revisited the conventional treatments of these motifs, informing them with new meanings and social significance. We will devote particular attention to how this material comments upon issues of gender, sexuality, and human relationships in the context of Japan. Informing our perspective will be feminist and queer theories of reading and interpretation.

Same as: FEMGEN 187, JAPANGEN 287

JAPANGEN 198. Senior Colloquium in Japanese Studies. 1 Unit.

Research, write, and present capstone essay or honors thesis.

Same as: KORGEN 198

JAPANGEN 200. Directed Reading in Asian Languages. 1-12 Unit.

For Japanese literature. Prerequisite: consent of instructor. (Staff).

JAPANGEN 201. Teaching Japanese Humanities. 1 Unit.

Prepares graduate students to teach humanities at the undergraduate level. Topics include syllabus development and course design, techniques for generating discussion, effective grading practices, and issues particular to the subject matter.

JAPANGEN 220. The Situation of the Artist in Traditional Japan. 5 Units.

Topics may include: workshop production such as that of the Kano and Tosa families; the meaning of the signature on objects including ceramics and tea wares; the folk arts movement; craft guilds; ghost painters in China; individualism versus product standardization; and the role of lineage. How works of art were commissioned; institutions supporting artists; how makers purveyed their goods; how artists were recognized by society; the relationship between patrons/quest; desires and artists/quest; modes of production.

Same as: ARTHIST 485

JAPANGEN 221. Translating Japan, Translating the West. 3-4 Units.

Translation lies at the heart of all intercultural exchange. This course introduces students to the specific ways in which translation has shaped the image of Japan in the West, the image of the West in Japan, and Japan's self-image in the modern period. What texts and concepts were translated by each side, how, and to what effect? No prior knowledge of Japanese language necessary.

Same as: COMPLIT 142B, JAPANGEN 121

JAPANGEN 227. JAPANimals: Fauna in the Cultural History of Japan. 3-5 Units.

Multifarious roles played by animals throughout Japanese art and culture. Signs of the zodiac; shape-changers and tricksters; fabulous beasts and sacred animals; the notorious "Dog Shogun" and animal satires; commodification of animals, representation of animals in anime.

Same as: JAPANGEN 127

JAPANGEN 229. Topophilia: Place in Japanese Visual Culture through 19th Century. 5 Units.

Attachments to "place" and "home" are hard-wired into the biology of humans and animals alike, although such attachments vary according to specific times, cultures, and states of mind. Can we speak of a "Japanese sense of place" and if so, what is distinctive about it? Seminar explores religious visions and ritual fields; narratives of itinerancy; cityscapes; topographic taxonomies. Knowledge of Japanese culture is beneficial but not mandatory.

Same as: ARTHIST 229D

JAPANGEN 233. Japanese Media Culture. 2-4 Units.

Focuses on the intertwined histories of the postwar Japanese television, anime, music, and video game industries, and how their development intersects with wider trends in Japanese society. We will pay particular attention to questions of affect, labor, and environment in media production, consumption, and style.

Same as: JAPANGEN 133

JAPANGEN 237. Classical Japanese Literature in Translation. 4 Units.

Prose, poetry, and drama from the 10th-19th centuries. Historical, intellectual, and cultural context. Works vary each year. May be repeated for credit with consent of instructor.

Same as: JAPANGEN 137

JAPANGEN 238. Introduction to Modern Japanese Literature and Culture. 3-4 Units.

This class introduces key literary texts from Japan's modern era (1868-present), locating these works in the larger political, social, and cultural trends of the period. Primary texts include: Futabatei Shimei's *Floating Clouds*, Higuchi Ichiyocirc;'s *Child's Play*, Natsume Socirc;'s *Kokoro*, Kobayashi Takiji's *Cannery Boat*, Ocirc;'e *Kenzaburocirc;'s The Catch*, and Yoshimoto Banana's *Kitchen*. Examination of these literary works will be contextualized within larger political trends (e.g., the modernization program of the Meiji regime, the policies of Japan's wartime government, and postwar Japanese responses to the cold war), social developments (e.g., changing notions of social class, the women's rights movement, and the social effects of the postwar economic expansion), and cultural movements (e.g., literary reform movement of the 1890s, modernism of the 1920s and 30s, and postmodernism of the 1980s). The goal of the class is to use literary texts as a point of entry to understand the grand narrative of Japan's journey from its tentative re-entry into the international community in the 1850s, through the cataclysm of the Pacific War, to the remarkable prosperity of the bubble years in the 1980s.

Same as: JAPANGEN 138

JAPANGEN 241. Japanese Performance Traditions. 3-4 Units.

Major paradigms of gender in Japanese performance traditions from ancient to modern times, covering Noh, Kabuki, Bunraku, and Takarazuka.

Same as: JAPANGEN 141

JAPANGEN 242. Gender, Sex, and Text in Early Modern Japan. 3-4 Units.

The early modern period in Japan (1600-1868) was a vibrant time when popular culture flourished, cities expanded, and people enjoyed a 'floating world' of transient, sensual delights. Reading popular literature from the time (in translation), including novels and poetry, and looking at explicit erotic imagery in woodblock prints as well as other visual media, we will discuss topics related to gender, sex, and sexuality. Critical scholarship by historians, art historians and scholars of literature will add to students' own readings of these primary sources.

Same as: JAPANGEN 142

JAPANGEN 248. Modern Japanese Narratives: Literature and Film. 3-5 Units.

Central issues in modern Japanese visual and written narrative. Focus is on competing views of modernity, war, and crises of individual and collective identity and responsibility. Directors and authors include Kurosawa, Mizoguchi, Ozu, Ogai, Akutagawa, Tanizaki, Abe, and Oe.

Same as: JAPANGEN 148

JAPANGEN 249. Screening Japan: Issues in Crosscultural Interpretation. 3-4 Units.

Is the cinematic language of moving images universal? How have cultural differences, political interests, and genre expectations affected the ways in which Japanese cinema makes meaning across national borders? Sources include the works of major Japanese directors and seminal works of Japanese film criticism, theory, and scholarship in English. No Japanese language skills required.

Same as: JAPANGEN 149

JAPANGEN 251. Japanese Business Culture and Systems. 3-5 Units.

Japanese sociocultural dynamics in industrial and corporate structures, negotiating styles, decision making, and crisis management. Practicum on Japan market strategies.

Same as: JAPANGEN 51

JAPANGEN 252. Art Animation. 2-4 Units.

While anime has spread around the world, Japanese art animators have been busy developing a parallel tradition, built from a more personal, experimental, and idiosyncratic approach to the medium. Looking closely at key works from major artists in the field, this course explores art animation from a variety of perspectives: animation scene; philosophical attempts to account for animated movement; and art animation's unique perspective on Japanese culture.

Same as: FILMSTUD 146, JAPANGEN 152

JAPANGEN 260. Early Modern Japan: The Floating World of Chikamatsu. 4 Units.

Early modern Japan as dramatized in the puppet theater of Chikamatsu Monzaemon (1653-1725), Japan's leading dramatist, who depicted militarization, commercialization, and urbanization in the Tokugawa period (1603-1868). Emperors, shogun, daimyo, samurai, merchants, monks, geisha, and masterless ronin in his bunraku plays as denizens of a floating world. Themes of loyalty, love, heroism, suicide, and renunciation in the early modern world. In English.

Same as: JAPANGEN 160

JAPANGEN 286. Theme and Style in Japanese Art. 4 Units.

A mixture of lecture and discussion, this course presents a chronological introduction to some of the defining monuments in the history of Japanese visual culture from prehistory to the mid-19th century. This introductory class presumes no prior knowledge of art history or of Japan. We will emphasize certain overarching themes like religious life; notions of decorum appropriate to various classes (court, warrior, and commoner); the relationship between and among the arts, such as the visual and the verbal, or the symphonic assemblage arts as seen in the tea ceremony; pervasive cultural tropes like nostalgia, seasonality, or the sense of place; and broader issues such as censorship, patronage, gender issues, and the encounters between Japanese and foreign cultures.

Same as: ARTHIST 186, ARTHIST 386, JAPANGEN 186

JAPANGEN 287. Romance, Desire, and Sexuality in Modern Japanese Literature. 3-4 Units.

This class is structured around three motifs: love suicide (as a romantic ideal), female desire, and same-sex sexuality. Over the course of the quarter we will look at how these motifs are treated in the art and entertainment from three different moments of Japanese history: the Edo period (1615-1868), the modern period (1920-65), and the contemporary period (1965-present). We will start by focusing on the most traditional representations of these topics. Subsequently, we will consider how later artists and entertainers revisited the conventional treatments of these motifs, informing them with new meanings and social significance. We will devote particular attention to how this material comments upon issues of gender, sexuality, and human relationships in the context of Japan. Informing our perspective will be feminist and queer theories of reading and interpretation.

Same as: FEMGEN 187, JAPANGEN 187

JAPANGEN 287A. The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime. 5 Units.

The Japanese tea ceremony, the ultimate premodern multimedia phenomenon, integrates architecture, garden design, ceramics, painting, calligraphy, and other treasured objects into a choreographed ritual wherein host, objects, and guests perform designated roles on a tiny stage sometimes only six feet square. In addition to its much-touted aesthetic and philosophical aspects, the practice of tea includes inevitable political and rhetorical dimensions. This course traces the evolution of tea practice from its inception within the milieu of courtier diversions, Zen monasteries, and warrior villas, through its various permutations into the 20th century, where it was manipulated by the emerging industrialist class for different-but ultimately similar-ends.

Same as: ARTHIST 287A

JAPANGEN 384. Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting. 4 Units.

Changes marking the transition from medieval to early modern Japanese society that generated a revolution in visual culture, as exemplified in subjects deemed fit for representation; how commoners joined elites in pictorializing their world, catalyzed by interactions with the Dutch.

Same as: ARTHIST 184, ARTHIST 384, JAPANGEN 184

Japanese Language Courses

JAPANLNG 1. First-Year Japanese Language, Culture, and Communication, First Quarter. 5 Units.

(Formerly JAPANLNG 7). First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. 300 kanji characters. See http://japanese.stanford.edu/?page_id=5.

JAPANLNG 2. First-Year Japanese Language, Culture, and Communication, Second Quarter. 5 Units.

(Formerly JAPANLNG 8). Continuation of 1. First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. Prerequisite: placement test, 1. 300 kanji characters. http://japanese.stanford.edu/?page_id=5.

JAPANLNG 3. First-Year Japanese Language, Culture, and Communication, Third Quarter. 5 Units.

(Formerly JAPANLNG 9). Continuation of 2. First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. Fulfills University Foreign Language Requirement. Prerequisite: placement test, 2. 300 kanji characters. http://japanese.stanford.edu/?page_id=5.

JAPANLNG 4A. First-Year Japanese Language Essentials, First Quarter. 3 Units.

(Formerly JAPANLNG 7A.) For students who want to build communication skills in limited time. Online listening exercises, audiovisual materials, kanji exercises. See http://japanese.stanford.edu/?page_id=73.

JAPANLNG 4B. First-Year Japanese Language Essentials, Second Quarter. 3 Units.

(Formerly JAPANLNG 8A.) Continuation of JAPANLNG 4A. For students who want to build communication skills in limited time. Online listening exercises, audiovisual materials, kanji exercises. Prerequisite: Placement Test, JAPANLNG 4A. See http://japanese.stanford.edu/?page_id=73.

JAPANLNG 4C. First-Year Japanese Language Essentials, Third Quarter. 3 Units.

(Formerly JAPANLNG 9A.) Continuation of JAPANLNG 4B. For students who want to build communication skills in limited time. Online listening exercises, audiovisual materials, kanji exercises. Prerequisite: Placement Test, JAPANLNG 4B. See http://japanese.stanford.edu/?page_id=73.

JAPANLNG 5. Intensive First-Year Japanese Language. 15 Units.

Equivalent to 1, 2, and 3 combined. See http://japanese.stanford.edu/?page_id=323. Graduate students restricted to 9 units should enroll in 305.

JAPANLNG 11A. Intermediate Japanese Conversation, First Quarter. 2 Units.

(Formerly JAPANLNG 27.) Develops oral proficiency through simple sentence patterns, audio materials, and oral presentations. For the practical use of Japanese. Prerequisite: JAPANLNG 3.

JAPANLNG 11B. Intermediate Japanese Conversation, Second Quarter. 2 Units.

(Formerly JAPANLNG 28.) Continuation of JAPANLNG 11A. Develops oral proficiency through simple sentence patterns, audio materials, tapes, and, oral presentations. For the practical use of Japanese. Prerequisite: JAPANLNG 11A.

JAPANLNG 11C. Intermediate Japanese Conversation, Third Quarter. 2 Units.

(Formerly JAPANLNG 29.) Continuation of JAPANLNG 11B. Develops oral proficiency through simple sentence patterns, audio materials, and oral presentations. For the practical use of Japanese. Prerequisite: JAPANLNG 11B.

JAPANLNG 14A. Second-Year Japanese Language Essentials, First Quarter. 3 Units.

(Formerly JAPANLNG 17A.) Continuation of JAPANLNG 4C. For students who want to build communication skills in limited time. Prerequisite: JAPANLNG 4C. See http://japanese.stanford.edu/?page_id=89.

JAPANLNG 14B. Second-Year Japanese Language Essentials, Second Quarter. 3 Units.

(Formerly JAPANLNG 18A.) Continuation of JAPANLNG 14A. For students who want to build communication skills in limited time. Prerequisite: JAPANLNG 14A. See http://japanese.stanford.edu/?page_id=89.

JAPANLNG 14C. Second-Year Japanese Language Essentials, Third Quarter. 3 Units.

(Formerly JAPANLNG 19A.) Continuation of JAPANLNG 14B. For students who want to build communication skills in limited time. Prerequisite: JAPANLNG 14B. See http://japanese.stanford.edu/?page_id=89.

JAPANLNG 20. Intensive Second-Year Japanese. 15 Units.

Equivalent to 21,22,23 combined. Prerequisite: 3. 5 or consent of instructor. Graduate students restricted to 9 units may take the course under JAPANLNG 320. See http://japanese.stanford.edu/?page_id=323.

JAPANLNG 21. Second-Year Japanese Language, Culture, and Communication, First Quarter. 5 Units.

(Formerly JAPANLNG 17.) Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: Placement Test, JAPANLNG 3. See http://japanese.stanford.edu/?page_id=23.

JAPANLNG 22. Second-Year Japanese Language, Culture, and Communication, Second Quarter. 5 Units.

(Formerly JAPANLNG 18.) Continuation of JAPANLNG 21. Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: Placement Test, JAPANLNG 21. See http://japanese.stanford.edu/?page_id=23.

JAPANLNG 23. Second-Year Japanese Language, Culture, and Communication, Third Quarter. 5 Units.

(Formerly JAPANLNG 19.) Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. (Formerly JAPANLNG 18B.) Prerequisite: 22. http://japanese.stanford.edu/?page_id=23.

JAPANLNG 31A. Intermediate to Advanced Conversation, First Quarter. 2 Units.

Oral proficiency through role play, oral presentations, and discussion. Recommended for those who have participated in Kyoto SCTI program. May be taken concurrently with JAPANLNG 21, 22, and 23. Prerequisite: 9K, or consent of instructor. See http://japanese.stanford.edu/?page_id=421.

JAPANLNG 31B. Intermediate to Advanced Conversation, Second Quarter. 2 Units.

Continuation of JAPANLNG 31A. (Oral proficiency through role play, oral presentations, and discussion. Recommended for those who have participated in Kyoto SCTI program. May be taken concurrently with JAPANLNG 21, 22, and 23. Prerequisite: JAPANLNG 31A. See http://japanese.stanford.edu/?page_id=421.

JAPANLNG 31C. Intermediate to Advanced Conversation, Third Quarter. 2 Units.

(Continuation of JAPANLNG 31B. Oral proficiency through role play, oral presentations, and discussion. Recommended for those who have participated in Kyoto SCTI program. May be taken concurrently with JAPANLNG 21, 22, and 23. Prerequisite: JAPANLNG 32B. See http://japanese.stanford.edu/?page_id=421.

JAPANLNG 31E. Accelerated Beginning Japanese for Engineering Students. 4 Units.

Restricted to engineering students participating in the School of Engineering Japan Internship Program. Grad students enroll in JAPANLNG 331E.

JAPANLNG 32G. Accelerated Beginning Business Japanese II. 4 Units.

For GSB students only. Limited enrollment.

JAPANLNG 33G. Accelerated Beginning Business Japanese III. 4 Units.

For GSB students only. Limited enrollment.

JAPANLNG 99. Language Specials. 1-5 Unit.

Prerequisite: consent of instructor.nn (Staff).

JAPANLNG 101. Third-Year Japanese Language, Culture, and Communication, First Quarter. 5 Units.

(Formerly JAPANLNG 117.) Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: Placement Tests, JAPANLNG 23. See http://japanese.stanford.edu/?page_id=39.

JAPANLNG 102. Third-Year Japanese Language, Culture, and Communication, Second Quarter. 5 Units.

(Formerly JAPANLNG 118.) Continuation of 101. Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: 101. See http://japanese.stanford.edu/?page_id=39.

JAPANLNG 103. Third-Year Japanese Language, Culture, and Communication, Third Quarter. 5 Units.

(Formerly JAPANLNG 119.) Continuation of 102. Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: 102. See http://japanese.stanford.edu/?page_id=39 Prerequisite.

JAPANLNG 104A. Japanese for Professionals, First Quarter. 3 Units.
Recommended for students who have the basic grammatical foundation (equivalent to completion of JAPANLNG 14C or 3), and are ready to develop further communication skills in a limited time not only in their field of interest but also in a professional environment. Prerequisite: JAPANLNG 14C, JAPANLNG 3. See http://japanese.stanford.edu/?page_id=223.

JAPANLNG 104B. Japanese for Professionals, Second Quarter. 3 Units.

Continuation of JAPANLNG 104A. Recommended for students who have the basic grammatical foundation, and are ready to develop further communication skills in a limited time not only in their field of interest but also in a professional environment. Prerequisite: JAPANLNG 104A.

JAPANLNG 104C. Japanese for Professionals, Third Quarter. 3 Units.

Continuation of JAPANLNG 104B. Recommended for students who have the basic grammatical foundation, and are ready to develop further communication skills in a limited time not only in their field of interest but also in a professional environment. Prerequisite: JAPANLNG 104B. .

JAPANLNG 105. Intensive 3rd Year Modern Japanese. 15 Units.

Equivalent to 101, 102, 103 combined. Prerequisite 20, 23, or, equivalent. Graduate students restricted to 9 units may take the course for 9 units under 405.

JAPANLNG 111A. Advanced Japanese Conversation, First Quarter. 2 Units.

(formerly JAPANLNG 121) The J111A, B, & C course sequence is designed for students who wish to advance their speaking skills of the Japanese language to the advanced level. Its goals are to help students gain proficiency and confidence in the use of Japanese and to prepare them for their lifelong study. This is a "students-driven, students-centered" course. The instructor will not "teach." Instead she is there to facilitate interactions and "help the students obtain their goals." Students are expected to come to class with their concrete goals as to what they want to do with their Japanese, and be ready to work hard in class to reach their goals.

JAPANLNG 111B. Advanced Japanese Conversation, Second Quarter. 2 Units.

(Formerly JAPANLNG 122.) Continuation of JAPANLNG 111A. The J111A, B, & C course sequence is designed for students who wish to advance their speaking skills of the Japanese language to the advanced level. Its goals are to help students gain proficiency and confidence in the use of Japanese and to prepare them for their lifelong study. This is a "students-driven, students-centered" course. The instructor will not "teach." Instead she is there to facilitate interactions and "help the students obtain their goals." Students are expected to come to class with their concrete goals as to what they want to do with their Japanese, and be ready to work hard in class to reach their goals.

JAPANLNG 111C. Advanced Japanese Conversation, Third Quarter. 2 Units.

(Formerly JAPANLNG 123.) Continuation of JAPANLNG 111B. The J111A, B, & C course sequence is designed for students who wish to advance their speaking skills of the Japanese language to the advanced level. Its goals are to help students gain proficiency and confidence in the use of Japanese and to prepare them for their life-long study. This is a "students-driven, students-centered" course. The instructor will not "teach." Instead she is there to facilitate interactions and "help the students obtain their goals." Students are expected to come to class with their concrete goals as to what they want to do with their Japanese, and be ready to work hard in class to reach their goals.

JAPANLNG 113F. Japanese Through Film, Part 1. 2-4 Units.

Contemporary Japanese culture through Japanese films, documentaries, news, and TV dramas. Structured for students with a strong desire to advance their Japanese communication skills quickly and who have limited class preparation time. In-depth discussion and exploration of current issues, cultural icons, idiomatic expressions and nonverbal social cues. Prerequisite: JAPANLNG 23. See http://japanese.stanford.edu/?page_id=255.

JAPANLNG 114F. Japanese Through Film, Part 2. 2-4 Units.

Continuation of JAPANLNG 113F. Contemporary Japanese culture through Japanese films, documentaries, news, and TV dramas. Structured for students with a strong desire to advance their Japanese communication skills quickly and who have limited class preparation time. In-depth discussion and exploration of current issues, cultural icons, idiomatic expressions and nonverbal social cues. Prerequisite: JAPANLNG 113F. See http://japanese.stanford.edu/?page_id=255.

JAPANLNG 115F. Japanese Through Film, Part 3. 2-4 Units.

Continuation of JAPANLNG 114F. Contemporary Japanese culture through Japanese films, documentaries, news, and TV dramas. Structured for students with a strong desire to advance their Japanese communication skills quickly and who have limited class preparation time. In-depth discussion and exploration of current issues, cultural icons, idiomatic expressions and nonverbal social cues. Prerequisite: JAPANLNG 114F. See http://japanese.stanford.edu/?page_id=255.

JAPANLNG 200. Directed Reading. 1-5 Unit.

Prerequisite: 213 and consent of instructor.

JAPANLNG 211. Fourth-Year Japanese, First Quarter. 3-5 Units.

Structure of Japanese, writings in different genres and styles, using such knowledge in writing, and expressing opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: JAPANLNG 103. See http://japanese.stanford.edu/?page_id=263.

JAPANLNG 212. Fourth-Year Japanese, Second Quarter. 3-5 Units.

Continuation of JAPANLNG 211. Structure of Japanese, writings in different genres and styles, using such knowledge in writing, and expressing opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: JAPANLNG 211. See http://japanese.stanford.edu/?page_id=263.

JAPANLNG 213. Fourth-Year Japanese, Third Quarter. 3-5 Units.

Continuation of JAPANLNG 212. Structure of Japanese, writings in different genres and styles, using such knowledge in writing, and expressing opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: JAPANLNG 212. See http://japanese.stanford.edu/?page_id=263.

JAPANLNG 305. Intensive First-Year Japanese for Stanford Graduate Students. 9 Units.

Equivalent to 3 quarters of JAPANLNG 1, 2, and 3 combined. Same as JAPANLNG nn5. Stanford Grads only. http://japanese.stanford.edu/?page_id=323. nnSum.

JAPANLNG 320. Intensive Second-Year Japanese for Stanford Graduate Students. 9 Units.

Equivalent to 21, 22, 23 combined or 20. Stanford Grads only. See http://japanese.stanford.edu/?page_id=323.

JAPANLNG 331E. Accelerated Beginning Japanese for Engineering Students, First Quarter. 1-4 Unit.

Restricted to engineering students participating in the School of Engineering Japan Internship Program.

JAPANLNG 394. Graduate Studies in Japanese Conversation. 1-3 Unit.

Prerequisite: consent of instructor. (Staff).

JAPANLNG 395. Graduate Studies in Japanese. 1-5 Unit.

Prerequisite: consent of instructor. (Staff).

JAPANLNG 405. Intensive third Year Japanese for Graduate Students. 9 Units.

Equivalent to 101, 102, and 103 combined or 105. Prerequisite 23 or 20. For Stanford grads only.

Japanese Literature Courses

JAPANLIT 146. Introduction to Premodern Japanese. 3-5 Units.

Readings from Heian, Kamakura, Muromachi, and early Edo periods with focus on grammar and reading comprehension. Prerequisite: JAPANLNG 129B or 103, or equivalent.

Same as: JAPANLIT 246

JAPANLIT 157. Points in Japanese Grammar. 2-4 Units.

Meaning and grammatical differences of similar expressions, and distinctions that may not be salient in English. Prerequisite: JAPANLNG 18B or 22, or equivalent.

Same as: JAPANLIT 257

JAPANLIT 170. The Tale of Genji and Its Historical Reception. 4 Units.

Approaches to the tale including 12th-century allegorical and modern feminist readings. Influence upon other works including poetry, Noh plays, short stories, modern novels, and comic book (manga) retellings. Prerequisite for graduate students: JAPANLNG 129B or 103, or equivalent.

Same as: JAPANLIT 270

JAPANLIT 181. Japanese Pragmatics. 2-4 Units.

The choice of linguistic expressions and our understanding of what is said involve multiple sociocultural, cognitive and discourse factors. Can such pragmatic factors and processes be considered universal to all languages, or are there variations among languages? The course will investigate an array of phenomena observed in Japanese. Through readings and projects, students will deepen their knowledge of Japanese and consider theoretical implications. Prerequisites: one year of Japanese and a course in linguistics, or two years of Japanese, or consent of instructor.

Same as: JAPANLIT 281

JAPANLIT 189A. Honors Research. 2-5 Units.

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JAPANLIT 189B. Honors Research. 5 Units.

Open to senior honors students to write thesis.

JAPANLIT 199. Individual Reading in Japanese. 1-4 Unit.

Asian Languages majors only. May be repeated for credit. Prerequisites: JAPANLNG 129B or 103, and consent of instructor.

JAPANLIT 200. Directed Reading in Japanese. 1-12 Unit.

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JAPANLIT 201. Proseminar: Introduction to Graduate Study in Japanese. 2-5 Units.

Bibliographical and research methods. Major trends in literary and cultural theory and critical practice. May be repeated once for credit. Prerequisite: JAPANLNG 103 or 129B, or consent of instructor.

JAPANLIT 202. Bibliographic and Research Methods in Japanese. 1-3 Unit.

The use of library and online resources for the study of Japanese literature, language, and culture. Prerequisite: JAPANLNG 103 or 129B, or consent of instructor.

JAPANLIT 224. Dramatic Manga. 2-4 Units.

In depth reading and analysis of so-called "dramatic" or "realistic" manga (gekiga), concentrating on one of the major contributors to that genre (Saito Takao, Tatsumi Yoshihiro, Taniguchi Jiro, Sugiura Hinako, Mase Moto, and others). Readings in Japanese and English translation. Prerequisite: four years of Japanese, or consent of instructor.

JAPANLIT 235. Academic Readings in Japanese I. 2-4 Units.

Strategies for reading academic writings in Japanese. Readings of scholarly papers and advanced materials in Japanese in students' research areas in the humanities and social sciences. Prerequisites: JAPANLNG 103, 129B, or equivalent; and consent of instructor.

JAPANLIT 236. Academic Readings in Japanese II. 2-4 Units.

Strategies for reading academic writings in Japanese. Readings of scholarly papers and advanced materials in Japanese in students' research areas in the humanities and social sciences. May be taken independently of 264. May be repeated for credit. Prerequisites: JAPANLNG 103, 129B, or equivalent; and consent of instructor.

JAPANLIT 246. Introduction to Premodern Japanese. 3-5 Units.

Readings from Heian, Kamakura, Muromachi, and early Edo periods with focus on grammar and reading comprehension. Prerequisite: JAPANLNG 129B or 103, or equivalent.

Same as: JAPANLIT 146

JAPANLIT 247. Readings in Premodern Japanese. 2-5 Units.

Edo and Meiji periods with focus on grammar and reading comprehension. May be repeated for credit. Prerequisite: 246 or equivalent.

JAPANLIT 248. Readings in Classical Japanese. 5 Units.

Edo and Meiji periods including travel writings, fictions, miscellanies, and poetry. Focus is on grammar, stylistic analysis, and rhetoric. Can be taken independently. Prerequisite: 246.

JAPANLIT 257. Points in Japanese Grammar. 2-4 Units.

Meaning and grammatical differences of similar expressions, and distinctions that may not be salient in English. Prerequisite: JAPANLNG 18B or 22, or equivalent.

Same as: JAPANLIT 157

JAPANLIT 260. Japanese Poetry and Poetics. 2-4 Units.

Heian through Meiji periods with emphasis on relationships between the social and aesthetic. Works vary each year. This year's genre is the diary. Prerequisites: 246, 247, or equivalent.

JAPANLIT 266. Introduction to Sino-Japanese. 3-5 Units.

Readings in Sino-Japanese (*kambun*) texts of the Heian, Kamakura, and Muromachi periods, with focus on grammar and reading comprehension. Prerequisite: 246 or equivalent.

JAPANLIT 267. Readings in Sino-Japanese. 2-4 Units.

Readings in Sino-Japanese (*kambun*) texts of the Edo and Meiji periods, with focus on grammar and reading comprehension. Prerequisite: 264 or equivalent.

JAPANLIT 270. The Tale of Genji and Its Historical Reception. 4 Units.

Approaches to the tale including 12th-century allegorical and modern feminist readings. Influence upon other works including poetry, Noh plays, short stories, modern novels, and comic book (manga) retellings. Prerequisite for graduate students: JAPANLNG 129B or 103, or equivalent.

Same as: JAPANLIT 170

JAPANLIT 276. Modern Japanese Short Stories. 2-4 Units.

This course explores the postwar Japanese short story. We will read representative works by major authors, such as Ishikawa Jun, Hayashi Fumiko, Abe Kobe and Murakami Haruki. Attention will be devoted to both accurate reading of the Japanese prose and more general discussion of the literary features of the texts.

JAPANLIT 279. Research in Japanese Linguistics. 2-4 Units.

Introduction to graduate research in Japanese linguistics. Fields of research, methods and bibliographical background. Conduct a pilot research project in a chosen area. May be repeated for credit. Prerequisite: JAPANLNG 119 or consent of instructor.

JAPANLIT 281. Japanese Pragmatics. 2-4 Units.

The choice of linguistic expressions and our understanding of what is said involve multiple sociocultural, cognitive and discourse factors. Can such pragmatic factors and processes be considered universal to all languages, or are there variations among languages? The course will investigate an array of phenomena observed in Japanese. Through readings and projects, students will deepen their knowledge of Japanese and consider theoretical implications. Prerequisites: one year of Japanese and a course in linguistics, or two years of Japanese, or consent of instructor.

Same as: JAPANLIT 181

JAPANLIT 287. Pictures of the Floating World: Images from Japanese Popular Culture. 5 Units.

Printed objects produced during the Edo period (1600-1868), including the Ukiyo-e (pictures of the floating world) and lesser-studied genres such as printed books (ehon) and popular broadsheets (kawaraban). How a society constructs itself through images. The borders of the acceptable and censorship; theatricality, spectacle, and slippage; the construction of play, set in conflict against the dominant neo-Confucian ideology of fixed social roles.

Same as: ARTHIST 287, ARTHIST 487X

JAPANLIT 296. Modern Japanese Literature. 2-5 Units.

Advanced readings. May be repeated for credit. Prerequisite: JAPANLNG 213. Formerly JAPANLIT 396.

JAPANLIT 298. The Theory and Practice of Japanese Literary Translation. 2-5 Units.

Theory and cultural status of translation in modern Japanese and English. Comparative analysis of practical translation strategies. Final project is a literary translation of publishable quality. Prerequisite: fourth-year Japanese or consent of instructor.

JAPANLIT 299. Master's Thesis or Translation. 1-5 Unit.

A total of 5 units, taken in one or more quarters.nn (Staff).

JAPANLIT 350. Japanese Historical Fiction. 3-5 Units.

Authors include Mori Ogai, Akutagawa Ryunosuke, Tanizaki Jun'ichiro, Enchi Fumiko, Shiba Ryotaro, Fujisawa Shuhei, and Hiraiwa Yumie. Genre theory, and historical and cultural context. Works vary each year. May be repeated for credit.

JAPANLIT 377. Seminar: Structure of Japanese. 2-4 Units.

Linguistic constructions in Japanese. Topics vary annually. In 2009-10, focus is on noun-modifying constructions in Japanese from multiple perspectives including syntax, semantics, pragmatics, and acquisition. Contrasts with similar constructions in other languages. Typological implications. Prerequisites: courses in Japanese linguistics, consent of instructor.

JAPANLIT 381. Topics in Pragmatics and Discourse Analysis. 2-4 Units.

Naturally occurring discourse (conversational, narrative, or written) and theoretical implications. Discourse of different age groups, expressions of identity and persona, and individual styles. May be repeated for credit.

JAPANLIT 382. Research Projects in Japanese Linguistics. 2-5 Units.

For advanced graduate students with specific research projects in Japanese linguistics. Consent of instructor required.

JAPANLIT 395. Early Modern Japanese Literature. 2-4 Units.

May be repeated for credit. Prerequisite: 247.

JAPANLIT 396. Modern Japanese Literature Seminar. 2-5 Units.

Works and topics vary each year. May be repeated for credit. Prerequisite: fourth-year Japanese or consent of instructor.

JAPANLIT 399. Dissertation Research. 1-12 Unit.

For doctoral students in Japanese working on dissertations.

JAPANLIT 801. TGR Project. 0 Units.**JAPANLIT 802. TGR Dissertation. 0 Units.**

Jewish Studies Courses

JEWISHST 4N. A World History of Genocide. 3-5 Units.

Reviews the history of genocide from ancient times until the present. Defines genocide, both in legal and historical terms, and investigates its causes, consequences, and global dimensions. Issues of prevention, punishment, and interdiction. Main periods of concern are the ancient world, Spanish colonial conquest; early modern Asia; settler genocides in America, Australia, and Africa; the Armenian genocide and the Holocaust; genocide in communist societies; and late 20th century genocide.

Same as: HISTORY 4N

JEWISHST 5. Biblical Greek. 3-5 Units.

(Formerly CLASSGRK 5.) This is a one term intensive class in Biblical Greek. After quickly learning the basics of the language, we will then dive right into readings from the New Testament and the Septuagint, which is the ancient Greek translation of the Hebrew Bible. No previous knowledge of Greek required. If demand is high for a second term, an additional quarter will be offered in the Spring.

Same as: CLASSICS 6G, RELIGST 171A

JEWISHST 5B. Biblical Greek. 3-5 Units.

(Formerly CLASSGRK 6) This is a continuation of the Winter Quarter Biblical Greek Course. Pre-requisite: CLASSICS 6G (Formerly CLASSGRK 5) or a similar introductory course in Ancient Greek.

Same as: CLASSICS 7G

JEWISHST 5G. Intensive Biblical Greek. 8 Units.

Equivalent to two quarters of Biblical Greek (CLASSICS 6G, 7G). Students will learn the core of New Testament Greek with the goal of learning to accurately translate and read the New Testament. Students will read one-third of the Gospel of John during the course and will be well-prepared to read the Greek New Testament independently after the course. Focus on knowledge of key vocabulary and grammar needed to read the Greek Bible with ease. No previous knowledge of Greek required. Course does not fulfill the Stanford language requirement.

Same as: CLASSICS 9G, RELIGST 171X

JEWISHST 18N. Religion and Politics: Comparing Europe to the U.S.. 3-4 Units.

Interdisciplinary and comparative. Historical, political, sociological, and religious studies approaches. The relationship between religion and politics as understood in the U.S. and Europe. How this relationship has become tense both because of the rise of Islam as a public religion in Europe and the rising influence of religious groups in public culture. Different understandings and definitions of the separation of church and state in Western democratic cultures, and differing notions of the public sphere. Case studies to investigate the nature of public conflicts, what issues lead to conflict, and why. Why has the head covering of Muslim women become politicized in Europe? What are the arguments surrounding the Cordoba House, known as the Ground Zero Mosque, and how does this conflict compare to controversies about recent constructions of mosques in Europe? Resources include media, documentaries, and scholarly literature.

Same as: RELIGST 18N

JEWISHST 19N. "Land of Milk and Honey": Food, Justice, and Ethnic Identity in Jewish Culture. 3 Units.

Food is an essential aspect of the human experience. The decisions and choices we make about food define who we have been, who we are now, and who we want to become. This seminar examines Jewish culture and the food practices and traditions that have shaped and continue to shape it. Why has Jewish culture been centered around food practices? How have religious laws and rituals about food and food production shaped Jewish culture and vice versa? Dietary laws prescribe which animals are and are not "kosher" and what can be eaten with them, holidays are celebrated with traditional foods, and regional foods contribute to the formation of distinct Jewish ethnic identities. More recently, American Jews have begun to organize around issues of food justice, and joined the sustainability movement, adapting Jewish traditions about food production into their cause. What is the significance of animal welfare, environmental issues, and labor practices in Jewish culture? This multi-disciplinary seminar explores the connection between food practices and ethnic and religious identity(ies), the history of the dietary laws and their multiple interpretations, the cultural significance of the phenomenal success of kosher certification in the U.S. food market, and the rise of the Jewish food justice movement. These issues raise a multitude of comparative questions, and you are encouraged to engage in research into other religious and ethnic food cultures. Course materials include: biblical and later religious, legal, and philosophical texts; cook-books (as cultural and historical sources); literature (both fiction and academic); films; news media, and food experts. We will visit an urban farming community (Urban Adamah) to learn from those involved in the Jewish sustainability movement.

Same as: CSRE 19N, RELIGST 19N

JEWISHST 37Q. Zionism and the Novel. 4 Units.

At the end of the nineteenth century, Zionism emerged as a political movement to establish a national homeland for the Jews, eventually leading to the establishment of the State of Israel in 1948. This seminar uses novels to explore the changes in Zionism, the roots of the conflict in the Middle East, and the potentials for the future. We will take a close look at novels by Israelis, both Jewish and Arab, in order to understand multiple perspectives, and we will also consider works by authors from the North America and from Europe.

Same as: COMPLIT 37Q

JEWISHST 38A. Germany and the World Wars. 3 Units.

(Same as HISTORY 138A. Majors and others taking 5 units, enroll in 138A.) Germany's tumultuous history from the Second Empire through the end of the Cold War. International conflict, social upheaval, and state transformation during Bismarck's wars of unification, World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.

Same as: HISTORY 38A

JEWISHST 71. Jews and Christians: Conflict and Coexistence. 3 Units.

The relationship between Judaism and Christianity has had a long a controversial history. Christianity originated as a dissident Jewish sect but eventually evolved into an independent religion, with only tenuous ties to its Jewish past and present. At the same time, Judaism has at times considered Christianity a form of idolatry. It seems that only since the catastrophe of the Holocaust, Jews and Christians (Catholics and Protestants) have begun the serious work of forging more meaningful relationships with each other. This course explores the most significant moments, both difficult and conciliatory ones, that have shaped the relationship between Judaism and Christianity, and introduces students to some of the most important literature, art, and music that are part of it. Selected literature: Gospel according Matthew, the letters of St. Paul, St. Augustine, the Talmud (selections), Maimonides, Martin Luther's sermons on the Jews, Nostra Aetate (Vatican II) Art and Music: Medieval art and sculpture, Haendel's Messiah.

Same as: RELIGST 71

JEWISHST 80T. Jewish Music in the Lands of Islam. 4 Units.

An Interdisciplinary study of Music, Society, and Culture in communities of the Jewish Diaspora in Islamic countries. The course examines the diverse and rich musical traditions of the Jews in North Africa and the Middle East. Based on the "Maqamat" system, the Arabic musical modes, Jewish music flourished under Islamic rule, encompassing the fields of sacred music, popular songs, and art music. Using musicological, historical, and anthropological tools, the course compares and contrasts these traditions from their original roots through their adaptation, appropriation, and re-synthesis in contemporary art music and popular songs.

Same as: MUSIC 80T

JEWISHST 84. Zionism. 3 Units.

(Same as HISTORY 184. History majors and others taking 5 units, register for 184.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.

Same as: CSRE 84, HISTORY 84, REES 84

JEWISHST 85B. Jews, 1500 to the Present. 3 Units.

(Same as HISTORY 185B. History majors and others taking 5 units, register for 185B.) Topics include the restructuring of Jewish existence during the Enlightenment and legal emancipation at the end of the 18th century in W. Europe; the transformation of Jewish life in E. Europe under the authoritarian Russian regime; colonialism in the Sephardic world; new ideologies (Reform Judaism and Jewish nationalisms); the persistence and renewal of antisemitism; the destruction of European Jewry under the Nazis; new Jewish centers in the U.S.; and the State of Israel.

JEWISHST 101A. First-Year Hebrew, First Quarter. 5 Units.

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Same as: AMELANG 128A

JEWISHST 101B. First-Year Hebrew, Second Quarter. 5 Units.

Continuation of AMELANG 128A. Prerequisite: Placement Test, AMELANG 128A.

Same as: AMELANG 128B

JEWISHST 101C. First-Year Hebrew, Third Quarter. 5 Units.

Continuation of AMELANG 128B. Prerequisite: Placement Test, AMELANG 128B. Fulfill the University Foreign Language Requirement.

Same as: AMELANG 128C

JEWISHST 102A. Second-Year Hebrew, First Quarter. 4 Units.

Continuation of AMELANG 128C. Prerequisite: Placement Test, AMELANG 128C.

Same as: AMELANG 129A

JEWISHST 102B. Second-Year Hebrew, Second Quarter. 4 Units.

Continuation of AMELANG 129A. Prerequisite: Placement Test, AMELANG 129A.

Same as: AMELANG 129B

JEWISHST 102C. Second-Year Hebrew, Third Quarter. 4 Units.

Continuation of AMELANG 129B. Prerequisite: Placement Test, AMELANG 129B.

Same as: AMELANG 129C

JEWISHST 103A. Third-Year Hebrew, First Quarter. 3-4 Units.

Continuation of AMELANG 129C. Prerequisite: Placement Test, AMELANG 129C.

Same as: AMELANG 130A

JEWISHST 104. Hebrew Forum. 2-4 Units.

Intermediate and advanced level. Biweekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew.

Same as: AMELANG 131A

JEWISHST 104A. First-Year Yiddish, First Quarter. 4 Units.

Reading, writing, and speaking.
Same as: AMELANG 140A

JEWISHST 104B. First-Year Yiddish, Second Quarter. 4 Units.

Continuation of AMELANG 140A. Prerequisite: AMELANG.
Same as: AMELANG 140B

JEWISHST 104C. First-Year Yiddish, Third Quarter. 4 Units.

Continuation of AMELANG 140B. Prerequisite: AMELANG 140B. Fulfills the University Foreign Language Requirement.
Same as: AMELANG 140C

JEWISHST 105. Hebrew Forum. 2-4 Units.

Intermediate and advanced level. Biweekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew.
Same as: AMELANG 131B

JEWISHST 106. Reflection on the Other: The Jew and the Arab in Literature. 3-5 Units.

How literary works outside the realm of Western culture struggle with questions such as identity, minority, and the issue of the Other. How the Arab is viewed in Hebrew literature, film and music and how the Jew is viewed in Palestinian works in Hebrew or Arabic (in translation to English). Historical, political, and sociological forces that have contributed to the shaping of these writers' views. Guest lectures about the Jew in Palestinian literature and music.
Same as: AMELANG 126, COMPLIT 145

JEWISHST 107A. Biblical Hebrew, First Quarter. 2 Units.

Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. Students that are enrolled in this course must also enroll in Beginning Hebrew. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the year, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or own their own.
Same as: AMELANG 170A, RELIGST 170A

JEWISHST 107B. Biblical Hebrew, Second Quarter. 1 Unit.

Continuation of 170A.
Same as: AMELANG 170B

JEWISHST 120. Sex and Gender in Judaism and Christianity. 3 Units.

What role do Jewish and Christian traditions play in shaping understandings of gender differences? Is gender always imagined as dual, male and female? This course explores the variety of ways in which Jewish and Christian traditions - often in conversation with and against each other - have shaped gender identities and sexual politics. We will explore the central role that issues around marriage and reproduction played in this conversation. Perhaps surprisingly, early Jews and Christian also espoused deep interest in writing about 'eunuchs' and 'androgynes,' as they thought about Jewish and Christian ways of being a man or a woman. We will examine the variety of these early conversations, and the contemporary Jewish and Christian discussions of feminist, queer, trans- and intersex based on them.
Same as: FEMGEN 130, RELIGST 130

JEWISHST 127D. Readings in Talmudic Literature. 1 Unit.

Readings of the talmudic texts. Some knowledge of Hebrew is preferred. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Class meets on Fridays, from 12:00-1:15 pm in Hillel (Koret Pavilion Taube Hillel House; Ziff Center for Jewish Life). May be repeat for credit.
Same as: JEWISHST 227D, RELIGST 170D

JEWISHST 129. Modern Jewish Thought. 4 Units.

From 1870 to the late twentieth century, Jewish thought and philosophy attempted to understand Judaism in response to the developments and crises of Jewish life in the modern world. In this course we shall explore the responses of figures such as Martin Buber, Franz Rosenzweig, Hermann Cohen, Abraham Joshua Heschel, Joseph Soloveitchik, Emil Fackenheim, and Emmanuel Levinas. Central topics will concern ethics and politics, faith and revelation, redemption and messianism, and the religious responses to catastrophe and atrocity. We shall discuss Judaism in European culture before and after World War I and in North America in the postwar period and after the Six Day War. A central theme will be the ways in which attempts to understand Jewish experience are related to history.
Same as: RELIGST 129

JEWISHST 132D. Sociology of Jewishness. 3-5 Units.

Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.
Same as: CSRE 132J, SOC 132J

JEWISHST 138A. Germany and the World Wars. 5 Units.

(Same as HISTORY 38A. Majors and others taking 5 units, enroll in 138A.) Germany's tumultuous history from the Second Empire through the end of the Cold War. International conflict, social upheaval, and state transformation during Bismarck's wars of unification, World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.
Same as: HISTORY 138A

JEWISHST 139. Rereading Judaism in Light of Feminism. 4 Units.

During the past three decades, Jewish feminists have asked new questions of traditional rabbinic texts, Jewish law, history, and religious life and thought. Analysis of the legal and narrative texts, rituals, theology, and community to better understand contemporary Jewish life as influenced by feminism.
Same as: FEMGEN 139

JEWISHST 143. Literature and Society in Africa and the Caribbean. 4 Units.

This course aims to equip students with an understanding of the cultural, political and literary aspects at play in the literatures of Francophone Africa and the Caribbean. Our primary readings will be Francophone novels and poetry, though we will also read some theoretical texts, as well as excerpts of Francophone theater. The assigned readings will expose students to literature from diverse French-speaking regions of the African/Caribbean world. This course will also serve as a "literary toolbox," with the intention of facilitating an understanding of literary forms, terms and practices. Students can expect to work on their production of written and spoken French (in addition to reading comprehension) both in and outside of class. Required readings include: Aimeaceute; Ceacute;saire, "Cahier d'un retour au pays natal," Albert Memmi, "La Statue de Sel," Kaouthier Adimi, "L'envers des autres", Maryse Condeacute;," "La Vie sans fards". Movies include "Goodbye Morocco", "Aya de Yopougon", "Rome plutocirc;t sue Vous". Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.
Same as: AFRICAAM 133, FRENCH 133

JEWISHST 144B. Poetic Thinking Across Media. 4 Units.

Even before Novalis claimed that the world must be romanticized, thinkers, writers, and artists wanted to perceive the human and natural world poetically. The pre- and post-romantic poetic modes of thinking they created are the subject of this course. Readings include Ecclestias, Zhaozhou Congshen, Montaigne, Nietzsche, Kafka, Benjamin, Arendt, and Sontag. This course will also present poetic thinking in the visual arts--from the expressionism of Ingmar Bergman to the neo-romanticism of Gerhard Richter.

Same as: COMPLIT 154B, COMPLIT 354B, GERMAN 154, GERMAN 354

JEWISHST 145. Masterpieces: Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers.

Same as: COMPLIT 114, GERMAN 150

JEWISHST 146. Co-Existence in Hebrew Literature. 4-5 Units.

Is co-existence possible? Does pluralism require co-existence? Can texts serve as forms of co-existence? The class will focus on these and other questions related to coexistence and literature. Through reading works mostly by Jewish authors writing in Europe, Israel and the US we will explore attempts for complete equality, for a variety of hierarchical systems and for different kinds of co-dependence. Guest speaker: professor Anat Weisman, Ben Gurion University of the Negev.

Same as: AMELANG 175, COMPLIT 161

JEWISHST 147. German Capstone: Reading Franz Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. (Meets Writing-in-the-Major requirement).

Same as: COMPLIT 111, COMPLIT 311C, GERMAN 190, GERMAN 390, JEWISHST 349

JEWISHST 147A. The Hebrew Bible in Literature. 3-5 Units.

Close reading of major biblical stories and poems that influenced modern literature written in English and Hebrew. Hebrew texts will be read in translation to English. Each class will include a section from the Hebrew Bible as well as a modern text or film based on the biblical story/poem. Discussion of questions such as: the meaning and function of myths and the influence of the Hebrew Bible on the development of literary styles and genres.

Same as: COMPLIT 147A, COMPLIT 347A, JEWISHST 347A

JEWISHST 148. Writing Between Languages: The Case of Eastern European Jewish Literature. 3-5 Units.

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well.

Same as: JEWISHST 348, SLAVIC 198, SLAVIC 398

JEWISHST 155D. Jewish American Literature. 5 Units.

Fiction of Jewish-American writers across the 20th and into the 21st centuries, both immigrants and subsequent generations of native-born Jews, to show how the topic of assimilation is thematized in the literature and to evaluate the distinctiveness of Jewish-American literature as a minority literature.

Same as: REES 145D

JEWISHST 183. The Holocaust. 4 Units.

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 137, HISTORY 337, JEWISHST 383

JEWISHST 184. Zionism. 5 Units.

(Same as History 84.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.

Same as: CSRE 184C, HISTORY 184, REES 184

JEWISHST 199B. Directed Reading in Yiddish, Second Quarter. 1-5 Unit.

For intermediate or advanced students. May be repeated for credit.

JEWISHST 205. Reading Hebrew, First Quarter. 2-4 Units.

Introduction to Hebrew literature through short stories and poetry by notable Israeli writers. In Hebrew. Prerequisite: one year of Hebrew or equivalent.

Same as: AMELANG 250A

JEWISHST 224. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy.

Same as: JEWISHST 324, RELIGST 234, RELIGST 334

JEWISHST 227D. Readings in Talmudic Literature. 1 Unit.

Readings of the talmudic texts. Some knowledge of Hebrew is preferred. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Class meets on Fridays, from 12:00-1:15 pm in Hillel (Koret Pavilion Taube Hillel House; Ziff Center for Jewish Life). May be repeat for credit.

Same as: JEWISHST 127D, RELIGST 170D

JEWISHST 242. Beyond Casablanca: North African Cinema and Literature. 3-5 Units.

This course explores the emergence of Francophone cinema and literature from North Africa (Algeria, Tunisia, Morocco) in the post-independence era: aesthetics, exile, language message, race and gender relations, collective memory, parallax, nationalism, laïcité, religion, emigration and immigration, and the Arab Spring will be covered. Special attention will be given to judeo-maghrebi history, and to the notions of francophone / maghrebi / "beur" / diasporic cinema and literature. Readings from Frantz Fanon, Albert Memmi, Kateb Yacine, Albert Camus, Colette Fellous, Abdelkebir Khatibi, Leila Sebbar, Benjamin Stora, Lucette Valensi, Abdelwahab Meddeb. Movies include Viva Laldjeacutie, Tenja, Le Chant des Marieacutes, Franccedil;aise, Bled Number One, Omar Gatlatto, Casanegra, La Saison des Hommes. Taught in French. Films in French and Arabic with English subtitles.

Same as: COMPLIT 247F, FRENCH 242

JEWISHST 243. Masterpieces of Hebrew Literature from the Bible to the Present. 3-5 Units.

This course presents and reflects on some of the canonical works of Hebrew literature, from biblical era to the present. Discussing works such as the Wisdom Books and selections from the Midrash; and reflecting on important periods such as the Golden Age of Jewish Culture in Spain, the Renaissance, and contemporary Israeli literature, we will highlight linguistic innovation, as well as crucial thematic and philosophical concerns. Readings include the Book of Job, Psalm, Ibn Gabirol, Mapu, Rachel, Goldbegr, Agnon, S. Yizhar, Amichai, Oz and more.

Same as: COMPLIT 283

JEWISHST 271C. Campaigns and Elections in Israel. 5 Units.

Employing a theoretical and comparative framework, this seminar focuses on campaigns and elections in Israel. The seminar is divided into two interrelated sections. In the first section, we will cover voting behavior. Here we will look at Israeli election laws, its political culture, socialization and cleavages, turnout, political sophistication, ideology, partisanship and issue voting. In the second half of the semester we will examine elections from the perspective of candidates and campaign strategists. The topics we will focus on include election laws, public and private campaign finance, campaign strategy, media, polling, and advertising. In examining these topics, we will cover a variety of elections campaigns since Israeli election laws, with an emphasis on the most recent ones.

Same as: POLISCI 241C

JEWISHST 279P. Introduction to Israeli Politics. 5 Units.

This course aims to introduce students to Israeli political system and its major actors. We will survey Israeli political landscape, both chronologically and thematically, covering the major issues and conflicts which have dominated Israeli politics since its inception.

Same as: INTNLREL 163, POLISCI 249P

JEWISHST 282. Circles of Hell: Poland in World War II. 5 Units.

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.

Same as: HISTORY 228, HISTORY 328, JEWISHST 382

JEWISHST 283D. The Holocaust in Recent Memory: Conflicts - Commemorations - Challenges. 5 Units.

This course offers an in-depth approach to the study of the Holocaust as a historical point of reference for European memory, or for the memory cultures of European nations, where the international context in particular the USA and Israel will also be taken into consideration. The starting point is the transformations in Holocaust memory: after 1945, in the era of European postwar myths, the Holocaust was on the periphery of historical thinking, of scholarly and public interest. Today the Holocaust is acknowledged as a 'break in civilization', a watershed event in human history. This approach has only evolved since the 1980s.

Same as: HISTORY 203D, HISTORY 303D, JEWISHST 383D

JEWISHST 284C. Genocide and Humanitarian Intervention. 3 Units.

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 224C, HISTORY 324C, JEWISHST 384C, PEDS 224

JEWISHST 286. Jews Among Muslims in Modern Times. 4-5 Units.

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 286, HISTORY 386, JEWISHST 386

JEWISHST 287S. Research Seminar in Middle East History. 4-5 Units.

Student-selected research topics.

Same as: HISTORY 481, JEWISHST 481

JEWISHST 288. Palestine and the Arab-Israeli Conflict. 4-5 Units.

This course examines some salient issues of the Israeli-Palestinian conflict from the late 19th century to the present. At the end of the course you should be able to articulate the positions of the major parties to the conflict, with the understanding that there is no single, unified Zionist (or Jewish) or Palestinian (or Arab) position. One quarter does not allow sufficient time to cover even all of the important topics comprehensively (for example, the role of the Arab states, the USA and the USSR, and the internal history of Israel receive less attention than is desirable). Some prior knowledge of Middle East history is desirable, but not required. Vigorous debate and criticism are strongly encouraged. Criticism and response expressed in a civil tone is an important way to get a fuller and more truthful picture of something. This is not only a fundamental democratic right and a basic citizenship skill, but it is essential to interpreting information and making good policy. Rights not used are easily lost.

Same as: HISTORY 288, JEWISHST 388

JEWISHST 291X. Knowing God: Learning Religion in Popular Culture. 4 Units.

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education.

Same as: AMSTUD 231X, EDUC 231X, RELIGST 231X

JEWISHST 297X. American Jewish History: Learning to be Jewish in America. 2-4 Units.

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience. History students must take course for at least 3 units.

Same as: AMSTUD 279X, EDUC 279X, HISTORY 288D, RELIGST 279X

JEWISHST 299A. Directed Reading in Yiddish, First Quarter. 1-5 Unit.

Directed Reading in Yiddish, First Quarter.

JEWISHST 324. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy.

Same as: JEWISHST 224, RELIGST 234, RELIGST 334

JEWISHST 347A. The Hebrew Bible in Literature. 3-5 Units.

Close reading of major biblical stories and poems that influenced modern literature written in English and Hebrew. Hebrew texts will be read in translation to English. Each class will include a section from the Hebrew Bible as well as a modern text or film based on the biblical story/poem. Discussion of questions such as: the meaning and function of myths and the influence of the Hebrew Bible on the development of literary styles and genres.

Same as: COMPLIT 147A, COMPLIT 347A, JEWISHST 147A

JEWISHST 348. Writing Between Languages: The Case of Eastern European Jewish Literature. 3-5 Units.

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well.

Same as: JEWISHST 148, SLAVIC 198, SLAVIC 398

JEWISHST 349. German Capstone: Reading Franz Kafka. 3-5 Units.

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. (Meets Writing-in-the-Major requirement).

Same as: COMPLIT 111, COMPLIT 311C, GERMAN 190, GERMAN 390, JEWISHST 147

JEWISHST 382. Circles of Hell: Poland in World War II. 5 Units.

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.

Same as: HISTORY 228, HISTORY 328, JEWISHST 282

JEWISHST 383. The Holocaust. 4 Units.

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 137, HISTORY 337, JEWISHST 183

JEWISHST 383D. The Holocaust in Recent Memory: Conflicts - Commemorations - Challenges. 5 Units.

This course offers an in-depth approach to the study of the Holocaust as a historical point of reference for European memory, or for the memory cultures of European nations, where the international context in particular the USA and Israel will also be taken into consideration. The starting point is the transformations in Holocaust memory: after 1945, in the era of European postwar myths, the Holocaust was on the periphery of historical thinking, of scholarly and public interest. Today the Holocaust is acknowledged as a 'break in civilization', a watershed event in human history. This approach has only evolved since the 1980s.

Same as: HISTORY 203D, HISTORY 303D, JEWISHST 283D

JEWISHST 384C. Genocide and Humanitarian Intervention. 3 Units.

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 224C, HISTORY 324C, JEWISHST 284C, PEDS 224

JEWISHST 385A. Core Colloquium in Jewish History, 17th-19th Centuries. 4-5 Units.

Same as: HISTORY 385A

JEWISHST 385B. Core in Jewish History, 20th Century. 4-5 Units.

Instructor consent required.

Same as: HISTORY 385B

JEWISHST 386. Jews Among Muslims in Modern Times. 4-5 Units.

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 286, HISTORY 386, JEWISHST 286

JEWISHST 388. Palestine and the Arab-Israeli Conflict. 4-5 Units.

This course examines some salient issues of the Israeli-Palestinian conflict from the late 19th century to the present. At the end of the course you should be able to articulate the positions of the major parties to the conflict, with the understanding that there is no single, unified Zionist (or Jewish) or Palestinian (or Arab) position. One quarter does not allow sufficient time to cover even all of the important topics comprehensively (for example, the role of the Arab states, the USA and the USSR, and the internal history of Israel receive less attention than is desirable). Some prior knowledge of Middle East history is desirable, but not required. Vigorous debate and criticism are strongly encouraged. Criticism and response expressed in a civil tone is an important way to get a fuller and more truthful picture of something. This is not only a fundamental democratic right and a basic citizenship skill, but it is essential to interpreting information and making good policy. Rights not used are easily lost.

Same as: HISTORY 288, JEWISHST 288

JEWISHST 393X. The Education of American Jews. 4 Units.

This course will take an interdisciplinary approach to the question of how American Jews negotiate the desire to retain a unique ethnic sensibility without excluding themselves from American culture more broadly. Students will examine the various ways in which people debate, deliberate, and determine what it means to be an "American Jew". This includes an investigation of how American Jewish relationships to formal and informal educational encounters through school, popular culture, religious ritual, and politics.

Same as: EDUC 313X, RELIGST 313X

JEWISHST 481. Research Seminar in Middle East History. 4-5 Units.

Student-selected research topics.

Same as: HISTORY 481, JEWISHST 287S

JEWISHST 486A. Graduate Research Seminar in Jewish History. 4-5 Units.

Same as: HISTORY 486A

JEWISHST 486B. Graduate Research Seminar in Jewish History. 4-5 Units.

Prerequisite: HISTORY 486A.

Same as: HISTORY 486B

Korean General Courses

KORGEN 101. Kangnam Style: Korean Media and Pop Culture. 4 Units.

For over a decade now, South Korea has established itself as a tireless generator of soft power, the popularity of its pop-culture spreading from Asia to the rest of the world. This class will look into the economic engine that moves this "cultural contents" industry, and will examine some of its expressions in the form of K-pop, soap operas, tourism, food, sports, and fashion in order to illuminate the ways in which Korean culture is being (self-)narrated and consumed in this era of globalization of the 21st century.

Same as: KORGEN 201

KORGEN 101N. Kangnam Style: Korean Media and Pop Culture. 4 Units.

For over a decade now, South Korea has established itself as a tireless generator of soft power, the popularity of its pop-culture spreading from Asia to the rest of the world. This class will look into the economic engine that moves this "cultural contents" industry, and will examine some of its expressions in the form of K-pop. Will be held in Rm. 212, Lathrop Library.

KORGEN 120. Narratives of Modern and Contemporary Korea. 4-5 Units.

This introductory survey will examine the development of South and North Korean literature from the turn of the 20th century until the present. The course will be guided by historical and thematic inquiries as we explore literature in the colonial period, in the period of postwar industrialization, and contemporary literature from the last decade. We will supplement our readings with critical writing about Korea from the fields of cultural studies and the social sciences in order to broaden the terms of our engagement with our primary texts.

Same as: KORGEN 220

KORGEN 121. Doing the Right Thing: Ethical Dilemmas in Korean Film and Literature. 3-4 Units.

Ethics and violence seem to be contradictory terms, yet much of Korean film and literature in the past five decades has demonstrated that they are an intricate part of the fabric of contemporary existence. Film and literature exposes time and again the complex ways in which the supposed vanguards of morality are sites of religious transgression, family, schools, and the state are sites of inflicted transgression, wherein spiritual and physical violation is inflicted relentlessly. This class will explore the ways in which questions about Truth and the origins of good and evil are mediated through film and literature in the particular context of the political, social, and economic development of postwar South Korea. Class held in Lathrop Library Rm. 212.

Same as: KORGEN 221

KORGEN 140. Childhood and Children: Culture in East Asia. 3-5 Units.

Literature for children often reflects society's deepest-held convictions and anxieties, and is therefore a critical site for the examination of what is deemed to be the most imperative knowledge for the young generation. In this respect, the analysis of both texts and visual culture for children, including prose, poetry, folk tales, film, and picture books illuminates prevalent discourses of national identity, family, education and gender. Through an examination of a diverse range of genres and supported by the application of literary theories, students will obtain an understanding, in broad strokes, of the birth of childhood and the emergence of children's literature of China, Korea and Japan from the turn of the century until the present.

Same as: KORGEN 240

KORGEN 198. Senior Colloquium in Japanese Studies. 1 Unit.

Research, write, and present capstone essay or honors thesis.

Same as: JAPANGEN 198

KORGEN 200. Directed Reading. 1-12 Unit.

Directed Reading in Korean Studies.

KORGEN 201. Kangnam Style: Korean Media and Pop Culture. 4 Units.

For over a decade now, South Korea has established itself as a tireless generator of soft power, the popularity of its pop-culture spreading from Asia to the rest of the world. This class will look into the economic engine that moves this "cultural contents" industry, and will examine some of its expressions in the form of K-pop, soap operas, tourism, food, sports, and fashion in order to illuminate the ways in which Korean culture is being (self-)narrated and consumed in this era of globalization of the 21st century.

Same as: KORGEN 101

KORGEN 220. Narratives of Modern and Contemporary Korea. 4-5 Units.

This introductory survey will examine the development of South and North Korean literature from the turn of the 20th century until the present. The course will be guided by historical and thematic inquiries as we explore literature in the colonial period, in the period of postwar industrialization, and contemporary literature from the last decade. We will supplement our readings with critical writing about Korea from the fields of cultural studies and the social sciences in order to broaden the terms of our engagement with our primary texts.

Same as: KORGEN 120

KORGEN 221. Doing the Right Thing: Ethical Dilemmas in Korean Film and Literature. 3-4 Units.

Ethics and violence seem to be contradictory terms, yet much of Korean film and literature in the past five decades has demonstrated that they are an intricate and in many ways justifiable part of the fabric of contemporary existence. Film and literature exposes time and again the complex ways in which the supposed vanguards of morality, religious institutions, family, schools, and the state are sites of condoned transgression, wherein spiritual and physical violation is inflicted relentlessly. This class will explore the ways in which questions about Truth and the origins of good and evil are mediated through film and literature in the particular context of the political, social, and economic development of postwar South Korea. Class held in Lathrop Library Rm. 212.

Same as: KORGEN 121

KORGEN 240. Childhood and Children: Culture in East Asia. 3-5 Units.

Literature for children often reflects society's deepest-held convictions and anxieties, and is therefore a critical site for the examination of what is deemed to be the most imperative knowledge for the young generation. In this respect, the analysis of both texts and visual culture for children, including prose, poetry, folk tales, film, and picture books illuminates prevalent discourses of national identity, family, education and gender. Through an examination of a diverse range of genres and supported by the application of literary theories, students will obtain an understanding, in broad strokes, of the birth of childhood and the emergence of children's literature of China, Korea and Japan from the turn of the century until the present.

Same as: KORGEN 140

Korean Language Courses

KORLANG 1. First-Year Korean, First Quarter. 5 Units.

Communication skills, vocabulary, and grammar patterns. Culturally appropriate conduct relevant to contexts such as greetings, gestures, and body language.

KORLANG 1H. Beginning Korean for Heritage Learners, First Quarter. 3 Units.

For students with previous knowledge of Korean or a strong background in listening and speaking. Focus is on reading, writing, and spelling rather than speaking and listening. Sources include textbook, workbook, and digitized listening materials.

KORLANG 2. First-Year Korean, Second Quarter. 5 Units.

Continuation of KORLANG 1. Communication skills, vocabulary, and grammar patterns. Culturally appropriate conduct relevant to contexts such as greetings, gestures, and body language. Prerequisite: Placement Test, KORLANG 1.

KORLANG 2H. Beginning Korean for Heritage Learners, Second Quarter. 3 Units.

Continuation of KORLANG 1H. For students with previous knowledge of Korean or a strong background in listening and speaking. Focus is on reading, writing, and spelling rather than speaking and listening. Sources include textbook, workbook, and digitized listening materials. Prerequisite: KORLANG 1H.

KORLANG 3. First-Year Korean, Third Quarter. 5 Units.

Continuation of KORLANG 2. Communication skills, vocabulary, and grammar patterns. Culturally appropriate conduct relevant to contexts such as greetings, gestures, and body language. Prerequisite: Placement Test, KORLANG 2. Fulfills the University language requirement.

KORLANG 3H. Beginning Korean for Heritage Learners, Third Quarter. 3 Units.

Continuation of KORLANG 2H. For students with previous knowledge or a strong background in listening and speaking. Focus is on reading, writing, and spelling rather than speaking and listening. Sources include textbook, workbook, and digitized listening materials. Prerequisite: KORLANG 2H. Fulfills University Language requirement.

KORLANG 21. Second-Year Korean, First Quarter. 5 Units.

Continuation of KORLANG 3. More complex sentences and grammatical patterns. Conversation in daily situations such as making a polite request or suggestion, reading simple texts, and Korean culture. Prerequisite: Placement Test, KORLANG 3.

KORLANG 22. Second-Year Korean, Second Quarter. 5 Units.

Continuation of KORLANG 21. More complex sentences and grammatical patterns. Conversation in daily situations such as making a polite request or suggestion, reading simple texts, and Korean culture. Prerequisite: Placement Test, KORLANG 21.

KORLANG 23. Second-Year Korean, Third Quarter. 5 Units.

Continuation of KORLANG 22. More complex sentences and grammatical patterns. Conversation in daily situations such as making a polite request or suggestion, reading simple texts, and Korean culture. Prerequisite: Placement Test, KORLANG 22.

KORLANG 101. Third-Year Korean, First Quarter. 4-5 Units.

Continuation of KORLANG 23. Materials about Korean culture and society. Proficiency in interpersonal, interpretive, and presentational communication. Vocabulary, reading, and aural/oral skills. Prerequisite: Placement Test, KORLANG 23.

KORLANG 102. Third-Year Korean, Second Quarter. 4-5 Units.

Continuation of KORLANG 101. Materials about Korean culture and society. Proficiency in interpersonal, interpretive, and presentational communication. Vocabulary, reading, and aural/oral skills. Prerequisite: Placement Test or KORLANG 101.

KORLANG 103. Third-Year Korean, Third Quarter. 4-5 Units.

Continuation of KORLANG 102. Materials about Korean culture and society. Proficiency in interpersonal, interpretive, and presentational communication. Vocabulary, reading, and aural/oral skills. Prerequisite: Placement Test, or KORLANG 102.

KORLANG 110. Korean Pronunciation and Intonation. 1-2 Unit.

Goal is intelligibility and fluency. Lab assignments. Prerequisite: 3.

KORLANG 111. Medical Korean, First Quarter. 2-3 Units.

Medical vocabulary; cultural attitude. Video clips, technical journal and prescription reading, and class simulations. Prerequisite: 23.

KORLANG 112. Medical Korean, Second Quarter. 2 Units.

Medical vocabulary; cultural attitude. Video clips, technical journal and prescription reading, and class simulations. Prerequisite: 111.

KORLANG 120A. Korean Culture. 1-3 Unit.

Examination of Korean culture and society to develop fluency and vocabulary through newspapers and short essays. May be repeated for credit. Prerequisite: 103.

KORLANG 120B. Korean Culture. 1-2 Unit.

Examination of Korean culture and society to develop fluency and vocabulary through newspapers and short essays. May be repeated for credit. Prerequisite: 103.

KORLANG 120C. Korean Culture. 1-2 Unit.

Examination of Korean culture and society to develop fluency and vocabulary through newspapers and short essays. May be repeated for credit. Prerequisites: 103.

KORLANG 120K. Korean Language and Culture through Drama and Film. 2-3 Units.

Korean culture and society through contemporary Korean drama and films. Advanced vocabulary, grammar, and idiomatic expressions. Prerequisite: placement test or 103.

KORLANG 130. Reading Korean. 2-3 Units.

Contemporary literature and academic texts. May be repeated for credit. Prerequisite: KORLANG 103.

KORLANG 200. Directed Reading in Korean. 1-5 Unit.

Prerequisite: consent of instructor.nn (Staff).

KORLANG 395. Graduate Studies in Korean. 1-5 Unit.

Prerequisite: consent of instructor.

Korean Literature Courses

KORLIT 230. Intimate Encounters: Reading and Translating Korean Literature. 4-5 Units.

Close analysis of fiction and poetry in original Korean. Discussion of the works in a broader context of Korean literature, history, and current events. Translation of Korean fiction that has not previously been translated; select translations will be considered for publication. Prerequisite: three years of Korean language.

Same as: KORLIT 330

KORLIT 231. Topics in Korean Literature. 4-5 Units.

Colonial period fiction is often described in binary terms in Korean literary history, via genre (modernism/realism), politics (resistance/collaboration), aesthetics (verisimilitude/style), interpretive focus (content/form), subject (collective/individual), and class (engaged/elite), among others. This term we will focus on major works and authors but will also raise questions regarding the status of cultural production under colonial rule. nPrerequisite: KORGEN 120/220.

KORLIT 330. Intimate Encounters: Reading and Translating Korean Literature. 4-5 Units.

Close analysis of fiction and poetry in original Korean. Discussion of the works in a broader context of Korean literature, history, and current events. Translation of Korean fiction that has not previously been translated; select translations will be considered for publication. Prerequisite: three years of Korean language.

Same as: KORLIT 230

Latin American Studies Courses

LATINAM 197. Directed Individual Research. 1-10 Unit.

For students engaged in interdisciplinary work that cannot be arranged by department. May be repeated for credit. Prerequisite: consent of instructor.

LATINAM 198. Honors Thesis. 1-10 Unit.

Restricted to those writing an honors thesis in Latin American Studies.

LATINAM 200. Seminar on Contemporary Issues in Latin American Studies. 1 Unit.

Guest scholars present analyses of major Latin American themes.

LATINAM 207. Spanish in Science/Science in Spanish. 2 Units.

For graduate and undergraduate students interested in the natural sciences and the Spanish language. Students will acquire the ability to communicate in Spanish using scientific language and will enhance their ability to read scientific literature written in Spanish. Emphasis on the development of science in Spanish-speaking countries or regions. Course is conducted in Spanish and intended for students pursuing degrees in the sciences, particularly disciplines such as ecology, environmental science, sustainability, resource management, anthropology, and archeology. Same as: BIO 208, EARTHSYS 207

LATINAM 398. Master's Thesis. 1-10 Unit.

Restricted to students writing a master's thesis in Latin American Studies. May be repeated for credit.

LATINAM 801. TGR Project. 0 Units.

Law Courses

LAW 201. Civil Procedure I. 4 Units.

This course is part of the required first-year JD curriculum. This course is a study of the process of civil litigation from the commencement of a lawsuit through final judgment under modern statutes and rules of court, with emphasis on the federal rules of civil procedure. May include class participation, written assignments, or other elements. Your instructor will advise you of the basis for grading.

LAW 203. Constitutional Law. 3 Units.

This course is part of the required first-year JD curriculum. This course offers an introduction to American constitutional law. In addition to examining questions of interpretive method, the course focuses on the powers of the federal government and the allocation of decision making authority among government institutions, including both federalism and separation of powers. Class participation, attendance, written assignments, and final exam. This course is open to first-year Law School students only.

LAW 205. Contracts. 4 Units.

This course is part of the required first-year JD curriculum. It provides exposure to basic contract law. The course will identify the scope and purpose of the legal protection accorded to interests predicated on contract and will focus on problems of contract formation, interpretation, performance, and remedies for breach.

LAW 207. Criminal Law. 4 Units.

This course is part of the required first-year JD curriculum. It examines the traditional general issues in the substantive criminal law, including the purposes of punishment and the appropriate limits on the use of the criminal sanction. It focuses predominantly on how criminal statutes are organized around objective offense elements (conduct, causation, and attendant circumstances) and mental states, and to a lesser degree on inchoate crimes, complicity, justification and excuse.

LAW 217. Property. 4 Units.

This course is part of the required first-year JD curriculum. It deals with possession and ownership of land and with the incidents thereof, including private and public restrictions on its use and development, nuisance, trespass, concurrent interests, landlord and tenant, and eminent domain. Attendance and final exam. Your instructor will advise you of other basis of grading. This course is open to first-year Law School students only.

LAW 218. JSD Research Colloquium. 0 Units.

Required for and limited to JSD candidates. The objective of the colloquium is to assist students in developing their dissertation research proposals. Weekly colloquium sessions will include a mix of lectures and discussions on selected methodological topics, relevant to the candidates' dissertation research; guest lectures by empirical legal research scholars; presentations by and discussions with more advanced doctoral candidates; and presentations by the first year JSD candidates.

LAW 219. Legal Research and Writing. 2 Units.

Legal Research and Writing is a two-unit course taught as a simulation. Students work on a legal problem starting with an initial interview, and they conduct fact investigation and legal research related to that problem. Students receive rigorous training in reading and analyzing legal authority, and in using persuasive strategies--legal analysis, narrative, rhetoric, legal theory, and public policy--to frame and develop legal arguments. Students write predictive memos and persuasive briefs, and are introduced to the professional norms of ethics, timeliness, and courtesy. This course is part of the required first-year JD curriculum.

LAW 220. Regulatory Economics. 5 Units.

Law 220 examines public policies for dealing with problems arising in markets in which competitive forces are weak. The focus is on monopolies, oligopolies, cartels, and other environments where market mechanisms are unlikely to produce outcomes that benefit consumers more than the alternatives involving costly government intervention. The two main areas examined are competition policy and economic regulation. Competition policy refers to laws that define certain market behavior as illegal because it is harmful to competition or fails to provide consumer benefits that justify its costs to consumers. Economic regulation refers to policies in which government controls prices and/or decides the terms and conditions under which firms can participate in a market. A growing area of study and policy design is the introduction of market mechanisms into formerly regulated industries such as: telecommunications, electricity, airlines, railroads, postal delivery services and environmental regulation. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper and Final Exam. Cross-listed with Economics (ECON 158).

LAW 221. Intellectual Property: Commercial Law. 3 Units.

This seminar, co-taught by eBay's first In-House Counsel and former Director of Law & Public Policy, Brad Handler, examines the ways in which intellectual property rights are asserted, exchanged, protected, and respected, both in theory and in practice. Special attention is devoted to the regulatory and strategic considerations involved in the business and legal decisions implicating intellectual property. See SLS Registrar's website for prerequisites.

LAW 222. Advanced Legal Research. 3 Units.

The course is designed to prepare law students for research in practice and clerkships. The course will review who produces legal authority and how this material is organized, published, indexed and kept current. Objectives for the course: 1) to show students how to evaluate legal research sources and use them effectively, with particular emphasis on cost-effective research; 2) to expand skills in primary and secondary U.S. legal sources; and 3) to introduce students to the array of non-legal information resources that could be useful to legal practice. Since learning legal research requires a hands-on approach, students are required to complete homework assignments and in-class exercises. Each student is also required to analyze a recent California Supreme Court opinion. This course is open to Stanford graduate students with permission from the instructor. Elements used in grading: Written assignments and in-class exercises.

LAW 223. Torts. 4 Units.

This course is part of the required first-year JD curriculum. It considers issues involved in determining whether the law should require a person to compensate for harm intentionally or unintentionally caused. These problems arise in situations as diverse as automobile collisions, operations of nuclear facilities, and consumption of defective food products. Among other considerations, the course explores various resolutions in terms of their social, economic, and political implications.

LAW 224. Federal Litigation: Coursework. 2 Units.

This course is part of the required first-year JD curriculum. It is an introductory course in the litigation process. Students represent the plaintiff or defendant in a simulated public interest case set in a federal district court that raises complex issues of federal civil procedure, privacy, and first amendment law. Students plan litigation strategy, draft pleadings, conduct discovery, write short briefs, and orally argue major motions for dismissal, class action certification, and preliminary injunctive relief. While developing students' written and oral advocacy skills, the course also focuses on substantive issues of civil procedure and constitutional law. Attendance, class participation and written assignments. This course is open to first-year Law School students only.

LAW 224B. Federal Litigation: Methods. 1 Unit.

This course is part of the required first-year JD curriculum. It is an introductory course in the litigation process. Students represent the plaintiff or defendant in a simulated public interest case set in a federal district court that raises complex issues of federal civil procedure, privacy, and first amendment law. Students plan litigation strategy, draft pleadings, conduct discovery, write short briefs, and orally argue major motions for dismissal, class action certification, and preliminary injunctive relief. While developing students' written and oral advocacy skills, the course also focuses on substantive issues of civil procedure and constitutional law. Attendance, class participation and written assignments. This course is open to first-year Law School students only.

LAW 224C. Federal Litigation: Practice. 1 Unit.

This course is part of the required first-year JD curriculum. It is an introductory course in the litigation process. Students represent the plaintiff or defendant in a simulated public interest case set in a federal district court that raises complex issues of federal civil procedure, privacy, and first amendment law. Students plan litigation strategy, draft pleadings, conduct discovery, write short briefs, and orally argue major motions for dismissal, class action certification, and preliminary injunctive relief. While developing students' written and oral advocacy skills, the course also focuses on substantive issues of civil procedure and constitutional law. Attendance, class participation and written assignments. This course is open to first-year Law School students only.

LAW 225A. Immigrants' Rights Clinic: Clinical Practice. 4 Units.

The Immigrants' Rights Clinic offers students the opportunity to represent immigrants before the San Francisco Immigration Court, the Board of Immigration Appeals, and the Ninth Circuit Court of Appeals. Students in the clinic conduct mini-trials in immigration court, write motions and appellate briefs, interview clients and witnesses, investigate facts, develop case strategy, and argue cases. The Clinic represents immigrants with past criminal convictions, asylum seekers, and survivors of domestic violence. All clinic students also work on a variety of impact litigation and advocacy projects to address federal government immigration enforcement practices at the national and local levels, including impact litigation to challenge prolonged immigration detention, local and state advocacy to limit enforcement activity by police, the creation of model pleadings and know your rights materials for immigrant detainees, and advocacy with the federal agencies that regulate immigration. No prior substantive experience or background in immigration or immigrants' rights work is necessary. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, case and project work and writing assignments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 225B. Immigrants' Rights Clinic: Clinical Methods. 4 Units.

The Immigrants' Rights Clinic offers students the opportunity to represent immigrants before the San Francisco Immigration Court, the Board of Immigration Appeals, and the Ninth Circuit Court of Appeals. Students in the clinic conduct mini-trials in immigration court, write motions and appellate briefs, interview clients and witnesses, investigate facts, develop case strategy, and argue cases. The Clinic represents immigrants with past criminal convictions, asylum seekers, and survivors of domestic violence. All clinic students also work on a variety of impact litigation and advocacy projects to address federal government immigration enforcement practices at the national and local levels, including impact litigation to challenge prolonged immigration detention, local and state advocacy to limit enforcement activity by police, the creation of model pleadings and know your rights materials for immigrant detainees, and advocacy with the federal agencies that regulate immigration. No prior substantive experience or background in immigration or immigrants' rights work is necessary. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, case and project work and writing assignments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 225C. Immigrants' Rights Clinic: Clinical Coursework. 4 Units.

The Immigrants' Rights Clinic offers students the opportunity to represent immigrants before the San Francisco Immigration Court, the Board of Immigration Appeals, and the Ninth Circuit Court of Appeals. Students in the clinic conduct mini-trials in immigration court, write motions and appellate briefs, interview clients and witnesses, investigate facts, develop case strategy, and argue cases. The Clinic represents immigrants with past criminal convictions, asylum seekers, and survivors of domestic violence. All clinic students also work on a variety of impact litigation and advocacy projects to address federal government immigration enforcement practices at the national and local levels, including impact litigation to challenge prolonged immigration detention, local and state advocacy to limit enforcement activity by police, the creation of model pleadings and know your rights materials for immigrant detainees, and advocacy with the federal agencies that regulate immigration. No prior substantive experience or background in immigration or immigrants' rights work is necessary. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, case and project work and writing assignments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 226. Accounting. 3 Units.

The objective of financial accounting is to measure economic activity for decision-making. Financial statements are a key product of this measurement process and an important component of firms' financial reporting activities. This course is aimed at developing students' ability to read, understand, and use corporate financial statements. The primary focus is on understanding the mapping between underlying economic events and financial statements, and how this mapping can affect inferences about future firm profitability. To this end, the course will provide an introduction to: (1) accrual accounting concepts, principles and conventions; (2) the process of preparing and presenting the primary financial statements (income statement, balance sheet, and statement of cash flows); (3) the judgment involved and discretion allowed in making accounting choices; (4) the effects of accounting discretion on the quality of the (reported) financial information; and (5) the fundamentals of financial statement analysis. Class time will be allocated to a combination of short lectures and discussions of the assigned cases. The assigned cases are based on actual corporate financial statements and/or "real life" financial situations. Elements used in grading: Class participation, attendance, written assignments, final paper.

LAW 229. Equal Protection: Race and the Law. 3 Units.

This course will examine the application of constitutional and statutory antidiscrimination law to race related controversies across a variety of settings. The course will begin with an exploration of the historical developments that led to antidiscrimination law, and with an introduction to the competing frameworks that define current antidiscrimination law: the discriminatory purpose and anti-classification approaches that feature prominently in equal protection doctrine, and the disparate impact framework that is incorporated into some statutory law. After some exploration of the historical origins of antidiscrimination law and its alternative formulations, the course will then turn to the specific contexts in which controversies arise. The settings that will be examined include criminal justice, college admissions, political participation, primary/secondary education, employment, housing, hate speech, and the formation of family relationships. In each of these settings, we will devote close attention to the role of antidiscrimination law in specific controversies. Throughout, our intellectual goals will be twofold: to understand the special challenges that race poses, and to appreciate more generally some of the dilemmas of legal regulation.

LAW 230. Creation of the Constitution. 4 Units.

The course begins with readings setting forth the intellectual and experiential background of the framing, including common law and natural rights theory, republicanism, economic & political scientific ideas, and colonial and post-Independence experience. We then study large parts of the debates at the Constitutional Convention, primarily using Madison's Notes. Next come the ratification debates, including readings from antifederalist writers, about half of *The Federalist*, and overviews of the Virginia and New York ratification conventions. We conclude with the addition of the Bill of Rights. Classes consist of a combination of lecture and extensive participation by students. Elements used in grading: Exam. Cross-listed with History (HISTORY 153).

LAW 233. Antitrust. 4 Units.

Antitrust law sets the ground rules for competition. This course will explore the basic concepts in antitrust law. We will examine cartels and competitor collaborations, monopolization, vertical restraints and mergers. There are no prerequisites for this course. No economic background is required. The course is open to GSB students and graduate students in the Economics Department. To apply for this course, non-Law students must complete a Non-Law Student Add Request Form available on the SLS Registrar's Office website (see Non-Law Students). Elements used in grading: Class participation, attendance and final exam.

LAW 236. Art and the Law. 2 Units.

This course covers the legal, public policy, and ethical issues that concern artists, art dealers, auction houses, museums, collectors, and others who comprise the world of visual art. Our focus will be on artists' rights (including copyright, resale royalties, moral rights, and freedom of expression issues), how the market in art functions (such as the artist-dealer relationship, auction rules, and issues faced by collectors), and the legal and ethical rules governing the collection, donation, and display of visual art, particularly for museums and their donors. The course focuses on certain recurrent themes: How do statutes and courts define (or attempt to define) art and how is art defined differently for different legal purposes? How does the special character of art justify or require different treatment under the law from that accorded other tangible personal property, and how does (and should) the expressive nature of art affect the way it is owned, protected, regulated, or funded? We anticipate having two or three visitors to the class during the quarter, such as a gallery owner, auctioneer, and museum director. In addition, we will also have the students participate in at least one or two interactive negotiation simulation exercises inspired by real situations and controversies in the art world. Special Instructions: Students have the option to write a research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, final paper or final exam.

LAW 238. Administrative Law. 4 Units.

Law made by administrative agencies dominates the modern legal system and modern legal practice. This course examines the legal and practical foundations of the modern administrative state. Topics include rationales for delegation to administrative agencies; the legal framework (both constitutional and statutory) that governs agency decision-making; the proper role of agencies in interpreting statutory and regulatory law; and judicial review of agency action. The course will cover these topics through a combination of cases and examples drawn primarily from separation of powers doctrine; the constitutional law of due process; health, safety, and environmental policy; criminal justice; and national security law. The central theme of the course is how administrative law balances "rule of law" values (procedural regularity, substantive limits on arbitrary action) against the often competing values of political accountability, democratic participation, and effective administrative governance. Elements used in grading: Class participation, attendance and final exam.

LAW 239. Writing Workshop: Law and Creativity. 3 Units.

Practicing law is very much a creative enterprise. Effective advocates and counselors provide innovative and thoughtful solutions to complex problems. But there often isn't enough attention devoted in law school either to thinking creatively or to reflecting in a creative way on the issues students confront inside and outside the classroom. This course will respond to this gap by building a bridge between law and the arts, with the goal of helping students hone their ability to think creatively and use disciplined imagination. Law & Creativity will meet twice a week and have dual components designed to inform one another. The first session will be structured as a seminar in which students gather to examine and discuss creative treatments of legal and professional issues in a variety of media (including film, fiction, and nonfiction). The second session will follow the creative-writing workshop model in which students submit their own fiction and creative nonfiction pieces for group discussion. Through the workshop process, students will develop the skills necessary to constructively critique and workshop one another's work, and learn a variety of techniques for improving their own creative writing. Writing (W) credit is for students entering prior to Autumn 2012. Elements used in grading: Class attendance, participation and final paper.

LAW 240. Bankruptcy. 3 Units.

This course concerns the law and finance of corporate bankruptcy with an emphasis on reorganization. The course reviews the fundamentals of debt contracting, including the role of events of default, debt priority, and security interests. The course examines various aspects of the bankruptcy process: including the automatic stay, the avoidance of prebankruptcy transactions (e.g. fraudulent conveyances and preferences), the treatment of executory contracts, the debtor's governance structure during bankruptcy, the financing of operations and investments in bankruptcy, sales of assets during bankruptcy, and the process of negotiating, voting, and ultimately confirming a plan of reorganization. Elements used in grading: Class participation and exam.

LAW 241. Payment Systems. 3 Units.

Negotiable instruments, letters of credit, checks, credit cards, electronic fund transfers, and cash. This course surveys the legal mechanisms by which funds can be transferred, including new mechanisms that have become more important as a result of (a) changes in electronic technology and (b) increased international trade. Designing a system for transferring funds is not easy -- as e-firms like PayPal have discovered -- and the law has had to deal with the difficulties of each new system in turn. The principal focus will be on articles 3, 4, 4A, and 5 of the Uniform Commercial Code, with occasional reference to other statutes and to international conventions and treaties. Bankruptcy is the first of three courses (the other two are Secured Credit and Payment Systems) dealing with the financing of commercial ventures through means other than the sale of corporate stock. These courses may be taken in any order: neither presupposes any knowledge of the others. Students who cannot take all three should probably prioritize them in the order they are listed--that is, Bankruptcy is the single most important course to take, then Secured Credit, then Payment Systems. Elements Used in Grading: In-School, open book.

LAW 242. Corporations. 4 Units.

This course is an introduction to the law of organizations with a focus on business corporations. The course is the foundation for advanced business courses. We will examine how organizational law mitigates the conflicts among owners, managers, and creditors and facilitates enterprise. Topics covered will include the law of agency, fiduciary duties, voting rights, and mergers and acquisitions. Elements used in grading: Class Participation, Attendance, Final Exam.

LAW 245. China Law and Business. 3 Units.

This introductory course provides an overview of the Chinese legal system and business environment and examines Chinese legal rules and principles in select business-related areas. These areas include intellectual property, dispute resolution, foreign investment, mergers and acquisitions, antimonopoly law, and environment. Through active class participation and analysis of business case studies, students will learn both the law in the books and the law in action, as well as strategies that businesses could use to overcome limitations in the Chinese legal system. Leaders from the law and business community will be invited to share their experiences and insights. This course is particularly suitable for law students and students enrolled in the MBA program and/or the East Asian Studies Program. Undergraduates who have permission from the instructor may also take this course. A Stanford Non-Law Student Course Registration Form is available on the SLS Registrar's Office website. Elements used in grading: Class participation (30%) and extended take-home exam (70%).

LAW 248. Corporate Reorganization. 3 Units.

This course examines the reorganization of a financially distressed company under chapter 11 of the Bankruptcy Code. Among other things, the course follows a fictitious company through several stages of a business turnaround and financial restructuring, including an out-of-court workout, a chapter 11 filing, selected chapter 11 operating issues, and the negotiation, formulation and confirmation of a plan of reorganization. In addition, the course follows current developments relating to bankruptcy, primarily through reports in the media. For example, in recent years the course has examined developments in actual chapter 11 cases (e.g., General Motors, Chrysler Corporation, American Airlines and Lehman Brothers) and the effects of bankruptcy on various industries (e.g., airlines, automotive, and retail). The course also touches on various issues that often arise in a reorganization setting, such as valuation, leveraged buyouts, debt and derivative instruments, and distressed debt trading. Elements used in grading: Class participation and final exam.

LAW 251. Conflict of Laws. 3 Units.

Instances are common in law where more than one legal authority potentially governs a particular event, occurrence or transaction. When the outcome required by these authorities differs, which law governs? Beginning with the classic problem of choosing an applicable law in cases with facts touching more than one jurisdiction, this course is designed broadly to explore the variety of theories and systems used to resolve this question. The course thus uses state/state conflicts to develop a set of approaches and then extends these to such other problems as adjudicatory jurisdiction, judgments, federal subject-matter jurisdiction, and public and private international law. Elements used in grading: Attendance, preparation, participation and final examination.

LAW 253. Advanced Civil Procedure. 3 Units.

This course will address major areas of civil procedure that receive little attention in the basic first-year course as well as broader questions of procedural design. We will address more complex forms of litigation by studying the joinder of claims and parties, preclusion doctrines, class actions, and arbitration, with special attention to the impact of these doctrines and practices on civil rights and social justice litigation. We will also explore questions of procedural design, especially through comparing U.S. procedure to procedural regimes of other countries. Elements used in grading: Exam.

LAW 255. Constitutional Law: The Fourteenth Amendment. 3 Units.

This course examines various aspects of the Fourteenth Amendment, with special attention to equal protection, substantive due process, and state action. Topics addressed will include equal protection in relation to race, gender, and sexual orientation, and substantive due process in relation to procreation, sexuality, and relationships. Elements used in grading: Class participation and exam.

LAW 259. State-Building and the Rule of Law Workshop. 4 Units.

Students previously selected through a competitive application process to participate in the Rule of Law Projects (the Afghanistan Legal Education Project, Iraq Legal Education Initiative, and Rwanda Law and Development Project) are required to take the State-Building and Rule of Law Seminar. The seminar introduces the key theories relevant to state-building generally and strengthening the rule of law in particular. This course expounds on the multidisciplinary nature of development -- through readings, lectures, guest lectures, and seminar discussions -- and asks how lawyers fit in and contribute to the process. Students will explore these issues in a weekly 3-hour seminar and then discuss application to their particular Rule of Law Project countries in weekly hour long workshops. This course will employ case studies as a way to analyze rule-of-law practice within development theory. The set of developing countries considered within the scope of this workshop is broad. It includes, among others, states engaged in post-conflict reconstruction, e.g., Cambodia, Timor Leste, Rwanda, Iraq, Sierra Leone; states still in conflict, e.g., Afghanistan, Somalia; the poorest states of the world that may not fall neatly into the categories of conflict or post-conflict, e.g., Nepal, Haiti; and least developed states that are not marked by high levels of violent conflict at all, e.g., Bhutan. Special Instructions: Students have the option to receive Writing (W) credit or Research (R) credit upon instructor approval. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Class participation and presentation of final written product, reaction papers, and final paper/project/proposal. Automatic grading penalty waived for writers. Writing (W) credit is for 3Ls only.

LAW 260. Contemporary Issues in Law and Politics. 2-3 Units.

This seminar covers high profile legal controversies from the previous few years. Topics to be covered this semester will include recent Supreme Court decisions concerning affirmative action, the Voting Rights Act, campaign finance, the First Amendment, national security, and criminal procedure, as well as other legislative controversies and cases pending during the term. Students are required to complete a considerable amount of reading each week and participate actively in the seminar. The final paper will be approximately 30 pages in length and will concern a topic of the student's choice dealing with law and politics. Students can take the seminar for either 2 or 3 units. Students taking the seminar for 3 units are required to complete weekly written assignments in addition to the final paper. After the term begins, students accepted into the course can transfer from section (01) into section (02), for 3 units with instructor consent. Elements used in grading: Class participation, final paper and written assignments (optional).

LAW 262. Corporate Finance I. 3 Units.

There are many contexts in which lawyers need an understanding of finance. For example, many of the disputes that give rise to litigation center on the financial valuation of firms and the securities they issue. In addition, an understanding of firms' capital structures and the design of corporate securities is necessary in analyzing many legal issues, especially those arising in corporate transactions, executive compensation, and bankruptcy proceedings. This course is designed to provide students with a rigorous conceptual understanding of finance and to give students the analytical tools needed to make financial decisions and value financial securities. The course stresses problem solving and includes problem sets, cases, and a midterm and final examination. The course is designed to be accessible to students with a fairly limited mathematical background. In general we will not assume any knowledge of mathematics beyond high-school algebra. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam.

LAW 266A. Juelsgaard Intellectual Property and Innovation Clinic: Clinical Practice. 4 Units.

The Juelsgaard Intellectual Property and Innovation Clinic provides students the opportunity to understand and advocate for sound innovation policies. Students in the clinic will help shape the course and outcome of significant legal and policy debates before courts, legislators, regulatory bodies, and other policy makers. Our work focuses on the relationship between law, regulation and innovation in areas ranging from biotechnology to information technology, pharmaceuticals, clean technology, and the creation and distribution of information. Students will represent a variety of NGOs and non-profit entities and, in certain cases, groups or associations of innovators, entrepreneurs, technology users or consumers, economists, technologists, legal academics, and the like, and occasionally individual inventors, start-ups, journalists, or researchers. Students will address their client's complex issues through tools that may include amicus briefs; comments or testimony in rulemaking and regulatory proceedings (i.e., DMCA exemption requests, comments to OSTP on issues such as open access, privacy or open data, comments to the FTC as part of IP and innovation hearings and reports, comments to the PTO or FDA, etc.); comments or testimony on proposed legislation; and whitepapers or other "best practices" documents to encourage sensible and balanced legal approaches to innovation and creativity. Our policy advocacy will often involve intertwined factual, technological, business, economic, political and public relations considerations along with the substantive legal issues. Students in the clinic may be called upon to collaborate with technologists, researchers, doctors, economists, social scientists, industry experts, and others to develop and articulate the appropriate policy advocacy for their clients. The clinic seminar will focus on student-led workshops regarding client projects, and on engaging with current thinking around innovation, innovation economics and the impact of IP, antitrust, and other law and regulation on innovation. We will explore the process of policy advocacy, including various policy levers, the types of tools available to advocates and the strategies and tactics that may be employed, and will consider and critique a variety of case studies of previous advocacy, situating them in the larger context in which these efforts occurred. Students will critically examine the role of lawyers advocating for the public interest and for sound and sensible innovation policy outcomes and bring those lessons to bear on their own clinic work. A background in technology may be useful in some cases but is not necessary to a successful experience in the clinic. - Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system.

LAW 266B. Juelsgaard Intellectual Property and Innovation Clinic: Clinical Methods. 4 Units.

The Juelsgaard Intellectual Property and Innovation Clinic provides students the opportunity to understand and advocate for sound innovation policies. Students in the clinic will help shape the course and outcome of significant legal and policy debates before courts, legislators, regulatory bodies, and other policy makers. Our work focuses on the relationship between law, regulation and innovation in areas ranging from biotechnology to information technology, pharmaceuticals, clean technology, and the creation and distribution of information. Students will represent a variety of NGOs and non-profit entities and, in certain cases, groups or associations of innovators, entrepreneurs, technology users or consumers, economists, technologists, legal academics, and the like, and occasionally individual inventors, start-ups, journalists, or researchers. Students will address their client's complex issues through tools that may include amicus briefs; comments or testimony in rulemaking and regulatory proceedings (i.e., DMCA exemption requests, comments to OSTP on issues such as open access, privacy or open data, comments to the FTC as part of IP and innovation hearings and reports, comments to the PTO or FDA, etc.); comments or testimony on proposed legislation; and whitepapers or other "best practices" documents to encourage sensible and balanced legal approaches to innovation and creativity. Our policy advocacy will often involve intertwined factual, technological, business, economic, political and public relations considerations along with the substantive legal issues. Students in the clinic may be called upon to collaborate with technologists, researchers, doctors, economists, social scientists, industry experts, and others to develop and articulate the appropriate policy advocacy for their clients. The clinic seminar will focus on student-led workshops regarding client projects, and on engaging with current thinking around innovation, innovation economics and the impact of IP, antitrust, and other law and regulation on innovation. We will explore the process of policy advocacy, including various policy levers, the types of tools available to advocates and the strategies and tactics that may be employed, and will consider and critique a variety of case studies of previous advocacy, situating them in the larger context in which these efforts occurred. Students will critically examine the role of lawyers advocating for the public interest and for sound and sensible innovation policy outcomes and bring those lessons to bear on their own clinic work. A background in technology may be useful in some cases but is not necessary to a successful experience in the clinic. - Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. 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Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system.

LAW 266C. Juelsgaard Intellectual Property and Innovation Clinic: Clinical Coursework. 4 Units.

The Juelsgaard Intellectual Property and Innovation Clinic provides students the opportunity to understand and advocate for sound innovation policies. Students in the clinic will help shape the course and outcome of significant legal and policy debates before courts, legislators, regulatory bodies, and other policy makers. Our work focuses on the relationship between law, regulation and innovation in areas ranging from biotechnology to information technology, pharmaceuticals, clean technology, and the creation and distribution of information. Students will represent a variety of NGOs and non-profit entities and, in certain cases, groups or associations of innovators, entrepreneurs, technology users or consumers, economists, technologists, legal academics, and the like, and occasionally individual inventors, start-ups, journalists, or researchers. Students will address their client's complex issues through tools that may include amicus briefs; comments or testimony in rulemaking and regulatory proceedings (i.e., DMCA exemption requests, comments to OSTP on issues such as open access, privacy or open data, comments to the FTC as part of IP and innovation hearings and reports, comments to the PTO or FDA, etc.); comments or testimony on proposed legislation; and whitepapers or other "best practices" documents to encourage sensible and balanced legal approaches to innovation and creativity. Our policy advocacy will often involve intertwined factual, technological, business, economic, political and public relations considerations along with the substantive legal issues. Students in the clinic may be called upon to collaborate with technologists, researchers, doctors, economists, social scientists, industry experts, and others to develop and articulate the appropriate policy advocacy for their clients. The clinic seminar will focus on student-led workshops regarding client projects, and on engaging with current thinking around innovation, innovation economics and the impact of IP, antitrust, and other law and regulation on innovation. We will explore the process of policy advocacy, including various policy levers, the types of tools available to advocates and the strategies and tactics that may be employed, and will consider and critique a variety of case studies of previous advocacy, situating them in the larger context in which these efforts occurred. Students will critically examine the role of lawyers advocating for the public interest and for sound and sensible innovation policy outcomes and bring those lessons to bear on their own clinic work. A background in technology may be useful in some cases but is not necessary to a successful experience in the clinic. - - Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system.

LAW 267. Law of Nonprofits. 3 Units.

This course provides an overview of the rules governing the formation and operation of nonprofit organizations. The course will focus both on the state laws governing nonprofit corporations and on federal tax laws. Topics will include the fiduciary duties of nonprofit directors, obtaining and maintaining tax-exempt status, nonprofit lobbying and political activities, and nonprofit earned income strategies, including social enterprise.

LAW 268. Democracy and the Constitution. 3 Units.

This course will explore connections between democratic theory, constitutional theory, and constitutional law. We will discuss issues in political philosophy, law, and jurisprudence, and leading cases about freedom of expression, campaign finance, deference to administrative agencies, and legislative apportionment. Readings from Scalia, Breyer, Ely, Rawls, Dahl, Sunstein, Siegel, Kramer, Habermas, Dworkin, Przeworski, Riker, and Schumpeter. Special Instructions: Enrollment is limited to 20 students, 10 from SLS and 10 from H&S, who will be selected by lottery. Elements used in grading: Class participation and final paper. Writing (W) credit is for students entering prior to Autumn 2012. Cross-listed with Political Science (POLISCI 438) and Philosophy (PHIL 374C).

LAW 272A. Organizations and Transactions Clinic: Clinical Practice. 4 Units.

The O&T Clinic is targeted at both students planning to do M&A, finance, securities, IP licensing or other corporate or transactional work at major firms and those seeking to explore a non-litigation, advisory-oriented practice. In the clinic, students develop legal advice, learn to review and write contracts and governance materials, meet with client executives, examine commercial relationships, and receive extensive feedback about their work. No prior experience in business, finance, or corporate law is necessary. Students work on structural, programmatic, contractual, affiliation, and governance matters for corporate entities. Students typically represent multiple clients during the term, interact with client CEOs, CFOs, board members, and general counsels, and work in teams with other students and the instructors. Students receive detailed comments about the design, content, and execution of work-products and client communications, and about their performance in client meetings and calls. Students regularly assess their own work throughout the quarter and prepare a self-evaluation at the end of the term. O&T clients are all established Northern California nonprofit corporations. Most of the clients generate annual revenues in the range of \$1 - \$25 million, and some are considerably larger. We focus on these organizations because they are corporations that typically have substantial governance and external disclosure obligations, active boards of directors, audited financial statements, complex programs, varied collaborations, and diverse funding sources and contractual relationships -- all of which are relevant to and productive of corporate work -- yet are small enough that the clinic's contact is a senior executive. We think they provide excellent material for students learning about organizational representation and institutional corporate practice. The course includes a seminar that generally meets twice a week. Seminar meetings focus on student-led workshops regarding client projects, and on orientation to corporate practice, including discussion of core commercial relationships such as acquisition, credit, and licensing, and practice skills such as transaction planning and management. Evaluation and grading are based on detailed points of emphasis that reflect ways of working we believe characterize an effective lawyer and responsible colleague. Course design and operation reflect the instructors' combined 40+ years of corporate practice representing consumer products, finance, technology, and life science companies, in both law firm and senior in-house roles. Information about prior projects is available from the instructors and on the SLS website. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a

LAW 272B. Organizations and Transactions Clinic: Clinical Methods. 4 Units.

The O&T Clinic is targeted at both students planning to do M&A, finance, securities, IP licensing or other corporate or transactional work at major firms and those seeking to explore a non-litigation, advisory-oriented practice. In the clinic, students develop legal advice, learn to review and write contracts and governance materials, meet with client executives, examine commercial relationships, and receive extensive feedback about their work. No prior experience in business, finance, or corporate law is necessary. Students work on structural, programmatic, contractual, affiliation, and governance matters for corporate entities. Students typically represent multiple clients during the term, interact with client CEOs, CFOs, board members, and general counsels, and work in teams with other students and the instructors. Students receive detailed comments about the design, content, and execution of work-products and client communications, and about their performance in client meetings and calls. Students regularly assess their own work throughout the quarter and prepare a self-evaluation at the end of the term. O&T clients are all established Northern California nonprofit corporations. Most of the clients generate annual revenues in the range of \$1 - \$25 million, and some are considerably larger. We focus on these organizations because they are corporations that typically have substantial governance and external disclosure obligations, active boards of directors, audited financial statements, complex programs, varied collaborations, and diverse funding sources and contractual relationships -- all of which are relevant to and productive of corporate work -- yet are small enough that the clinic's contact is a senior executive. We think they provide excellent material for students learning about organizational representation and institutional corporate practice. The course includes a seminar that generally meets twice a week. Seminar meetings focus on student-led workshops regarding client projects, and on orientation to corporate practice, including discussion of core commercial relationships such as acquisition, credit, and licensing, and practice skills such as transaction planning and management. Evaluation and grading are based on detailed points of emphasis that reflect ways of working we believe characterize an effective lawyer and responsible colleague. Course design and operation reflect the instructors' combined 40+ years of corporate practice representing consumer products, finance, technology, and life science companies, in both law firm and senior in-house roles. Information about prior projects is available from the instructors and on the SLS website. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a

LAW 272C. Organizations and Transactions Clinic: Clinical Coursework. 4 Units.

The O&T Clinic is targeted at both students planning to do M&A, finance, securities, IP licensing or other corporate or transactional work at major firms and those seeking to explore a non-litigation, advisory-oriented practice. In the clinic, students develop legal advice, learn to review and write contracts and governance materials, meet with client executives, examine commercial relationships, and receive extensive feedback about their work. No prior experience in business, finance, or corporate law is necessary. Students work on structural, programmatic, contractual, affiliation, and governance matters for corporate entities. Students typically represent multiple clients during the term, interact with client CEOs, CFOs, board members, and general counsels, and work in teams with other students and the instructors. Students receive detailed comments about the design, content, and execution of work-products and client communications, and about their performance in client meetings and calls. Students regularly assess their own work throughout the quarter and prepare a self-evaluation at the end of the term. O&T clients are all established Northern California nonprofit corporations. Most of the clients generate annual revenues in the range of \$1 - \$25 million, and some are considerably larger. We focus on these organizations because they are corporations that typically have substantial governance and external disclosure obligations, active boards of directors, audited financial statements, complex programs, varied collaborations, and diverse funding sources and contractual relationships -- all of which are relevant to and productive of corporate work -- yet are small enough that the clinic's contact is a senior executive. We think they provide excellent material for students learning about organizational representation and institutional corporate practice. The course includes a seminar that generally meets twice a week. Seminar meetings focus on student-led workshops regarding client projects, and on orientation to corporate practice, including discussion of core commercial relationships such as acquisition, credit, and licensing, and practice skills such as transaction planning and management. Evaluation and grading are based on detailed points of emphasis that reflect ways of working we believe characterize an effective lawyer and responsible colleague. Course design and operation reflect the instructors' combined 40+ years of corporate practice representing consumer products, finance, technology, and life science companies, in both law firm and senior in-house roles. Information about prior projects is available from the instructors and on the SLS website. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a

LAW 273. Deals I. 3 Units.

This course applies economic concepts to the practice of structuring contracts. Our goal is to understand common problems and solutions that arise in complex deals. The course extends over two quarters, meeting three hours per week the first quarter and two hours per week the second quarter. Students enrolled in the course must take both quarters. The first quarter will be spent in a traditional classroom setting, discussing economics articles and case studies of actual contracts that illustrate the concepts described in the articles. We focus on the issues arising from transaction costs, adverse selection, moral hazard, problems of enforceability, agency problems, and contracting over time. During the second quarter, we will explore the connection between economic theory and contracting practice by studying specific deals. Students, divided into groups, will study a deal and give a class presentation based on their deal. A lawyer or another participant in the deal will also lead a class discussion of that deal. When it works, the students' and the practitioners' analyses are mutually enlightening. In the past, we have studied movie financings, biotech alliances, venture capital financings, cross-border joint ventures, private equity investments, and corporate reorganizations. This course is capped at 30 Students, 12 GSB, 18 Law School students. Students enrolled in the course must take both quarters. The course is open to first-year Law School students. Writing (W) credit is for 3Ls only. No exam in Winter Term. An In-School exam will be given at the conclusion of the course in the Spring Term. Elements used in grading: Attendance, class participation, presentation, written assignments, a group paper, and exam. Grades will be given at the end of the second quarter and will be applied to both quarters. This course is cross-listed with GSBGEN 304. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 274. Advanced Immigrants' Rights Clinic. 2-7 Units.

The Immigrants' Rights Advanced Clinic offers the opportunity for students who have already successfully completed the Immigrants' Rights Clinic to pursue: a specific immigrants' rights advocacy project; advanced individual client representation; and/or working with the clinic director to provide direction/guidance to those enrolled in the Clinic for the first time. All advanced Clinic projects will be jointly designed by the director and the advanced student. Advanced students providing guidance/direction to first-time students will receive additional training on providing supervision. Special instructions: Advanced students are expected to attend the case-rounds portion of the weekly seminar, and to participate as needed in the lecture/discussion portion of the seminar. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Elements used in grading: Attendance and participation in class, project work, writing assignments, and case preparation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 275. Deals II. 2 Units.

This course applies economic concepts to the practice of structuring contracts. Our goal is to understand common problems and solutions that arise in complex deals. The course extends over two quarters, meeting three hours per week the first quarter and two hours per week the second quarter. Students enrolled in the course must take both quarters. The first quarter will be spent in a traditional classroom setting, discussing economics articles and case studies of actual contracts that illustrate the concepts described in the articles. We focus on the issues arising from transaction costs, adverse selection, moral hazard, problems of enforceability, agency problems and contracting over time. During the second quarter, we will explore the connection between economic theory and contracting practice by studying specific deals. Students, divided into groups, will study a deal and give a class presentation based on their deal. A lawyer or another participant in the deal will also lead a class discussion of that deal. When it works, the students' and the practitioners' analyses are mutually enlightening. In the past, we have studied movie financings, biotech alliances, venture capital financings, cross-border joint ventures, private equity investments, and corporate reorganizations. This course is capped at 30 Students, 12 GSB, 18 Law School students. Students enrolled in the course must take both quarters. The course is open to first-year Law School students. Writing (W) credit is for 3Ls only. No exam in Winter Term. An In-School exam will be given at the conclusion of the course in the Spring Term. Elements used in grading: Attendance, class participation, presentation, written assignments, a group paper, and exam. Grades will be given at the end of the second quarter and will be applied to both quarters. (Cross-listed as GSBGEN 508).

LAW 276. Employee Benefits Law. 3 Units.

Employee benefits law focuses on the various forms of benefits and compensation employers provide to their employees: cash and equity compensation, retirement plans, and health and welfare benefits. The field lies at the intersection of a number of different legal disciplines, including employment and labor law, tax, health care law and even corporate and securities law. As such it is a uniquely challenging field of law, one which offers insight into many of the major issues our society currently faces: fears about the adequacy of retirement savings, struggles over the new health care law, and attempts to rein in outside executive compensation arrangements. Elements used in grading: Class participation, attendance and final paper. Writing (W) credit is for 3Ls only.

LAW 278. The Article III Judge. 2 Units.

The contemporary debate over the proper role of a federal judge under the Constitution turns, in large measure, on what it is we think an Article III judge is doing when she is called upon to resolve a "case or controversy." Is she looking for the fair result? If so, by whose lights? Is she a political actor, or is she instead looking for a rule of decision that has been previously established by law (a "mere translator" of the law, in Justice Frankfurter's words). If so, by natural law or positive law? These are some of the questions we will consider in discussing what role a federal judge plays when she exercises "the judicial Power of the United States" conferred by Article III of the Constitution. Readings will include books and articles by some of the leading legal thinkers in the nation's history. Special Instructions: This class will meet the first three weeks of the quarter only. Elements used in grading: Class attendance and participation, reading the assigned material, and a 10-15 page paper that uses the readings to analyze a significant judicial opinion. Special Instructions: This class will meet the first three weeks of the quarter only.

LAW 279. Advanced Organizations and Transactions Clinic. 2-7 Units.

Advanced clinic allows students who have taken the Organizations & Transactions Clinic to work on ongoing projects. Advanced clinic may be taken for 2-7 units. Students may not enroll in any clinic (basic or advanced) which would result in them earning more than 27 clinical credits during their law school career. Students must have taken Organizations & Transactions Clinic (Law 272). Writing (W) credit is for 3Ls only. Elements used in grading: Written assignments and client interactions.

LAW 280. Toxic Harms. 2 Units.

This seminar will examine the concerns arising from exposure to toxic substances from a variety of perspectives. A principal focus will be tort liability, and a central theme in the course will be whether tort law is an effective method of compensating victims of toxic exposure and controlling the distribution and/or emission of toxic substances. In order to assess the efficacy of tort, it is essential to compare the liability system with alternatives such as restructured "public law" litigation, administrative compensation schemes, and regulatory control strategies. Moreover, it seems equally important that these options be grounded in a concrete understanding of the major current problem areas. To accomplish these aims, the course will focus on a number of specific present concerns, including tobacco, asbestos, anti-inflammatory drugs, and workplace emissions exposures. In each instance, we will look at the nature of the public health problem as well as ensuing tort litigation and regulatory activity. In addition to examining these distinctive problem areas, we will look at broader, cross-cutting institutional reform proposals that have received recent attention. Students in Section (01) will write three ten-page writing exercises on topics discussed in class. After the term begins, students accepted into the course can transfer from section (01) into section (02), and have the option to write a final independent research paper for Research credit, with instructor consent. Elements used in grading: Three ten-page writing exercises or final independent research paper. Early drop deadline.

LAW 281. Natural Resources Law and Policy. 3 Units.

Natural resource management presents extremely difficult and contentious issues of law and public policy. Major debates continue to rage over issues such as the Endangered Species Act, whether the United States should permit drilling in the Arctic National Wildlife Refuge, and how to prevent the overfishing of the oceans. This course will focus on two major aspects of natural-resource management: biodiversity protection (including the Endangered Species Act, ocean fisheries management, and global protection of marine mammals) and public lands in the United States such as national parks and wilderness areas. The course also will examine the National Environmental Protection Act and the effectiveness of environmental impact assessments. Class sessions will include critical examinations of current law and policy and in-depth discussions of situational case studies that force you to consider how you would resolve real-life issues. Students will be expected to participate actively in class discussions. (This course will not examine either water law or energy law in any depth. Water Law will be offered again in the 2015-2016 academic year. Several other courses in the Law School deal with energy-law questions.) Elements used in grading: Class participation and final exam (open book).

LAW 283. Federal Courts. 4 Units.

This course addresses the role of the federal courts in the American system of federalism and separation of powers, as well as their role in the development of substantive federal law and constitutional rights. A central premise of the course is that the institutional, political, and constitutional features of federal court litigation cannot be understood without engaging the historical context, especially the social, political, and legal movements, in response to which the federal courts have developed. Thus while many of the traditional aspects of federal court jurisprudence will be covered (e.g., federal common law including implied rights of action, justiciability doctrines and other doctrines of restraint, congressional power to limit the jurisdiction of the federal courts and to create "legislative courts" outside of Article III, Supreme Court review of judgments, state sovereign immunity, litigating against the government, and federal habeas corpus), doctrine will be placed alongside interdisciplinary readings on social, political, and theoretical accounts that reveal how the courts and ordinary Americans have come to understand the distinctive role of the federal courts, as well as claims for expansion or contraction of their powers. The course is strongly recommended for students interested in pursuing a career in litigation and/or judicial clerkships in the federal courts. Elements used in grading: Class attendance, class participation, take home exam and short paper.

LAW 285. International Trade Regulation. 3 Units.

This course will survey the law and policy of the WTO system and related legal regimes. Topics will include the relationship between international and domestic law, the WTO dispute resolution system, legal restrictions on border instruments, nondiscrimination obligations in international trade, preferential trading agreements such as NAFTA, the perceived tension between WTO obligations and domestic environmental/health/safety regulations, subsidies in international trade, antidumping law, trade in services, and investor rights under trade agreements. Elements used in grading: Class participation and final exam.

LAW 287. Advanced Juelsgaard Intellectual Property and Innovation Clinic. 2-7 Units.

Advanced clinic allows students who have taken the Advanced Juelsgaard Intellectual Property and Innovation Clinic to continue working on cases. Advanced clinic may be taken for 2-7 units. Students may not enroll in any clinic (basic or advanced) which would result in them earning more than 27 clinical credits during their law school career.

LAW 290. Evidence. 5 Units.

Evidence rules constrain proof at criminal and civil trials. We will study the Federal Rules of Evidence, related case law, and those constitutional concepts that limit proof at criminal trials. Topics include relevance, unfair prejudice, character evidence, impeachment, the rape shield law, hearsay, and the Confrontation and Compulsory Process Clauses. Please note that the California Bar Examiners have posted this announcement: "Applicants should be prepared to answer questions that have issues concerning the Federal Rules of Evidence and the California Evidence Code. Applicants should be prepared to compare and contrast the differences between the Federal Rules and the California Evidence Code, especially where the California rules of evidence have no specific counterparts in the Federal Rules." This evidence course covers only the Federal Rules of Evidence and does not address the California Evidence Code. Although similar principles of law govern the Federal Rules and California Code, the two sets of rules are not identical. Students preparing for the California Bar Exam will have to learn some new material. Special Instructions: Add-drop decisions need to be resolved by the end of the first week of instruction; no drops will be permitted thereafter. Elements used in grading: Final exam (one-half essay and one-half multiple choice).

LAW 291. Advanced Evidence. 3 Units.

Public interest lawyers often spend much of their time in the courtroom. Yet, prosecution, defender, and legal aid offices usually do not have the resources to train their lawyers in trial work. This course seeks to help remedy this deficiency by helping students who plan to do public interest work develop witness interrogation skills. Students will apply their theoretical grasp of evidence to concrete trial problems involving the direct and cross examination of lay and expert witnesses, the introduction of documentary evidence, and the use of illustrative evidence in California and federal courts. The goal is to train students in the art of examining friendly and hostile witness and in the use of documentary and illustrative evidence. The text will be Meacute;ndez, Evidence: The California Code and the Federal Rules -- A Problem Approach (West 5th ed. 2012) and additional course materials. Special Instructions: The course will be limited to 6 students who will be selected by the professor. Credit is contingent on attending all classes and participating in all exercises. Participation is crucial to the success of the course, as students will be working in teams of three. Do not take this course unless you are willing and able to participate fully and can accept criticism. Evidence (Law 290) is a prerequisite. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline. Elements used in grading: Attendance and class participation.

LAW 292. Estate Planning. 3 Units.

This class will cover the basics of the gift and estate tax system and estate planning principles. With these fundamentals, the course will then examine basic and advanced estate planning and wealth transfer techniques, including wills, various types of trusts, titling property, gifts during lifetime, charitable vehicles, handling closely held businesses and valuation matters--with an emphasis on how to use these tools in planning an estate to meet the objectives of a couple or individual. Probate of an estate, durable power of attorneys, conservatorships, and planning for other life situations will be explored. Elements used in grading: Class participation (is a small factor and only in the positive direction) and final exam. This course is open to GSB and graduate students with consent of the instructor.

LAW 293. Family Law. 3 Units.

If there were no legal institution called marriage, would we want to create one? In the context of people's intimate relationships, when and how does the law facilitate and reinforce people's preferences/choices, and when does and should it restrict them? What are (and should be) the sources of legally enforceable obligations between intimates or family members? How does and should the law take account of children, who cannot fend for themselves? This course will consider these questions and more. Elements used in grading: Exam, with minor adjustments for class participation.

LAW 297. Entertainment Law. 3 Units.

Entertainment law is not, in and of itself, a separate legal discipline. Instead, the practice of entertainment law lies at the intersection of various traditional legal disciplines, such as contract, tort, copyright, trademark, antitrust, secured transactions, etc., and applies those disciplines to a unique business setting. This course is intended to approach the study of entertainment law from a practical perspective, applying the principles of traditional legal disciplines to avoid problems and find solutions in various facets of the entertainment industry. To accomplish the necessary background, we will study the entertainment industry from both a macro level (i.e., the organization of the motion picture, television and music business, including the function of studios, producers, networks, record companies, agencies, managers, lawyers and labor unions) and a micro level (i.e., examining actual agreements in order to understand the principal components of motion picture talent, production and distribution contracts, television series contracts, music and book publishing contracts). We will also examine key litigation issues that affect the industry, such as the interaction of the First Amendment and the right of publicity, the right of privacy and libel, the anti-SLAPP laws, the "final cut" and profit participation cases. The impact of the digital media (including the internet) will, of course, be analyzed, along with the future of the entertainment industry, including convergence, holograms, syntho-thesians and the like. We plan to include guest speakers from the entertainment industry so that this class will embody both business and legal considerations. The overall goals of this course are (1) to expose students to the unique and increasingly complex structure of the entertainment business; (2) to foster an understanding of the role the law and entertainment lawyers play in that unique business structure; (3) to strengthen students' ability to draft key documents and craft persuasive legal arguments to accomplish the goals they may seek to achieve as lawyers in the entertainment industry; and (4) to develop the analytical and problem-solving skills necessary to make them into effective entertainment lawyers. Elements used in grading: Class participation, brief writing exercises, team contract negotiation and drafting projects. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 299. Derivatives. 2 Units.

The course will examine the legal, regulatory, trading and risk management aspects of the \$600 trillion notional over-the-counter and exchange traded derivatives markets. Derivatives are not well-understood by regulators or the public, and have been blamed for causing or contributing to the economic crisis. This course will offer students the opportunity to understand how various derivative products are designed, traded and risk-managed and what role regulators play in the derivatives industry. In addition, students will focus on understanding key legal contracts that underpin the global derivatives industry, in particular focusing on the ISDAcopy; Master Agreement and Credit Support Annex, as well as documentation supporting credit derivatives. Students will also consider the shifting regulatory landscape for financial institutions and hedge funds as it relates to the way in which these products are traded, with rates and credit products migrating to clearinghouses, as well as how conduct of business rules and disclosures may shift. The course will conclude with an examination of the economic crisis that erupted with Lehman Brothers' bankruptcy in September 2008 and the consequent policy reactions to that event from a derivatives and bankruptcy perspective. Elements used in grading: Attendance, written assignments and final exam.

LAW 300. Securities Litigation. 4 Units.

Securities litigation is a multi-billion dollar enterprise that addresses a complex web of legal, economic, and public policy questions that often have international implications. The course focuses on "big-ticket" class actions associated with potential SEC enforcement proceedings, criminal exposure, and foreign liability. The BP oil spill, GM ignition recall, Enron fraud, and Foreign Corrupt Practices Act cases serve as touch points for analysis. In addition to teaching substantive skills useful for success as a litigator or transaction attorney, the course addresses a range of public policy questions, including optimal damage rules, whether entities or individuals should be held responsible for corporate wrongdoing, and the operation, consequences, and enforcement of anti-corruption regimes. Elements used in grading: Final Exam.

LAW 301. Labor Law. 3 Units.

This course will consider the fundamental legal principles affecting collective labor relations in the private sector workplace, with particular attention to the National Labor Relations Act. Students will consider the strategies adopted by labor groups, employers, and legal actors in response to evolving economic and social conditions. The course will emphasize union organizing, the collective bargaining process, and related topics, including the scope of statutory coverage, interference with union rights, elections, negotiations, strikes, picketing, secondary boycotts, arbitration, and individual employee rights in the labor-management context. There is no prerequisite for the course. Special Instructions: Regular, punctual attendance is required. If you expect (or are unexpectedly forced) to miss more than two classes, please consult with the instructor as soon as possible, as exceptions will be considered on a case-by-case basis. Early Add/Drop Deadline: Add/Drop decisions must be made the first week of class. Exceptions are at the instructor's discretion and will be considered on a case-by-case basis. Elements used in grading: Final Exam.

LAW 302. Advanced Topics in Federalism. 2-3 Units.

This seminar will deal with a variety of legal issues arising out of our federal system. The goal is to go beyond well-worn debates about Congress's enumerated powers and look at a series of more intricate legal problems. The first part of the course will examine several discrete issues about the relationship of states to federal institutions, such as whether states have any reserved rights under the Tenth Amendment, and what relationship states have to federal courts. The second part of the course will look at "horizontal" federalism--i.e., relations between the states themselves. The final part of the course will reflect on the bigger picture--what purposes, if any, is federalism supposed to serve, and which of these doctrines, if any, serve them well?.

LAW 304. Law and the Rhetorical Tradition. 3 Units.

In this interdisciplinary seminar we will explore the rhetorical underpinnings of legal argument. In the first half of the course, we will acquaint ourselves with relevant elements of the rhetorical tradition. In the second half, we will analyze a variety of legal texts (both written and oral) with an eye to the use and function of rhetorical principles, as well as the ways form and content are mutually constitutive. This course aims both to increase students' understanding of rhetoric as readers and interpreters of legal texts and to develop students' skills as writers and speakers. Students will be expected to participate in class discussion in addition to completing a series of writing assignments including the rhetorical analysis of legal and non-legal texts and the revision of students' legal writing. Special Instructions: This course can satisfy either the Writing "W" or Research "R" requirement. The instructor and the student must agree whether the student will receive "W" or "R" credit. For "R" credit, the paper is substantial and is based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, assignments, final paper. Automatic grading penalty waived for writers. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 307. Gender, Law, and Public Policy. 3 Units.

Topics in this course will include equal protection standards, employment, family, reproductive rights, sexual harassment, rape, domestic violence, pornography, sexual orientation, diversity in the profession, feminist legal theory, international human rights, and intersections with race, ethnicity, class, and sexual orientation. Materials will include cases, commentary, problems, and media portrayals. Special Instructions: Course requirements will include class participation and a presentation and either (1) a long paper, which will satisfy the research requirement or (2) short weekly reflection papers on the assigned readings, and a short final research paper, which will satisfy the writing requirement. Students writing reflection papers will form teams and each member will be responsible for writing comments on one classmate's paper each week. There will be no final examination. A maximum of 10 students will be permitted to write the long paper for R credit. All students interested in R credit should pre-register by lottery for Law 307-0-02. Students who do not receive a spot in section 02 may enroll in section 01. Writing (W) credit is for 3Ls only. Open to students from other schools with the consent of the instructor. To apply for this course, non-Law students must complete a Non-Law Student Course Add Request Form available on the SLS Registrar's Office website (see Stanford Non-Law Student Course Registration). Elements used in grading: Class participation, attendance, written assignments, final paper, short reflection papers and class presentation.

LAW 310. Protecting Workers' Rights in Hard Times. 2-3 Units.

Workplace law is at a difficult crossroads. With high unemployment, violations of labor laws widespread, and unionization at an all-time low, promoting workers' rights poses unprecedented challenges. This seminar will explore, in turn, a variety of pressing issues confronting worker advocates and policymakers. Through analysis of academic and non-academic readings, and candid conversations with attorneys and officials in the trenches, we will evaluate the contours of each problem and consider a variety of solutions that have been attempted or proposed. We will consider statutory and common-law reforms, as well as the quality of enforcement, new regulatory approaches, and private/nonprofit-sector initiatives. Among the topics to be explored are the impact of outsourcing; of employment relationships through outsourcing, franchising, reliance on independent contractors, and the like; the prevalence of wage theft; the difficulties of redressing more subtle forms of workplace discrimination; the decline of private-sector unionization and the attack on public-sector unions; the precarious legal status of undocumented workers; the regulatory challenges involved in protecting workers' safety and health; and the proliferating contractual bans on workers' ability to pursue class actions and court adjudication. The course format will combine lecture, group discussions and guest presentations. Although there are no formal prerequisites, prior experience and/or coursework in at least one workplace-related field such as employment law, employment discrimination law, or labor law is recommended.

LAW 311. Comparative Law. 2 Units.

The big question in comparative law today—and one that is of key importance to anyone interested in international law—is whether we are currently witnessing a convergence of national legal systems. This course examines this question, as well as the related problem of American exceptionalism, by exploring key aspects of contemporary Western European legal systems. We will study a range of legal institutions and practices, including such topics as legal education, the role of judges and judging, the function and meaning of codes versus precedent, constitutional courts, judicial review, and criminal procedure and punishment. In contrast to the traditional comparative law course, we will also devote substantial time to such pressing public-law questions as racial equality and affirmative action, gender equality and sexual harassment, church and state, and the relationship between European institutions, on the one hand, and national legal systems, on the other. Elements used in grading: Class participation and exam.

LAW 312. Criminal Procedure: Investigation. 4 Units.

The law school offers two survey courses dealing with constitutional criminal procedure. "Criminal Adjudication" covers the formal pretrial and trial processes, including the right of counsel, prosecutorial charging criteria, grand juries, bail, speedy trial, discovery, plea bargaining, trial by jury, and double jeopardy. This course, "Criminal Investigation," covers police investigation in the form of searches and seizures, interrogations, lineups, and undercover operations, and hence examines the Fourth, Fifth, and Sixth Amendment rules regulating the police in these endeavors. It also incorporates some of the new statutory law of investigation under the USA Patriot Act and other laws relating to national security. Students may take both Criminal Investigation and Criminal Adjudication. (There is, of course, no requirement to do so.) Elements used in grading: Class participation, Final exam (In-school, open book).

LAW 315. Criminal Procedure: Adjudication. 4 Units.

The Law School offers two survey courses dealing with constitutional criminal procedure. "Criminal Investigation" will consider questions that arise under the fourth, fifth, and sixth amendments regarding investigations, interrogations, and charging decisions. This course, "Criminal Adjudication," will look at the way the judicial system handles criminal cases. Topics will include the right to counsel (and the concomitant right to "effective assistance" of counsel), prosecutorial discretion and plea bargaining, joinder and severance, discovery, the right to jury trial, double jeopardy, sentencing, and appellate review. Students may take both Criminal Investigation and Criminal Adjudication. (There is, of course, no requirement to do so.) Elements used in grading: Attendance, participation and final exam.

LAW 317. The Criminal Trial Jury. 3 Units.

This seminar, which is taught by a local state court judge, examines the criminal trial jury from both a practical and theoretical perspective. The course will consider the history of the criminal jury trial, legal and strategic considerations in jury selection, jurors' ability to act as fact-finders, rules protecting jury deliberations, the consequences of juror misconduct, and the practical importance of plea bargains as an alternative to jury trials. Students will observe portions of actual jury trials occurring at the Palo Alto Superior Court courthouse. They will also examine legal decisions, theoretical critiques, and empirical research about the jury. Class discussion will consider the practical challenges for lawyers and judges posed by jury trials. The course will culminate in a discussion of potential reforms to the jury system, with each student proposing a reform based on his or her in-person observations and review of the relevant literature. This course will combine a 2 hour seminar with a mandatory 1 hour per week "practicum" involving time spent at court. Elements used in grading: Class participation and a final research paper.

LAW 318. History of American Law. 3 Units.

This course examines the growth and development of American legal institutions with particular attention to crime and punishment, slavery, and race relations, the role of law in developing the economy, and the place of lawyers in American society, from colonial times to the present. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Final exam or paper. Automatic grading penalty waived for writers. Cross-listed with History (HISTORY 152 - Consent of instructor required) & (HISTORY 352B).

LAW 319. Legislation. 3 Units.

Lawyers work in a legal system largely defined by statutes, and constantly shaped by the application of legislative power. This course is about statutes and the legislative institutions that create them. It discusses some of the key laws governing access to legislative power and the procedures that culminate in the production of statutes in the legislature. The course is divided into two parts. The first part will focus on the acquisition of legislative power. Key topics include bribery laws, lobbying and indirect influence on legislative activity, and campaign finance regulations. The second part will focus on the exercise of legislative power. Through a number of public policy case studies, students will better understand the organization of the U.S. Congress, the ways in which power is exercised in that institution, and the intersection between politics, the law, and policymaking. Elements used in grading: Class participation and final exam. (Cross-listed with PUBLPOL 319).

LAW 321. Patent Prosecution. 2 Units.

The course follows the patent application process through the important stages: inventor interviews, patentability analysis, drafting claims, drafting a specification, filing a patent application, and responding to an office action. The subject matter and practical instruction relevant to each stage will be addressed in the context of current rules and case law. The course will include four written assignments: an invention capture, a claim set, a full patent application, and an Office Action response. Pre-requisites: IP: Patents (Law326), Intro to IP (Law 409) or Patent Law and Strategy for Innovators and Entrepreneurs (ME 208). Elements used in grading: Class participation and four written assignments. Cross-listed with Mechanical Engineering (ME 238).

LAW 322. Patent Litigation Workshop. 3 Units.

This course simulates the strategy and pretrial preparation of a patent lawsuit. The course materials include information typical to a patent lawsuit: a patent, file history, prior art, and information regarding the accused product. Students will represent either the patentee or the accused infringer. Students will plan litigation strategy, meet with and advise a client, conduct written discovery, take and defend depositions, and brief and argue claim construction and motions for summary judgment. Some knowledge of patent law is presumed. Special Instructions: IP: Patents (Law 326) is a prerequisite for this course, but can be taken coterminously. Students must attend the first class session (or contact the instructor) or they will be dropped from the class or waitlist. Elements used in grading: Attendance, participation, writing assignments, exercises and oral arguments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 323. Cross-Border Mergers and Acquisitions. 3 Units.

The course will explore the complexities of cross-border mergers and acquisitions, with a particular focus on transatlantic and other international public M&A transactions. The subject-matter provides an opportunity to tie together different bodies of law relevant to M&A (corporate, contracts, securities, antitrust and other regulatory fields) and to confront the US, European, and emerging markets legal, business, and cultural environments in a deal-oriented context, including case studies of major transactions. We will go over the business and legal framework of cross-border M&A, deal-making strategies, transaction structures and key deal considerations, and explore the content of cross-border M&A agreements. Regulatory matters, deal risk management and hostile takeovers will also be addressed, as well as the broader policy and cross-cultural considerations underlying global M&A practice. International guest speakers will be invited to share their experience. The course will aim to provide students with a broad understanding of the legal and business aspects of major cross-border M&A transactions. This is an interactive, primarily practice-oriented course requiring active student participation. Special Instructions: Corporations recommended but not required. This course is open to GSB students with permission of the instructor. Elements used in grading: Class participation, oral presentations, contractual practice exercise, and final exam.

LAW 324. Intellectual Property: Copyright. 3 Units.

Copyright crosses many corners of law practice today - not only litigation and licensing, but corporate due diligence, tax, trusts and estates, labor, and general business counselling. This course examines all aspects of copyright doctrine, as well as the business and policy challenges and opportunities that the Internet and other new technologies present for the exploitation of copyrighted works. There are no prerequisites for this class. Elements used in grading: Final Exam (In-School, open book).

LAW 325. The Role of the Modern General Counsel. 2 Units.

(Same as GSBGEN 544) The news is filled with reports of one corporate crisis after another - names like BP, Goldman Sachs, Bank of America, AIG, Siemens, Toyota, and issues like backdating, bribery, antitrust violations, insider trading, procurement fraud, health and safety violations, consumer class actions and the like. And often the cry is heard - where are the lawyers? This course explores the evolution of the role of the general counsel in major American public companies and, more broadly, the expanding role of in-house counsel. These are the lawyers in the trenches, on the front lines of American businesses. Each week, we'll review another dimension of the general counsel's job. We'll consider how general counsel today play an important role on the executive team of major companies and explore the different ways in which general counsels manage large corporate legal departments and direct functional legal areas like litigation, IP, corporate and securities, M&A, environmental and employment law. We will also examine the professional responsibilities and legal obligations of the general counsel -- including the delicate and sometimes conflicting reporting relationships to the CEO and the board of directors -- and consider how an in-house legal department fits into a corporation's organizational structure and how it supports the company's operating units on a day-to-day basis. We will explore the general counsel's role in internal investigations, regulatory investigations and compliance programs, and governmental affairs. We will also consider current practices in how in-house lawyers select, collaborate with and evaluate outside counsel. The class will meet weekly and we will invite current and former general counsels to join us occasionally for our discussions. Each student will be expected to participate actively in class discussions, and will be required to complete two projects, each in collaboration with three other students and submitted as a team, presenting how the team would address a complex set of legal and business issues.

LAW 326. Intellectual Property: Patents. 3 Units.

In this course we cover the major aspects of patent law, primarily as applied in the United States: patentability, including novelty, nonobviousness, and enablement; infringement; and remedies. The emphasis is on essential legal principles and a policy analysis of the patent system. The course is designed to be useful both as solid background for non-patent-specialists and for those planning a career in the field. Introduction to Intellectual Property or consent of the instructor is a prerequisite for this course. No technical background is required. Elements used in grading: Class participation and final exam.

LAW 327. Introduction to Organizational Behavior. 3 Units.

Why are some organizations more successful than others? Is it their emphasis on innovation and risk taking? Their founders' eccentric and visionary personalities? Or perhaps their bureaucratic discipline and effectiveness? We will explore these questions by reviewing existing theory and research on organizational problems in a number of areas including: individual motivation and behavior; decision making and leadership; interpersonal and intergroup communication, influence and conflict; organizational culture; and inter-organizational competition and cooperation. The course focuses on the reasons for organizational founding and failure, the variety of organizational forms and the ways in which organizations and their members affect one another. You will participate in a number of group exercises to illustrate the theoretical and practical implications of addressing organizational problems and increasing overall performance. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper.

LAW 328. Intellectual Property: Advanced Patents. 3 Units.

This is an advanced seminar, open only to those who have taken patent law. We will discuss current cases, as well as some issues not covered in the basic class. We will also focus on current efforts to reform the patent system. Students will write and present a research paper on a patent law topic.

LAW 329. Intellectual Property: International. 3 Units.

Music, motion pictures, even books travel instantaneously around the globe. So do patented inventions; so do brands and trademarks. Copyright and trademark licenses increasingly take foreign exploitation into account. Litigation over an important patented invention often proceeds on several foreign fronts. No lawyer practicing intellectual property law today can afford to overlook the substantive and procedural differences that separate one country's law from another's. This course will focus on the counseling considerations that surround the exploitation of intellectual properties in domestic and foreign markets through licensing, litigation, or both. The course will survey the principal legal systems and international treaty arrangements for copyright, patent, trademark and neighboring rights, as well as questions of jurisdiction, territoriality, national treatment and choice of law.

LAW 330. International Human Rights. 3 Units.

This course examines the law of international human rights, analyzing various categories of rights, from civil and political human rights, to social and economic human rights, to group and collective rights. It studies the structure and processes of international and regional courts that adjudicate human rights claims and international treaty bodies that report on State human rights action. It explores debates about the normative justifications for human rights, and whether and how these debates impact upon the application and enforcement of human rights. Special Instructions: Students have the option to write a long research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation; exam or final long research paper.

LAW 331. Intellectual Property: Strategy for Technology Companies. 3 Units.

This course focuses on the actual day-to-day intellectual property issues faced by a technology-based company. Each class will cover a different aspect of an intellectual property practice, covering such topics as the establishment of a patent program, trade secret management, intellectual property licensing, the intellectual property issues arising during M&A transactions and strategic alliances, patent litigation, and managing open source software. The emphasis in each class will be on case studies, guest speakers, and interactive exercises designed to simulate scenarios commonly faced by an intellectual property attorney, including the negotiation of patent cross licenses, the drafting of intellectual property representations and warranties, the generation of intellectual property disclosure and licensing policies, and the identification and prioritization of patentable inventions. Prerequisite: Basic familiarity with patent law is strongly recommended for this course. If necessary, Intellectual Property: Patents can be taken concurrently. Elements used in grading: Class participation and written assignments.

LAW 333. Problem Solving and Decision Making for Public Policy and Social Change. 4 Units.

This course introduces skills and bodies of knowledge useful for careers in law, public policy, and achieving social change at scale. These include framing problems; designing, implementing, and evaluating strategies; systems design; cost-benefit analysis; decision making under uncertainty; heuristics and biases that affect empirical judgments and decision making; methods for influencing people's behavior ranging from incentives and penalties to "nudges;" and human-centered design. The course will be taught through problems, cases, and a field project to solve real-world problems on or near the Stanford campus, with the goal of integrating strategic thinking and behavioral insights with human-centered design and systems design. The course may be of interest to students in Law and Policy Lab practicums who wish to broaden their policy analysis skills. Enrollment: Limited to 30 students, with priority given to students in Law School, the MPP program, and the IPS program in that order. Elements used in grading: Class participation, midterm assignment, and final assignment. Cross-listed with International Policy Studies (IPS 207A) & Public Policy (PUBLPOL 305A).

LAW 334. International Criminal Law. 3 Units.

The roots of modern international criminal law can be traced to the Nuremberg and Tokyo war crimes trials held after World War II. Since the establishment by the Security Council of the United Nations established the International Criminal Tribunal for the former Yugoslavia twenty years ago, the field has experienced remarkable growth. The international community has created a range of new international criminal tribunals to investigate and prosecute international crimes. National courts are now also exercising an expanded domestic and universal criminal jurisdiction over international or transnational crimes. The substantive criminal law has also expanded, and notions of individual responsibility for international crimes have evolved and extend the reach of international criminal law. At the same time, new debates have emerged about the suitability of using criminal justice mechanisms to respond to mass atrocity situations. This course will explore legal and institutional responses to transnational and international crime. It will examine traditional forms of international cooperation to address transnational crimes and the concept of universal jurisdiction that provides a basis for treating certain crimes as "international." It will cover the range of institutions created to punish international criminals, including the Nuremberg and Tokyo tribunals, the ad hoc tribunals for the former Yugoslavia and Rwanda, the "mixed" international/domestic tribunals such as the Special Court for Sierra Leone, the Cambodia war crimes tribunal, the Special Tribunal for Lebanon. As these tribunals approach the end of their mandates, the International Criminal Court is assuming greater importance. The progress of the ICC will be considered and, so too, the role of the United States in all of these developments. Alternative institutional arrangements and options for responding to international crimes, such as truth commissions and amnesties will also be examined. The course will also include: (1) the moral and political goals that motivate responses to international crimes; (2) the role of international politics and foreign policy considerations in shaping responses to international crimes; (3) the suitability of different institutional models for addressing international crimes. The grade for this course will be based on a final research paper of 26 pages, double spaced. The topic should relate to a subject covered directly or indirectly by the syllabus or readings. Elements used in grading: Class participation and final paper.

LAW 335. Legal Ethics. 3 Units.

A survey of the major legal and ethical issues presented in the practice of law. We will examine the concept of the lawyer endorsed by the rules of professional responsibility and assess the relationship between this concept and the personal, political, and economic constraints of law practice. To this end, emphasis will be given to the rules of professional responsibility and their elaboration in case law, but we will study modern practice from a range of interdisciplinary perspectives throughout the course. These include the philosophy of law, the history and sociology of the American legal profession, the philosophy of role morality, and theories of professional identity. Elements used in grading: Attendance, class participation, short papers and final exam.

LAW 336. Real Estate Transactions. 3 Units.

Real Estate Transactions will have a "real world" focus, helping students apply some of the substantive concepts covered in the first-year property course to actual commercial property transactions involving the transfer, leasing and financing of real property interests. Among the topics covered will be preparing the letter of intent, preparing and negotiating the purchase and sale contract, examining title and survey issues, reviewing leases, negotiating finance documents, and closing the transaction. The course will also explore various negotiation strategies. Emphasis will be on California law, with some discussion of how the laws of other states may affect how a transaction is structured. Tangential issues that may be covered include selecting the appropriate entity to be used in various real estate transactions, the role of the attorney v. the role of the businessperson on a transaction, and what actions should be taken when something goes wrong on a real estate transaction, including a discussion of applicable remedies. The course will be taught through a combination of lectures, reading assignments and drafting exercises. Time and size of class permitting, there may also be some practice negotiation exercises.

LAW 337. Intellectual Property: Trademark and Unfair Competition Law. 3 Units.

This course will consider the protection and enforcement of trademarks and related state rights in brands and names, including the right of publicity. There is no prerequisite, though some students will have taken Introduction to Intellectual Property. Elements used in grading: Class Participation, Exam (Open-book take-home).

LAW 338. Land Use. 3 Units.

This course focuses on the pragmatic (rather than theoretical) aspects of contemporary land use law and policy, including: nuisance as a land use tool and foundation for modern land use law; use and abuse of the "police power" (the legal basis for land use control); zoning flexibility; vested property rights, development agreements, and takings; redevelopment; growth control; and direct democracy. We explore how land use decisions affect environmental quality and how land use decision-making addresses environmental impacts. Special Instructions: All graduate students from other departments are encouraged to enroll, and no pre-requisites apply. Student participation is essential. Roughly two-thirds of the class time will involve a combination of lecture and classroom discussion. The remaining time will engage students in case studies based on actual land use issues and disputes. Elements used in grading: Attendance, class participation, writing assignments, and final exam. This course is cross-listed with Earth Systems 238.

LAW 339. Employment Law. 3 Units.

Workplace issues have become one of the fastest-growing areas of state and federal law. Employment-related lawsuits filed in federal court have tripled in volume in the past decade, and now account for a tenth of all civil cases. Many state courts have experienced a similar burgeoning of their employment law caseloads. This course examines this diverse, rewarding, and rapidly evolving area of legal practice by considering the diverse array of laws and institutions that regulate the employment relationship. The focus of the course is on laws that affect employees in non-unionized settings, such as protections against dismissal without cause, wage and hour restrictions, workplace privacy, covenants not to compete, the Family and Medical Leave Act, and mandatory arbitration of employment disputes. The course does not cover either Employment Discrimination or Labor Law, both of which are offered as separate courses. Special Instructions: Regular, punctual attendance is required. If you expect (or are unexpectedly forced) to miss more than two classes, please consult with the instructor as soon as possible, as exceptions will be considered on a case-by-case basis. Early Add/Drop Deadline: Add/Drop decisions must be made the first week of class. Exceptions are at the instructor's discretion and will be considered on a case-by-case basis. Elements used in grading: Final Exam.

LAW 340. Comparative Corporate Capitalism. 2 Units.

Forms of corporate ownership and control vary widely from one country to another. The type of corporate capitalism based on widely distributed share ownership that is found in the United States, and that is the usual subject of law school corporate law and corporate governance courses, is in fact an outlier. For example, in most countries public corporations have a controlling shareholder. In this seminar we'll examine the organization of enterprise in a range of both developed and developing countries to the end of understanding their variety, including the influence of a country's political governance. As part of this exercise, we'll look at the ways in which organizations and organizational law have evolved in different countries, and we'll speculate on the directions in which they'll continue to evolve in the future. Finally, we'll address the relationship between forms of capitalism and economic development. Students will do a series of short weekly papers on the readings. Elements used in grading: Series of short weekly papers.

LAW 343. Intellectual Property: Scientific Evidence in Patent Litigation. 3 Units.

(Same as GENE 243). This seminar will explore the role of scientific experts in patent infringement litigation. The class will have a mix of law students and doctoral candidates from the sciences and engineering. The law students must have some familiarity with United States patent law from classes or work experience. The graduate students must have completed their required coursework and have TGR status. In other areas of the law where scientific experts are used -- medical malpractice, environmental law, criminal law -- the science itself is often in dispute. In patent cases, however, the parties generally agree on the science. This affects the relationship between the lawyer and the expert and the substantive content of their interactions. Patent experts need to be able to explain science to the judge and jury, of course. But they also must help the litigators to choose which legal issues to press and which to concede, and to be aware of how the complications of the science might help, hurt, obscure or reveal how the law should be applied to the facts. Thus, both the lawyer and the scientist must educate the other about their specialties. For the first several weeks, the class will examine judicial decisions and trial documents involving scientific evidence in patent litigation. The rest of the quarter is largely devoted to work on the final projects: simulations of expert testimony in a patent case. Students will work together in teams and will meet regularly with the instructor in order to: select suitable patents; identify a balanced issue on either validity or infringement; prepare claim charts and materials for testimony; and give short, illustrated talks to inform their classmates about their projects. Finally, they will choose sides (patent owner or accused infringer) and finetune their presentations. The simulations will be performed at the end of the quarter before panels of practicing patent lawyers.

LAW 344. Law and Economics Seminar II. 2-3 Units.

This seminar will examine current research by lawyers and economists on a variety of topics in law and economics. Several sessions of the seminar will consist of an invited speaker, usually from another university, who will discuss his or her current research. Representative of these sessions have been discussions of compensation for government regulations and takings, liability rules for controlling accidents, the definition of markets in antitrust analysis, the role of the government as a controlling shareholder, and optimal drug patent length. Special Instructions: Students may enroll in this seminar for either W or R credit. You may write a series of short commentaries on the guest speakers' papers, of which there will be four. This will satisfy the Law School's Writing requirement. Students electing this option will be graded on a Mandatory Pass/Restricted Credit/Fail basis and receive 2 units of credit. Alternatively, you may write a single research paper on a law and economics topic of your choice. This will satisfy the Law School's Research requirement. These papers will be graded on an Honors/Pass/Restricted Credit/Fail basis. (You may write a single longer paper for two quarters if you enroll in the Seminar in the Autumn as well.) Students taking the seminar for R credit can take the seminar for either 2 or 3 units of credit, depending on the paper length. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. There is no formal economics prerequisite to take this seminar, though students doing the longer research papers typically have some prior training in economics. Students may take both Law and Economics Seminar I and Law and Economics Seminar II in either order (neither is a prerequisite for the other). CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Four commentaries or one research paper. Writing (W) credit is for students entering prior to Autumn 2012. Cross-listed with Economics (ECON 354).

LAW 345. Law and Culture in American Fiction. 3 Units.

This seminar examines the way literary texts register changes in property law, the law of contracts, intellectual property and legal constructions of race, gender, and privacy, especially as they relate to the maintenance of personal identity, community stability, and linguistic meaning. The terms and stakes of these relationships will inform our readings of the texts themselves, as well as our understanding of their representations of law. The writers whose work we will consider include James Fenimore Cooper, Herman Melville, Henry James, Nella Larsen, Willa Cather, William Faulkner, and Sherman Alexie. Each week, a novel or story will be paired with relevant legal and historical readings. We will also consider the points of contact between literary narrative and narrative in law. English Department cognate course. Special instructions: Course requirements include class attendance and participation, three short response papers, and two longer papers. For Research "R" credit, students may petition to complete one long paper based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, written assignments and final paper. Automatic grading penalty waived for writers. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 347. Law and Culture in American Film. 3 Units.

In this course we will attend to representations of law in 20th century American film - particularly Westerns, gangster films, and courtroom dramas. The themes we will address include: the asymmetry of law and justice, the relationship between law and social change, the public and private identities of lawyers, anxiety that the rule of law fails individuals and minorities, and the disciplinary modes of both law and culture. We will also attend to the convergence of narrative, visual, aural, and dramatic practices in legal proceedings and cinematic productions. Special instructions: Course requirements include class attendance and participation, three short response papers, and two longer papers. For Research "R" credit, students must complete one long paper based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, assignments, final paper. Automatic grading penalty waived for writers. This course is open to first year Law School students. Writing (W) credit is for 3Ls only.

LAW 348. Health Law: Finance and Insurance. 3 Units.

This course provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. We will discuss the Affordable Care Act, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), the approval process and IP protection for pharmaceuticals, and antitrust policy. We may discuss obesity and wellness, regulation of fraud and abuse, and medical malpractice. The syllabus for this course can be found at <https://syllabus.stanford.edu>. Elements used in grading: Participation, attendance, class presentation, and final exam. Cross-listed with Health Research & Policy (HRP 391) & Public Policy (PUBLPOL 231).

LAW 349. Employment Discrimination. 3 Units.

This course will examine legal responses to the barriers to workplace equality that are faced by minority groups. The course will survey the relevant doctrine, focusing primarily on federal employment discrimination statutes, but also addressing more expansive antidiscrimination protections under some state statutes, and local ordinances. Covered topics include sexual and racial harassment, sexual orientation discrimination, and affirmative interventions aimed at increasing the minority group and/or female representation in certain job categories or segments of the labor market. In addition to surveying the doctrine as it stands and as it has developed over time, we will also explore the doctrinal and conceptual difficulties inherent in identifying invidious discrimination and in devising appropriate remedies. Elements used in grading: Class participation and exam.

LAW 351. Corporate Income Taxation. 3 Units.

Overview of the fundamental tax rules and principles regarding the taxation of domestic corporate entities. Course will address choice of entity (C corporation, S corporation and non-corporate pass-through entities), capital structure and formation issues, corporate operations, including cash and property distributions and shareholder exit transactions. Approximately half of the course will be devoted to taxable and non-taxable acquisitions, dispositions and reorganizations, including planning and structuring strategies; a portion will address current tax policy considerations. The student's final grade will be based on a final exam, although class participation may improve a student's grade. Elements used in grading: Class Participation, Final Exam.

LAW 352. International Tax. 2 Units.

This course examines the United States federal income taxation of international operations and transactions, including international joint ventures and M&A transactions. Income source, foreign tax credits and Subpart F are important. International transfer pricing rules also will be addressed. Elements used in grading: Final Exam.

LAW 353. Corporate Acquisitions. 4 Units.

This course examines the corporate acquisitions from a transactional and financial perspective. It begins with a review of a corporate acquisition agreement, the document at the center of a friendly transaction. We then consider a variety of explanations for how corporate acquisitions may promise to create value, and think about why they often fail to meet that expectation. In doing so, we will review the basics of accounting for acquisitions and their tax treatment. From there we move on to the corporate law side of acquisitions - the different forms the transaction can take, the rules governing hostile transactions, freezeouts of minority shareholders, and proxy fights. Elements used in grading: Final exam.

LAW 355. Taxation I. 5 Units.

This class teaches the fundamentals of the federal income tax as applied to individuals. It considers what is taxed as income and what is deductible, timing issues, and the taxation of capital gains and losses. The class considers the politics of tax reform as well as fundamental tax policy issues. Elements Used in Grading: Final Exam.

LAW 358. Advanced Antitrust: Litigating an Antitrust Case. 3 Units.

We will examine in depth four pivotal antitrust cases: Polygram Holdings, Microsoft, Leegin and Oracle. We will study the record created in the lower courts and then analyze how the court came to the conclusions it did. Students will write an amicus brief and argue a motion for preliminary injunction or an appeal.

LAW 359. Tax Policy. 2 Units.

This course will explore various tax policy issues. In past years, the issues we've explored have included the carbon tax, health care, social security, consumption tax, tax compliance, tax shelters and school financing. Special Instructions: Grades will be based on either (A) class participation and memos responding to the discussion questions for any three of the sessions or (B) class participation and a research paper on a topic of your choosing (subject to instructor approval). Option A is Writing (W) credit and option B is Research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, attendance and written assignments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 360. Advanced Empirical Methods. 3 Units.

This course will examine topics in the empirical evaluation of law and policy for those who have already been exposed to basic statistics and regression. The course will begin with a discussion of problems of causal inference that have plagued some traditional statistical approaches and then examine the virtues and limitations associated with some more advanced techniques, such as regression discontinuity analyses and instrumental variables estimation. The course is designed to move students towards a publishable empirical research project. Given the constraints of the quarter system, the product is more likely to end with a detailed project design rather than a fully implemented study. Successful completion of the course requires regular attendance, and: (1) Careful reading of the course assignments coupled with frequent one page written assignments on the reading; (2) A PowerPoint presentation to the class discussing a major paper; and (3) A detailed project design using one of the empirical approaches discussed in the class. Elements used in grading: Attendance, written assignments, class-room presentation and paper.

LAW 363. History of the Common Law in England and America. 3 Units.

The right to a trial by jury, the presumption of public access to criminal proceedings, and citizenship by birth rather than blood, all enshrined in the U.S. Constitution, ultimately derive from English common law. American private law-including contracts, torts, and property-is indebted to the same heritage. This course will examine the history and theory of the common law with the aim of demonstrating its continuing relevance. Three principal strands will run through the class. The first will trace the substantive and procedural evolution of the common law from its early English roots and writs to its role in the American legal system today. Another thread will emphasize conceptions of the common law, including both historical accounts derived from the writings of Sir Edward Coke, Matthew Hale, Jeremy Bentham, and Oliver Wendell Holmes, and more recent theoretical contributions by Guido Calabresi and Ronald Dworkin, among others. Finally, the course will examine certain central institutions of the common law, including the judge who follows precedent and the jury, and compare common law modes of adjudication with the alternative methods employed by the Chancellor in equity and judges in the civil law system. Source materials will include historical cases and documents as well as some secondary articles. Special Instructions: Grades will be based on class participation and (1) the final exam or (2) a long independent research paper for Research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, assignments, final exam or final paper. This course is cross-listed with Hist 131B.

LAW 368. Law and Biosciences: Neuroscience. 3 Units.

(Same as HRP211) This seminar examines legal, social, and ethical issues arising from advances in the biosciences. This year it will focus exclusively on neuroscience. It will examine how neuroscience will affect the law, and society, through improvements in predicting illnesses and behaviors, in "reading minds" through neuroimaging, in understanding responsibility and consciousness, in "treating" criminal behavior, and in cognitive enhancement. Students who have taken the Law and the Biosciences seminar in past years may receive additional credit for taking this year's class.

LAW 372. Legal History Workshop. 2-3 Units.

The Legal History Workshop is designed as a forum in which faculty and students from both the Law School and the History Department can discuss some of the best work now being done in the field of legal history. Every other week, an invited speaker will present his or her current research for discussion. This year the theme of the Workshop will be Conservative Legal Movements from 1950 to the Present. Speakers will include Reva Siegel, the Nicholas deB. Katzenbach Professor of Law at Yale Law School, and Thomas Sugrue, the David Boies Professor of History and Sociology at the University of Pennsylvania, as well several other scholars of law, the social sciences and humanities writing about this topic. In the week prior to a given speaker's presentation, the class will meet as a group to discuss secondary literature relevant to understanding and critiquing the speaker's research. Students will then read the speaker's paper in advance of the following week's workshop presentation. Special Instructions: Students are required to write a brief response to each speaker's paper. There will be a total of four speakers, and thus four papers. Guidance will be provided concerning how to frame these response papers, which will be due every two weeks - i.e., on the day before speaker presents and students will receive "W" writing credit. Students taking the course to receive "R" research credit are required to write a research paper on a legal history topic that they choose (in consultation with the professor). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Enrollment will be limited to 30 students -- 20 from SLS who will be selected by lottery and 10 from H&S. Elements used in grading: Class participation, attendance, assignments and final paper. Writing (W) credit is for students entering prior to Autumn 2012. Cross-listed with History (HISTORY 307A).

LAW 373. Protection of Personality. 3 Units.

This course will examine the theoretical foundations and common law development of the range of tort remedies designed to afford protection to the interests in personality. Defamation, the right of privacy, and claims of emotional distress and harassment will receive particular attention, along with the constitutional defenses to these claims, based on the First Amendment, which have arisen since the mid-1960's. Elements used in grading: Final Exam.

LAW 377. Partnership Tax. 2 Units.

This course will cover the basic rules that govern the tax treatment of partnerships and partners. Prerequisites: Taxation I required; Corporate Income Taxation suggested but not required. Elements used in grading: Class Participation, Final Exam.

LAW 378. Banking Law. 3 Units.

This course will examine the legal and regulatory system governing financial institutions, with an emphasis on banks. It will do so by exploring the underlying economics of banking, and the ongoing effort to reform financial regulation. Questions addressed will include: Why do we regulate financial institutions? What dangers do we want to avoid? How well does the current regulatory system achieve what we want to achieve? What alternative approaches can be taken? What are the costs and benefits of the current system, and those of the alternatives? Elements used in grading: Class participation, attendance, final exam.

LAW 381. Wrongful Convictions: Causes, Preventions and Remedies. 3 Units.

Over the course of the past two decades there has been increasing recognition that, despite its commitment to the concept of proof beyond a reasonable doubt, our criminal justice system yields a steady stream of wrongful convictions. This Seminar will focus on some causes, preventions and potential remedies for this phenomenon. Subjects to be addressed include eyewitness identification, interrogations and confessions, jailhouse informant testimony, forensic evidence, the psychology of tunnel vision and confirmation bias, the role of appellate review and habeas corpus, the role of clemency, the impact of the problem on the death penalty, and issues around compensation of those who have been wrongly convicted. The class will meet for two hours each week. In addition, there will be three additional evening or weekend sessions (to be scheduled at the convenience of the participants). During each of these additional sessions, students will watch a film involving a wrongful conviction and will engage in conversation about the particular case involved. Each student will be responsible for preparing a paper on an appropriate topic to be chosen in consultation with the instructor. Consent Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Writing (W) credit is for students entering prior to Autumn 2012. Elements used in grading: Class participation; Paper.

LAW 386. Health Law and Policy: Public Health and Bioethics. 3 Units.

This course will focus on the physician/patient relationship, medical ethics, and public health law.

LAW 387. Internet Torts and Crimes. 2 Units.

The purpose of this course is to cover the highlights of torts and crimes on the Internet. Topics include cybercrimes (spam, fraud, cyberbullying), privacy, and First Amendment issues (defamation, threats, and indecent speech). The perspective will be from that of a practitioner faced with various fact patterns and known case law who has to advise his/her client on the best course of action. (Think stud poker as applied to the practice of law.).

LAW 388. Technological, Economic and Business Forces Transforming the Private Practice of Law. 2 Units.

The private commercial practice of law is undergoing fundamental change. Modern technological, economic and business forces are placing extreme pressure on the traditional private attorney law firm model. These forces will transform, eliminate or replace virtually every aspect of legal services provided by attorneys. Traditional foundations of the large law firm model such as "billable" hours, summer associate programs, large staffs (e.g., paralegals and secretaries) and high associate-to-partner ratios are becoming (or have already become) relics of a bygone era. Today, the business need for clients to select a one-stop, full-service law firm for their important legal work has, in a variety of circumstances, disappeared. Sophisticated clients are utilizing a wide range of legal services firms and companies for their legal work. As a result, the diversity of legal business models and manner of providing legal services has greatly expanded. Often individual lawyers (or very small firms) can provide high-level legal services by assembling "virtual" teams in which each team member handles a different constituent part of the representation. "In-sourcing," "out-sourcing" and the transferring of large portions of work to non-lawyer legal support vendors are all becoming fixtures of the legal economy. This rapid increase in diversity on both the supply and demand side of the legal economy will greatly alter the skills and prerequisites required for the successful private practice of law. The course is composed of two parts. In part one, the technological, economic and business practices transforming the legal profession are identified and their impact on the traditional approaches to private practice law firms will be examined. In part two, the course focuses on how individual lawyers can adapt to or embrace the forces transforming law to improve their practice and succeed in the new environment. Part two of the course will additionally focus on how specific skills such as project management, social networking and information management will be crucial to a successful legal career. Part two of the course will also discuss how the changing legal environment creates new ethical and professional challenges for attorneys. Elements used in grading: Attendance, class participation and written assignments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 393. Remedies. 3 Units.

The remedy is arguably the most important part of any lawsuit, and often the most neglected. This course considers the question of what plaintiffs are entitled to when they win a case and why. It will cover damages, punitive damages, restitution, unjust enrichment, and injunctive relief. While we will consider public remedies in constitutional cases, the majority of the course will focus on remedies in private law civil actions.

LAW 395. Creating New Legal Tools to Address the Environmental Impacts of Energy Projects. 3 Units.

A domestic energy boom is underway with major new energy projects being sited on both private and public lands, including wind projects, utility-scale solar projects, oil and gas projects, and associated transmission lines and pipeline projects. Many of these projects have significant footprints, with related negative impacts on their local environments. Students will work with policymakers in Sacramento and Washington this fall in evaluating new regulatory and market-based options to address the environmental impacts of energy-related projects. In doing so, seminar participants will be working "in real time" on new state and federal initiatives to develop more expedited and effective mechanisms to compensate for environmental impacts of energy and other infrastructure projects, including a number of large renewable energy projects that currently are being developed on public and private lands in the southwest. The seminar also will explore the full range of environmental issues associated with major infrastructure development, including an in-depth discussion and evaluation of permitting reforms and environmental issues that the Administration is now addressing under Executive Order 13604 (President Obama's infrastructure permitting reform initiative).

LAW 397. Law and Economics of Death Penalty Seminar. 2-3 Units.

This seminar will examine the legal and policy aspects of a capital punishment regime. Students will have the option to take the seminar alone or to combine it with a practicum. This seminar component will explore three primary issues: 1) the Supreme Court's forty-year effort to define what cases can permissibly receive the death penalty and the procedures under which it must be imposed; 2) the arguments for and against the death penalty, with a major focus on whether the death penalty deters, is administered in a racially biased way, or is otherwise implemented in an arbitrary and capricious manner; and 3) what the U.S. and international status of the death penalty is today and what the prospects are for the future. The readings on deterrence and racial discrimination will entail some substantial statistical analysis, although a background in statistics, though helpful, will not be required. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Writing (W) credit is for students entering prior to Autumn 2012. Elements used in grading seminar: Written assignments and final paper. Students who take the practicum component must attend the 9 seminar class meetings and do all reading and writing assignments of the seminar except that instead of writing a final paper of their choosing they will focus on actual policy or litigation work that will be arranged with various death penalty abolition groups. I expect that there will be an opportunity to work on policy relevant research that will be of assistance in the repeal movement (as well as attending the 9 seminar class meetings and doing the readings for each class).

LAW 400. Directed Research. 1-4 Unit.

Directed Research is an extraordinary opportunity for students beyond the first-year to research problems in any field of law. The final product must be embodied in a paper or other form of written work involving a substantial independent effort on the part of the student. A student must submit a detailed petition of at least 250 words, approved by the sponsoring faculty member, outlining his or her proposed project and demonstrating that the research is likely to result in a significant scholarly contribution. A petition will not be approved for work assigned or performed in a course, clinic, or externship for which the student has or will receive credit. A petition must indicate whether the product is intended for publication in a law review or elsewhere. A student may petition for "Directed Research: Curricular Development" when the work involves assisting a Law School faculty member in developing concepts or materials for new and innovative law school courses. Both the supervising faculty member and the Associate Dean for Curriculum must approve petition for "Directed Research: Curricular Development." Students must meet with the instructor frequently for the purposes of report and guidance. Unit credit is by arrangement. Students whose projects warrant more than four units should consider a Senior Thesis or the Research Track. See SLS Student Handbook for requirements and limitations. With the approval of the instructor, a directed research project of two-units or more may satisfy one research writing course (R course). Elements used in grading: As agreed to by instructor. Directed Research petitions are available on the Law School Registrar's Office website (see Petition Process and Forms).

LAW 401. Venture Capital II: Starting and Running a Venture-Backed Company. 3 Units.

This class will focus on the legal and non-legal tactical details of entrepreneurial endeavors. The legal specifics of corporate formation, tax, and contracts are well covered by a variety of other courses at the Law School and will only be reviewed briefly in this course. Instead, the course will examine the life stages (formation, financing, execution, and exit) of a venture-backed company from the entrepreneur's perspective. Students who are interested in either starting companies or working with startup founders as their legal counsel will solidify their foundations in this course. There will be no textbook - course materials will include PowerPoint slides, readings from various entrepreneur and venture capital blogs, sample business plans, and other sources. Grades will be based on class participation (10%), short reflection papers and/or short problem sets (15%), and a 60 minute oral business plan presentation with accompanying slide deck and written business plan. This course is limited to 16 students with students who have taken VC I receiving priority in enrollment. Prerequisites: A modest background in financial analysis or Excel, such as might be obtained in QM finance (Law 467), is a prerequisite for this course. Venture Capital I will be helpful but is not a prerequisite. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class participation (10%), several short reflection papers and/or short problem sets (15%), and a 60 minute oral business plan presentation with accompanying slide deck and written business plan (75%).

LAW 402. Moot Court. 1 Unit.

The major moot court activity at Stanford Law School is the Marion Rice Kirkwood Memorial Competition, which takes place each year during Autumn and Winter terms. Autumn term will be dedicated to brief writing and completion of the written portion of the Competition; the oral portion of the Competition will be conducted during the first four weeks (approx.) of Winter term. Students on externship and in clinics may enroll if permitted by their respective programs as class attendance is not required Autumn or Winter term and students must only participate in scheduled oral arguments Winter term, which are in the evenings or late afternoons. Prior to the Competition itself, materials and lectures are provided on research, brief writing, and oral advocacy techniques. Registration for the Kirkwood Competition is by team. Each team is required to submit an appellate brief of substantial length and quality, and to complete at least two oral arguments, one on each side of an actual case. The first draft of the brief is reviewed and critiqued by the course instructors. The final draft of the brief is scored by the course instructors and members of the Moot Court Board. The course also offers digital recording and critiques of practice oral arguments. Panels of local attorneys and judges serve as judges who score the oral argument portion of the Competition. Teams are selected for the quarterfinal, semifinal and final round of the Competition based on their brief score and oral advocacy scores. The final round of the Competition is held before a panel of distinguished judges and the entire Law School community is invited to attend. Special Instructions: In order to maintain academic standards, enrollment in the Kirkwood Competition is limited to 20 two-person teams. This limit will be strictly enforced. Registration forms will be distributed Spring term. If the program is oversubscribed, a lottery will be held to determine participating teams and to establish a waiting list. The final drop deadline for the course will be Friday of the first week of classes. Enrollment in both Autumn (2 units) and Winter (1 unit) terms is required. The final grade for both Autumn and Winter terms and the Writing and Professional Skills credit will be awarded upon the completion of the course requirements. Registration and Consent Instructions: Instructions on how to register for the Moot Court competition are sent out to students each year in Spring term for the coming academic year. The registration process is separate from the regular class registration process. Elements used in grading: Satisfactory completion of appellate brief and oral arguments. Writing (W) credit is for students entering prior to Autumn 2012. Early application and drop deadlines.

LAW 403. Senior Thesis. 5-8 Units.

An opportunity for third-year students to engage in original research and to prepare a substantial written-work product on the scale of a law review article. The thesis topic should be chosen no later than two weeks after the beginning of the seventh term of law study and may be chosen during the sixth term. The topic is subject to the approval of the thesis supervisor, who may be any member of the Law School faculty under whose direction the student wishes to write the thesis and who is willing to assume the responsibility therefor. An oral defense of the thesis before members of the faculty, including the thesis supervisor, will be conducted late in the student's ninth academic term. Acceptance of the thesis for credit requires the approval of the thesis supervisor and one or more other members of the faculty who will be selected by the supervisor. Satisfactory completion of the senior thesis will satisfy graduation requirements to the extent of (a) 5 - 8 units of credit and (b) two research courses. The exact requirements for a senior thesis are in the discretion of the supervising faculty member. Special Instructions: Two Research credits are possible. Elements Used in Grading: Paper.

LAW 404B. Foreign Legal Study: Bucerius Law School. 9-14 Units.

This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See SLS Foreign Legal Study Exchange Program at <http://www.law.stanford.edu/organizations/programs-and-centers/stanford-program-in-international-and-comparative-law/the-foreign-legal-study-program>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

LAW 404H. Foreign Legal Study: Hebrew University of Jerusalem. 9-14 Units.

This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See SLS Foreign Legal Study Exchange Program at <http://www.law.stanford.edu/organizations/programs-and-centers/stanford-program-in-international-and-comparative-law/the-foreign-legal-study-program>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

LAW 404I. Foreign Legal Study: Institut d'Etudes Politiques de Paris. 9-14 Units.

This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See SLS Foreign Legal Study Exchange Program at <http://www.law.stanford.edu/organizations/programs-and-centers/stanford-program-in-international-and-comparative-law/the-foreign-legal-study-program>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

LAW 404P. Foreign Legal Study: Peking University Law School. 9-14 Units.

This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See SLS Foreign Legal Study Exchange Program at <http://www.law.stanford.edu/organizations/programs-and-centers/stanford-program-in-international-and-comparative-law/the-foreign-legal-study-program>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

LAW 404S. Foreign Legal Study: National University of Singapore. 9-14 Units.

This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See SLS Foreign Legal Study Exchange Program at <http://www.law.stanford.edu/organizations/programs-and-centers/stanford-program-in-international-and-comparative-law/the-foreign-legal-study-program>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

LAW 404W. Foreign Legal Study: Waseda University. 9-14 Units.

This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See SLS Foreign Legal Study Exchange Program at <http://www.law.stanford.edu/organizations/programs-and-centers/stanford-program-in-international-and-comparative-law/the-foreign-legal-study-program>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

LAW 405. Privacy and Technology in Law and Practice. 2 Units.

In this lecture course, students will identify instances in which new technologies have changed the likelihood that information about individuals will be created, collected, stored, analyzed, and disclosed to both private entities and to governments. We will look at the internet, mobile platforms and drones, among other developments. The class will identify both privacy defeating and privacy enhancing technologies, and consider how legal regimes and policy choices as well as technological design can mitigate or heighten the risk of unwanted information disclosure. Assignments will ask for both descriptive and normative analysis. Students will examine the interrelationship between privacy, security, free speech, innovation and other public goods and be asked to debate particular policy outcomes in light of competing values about information privacy with regard to both the public and private sector. We will cover issues such as Do-Not-Track and online advertising, data security breaches, consumer notice, privacy by design, corporate best practices, Federal Trade Commission enforcement, workplace monitoring, and law enforcement and national security access.

LAW 406. Research Track. 9-12 Units.

The Research Track is for students who wish to carry out a research project of a scope larger than that contemplated for a Senior Thesis. Research Track projects are to be supervised by two or more professors, at least one of whom must be a member of the Law School faculty. At least one faculty member in addition to the supervisors must read the written product of the research, and the student must defend the written work orally before the readers. Students will be admitted to Research Track only if they have a demonstrated capability for substantial independent research, and propose a significant and well-formulated project at the time of application. Special Instructions: Two Research credits are possible. Elements Used in Grading: Paper.

LAW 407. International Deal Making. 2 Units.

This course specifically focuses on the application of legal and business knowledge to real world transactions in the international context. This is a practical course for students who are interested in applying their knowledge to deal structuring, identifying and resolving legal and business concerns, negotiations, documentation and deal closing. The caselets (short-form cases), developed by the instructor (JD/MBA/CPA) from his 25 years' experience in deal-making in China and Asia, raising \$9 billion in equity and debt, often place the student inside the negotiating room and challenge the student to strike deals with senior private and public officials. This course is structured as an intense large seminar with a maximum of 30 law and 10 business students, mixed into groups for class work and presentations. Course objectives: (1) To give the law student a deeper understanding of the legal issues that arise in cross-border transactions, and a broader understanding of the business context in which legal advice is asked for and given; (2) to give the business student an appreciation of the importance of reading the legal documents which purport to describe his/her business transaction, and an understanding of the role the legal advisor can and should play in deal structuring, negotiating and documenting aspects; and (3) for both sets of students, there will be the opportunity to strategize, structure and be the principal negotiator in real world, substantive, international business deals. Following the outcomes decided in class, the actual outcomes and subsequent events will be shared. This is an applied business law course focused on structuring, negotiating and closing pioneering business transactions which have several legal and business obstacles to overcome. Elements used in grading: Class participation (30%), attendance, final paper (30%) and group presentation (40%).

LAW 408A. Criminal Defense Clinic: Clinical Practice. 4 Units.

Students in the Criminal Defense Clinic will represent indigent criminal defendants in a wide range of misdemeanor cases in Santa Clara and San Mateo counties. Students will be California Bar Certified and thus will be bound by the rules and ethics of the profession, notably zealous advocacy on behalf of clients. Students will take the lead role in all aspects of case development, including interviewing clients and witnesses, investigating facts, developing case strategy, negotiating with the prosecutor, drafting and arguing motions, and trying cases before judges and juries. Common charges include drug possession, public order offenses, assault, theft, and weapons possession. While students will have primary responsibility for all aspects of their cases, all trial work will be closely supervised. In addition to casework, there will be weekly workshop sessions. These classes will focus both on case-rounds and on broader systemic issues. The goal of the clinic is to train students how to try a criminal case from beginning to end while engaging in thoughtful reflection on the role of the criminal defense attorney in the criminal justice system. While the work is often challenging and sometimes heartbreaking, it offers students a unique opportunity to put their skills, intellect and compassion to use by serving people in a moment of great need. Special Instructions: General Structure of Clinical Courses

-- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Class participation, attendance, written assignments and case work and professionalism. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 408B. Criminal Defense Clinic: Clinical Methods. 4 Units.

Students in the Criminal Defense Clinic will represent indigent criminal defendants in a wide range of misdemeanor cases in Santa Clara and San Mateo counties. Students will be California Bar Certified and thus will be bound by the rules and ethics of the profession, notably zealous advocacy on behalf of clients. Students will take the lead role in all aspects of case development, including interviewing clients and witnesses, investigating facts, developing case strategy, negotiating with the prosecutor, drafting and arguing motions, and trying cases before judges and juries. Common charges include drug possession, public order offenses, assault, theft, and weapons possession. While students will have primary responsibility for all aspects of their cases, all trial work will be closely supervised. In addition to casework, there will be weekly workshop sessions. These classes will focus both on case-rounds and on broader systemic issues. The goal of the clinic is to train students how to try a criminal case from beginning to end while engaging in thoughtful reflection on the role of the criminal defense attorney in the criminal justice system. While the work is often challenging and sometimes heartbreaking, it offers students a unique opportunity to put their skills, intellect and compassion to use by serving people in a moment of great need. Special Instructions: General Structure of Clinical Courses

-- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Class participation, attendance, written assignments and case work and professionalism. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 408C. Criminal Defense Clinic: Clinical Coursework. 4 Units. Students in the Criminal Defense Clinic will represent indigent criminal defendants in a wide range of misdemeanor cases in Santa Clara and San Mateo counties. Students will be California Bar Certified and thus will be bound by the rules and ethics of the profession, notably zealous advocacy on behalf of clients. Students will take the lead role in all aspects of case development, including interviewing clients and witnesses, investigating facts, developing case strategy, negotiating with the prosecutor, drafting and arguing motions, and trying cases before judges and juries. Common charges include drug possession, public order offenses, assault, theft, and weapons possession. While students will have primary responsibility for all aspects of their cases, all trial work will be closely supervised. In addition to casework, there will be weekly workshop sessions. These classes will focus both on case-rounds and on broader systemic issues. The goal of the clinic is to train students how to try a criminal case from beginning to end while engaging in thoughtful reflection on the role of the criminal defense attorney in the criminal justice system. While the work is often challenging and sometimes heartbreaking, it offers students a unique opportunity to put their skills, intellect and compassion to use by serving people in a moment of great need. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Class participation, attendance, written assignments and case work and professionalism. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 409. Introduction to Intellectual Property. 4 Units.

This is an overview course covering the basics of intellectual property law -- trade secrets, patents, copyrights, and trademarks, as well as selected other state intellectual property rights. This course is designed both for those who are interested in pursuing IP as a career, and those who are looking only for a basic knowledge of the subject. There are no prerequisites, and a scientific background is not required. Elements used in grading: Class participation and final exam (4-hour, open-book, in-class final).

LAW 411. Directed Writing. 1-4 Unit.

Teams of students may earn "Directed Writing" credit for collaborative problems involving professional writing, such as briefs, proposed legislation or other legal writing. Only projects supervised by a member of the faculty (tenured, tenure-track, senior lecturer, or professor from practice) may qualify for Directed Writing credit. It will not necessarily be appropriate to require each member of the team to write the number of pages that would be required for an individual directed research project earning the number of credits that each team member will earn for the team project. The page length guidelines applicable to individual papers may be considered in determining the appropriate page length, but the faculty supervisor has discretion to make the final page-length determination. Students must meet with the instructor frequently for the purposes of report and guidance. Unit credit is by arrangement. A petition will not be approved for work assigned or performed in a course, clinic, or externship for which the student has or will receive credit. Special Instructions: A Directed Writing project may count as the equivalent of a "W" (Writing - For students entering prior to Autumn 2012) course with the approval of the supervising faculty member. A Directed Writing project may not count as the equivalent of a "PW" (Professional Writing - For students entering Autumn 2012 and thereafter) course.

LAW 413A. Policy Practicum: Obesity in Santa Clara County. 1-3 Unit.

This course will develop obesity initiatives for Santa Clara County. Law, medical, and public policy students will work with representatives from the County Board of Supervisors to identify strategies for reducing child and adult obesity that the County can implement. A paper focusing on particular initiatives will be required. Course must be taken for two-units or more to satisfy the Research requirement. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for contact information and submission deadline. Elements used in grading: Class Participation, Attendance, Final Paper.

LAW 413B. Policy Practicum: Election Administration and Reform. 2 Units.

Students in this policy lab will be conducting research on problems in administration that have plagued recent elections, as well as potential reform proposals. The areas of inquiry will include: wait times to vote, polling place location and management, poll worker recruitment and training, voting accessibility for uniformed and overseas voters, individuals with disabilities, limited English proficiency, voter rolls and poll books, voting machine capacity and technology, ballot simplicity and voter education, provisional ballots, absentee and early voting, and the adequacy of contingency plans for natural disasters and other emergencies that may disrupt elections. Students will be responsible for white papers on one or more of these issues, as well as creating bibliographies on these and related topics. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for contact information and submission deadline. Elements used in grading: Written Assignments.

LAW 413C. Policy Practicum: Improving Bone Marrow Donation Programs. 2-3 Units.

The National Bone Marrow Donation Program (NBMD) operates the "Be the Match Registry." Individuals who register with Be the Match may be identified as potential donors of hematopoietic cells (most typically bone marrow) to patients facing life-threatening disorders such as leukemia, lymphoma, and aplastic anemia who do not have family members who are good matches to serve as donors. (Family members are appropriate for only 30% of patients needing these transplants.) The NBMD is considering whether the procedures that it uses to attract people to enroll as potential donors in the registry could be improved, and also wants to investigate the further possibility that the proportion of potential donors who actually donate cells once it is discovered that they are a match for a particular patient could be increased. Social psychologists here at Stanford are interested in working with the NBMD to examine some of the organization's practices, taking advantage of the sorts of social psychological insights often employed by those interested in marketing products or increasing charitable donations. There are questions, of course, about the efficacy of the techniques that they might recommend in terms of increasing ultimate donation levels, but there are also significant questions about whether some of the techniques might run afoul of existing legal regulation or pose other sorts of problems for the organization. Law students who choose to work on this practicum will almost surely work (in teams with other law students and in conjunction with social psychologists working on this issue and the NBMD) on the following issues: -- To what extent is it consonant with existing medical privacy law (or laws that the NBMD might press to adopt) to reveal personal information about donees to potential donors, assuming that donors are more likely to donate to those with whom they feel a greater personal connection? -- To what degree can NBMD simplify the process of registering potential donors without running afoul of current (or ideal) regulation protecting people against undergoing medical procedures in the absence of informed consent? -- What sorts of material incentives for donation, if any, are permissible under current (or ideal) law and what stance should the NBMD take on the use of material incentives? There may well be other related topics upon which students will work as well. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors at mkelman@stanford.edu and lmarsall@law.stanford.edu. See Consent Application Form for submission deadline. Elements used in grading: Written Assignments, Class Participation, Group Work.

LAW 413D. Policy Practicum: Institutional and Legislative Copyright Reform. 2-3 Units.

The US Copyright Office has developed an ambitious agenda for legislative and institutional reform of the American copyright system, and the Register of Copyrights would like us to assist in researching and formulating policy on two of the more pressing projects on its agenda, at least one of which may be the subject of hearings before the House Judiciary Committee this fall. Students will be responsible for developing and implementing the research design; consulting regularly with Copyright Office personnel on development of policy proposals; and preparing a final report for presentation to the Copyright Office. This will require a student commitment to two quarters of work during the Fall and Winter Quarters. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advance by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Elements used in grading: As agreed to by instructor. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413E. Policy Practicum: Empirical Study of Patent Troll Litigation. 1-3 Unit.

Many believe litigation by patent trolls—those in the business of asserting patents rather than making products—is rampant and has harmed innovation and raised consumer prices. This concern has spread to Congress and the U.S. Patent Office, which are considering new regulation of patent trolls. However, there remains insufficient data to determine the amount and impact of patent troll litigation. Students selected for this course will work with renowned patent law scholar Mark Lemley and Law, Science & Technology Teaching Fellow Shawn Miller to produce the first patent litigation database to include comprehensive identification of the type of patent plaintiff involved in each lawsuit. Students' principal responsibility will be to identify and code patent plaintiffs by type. Though voluntary, Professor Lemley and Dr. Miller will encourage and aid students in utilizing this experience and the database for their own scholarly work. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 413F. Policy Practicum: Mediation Confidentiality and Attorney Malpractice in California. 2 Units.

The issue of confidentiality is central to contemporary mediation practice, yet raises significant public policy issues. The California Legislature has directed the California Law Revision Commission to analyze "the relationship under current law between mediation confidentiality and attorney malpractice and other misconduct and the purposes for, and impact of, those laws on public protection, professional ethics, attorney discipline, client rights, the willingness of parties to participate in voluntary and mandatory mediation, and the effectiveness of mediation, as well as any other issues that the Commission deems relevant," with an eye to making recommendations for revising relevant state law. California is a leader in the ADR domain and significant changes in its policies regarding mediation have the potential to affect mediation law in other state courts as well as the federal court system. In this practicum students will work collaboratively to assist Commission staff identify issues for research and analysis, conduct research and prepare policy memoranda for consideration of Commission staff. Elements used in grading: Class Participation, Attendance, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413G. Policy Practicum: Social Mobility In Higher Education. 2 Units.

The Mobility Project will explore ways to increase the representation at elite universities of high achieving students who are socioeconomically disadvantaged. Economically disadvantaged students are underrepresented at most selective colleges or universities. This despite the fact that in recent years a number of prominent universities (Stanford among them) have made their financial aid policies considerably more generous for students from lower income families. Recent research indicates that the pool of resource disadvantaged, high achieving high school students is much larger than commonly thought. Each year, there are more than 25,000 high school seniors from relatively low income families whose standardized test scores and grades place them in the top 4% of high school students, making it likely that they could be admitted to, receive financial aid from, and thrive at a selective institution. Yet many thousands of these talented students do not apply to any top tier college. Some do not even apply to any four year school. This failure in the matching of students to schools is socially significant. While higher education has long been a means of promoting mobility for individuals and across generations, the economic benefits of advanced education are even greater now than in past eras. Thus, it has become especially important that universities provide an avenue of advancement for talented students of all backgrounds. The Mobility Project is also timely given the likelihood of increasing restrictions on race-based affirmative action. Expanding access to elite colleges for economically disadvantaged students will also contribute to the racial diversity of those institutions. The group of low income, high achievers is more racially diverse (and more specifically, has a higher representation of African Americans and Latinos) than the group of high achieving students from affluent families. We will examine a variety of initiatives to increase the enrollment at elite universities of high achieving economically disadvantaged students. We hope to assemble a small interdisciplinary team of faculty and students from the Schools of Law, Education, and Humanities and Sciences to explore scalable interventions. Students have the option to write papers for Research credit with instructor approval. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors at rbanks@law.stanford.edu and pbrest@law.stanford.edu. See Consent Application Form for submission deadline.

LAW 413H. Policy Practicum: State Law Enforcement Access to Customer Records of Communication Companies. 2 Units.

If California Senate Bill SCR 54 is enacted, as seems likely, the California Law Revision Commission will be tasked with modernizing California statutory law on law enforcement access to customer records of cell phone providers, internet service providers, social media companies, and other mobile and internet-based communication providers. The Commission would like us to prepare a thorough and balanced background study of the relevant legal and policy concerns, including civil liberties, public safety, and the scope of federal preemption in the area, with an emphasis on new and emerging communication services. This is likely to be a high profile project, with close attention from the Legislature and many interest groups. This project involves complex issues under the Fourth Amendment and such statutory structures as the Electronic Communications Privacy Act. Completion of the course in Criminal Investigation is a prerequisite, with exceptions only for those with demonstrable alternative background in Fourth Amendment law. Elements used in grading: As agreed to by instructor. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413I. Policy Practicum: Tax Regulatory Project. 3 Units.

The changing economic landscape places great stress on the tax legislative process. This stress is magnified by flaws in existing statutes, and by taxpayer attempts to exploit those flaws. There are no statutory rules governing hundreds of billions of dollars of annual transactions. Much of this void is filled in (imperfectly) by Treasury regulations. This practicum will take a close look at one or two issues raised by one proposed Treasury regulation. We will look at the relevant literature, talk to stakeholders, and (possibly) and in our individual names, provide public comments and testimony on the regulation. Since the primary output will be a public (and therefore published in the leading tax journal, *Tax Notes*) comment, the course will offer Professional Writing (PW) credit. Students with a research interest in this area that is aligned with the project can with permission of the professor write a paper that receives Research (R) credit. After the term begins, students accepted into the course can transfer from the PW section (01) to the R section (02) with consent of the instructor. Elements used in grading: Class Participation, Written Assignments or Research Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413J. Policy Practicum: Court-Supervised Remediation of Complex Environmental Problems. 2 Units.

The Law School's Environmental Law Clinic is representing an environmental group in a lawsuit against the Monterey County Water Resources Agency. The suit asserts that the agency has been polluting both surface and ground waters in the Salinas River Valley and Elkhorn Slough by discharging pesticide-laden farm irrigation run-off in violation of California environmental laws. If the plaintiffs prevail, the appropriate injunctive relief is likely to be complex. Neither the precise dimensions of the problem nor those of the most effective interventions to remedy it are known. So, ideally, relief should combine adaptive flexibility for the agency, meaningful accountability to the plaintiffs and the public, and an opportunity for all parties to learn in the process of the implementation. Policy Lab students will work with Professors Deborah Sivas (lead plaintiffs' counsel) and Bill Simon on some aspect of a possible remedial regime. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class Participation, Final Paper.

LAW 413K. Policy Practicum: Stream Flow Restoration Transactions. 1-3 Unit.

Water in the West (a joint program of the Woods Institute and the Lane Center for the American West) is working with the National Fish and Wildlife Foundation (NFWF) on research related to water rights transactions that restore water to the environment. Rivers in the western United States are subject to significant water withdrawals that have had major impacts on the health of their ecosystems. In an effort to restore the health of such rivers, a number of conservation groups have begun to facilitate voluntary transactions to restore water to the environment, such as acquiring water rights and funding irrigation efficiency improvements. NFWF has extensive experience with these efforts through its funding of the Columbia Basin Water Transaction Program and implementation of the Walker Basin Restoration Program, and intends to expand its efforts to other parts of the West. It faces the challenge of deciding where to invest funds and resources in order to achieve the greatest conservation benefits for available dollars. Students in this policy lab will assist NFWF in the development of an assessment methodology for identifying and analyzing watersheds in the western United States as potential locations for expanding its efforts. Our work will focus on evaluating western states in terms of the extent to which they allow the transfer of water rights for environmental use and in terms of the regulatory, financial, and social hurdles such transactions face in each state. We will also analyze data related to stream flow alteration and work with NFWF to integrate this information into its broader assessment. Finally, we will work with NFWF staff to integrate our work into their broader assessment and help them begin to evaluate specific candidate watersheds. Elements used in grading: As agreed to by instructor. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413L. Policy Practicum: Advising Congress on Health Policy. 2 Units.

This policy lab will conduct research on national health policy problems for the Medicare Payment Advisory Commission, or MedPAC (MedPAC is an independent Congressional agency established by the Balanced Budget Act of 1997 to advise the U.S. Congress on issues affecting the Medicare program). Students will work in teams with lawyers and PhD economists from MedPAC, resident and fellow physicians from Stanford Hospital, and other students from throughout the University on one of two topics: Expanding the healthcare workforce through reform of states' scope of practice regulation. This project will examine how changes in licensing rules governing health care providers' allowed scope of practice can accommodate the expansion of demand for health services due to the Affordable Care Act and other factors. Specific questions include: 1) Under existing state law, what additional tasks can non-physicians such as nurse practitioners, physician assistants, and pharmacists undertake that would reduce cost and/or improve quality? 2) What changes to state law might expand the allowed scope of practice of non-physicians that would reduce cost and/or improve quality? 3) What incentives might the federal government provide, either through Medicare or other means, to encourage states to reform optimally their scope of practice rules to reflect new available technologies? Designing antitrust policy to achieve the benefits of coordination and avoid the costs of consolidation. On one hand, closer links between physicians, hospitals, and other health care providers has the potential to reduce cost and improve quality by improving communication across care settings, avoiding wasteful duplication of effort, and reducing medical errors. On the other hand, consolidation may be used to exploit consumers by facilitating the exercise of health care providers' market power. This tension has become especially important due to incentives in the Affordable Care Act that encourage doctors and hospitals to join together in Accountable Care Organizations. This project will examine the following questions: 1) How can the U.S. Department of Justice and Federal Trade Commission use existing federal antitrust law to allow welfare-improving coordination while prohibiting welfare-reducing consolidation in ways that minimize costs of enforcement, including the legal uncertainty facing providers? 2) Can adoption of health-care-specific antitrust laws, such as those proposed or enacted in Massachusetts and California, effectively fill in the gaps in existing federal antitrust laws? 3) What incentives might the federal government provide, through design of reimbursement policies in the Medicare program, to complement federal and state antitrust laws? Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Written Assignments, Final Paper. This course is cross-listed with HRP 222A and B.

LAW 413M. Policy Practicum: Stereotype Threat and Higher Education. 2 Units.

A large body of social psychological research has established the existence of stereotype threat—a worry that one might be viewed through the lens of a negative intellectual stereotype. This concern provokes anxiety and can undermine the academic performance of members of negatively stereotyped groups, underrepresented minority groups in particular. Stereotype threat acts like an intellectual headwind. This project will consider changes that colleges and universities institutions might undertake to reduce the effect of stereotype threat. Elements use in grading: Class Participation, Attendance, Written Assignments, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413N. Policy Practicum: Court Online Mediation Service Practicum. 2 Units.

California is a leader in alternative dispute resolution (ADR), and its innovations have the potential to affect mediation law in state and federal courts across the nation. In this practicum students will work collaboratively to build a new online dispute resolution (ODR) system to be piloted in the San Mateo Superior Court for Family Law. Stanford students will work side by side with faculty, court staff, and experts from Modria Inc. (a leading mediation software designer) to implement the Beta Test of the design. The core of this quarter's work will focus on introducing the platform to its first users - claimants with family law disputes - and designing an evaluation program for collecting feedback and implementing improvements. The project will include opportunities to learn basic coding skills, innovate user experience (UX) design for a tech product, and work directly in family law client services. Most importantly, this project addresses a long-neglected access-to-justice issue in California, where 60-80% of claimants arriving in civil courts cannot afford an attorney. ODR, designed and tested properly, may streamline the system for those who need it most while still offering supervision and quality control of the court staff. Special Instructions: Enrollment in Thinking Like a Policy Analyst (Law 444) encouraged. Preference given to students who have taken LAW 615 Negotiation, LAW 613 Dispute System Design, LAW 638 Mediation, or demonstrate substantial experience in ADR, or law and technology. Students have the option to write a paper for R credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Participation, Attendance, and Contribution to Project. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413O. Policy Practicum: China's Solar Industry and its Global Implications. 2-3 Units.

China dominates and defines a growing global market for solar power. That market faces a stark dichotomy. Solar energy's prospects as a meaningful electricity source are increasingly bright. Yet, amid a global glut of solar panels, the future contours of the industry - the relative roles of leading players such as the United States and China - are increasingly unclear. Students in this seminar will analyze industry and policy data to assess China's competitive strengths in the global solar industry and, based on those conclusions, to suggest finance and policy approaches that the US and China each could adopt so that the two countries operate more strategically in an economically efficient global solar market - and, by extension, a globalizing market for cleaner sources of energy. This research will figure into a project on this theme underway at the Steyer-Taylor Center for Energy Policy and Finance. Course deliverables will vary among students and will be based on discussions at the start of the class between the instructors and the students. Some students will produce papers; others will develop and analyze key sets of data. Students from graduate programs around the university - the law school and others - are encouraged to apply. Preference will be given to those with demonstrated interest in energy finance and policy, particularly bearing on China, and with fluency in Mandarin, though neither is a firm requirement. Given that the Steyer-Taylor Center project will continue through the academic year, preference also will be given to students who intend to continue with the practicum in both the winter and spring quarters. Students have the option to write papers for W or R credit. If the paper involves independent research, then it will be eligible for R credit. The instructor and student must agree whether the student will receive an R or a W. After the term begins, students accepted into the course can transfer from the W writing section (01) into section (02), which meets the R requirement, with consent of the instructor. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. Elements used in grading: Class Participation, Written Assignments or Paper. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413P. Policy Practicum: Wildlife Trafficking: Stopping the Scourge. 2 Units.

This policy lab seminar will address the international wildlife trafficking crisis, with a focus on legal and policy tools that can help combat the scourge. The price of ivory on black markets has skyrocketed and elephant and rhino populations in Africa are being decimated. At current poaching rates, African elephants could be wiped out within 8 to 10 years. Trafficking also is hitting tigers, great apes, sharks and other important species. The seminar will key into the President's recent Executive Order on this subject (E.O. 13658, issued on July 1, 2013) and related international efforts to reduce the killing in host countries, the transshipment of poached materials, and consumer demand for ivory and other wildlife parts. The seminar will address US laws and their role in addressing trade in wildlife parts. It also will undertake a comparative review of the legal structures in relevant African and Asian nations, and the potential role of the international endangered species treaty (CITES) and transnational enforcement efforts in cracking down on ivory and other wildlife-related trafficking. The seminar will review prior poaching crises, including the elephant/ivory crisis in the late 1980s, and evaluate why the strategies that reduced killings in the 1990s are no longer successful. Based on these analyses, the class will develop and submit recommendations for reforms to US, African, and international laws and practices to two groups established under the Executive Order: (1) the President's Wildlife Trafficking Task Force, which is chaired by the Secretaries of State and Interior and the Attorney General; and (2) the Wildlife Trafficking Advisory Council, which is composed of outside experts who are advising the Task Force. (Professor Hayes is an appointed member of the Advisory Council.) Elements used in grading: Class Participation, Attendance, Final Paper. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413Q. Policy Practicum: Constitutional Design in Libya: The Division of National & Provincial Powers. 1 Unit.

Libya's government has experienced significant strains stemming from various interest groups and armed militias calling for federalism. The General National Congress, elected in 2012, is mandated to form a government, promulgate legislation for Libya's transitional period, and establish a constitution-drafting entity. A de facto federal structure has emerged since the fall of the Qaddafi regime, and it appears that a federal state structure is the only way forward for Libya. Even a decentralized framework may be threatened, however, if it does not clearly delineate the powers of the executive heads of provincial territories. Students in this Practicum will work to support the Public Interest Law and Policy Group (PILPG), a pro bono international law firm, which in turn is providing advice to civil society groups in Libya. To assist PILPG in supporting its clients' engagement on constitutional issues and decentralization, students in this Practicum will develop a legal memorandum analyzing comparative state practice of the distribution of powers between the national executive and provincial level executives in federal or decentralized states. The memorandum will address approaches states have taken on key issues such as whether the national executive can remove the heads of provincial governments; whether the provincial executive has a role in national-level policies; whether provincial executives maintain any control over the military; and whether the provincial executives' powers can supersede the national executive's powers on certain regional issues. State practice from the Middle East and North Africa region will be of particular relevance to PILPG's Libyan clients, but state practice examples will ultimately be selected based on their value in explaining or illustrating mechanisms and processes that shed light on the efficacy of different approaches to distributing powers between national and provincial executives. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class participation, Written Assignments.

LAW 413R. Policy Practicum: The National Environmental Policy Act: Pushing the Reset Button. 2 Units.

This policy lab will focus on recommendations for the reform and modernization of the National Environmental Policy Act (NEPA) -- the granddaddy of our environmental laws. NEPA is a disclosure statute which requires that before federal officials can issue a permit, commit federal funds, or otherwise take an action that may have a significant impact on the environment, decision-makers must have the opportunity to review an Environmental Impact Statement (EIS) that analyzes the potential environmental consequences of the proposed action and its alternatives. Many critics from both the right and left are dissatisfied with the way that NEPA and its state analogues are being implemented, prompting some legislators to advocate statutory overrides and agency officials to expand the use of categorical exemptions. Meanwhile, NEPA proponents are interested in making the environmental review process more user-friendly and efficient, while preserving its core disclosure requirements. In this policy lab, students will review, analyze, and develop positions on potential NEPA reform options. Students will interact with NEPA experts at the White House; the Council on Environmental Quality (CEQ) and produce work product that CEQ can use as it responds to Congressional and outside pressure to reform the NEPA process. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413S. Policy Practicum: Carbon Pollution Standards and Carbon Taxes. 2 Units.

This policy lab seminar will address the ongoing effort by the Environmental Protection Agency to reduce carbon pollution from electric power plants. The EPA is currently in the process of writing New Source Performance Standards for new and existing coal and natural gas fired electric power plants. A critical question in writing these rules will be the extent to which EPA can allow for economically efficient approaches to cutting emissions. States, including California, industry, and environmental groups are all pushing EPA to incorporate some sort of emissions pricing as either a safe harbor or to propose it as a Federal Implementation Plan that States may choose to join. By doing so, not only will costs fall for regulated sectors but also, deeper cuts in emissions may become feasible. Almost all parties expect, based on prior precedent, that such a proposal will take the form of a cap-and-trade or at least some sort of mass-based cap on emissions. Adele Morris, the Policy Director for the Climate and Energy Economics Project at the Brookings Institution, has asked for our assistance in formulating and assessing the legal implications of an alternative proposal - a carbon tax. Students will prepare briefings and written comments to EPA and OMB explaining the potential benefits of a carbon tax approach to New Source Performance Standards as well as exploring the legal risks that might be created by this approach. We anticipate that students will also participate in briefings with key OMB and EPA Air and Radiation staff involved in drafting the proposed rule. The New Source Performance Standard rulemaking for greenhouse gases is the most environmentally and economically significant regulatory effort that EPA will undertake this decade. Partnering with Brookings will allow us to both leverage legal and economic expertise and to inject students into the most exciting environmental policy making currently underway in the United States. Doing so now, before the draft rule is published, allows us to exert maximum influence before the agency loses flexibility to respond to outside input. To develop skills relevant to the work of practicing lawyers, students will research and write parts of memos and written comments to EPA and OMB on behalf of Morris based on their research into various legal and policy aspects of Clean Air Act Section 111 as applied to the problem of power plant emissions. These assignments, for Writing (W) or Professional Writing (PW), or Research (R) credit, will be due before the end of the quarter. Students must obtain the instructor's approval of their election to take the course for writing (PW or W) or research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413T. Policy Practicum: Human Rights in the Americas: the Inter-American System. 3-4 Units.

In this practicum, students will contribute to analyses of the current state of human rights in the Americas and, in particular, to analyses of areas of focus for the Inter-American Commission (the "Commission"). Students will become familiar with international and regional standards in human rights and with the procedures, history and practice of the Commission and will contribute, through their policy analysis, to the work of the Commission. Working independently and/or in teams, students will prepare studies on situations of rights abuse, as well as on best practices across the region. The scope of students' work product will expand as they acquire more expertise with international standards and transnational comparative tools in policy analysis. Fluency in Spanish or Portuguese helpful, but not required. One or more students may travel in conjunction with this practicum to sessions of the Inter-American Commission in October/November 2014. This course will be offered in the Fall of 2014. While priority will be given to students who enrolled in the course in the Spring of 2014, all students are encouraged to apply. Special Instructions: Students must enroll with a minimum of 3 units, but are encouraged to enroll in 4 units. This class meets the PW requirement. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Students who have taken the practicum in the Spring of 2014 have consent to take this course in the Fall of 2014 and need not file a Consent Application. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 413U. Policy Practicum: Next Steps in Network Neutrality. 1-3 Unit.

Earlier this year, the Court of Appeals for the D.C. Circuit struck down the Federal Communications Commission's Open Internet rules. This policy practicum will help policy makers assess the available options in the wake of the court's decision. In December 2010, the Federal Communications Commission (FCC) adopted the Open Internet Order, which enacted binding network neutrality rules for the first time. Network neutrality rules limit the ability of Internet service providers to interfere with the applications, content and services on their networks; they allow users to decide how they want to use the Internet without interference from Internet service providers. In January of this year, the Court of Appeals for the D.C. Circuit struck down the core provisions of the Open Internet Order - the rules against blocking and discrimination. The decision combined two wins for the FCC with one decisive loss. According to the Court, the FCC has authority to regulate providers of broadband Internet access service under Section 706 of the Telecommunications Act of 1996, and the FCC's justification for the Open Internet Order is "reasonable and supported by substantial evidence." The no-blocking and non-discrimination rules, the Court found, however, violate the Communications Act's ban on imposing common carrier obligations on entities like Internet service providers that the FCC has not classified as telecommunications service providers under Title II of the Communications Act. As a result of this ruling, Internet service providers like Verizon, AT&T or Cox Cable that connect users to the Internet are now free to block any content, service or application they want. They can slow down selected applications, speed up others, or ask application or content providers like Netflix or Spotify to pay fees to reach their users. These practices would fundamentally change how we experience the Internet. In the wake of the Court's decision, policy makers, stakeholders and observers are debating how to best ensure that the Internet remains open and free. Policy makers essentially have three options: First, the FCC can preserve the Open Internet Rules by reclassifying Internet service as a telecommunications service under Title II of the Communications Act. Second, it can develop a different, narrower network neutrality regime under Section 706 of the Telecommunications Act within the boundaries established by the Court of Appeal's decision. Finally, Congress or the FCC can adopt a new network neutrality regime, but only, in the case of the FCC, after reclassifying Internet service as a telecommunications service. In mid-February, the Federal Communications Commission opened a docket within which to consider how the Commission should proceed. Special Instructions: Upon consent of the instructor, students may choose enrollment Option 1 or Option 2: Option 1 (3 units) - Students who elect Option 1 will research and write parts of white papers and comments to the Federal Communications Commission that will help policy makers assess the available options. In special cases, students electing Option 1 may take the policy practicum for 2 units. Students interested in this option should indicate this on their application. Option 2 (1 to 2 units) - In order to elect Option 2, students must concurrently enroll (with consent of instructor) in the seminar component, "Current Issues in Network Neutrality" (2 units), which meets Thursdays from 4:15pm-6:15pm. Students in the policy practicum with the seminar component will research and write parts of white papers and comments to the Federal Communications Commission that will help policy makers assess the available options. Students will be required to attend the seminar and participate in the discussion, but will not do any of the written assignments for the seminar. Depending on the type of work in Option 1 or Option 2, students taking the policy practicum for two-units or more may receive professional writing (PW) or research (R) credit. Students must obtain the instructor's approval of their election to take the course for writing (PW or W) or research (R) credit. After the term begins, students accepted into the course can transfer from the W/PW writing section (01) into section (02), which meets the R requirement, with consent of the instructor. The class is open to law students and students from other parts of the university. It does not require any technical background. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413V. Policy Practicum: Law and Economics of the Death Penalty. 2 Units.

This is the practicum component of the Law and Economics of the Death Penalty Seminar. See Law and Economics of the Death Penalty Seminar (Law 397) for a detailed course description. Students who take the practicum component must attend the 9 seminar class meetings and do all reading and writing assignments of the seminar except that instead of writing a final paper of their choosing they will focus on actual policy or litigation work that will be arranged with various death penalty abolition groups. Only students enrolled in the Law and Economics of the Death Penalty Seminar (whether for two or three units) may enroll in the practicum component for two additional units. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413W. Policy Practicum: Expanding Access to Justice in California Courts for Limited-English Court Users. 1-4 Unit.

This policy practicum will offer recommendations to the California Supreme Court Chief Justice Tani Cantil-Sakauye, Associate Justice Maria Rivera (First District Court of Appeal), Hon. Manuel Cavarrubius (California Superior Court, County of Ventura) and members of the California Judicial Council to increase access to justice for limited English proficient (LEP) court users. The project interacts with the process of the Joint Working Group for California's Language Access Plan and assists development of a response to a U.S. Department of Justice notice that certain Court policies and procedures may be inconsistent with Title VI of the Civil Right Act of 1964 and its implementing regulations. Numerous state and local laws are also implicated by a potential lack of access for LEP court users. The California Commission on Access to Justice estimates that well over 7 million Californians, almost 20% of our state's population, "cannot access the courts without significant language assistance, cannot understand pleadings, forms or other legal documents and cannot participate meaningfully in court proceedings." Through fieldwork, literature review, legal research, and interviews with relevant participants and stakeholders students will identify challenges facing LEP litigants. Students will interview and consult with such parties as the Chief Justice, appellate court judges, state bar leaders and other attorneys, members of the Language Access Task Force of California, and individual stakeholders to develop recommendations for potential reform options, including whether the use of such technologies as video remote interpreting (VRI) can expand access to justice for LEP litigants. Students will be asked to produce written materials (findings and recommendations) as well as make oral presentations to California judges, Judicial Council staff, and others at meetings at each quarter. This policy practicum will be offered Fall 2014 and Winter 2015. We encourage students to participate both quarters if they are able to do so. Students should also note that field work will require some number of students to engage in overnight travel for court observation and local interviews in areas outside the Bay Area. Your availability to take the practicum both quarters and to travel for field research should be noted in your consent form. Students have the option to write papers for PW or R credit. If the paper involves independent research, then it will be eligible for R credit. The instructor and student must agree whether the student will receive an R or a PW. After the term begins, students accepted into the course can transfer from the PW writing section (01) into section (02), which meets the R requirement, with consent of the instructor. The practicum must be taken for at least two-units or more to receive R or PW credit. Elements used in grading: Class Participation, Attendance, Written Assignments. Oral presentations to judges, commissions and California Judicial Council representatives, quality of research. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413X. Policy Practicum: Designing a Social Impact Bond for Santa Clara County Mental Health. 3 Units.

Social impact bonds, also called "Pay for Success" initiatives, are an innovative finance mechanism through which investors provide the funds for organizations to provide social services at the request of a government entity. These investors may be repaid, with interest, depending on the organizations' success in achieving specified outcomes. The most noteworthy examples to date involve pay-for-success schemes to reduce recidivism in the UK, Massachusetts, and New York City prisons. Santa Clara County will soon issue a request for proposals for a social impact bond to reduce the hospitalization of mentally ill patients at the Santa Clara Valley Medical Center. It has retained Third Sector Capital Partners as an advisor and Keith Humphreys, Ph.D., Professor and Section Director for Mental Health Policy in the Department of Psychiatry and Behavioral Sciences at Stanford University, as the evaluator. Students in this Policy Lab practicum will work with Dr. Humphreys, the Santa Clara County Counsel's Office, and Third Sector to develop the scheme, including designing clear metrics for success and undertaking a cost-benefit analysis of the de-institutionalization of mental health patients. It is likely that we will collaborate with faculty and students from other schools and departments having particular expertise in cost-benefit analysis and evaluation. Special Instructions: Total enrollment in this course will be limited to 12 (4 SLS students, 4 Medical School students & 4 other). A preference will be given to students who can enroll for both the Autumn and Winter quarters. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Cross-listed with Psychiatry (PSYC 213).

LAW 413Y. Policy Practicum: Catalyzing Nature-Based Coastal Flood Mitigation and Adaptation. 2 Units.

Recently, several perilous and costly flood events have raised public awareness of the threats posed by coastal and riverine floods nationally. It is likely that with climate change, the frequency of heavy precipitation will increase in some areas over the 21st century, and that the return interval of flood events will decrease, greatly increasing overall flood risk. Traditionally, flood mitigation has occurred through the use of hard engineering - seawalls, revetments and levees. However, natural habitats and ecosystems also offer significant, and often overlooked and undervalued protections in mitigating or buffering flood hazards. Hazard mitigation plans and conservation project plans very rarely explicitly recognize the protective value of natural habitats, even though this value has been well documented. Moreover, hazard mitigation agents and environmental conservation organizations seldom work together, although recent catastrophic events highlight why it would make sense to do so. FEMA Region IX and The Nature Conservancy in California have recognized this and wish to develop a paradigm for working together to promote nature-based flood mitigation, and have asked for our help. Students in this practicum will: (a) Identify a coastal community with areas of both high flood risk and conservation value; (b) Design a nature-based strategy for risk reduction, which could include managed retreat and/or other mitigation/adaptation tactics; (c) Identify available resources/programs/incentives for and barriers to implementation at the local, state and federal levels; (d) Design a process for enabling the community to avail themselves of these resources; and (e) Comment on how laws, regulations and programs could be changed to better facilitate nature-based flood risk reduction. Students will also provide insight into the transferability of this approach beyond the study area. Elements Used in Grading: Class Participation, Attendance, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 413Z. Policy Practicum: Endstage Decisions: Health Directives in Law and Practice. 2 Units.

Medical decisions toward the end of life can be crucial and difficult for patients, doctors, and the families of patients. Law and medicine have been struggling to find ways to strike a balance between what the patients might want (or say they want), and what makes medical, economic, and ethical sense. People have been encouraged to fill out "Advanced Health Care Directives," which give guidance to doctors and surrogates (usually a family member) on what to do when faced with end-of-life dilemmas. Another form, adopted in just over half the states (including California) is the POLST form (Physician Orders for Life-Sustaining Treatment). The two types are supposed to complement each other, but they are different in important ways. The Advanced Health Care Directive expresses what a person wants, or thinks she wants, and/or appoints a surrogate, in case the patient is unable to express her wishes. Anybody can fill out a Directive, at any time of life. Ideally, a copy goes to the surrogate, if one is appointed, and another to the primary care physician. The POLST form is meant for people who are seriously ill. It is a one page form, printed on bright pink paper. It is signed by patient and doctor. The directives (for example "no artificial nutrition by tube") are supposed to be controlling; the patient, of course, can change her mind; but there is no surrogate. It is an agreement between the patient and the doctor. Who uses these forms? How effective are they? To what extent and in what situations are they useful? In what situations are they not useful? Can they be made more useful and, if so, how? There has been research on the subject; and a major report on the end-of-life issue (originally due out in December) will be released this summer. The class will look at some of this literature, but the main point will be to find out what local hospitals and nursing homes are doing. Students will conduct interviews with doctors, nurses, and other health care specialists in order to find out what one might call the living law of the Directive and of Polst. The aim is to get a more realistic picture of the situation in the area: how are these forms used, when are they used, what has the experience of health care professionals been; perhaps also some insight into the experience of patients and family members. The ultimately goal would, one hopes, be policy recommendations for improvements in the forms themselves, and the laws relating to the forms, along with recommendations for ways to improve the way the forms are or can be used; or whether some entirely different approach to the problem might be needed. Stanford Hospital and Clinics will be the client in researching and addressing the above questions. Elements used in grading: Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 414A. Policy Practicum: Central Valley Habitat Exchange. 3 Units.

This policy lab will assist in developing more flexible and effective wildlife habitat mitigation tools for use in California's Central Valley, a landscape that presents the challenge of taking advantage of the habitat potential provided by working agricultural lands. Habitat mitigation is an important tool under a variety of environmental and wildlife protection statutes, both state and federal. Current regulatory frameworks usually require that habitat mitigation employ permanent easements or long-term contracts fixed in particular locations, despite the fact that species have changing habitat needs. Many species are migratory and must move across the landscape to survive; a changing climate and shifting human activity only increase the dynamic nature of habitat needs. To ensure that species and their habitat are protected in the most effective manner possible, legal and policy frameworks must be structured to address this and other challenges. Additionally, there is a need for a robust market mechanism that recognizes the inherent natural capital and species habitat provided by working agricultural lands, and compensates landowners for the value of those resources. In the face of significant upcoming conservation and mitigation needs for California, new policies and regulatory frameworks are necessary, and must be rooted in rigorous science, be consistent with existing legal frameworks, and accomplish the dual goals of promoting species recovery and maintaining agricultural production. Students in the Law and Policy Lab will analyze cutting edge issues related to species habitat and protection. They will help provide recommendations to the Central Valley Habitat Exchange (CVHE) in the development of more flexible and marketable habitat mitigation tools that can be used under a variety of programs, including the Endangered Species Act, the Clean Water Act, state wildlife laws, and the Bay Delta Conservation Plan. The CVHE is a new initiative taking advantage of the emerging market of habitat credits by maximize the benefits of the habitat that willing agricultural landowners can provide. The CVHE will facilitate investment in conservation and restoration of vital and dynamic Central Valley floodplain and riparian habitat by promoting, monitoring and assisting in the exchange of habitat credits. Students will tackle issues of permanence and change from legal, policy, economic, and scientific perspectives, depending on their existing skill set and research needs. During the quarter, visitors from the CVHE Working Group - which includes members from national environmental non-profits, government agencies, and the private sector - will share their perspectives, and students will be invited to present their findings and make recommendations to help inform development of the CVHE. The course will meet at a mutually convenient time that will be chosen after the quarter begins. Meetings will include a mix of individual meetings and group meetings. Special Instructions: This practicum is offered in autumn quarter and winter quarter. Students enrolled in autumn quarter who intend to continue with the practicum will be given preference in winter quarter. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for contact information and submission deadline. Elements used in grading: As agreed to by instructor.

LAW 414B. Policy Practicum: Analyzing Alternative Laws and Policies for Psychoactive Drugs. 3 Units.

Four states have already legalized marijuana, and there is a strong likelihood that California will significantly change its marijuana laws. This practicum works closely with a policy client to assess alternative options for California marijuana laws. We will examine possible options through many lenses, including moral philosophy, welfare economics, neuroscience and medicine, criminal justice, and political analysis. Students will gain exposure to such policy analysis methodologies as epidemiology, econometrics, quasi-experimentation, simulation modeling, and cross-national case studies to identify and analyze options and likely tradeoffs to help the client and the citizens of California make informed choices. Elements used in grading: Class Participation, Attendance, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 414C. Policy Practicum: Strategic Litigation in Global Context. 3-4 Units.

Students will work with litigators at the Open Society Justice Initiative, a law center housed inside a global foundation, on a comparative research project exploring the impacts of strategic litigation in the public interest. The resulting publication aims to assist strategic litigators, social change actors and rights activists in understanding the promise, risks and complexity of the burgeoning global practice of strategic litigation and in wielding this specialized justice tool more skillfully. The autumn practicum will culminate in a conference at the Law School in December 2014 before an international audience of practitioners, with the possibility of student papers appearing in a conference compilation. Students who are available both autumn and winter quarter may continue their work on the project through the winter. The project on the impacts of strategic litigation will examine how legal judgments - both positive and negative - and the ensuing record of implementation have influenced, together with other tools of change, the advancement of human rights in a variety of settings. Over the course of the Practicum, students will explore one or more of the following human rights themes: equal access to quality education, the death penalty, disability, housing rights, land rights and/or state-sponsored violence/torture. Cases will be drawn from domestic courts across the globe, as well as regional human rights tribunals and UN treaty bodies. Specific questions to be examined include: What contributions to social, political and legal change has strategic litigation made on particular issues in particular places? What were the conditions, circumstances and manner in which litigation was pursued (in conjunction with other tools) which enhanced its contribution(s), and which diminished them? What does comparative experience teach about the risks and trade-offs involved in deciding whether, when and how to litigate so that it generates the strongest and most enduring impacts? There is a preference for students who can enroll for both autumn and winter quarter. Elements used in grading: Class Participation, Attendance, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 414D. Policy Practicum: Copyright Policy Practicum. 3 Units.

One of today's great challenges for creative production on and off the Internet is to connect creative users of copyrighted works with the works' owners quickly and cheaply in order to enable licensed uses. With the United States Copyright Office as its client, this practicum will develop a feasibility study/rough prototype for a Web-based copyright clearance system. Law students will work with computer science and business students to inventory existing sources of copyright ownership information; explore with the managers of these sources (including the Copyright Office) protocols for integrating the sources in a Web-based platform; explore use protocols with potential copyright users; develop strategies for gathering ownership data that do not presently reside in databases; and develop (and possibly implement) criteria for platform-enabling software. Elements used in grading: Class Participation, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for contact information and submission deadline. Elements used in grading: As agreed to by instructor.

LAW 414E. Policy Practicum: Legal and Policy Tools for Preventing Atrocities. 1-4 Unit.

In 2012, at the U.S. Holocaust Museum and Memorial, President Obama announced the adoption of a comprehensive global strategy to prevent atrocities. This strategy is based on a set of recommendations generated by an interagency review of the U.S. government's capabilities mandated by Presidential Study Directive 10 (PSD-10) of 2011. In unveiling this major new initiative, President Obama underscored that Preventing mass atrocities and genocide is a core national security interest and a core moral responsibility of the United States. Foundational to the PSD-10 recommendations was the creation of a high-level interagency Atrocities Prevention Board (APB) to monitor at-risk countries and emerging threats in order to coordinate the U.S. government's responses thereto. Since being established in 2012, the APB has worked to amass and strengthen a range of legal, diplomatic, military, and financial tools for atrocity prevention. This policy lab would support the APB primarily through one of its constitutive entities, the Office of Global Criminal Justice (GCJ) in the U.S. Department of State. GCJ is headed by an Ambassador-at-Large (Assistant Secretary equivalent) and advises the Secretary of State and the Under Secretary for Civilian Security, Democracy, and Human Rights on U.S. policy addressed to the prevention of, responses to, and accountability for mass atrocities. Students enrolled in the lab will pursue a range of projects devoted to (a) strengthening existing tools (such as hybrid accountability mechanisms and commissions of inquiry), (b) developing new capabilities (such as a global atrocities prevention sanctions regime), (c) evaluating the efficacy of past efforts in order to glean lessons learned, and (d) gathering best practices from other states and entities engaged in similar endeavors, all with an eye toward developing concrete recommendations for future action. The client is the Office of Global Criminal Justice in the State Department. Students may have the opportunity to travel to Washington to meet with the client and other government agencies involved in the APB and to present preliminary findings for feedback and additional direction. This is designed as a two quarter policy lab, although students may enroll for a single quarter (WINTER OR SPRING). Course must be taken for at least two units to meet "R" (Research) requirement. Elements used in grading: Class Participation, Written Assignments, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for contact information and submission deadline.

LAW 414F. Policy Practicum: Rethinking Penal Code Enhancements in California. 3 Units.

The Stanford Criminal Justice Center was approached by the Chief Justice of California to advise the judiciary, and indirectly the Legislature, on potential revisions to the California Penal Code. The California prison system remains under federal court control for unconstitutional overcrowding, and the federal court is loath to terminate the injunction without some reassurance of reforms that might prevent the overcrowding from recurring. In the absence of a state sentencing commission, the Chief Justice believes that we at Stanford can perform a fresh new analysis of the parts of the Penal Code that most merit review, in terms of their undue complexity, their arguably disproportionate severity, and the possibility that they are major drivers of the size of the prison population. Enhancements are an incredibly complex part of the Penal Code. Tens of provisions, many of them obscure even to judges, allow for very large upgrades to sentences because of aspects of conduct that are said to aggravate the underlying crime. (Please note that while some of the enhancements under review involve prior crimes, we are not dealing with the Three Strikes Law.) The Chief Justice's administrative arm, the Administrative Office of the Courts (AOC), acknowledges that no one has performed even a statutory analysis of the overall scheme of enhancements, much less any empirical effort to connect them to prison inputs. This will likely be a multi-term Policy Lab that will ultimately gather data to attempt this empirical analysis, but the first term effort is more circumscribed. A team of students will undertake the mapping of the statutory terrain - a charting of all the enhancements in the Penal Code and the many cross-permutations of these enhancements and the crimes to which they attach, and as a first empirical cut, identification of the permutations of crime and enhancements that are most often charged in California. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for contact information and submission deadline. Elements used in grading: As agreed to by instructor.

LAW 414G. Policy Practicum: Energy and Environmental Governance. 1-3 Unit.

Important energy and environmental initiatives cut across many agencies in the federal government, leading to significant policymaking and implementation challenges. Many of the agencies operating in the energy and environmental sphere have overlapping jurisdictions, but they also have different missions, priorities, and resources that push them toward agency-specific policies and programs and away from cross-cutting, government-wide initiatives. The result has been sub-optimal federal implementation of clean energy solutions, responses to climate change, the coordination of regulatory and permitting activity, and the like. In this SPRING QUARTER policy lab (3 units), students will work with the Center for American Progress (CAP) and the Office of Management & Budget in Washington to scope out the governance challenge and to review and analyze administrative tools (e.g., Executive Orders; Presidential Memoranda; inter-agency Task Forces; budget-led initiatives, etc.) that have been used to address it. Students will develop candid assessments of successes and failures and seek to identify common ingredients that may help predict the efficacy of cross-agency efforts. The policy lab will produce a report to CAP that should assist future Administrations in deploying more effective administrative governance tools in the energy and environmental arena. Elements used in grading - Individual and Team Development of Written Analyses and Policy Recommendations . NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 414H. Policy Practicum: Preparing for Transition in Syria: Head of State Exile. 1 Unit.

Syria is in the midst of a devastating civil war, during which almost 200,000 persons have been killed, many more have been injured, and millions have been displaced. One major coalition of Syrian opposition groups, known as the National Coalition for Syrian Revolution and Opposition Forces, or the Syrian National Coalition, seeks to replace the current Syrian government, led by President Bashar al-Assad. As the Coalition plans for a post-Assad transition, it has encountered a number of legal and policy challenges that implicate international law, international relations, and administrative problems. Students in this Practicum will work to support the Public Interest Law and Policy Group PILPG), a pro bono international law firm, which in turn is providing advice to the Coalition on these issues. Students in the Practicum will focus in particular on potential head of state exile arrangements. Many observers imagine that no political solution to the Syria conflict is possible unless arrangements are put in place to permit President Assad to safely depart the country for resettlement outside Syria. A threshold challenge will be to analyze whether any such exile arrangement for President Assad would be legally permissible under international law in light of his alleged responsibility for serious international humanitarian law violations. The project would also explore pragmatic questions, such as how head of state exile arrangements fit into the overall peace negotiation process, and under what circumstances head of state exile is a successful component of a peace agreement. Finally, the project could consider the role that third-party states play in head of state exile arrangements. Elements used in grading: Class Participation, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT: Contact Professor Weiner at aweiner@stanford.edu.

LAW 414I. Policy Practicum: Procedural Reform at the California Public Utilities Commission. 2 Units.

The CPUC is an administrative agency headquartered in San Francisco that regulates electricity, natural gas, telecommunications, water, and transportation. Many of its decisions (both adjudicatory decisions and regulations) are of enormous importance to the California economy. The proceedings to adopt these decisions are often lengthy and complex. The CPUC is interested in working with the Stanford Law and Policy Lab to consider procedural reforms to promote transparency and efficiency in its decisionmaking. There are three areas of potential procedural reform that the Policy Lab might consider. Which of the areas are selected for study will be decided after discussion between the CPUC, the supervising professor, and students enrolled in the practicum. i) Ex parte communication rules. Ex parte communications between outsiders and PUC decisionmakers are prohibited in adjudicatory cases; permitted in ratemaking cases but must be disclosed; and permitted in rulemaking without disclosure. Some CPUC decisionmakers believe that ex parte communications are essential to enable them to properly consider different points of view and to facilitate timely decisionmaking. Others view such communications as inherently unreliable and as undermining the transparency and accountability of the agency. The CPUC is interested in studying this problem and considering amendments to relevant statutes and regulations. ii) Open Meetings law. The Bagley Keene Act requires the CPUC to conduct open meetings when a quorum of its 5 commissioners meet. Bagley Keene has, in practice, effectively prevented the CPUC from properly managing its operations and engaging in useful deliberation. The CPUC and the Little Hoover Commission are considering whether to seek an amendment to Bagley Keene in order to permit more coordination and collaboration among CPUC Commissioners. iii) Evidence rules. The "residuum rule" requires that on judicial review of an agency decision, the record must contain at least some evidence, other than hearsay, to support the agency's findings and conclusions. A recent court decision has said the CPUC is subject to the residuum rule because it has been declared CPUC policy. A variety of evidence (such as studies by other government agencies) often comprise the underpinning of CPUC decisions and may not come under any hearsay exception. As a result, the residuum rule could compromise the efficiency of CPUC proceedings and risk reversal of future decisions on technical evidentiary grounds. The CPUC is interested in investigating potential solutions for remedying this problem. This practicum will carry two units of credit. It will be supervised by Visiting Professor Michael Asimow. Students will be expected to do field work and legal research and write a paper that makes policy proposals in one or more of the three areas discussed above. Enrollment is limited to three students and will be graded under the H/P/R/F system. Grades will be based on the level of a student's participation and the quality of the final paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline. Same as: CPUC

LAW 414J. Policy Practicum: Designing a Children's Coordinating Council. 2-4 Units.

The Lab would work with the San Francisco Mayor's Office, helping create the structure for a new "Our Children, Our Families Council" that was established by a recent amendment to the City's charter. It is tasked with coordinating the City's efforts, and aligning with the SF Unified School District, to better support children, youth and families. In the lab, we would look at other places that have established children's councils in order to see how they are made to work most effectively, examine the current landscape of policy activity related to children, youth and families in SF, and help shape initial structures and plans for the Council. Special Instructions: Not open to 1Ls. Requires early commitment. Minimum number of students required. Elements used in grading: Class Participation, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 414K. Policy Practicum: Veterans Research. 2 Units.

The Stanford Veterans Policy Practicum will explore the possibilities for veterans policy research programs at Stanford. The course is open to Stanford students from all departments, and will focus on researching the current disposition of veterans research at academic and research institutions nationwide, with a particular emphasis on entities and individuals engaged in conducting policy research. Through our research, we hope to identify the key entities, offices, and individuals engaged in veterans-related work, what they have studied and are studying, how they are funded, what models they use to operate and conduct research, how they publish their work, what impact their work has on policy and practice, and any other relevant information. Students interested in particular veterans policy issues are encouraged to study related research programs and all students will develop a strong understanding of veterans policy issues, the body of existing research on veterans issues and the current research framework. Students will present their research and findings in a suitable format, and there will be opportunities for students who choose to continue their work after the term. Elements used in grading: Class Participation, Attendance, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 414L. Policy Practicum: Race, Gender and Prosecution. 3 Units.

This policy practicum will focus on the gender and racial diversity of prosecutors' offices in California. Although police departments have collected and reported data of this kind for decades, no similar information is publicly available for prosecutors, despite the longstanding belief that diversity is important for criminal justice decision makers. Recent controversies around the country about the investigation and prosecution of killings by police officers have only underscored the continued importance of attention to the role that race plays in the administration of justice in our country. Students will request workforce demographic data from the 62 prosecutors offices in CA (58 county District Attorney offices and 4 US Attorney offices) based on the California Public Records Act and the federal Freedom of Information Act, collate and analyze the collected data, and collaborate in drafting a public report describing and analyzing the results. Work on the report will likely involve a literature review on the importance of staff diversity in criminal justice agencies. Students may also research public records laws in other states in anticipation of expanding the study. Elements used in grading: Class Participation, Attendance, Written Assignments. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT INSTRUCTIONS: If you're interested in enrolling in this class, please send your resume, a writing sample, and a one-page statement of your interest and relevant experience to Debbie Mukamal (dmukamal@law.stanford.edu) by March 6, 2015.

LAW 414M. Policy Practicum: Policing and Data Innovation. 2-4 Units.

This course will place students in projects with a local Police Department. Each student will work as part of a team that will communicate and work directly with Department officials. The projects will focus on one of three areas where the Dept. seeks to improve its operations. One project will examine ways the Department might better elicit and receive feedback from community members. Another project will examine how the Dept. might better use the information from the stop data forms that its officers complete. A third project will consider the use of body worn cameras. Each student team will produce a written report and present its findings to Dept officials. Elements used in grading: Class Participation, Attendance, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 417. Advanced Criminal Law and Public Policy: A Research Practicum. 3 Units.

This course will provide students with a rare opportunity to engage in real-world crime policy analysis, both as a way to use some of the skills they have learned in previous SLS courses, as well as to help them learn about the political and practical issues involved in constructing public policies. Students will work with a "client" agency or organization in the crime policy sector to carry out a policy-related research and analysis project. We will organize ourselves as a provisional policy think-tank or, if you prefer, a makeshift policy institute or short-term consulting group. As such, this practice-oriented course has both learning and real-world policy reform goals, which makes this course unique within SLS and, I hope, refreshing and compelling. Students will learn how to: Identify and analyze empirical data for policy purposes; develop evidence-based policy proposals; interact with high-level policymakers around politically sensitive issues; and effectively prepare a policy brief and deliver a formal presentation to high-level government officials.

LAW 418. Advanced Criminal Defense Clinic. 2-7 Units.

Advanced clinic allows students who have taken the Criminal Defense Clinic to continue working on cases. Participation in case rounds is required. Advanced clinic may be taken for 2-7 units. Students may not enroll in any clinic (basic or advanced) which would result in them earning more than 27 clinical credits during their law school career. Students must have taken Criminal Defense Clinic (Law 408). Elements used in grading: Class participation, attendance, written assignments and case work. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 419. Three Strikes Project: Criminal Justice Reform & Individual Representation. 3 Units.

This seminar offers a unique opportunity to study criminal justice reform in real time. In this seminar, students will read and discuss a variety of cases and articles, examining the evolution of incarceration and sentencing reform in California as a case study in the history, politics, practical considerations and legal regulation of sentencing and "mass incarceration" in the United States. Students will also have an opportunity to test their skills in the field, assisting in the representation of inmates currently seeking sentence reductions under recently enacted criminal justice legislation. California's criminal justice system has been under turmoil and scrutiny in recent years. The state remains under an order from the United States Supreme Court in its landmark decision, *Brown v. Plata*, to reduce its prison overall population. California began its effort to address prison overcrowding in 2011 by enacting sweeping legislation to "realign" criminal justice resources and shift major responsibilities from the state level to local counties. In 2012, voters passed the Three Strikes Reform Act of 2012 (Proposition 36) by ballot measure, reforming the California's famously harsh recidivist sentencing statute. And this past November, voters extended the reforms by passing the Safe Neighborhoods and Schools Act of 2014 (Proposition 47), reducing several nonviolent crimes to misdemeanors. Past Project students were closely involved in enacting last two reforms and are now engaged in implementing the new sentencing statutes. In addition to studying the law and related criminal justice policy, students will assist with different stages of ongoing litigation on behalf of nonviolent inmates seeking sentence reductions. Students will visit a Project client in prison, conduct factual investigation in the field, and draft petitions on our client's behalf. Students will also contribute to ongoing policy work to ensure the effective implementation of reforms impacting our clients, which include individual prisoners and the NAACP Legal Defense and Educational Fund. The Project is an ongoing, fast-paced organization that depends on the hard work and contributions of law students enrolled in the seminar. This course offers the opportunity to both study the theory behind the law, and to hone practical litigation and advocacy skills in and out of the courtroom. The seminar will meet for 3 hours per week. Students will also meet for 1 hour individually and in teams with Project director Mike Romano each week to discuss their work on their projects. CONSENT APPLICATION: Interested students must apply to enroll in the seminar by sending a one-page statement of interest and resume by email with the subject line "application" to Mike Romano (mromano@stanford.edu). Applications will be considered on a rolling basis. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 423. Advanced Supreme Court Litigation Clinic. 2-7 Units.

The Advanced Supreme Court Litigation Clinic provides an opportunity for students who have already successfully completed the Supreme Court Litigation Clinic to continue their work in the Clinic. Work includes research and drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting on drafts of briefs being filed by lawyers in other cases. Advanced students will also continue to participate in the Clinic's discussion of cases during case rounds. For a more elaborate description of the clinic's content, see the course description for Course Number 436-0-01. Special instructions: Admission is by consent of instructor. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Students have the option to receive R credit upon instructor approval. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Projects and participation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 424. Secured Credit. 3 Units.

This course surveys the law of raising funds by granting security interests in personal property. Security interests affect the creditor's rights if the debtor is unable to repay the loan; as a result, they significantly affect the terms on which capital can be raised. They affect industries ranging from traditional manufacturing to high tech start-ups; they also play a role in consumer loans (and help explain the movie "Repo Man"). The course focuses primarily on Article 9 of the Uniform Commercial Code, but also considers the federal Bankruptcy Code, the federal intellectual property statutes, and other state and federal laws. Bankruptcy is the first of three courses (the other two are Secured Credit and Payment Systems) dealing with the financing of commercial ventures through means other than the sale of corporate stock. These courses may be taken in any order: neither presupposes any knowledge of the others. Students who cannot take all three should probably prioritize them in the order they are listed—that is, Bankruptcy is the single most important course to take, then Secured Credit, then Payment Systems. Elements used in grading: Final exam.

LAW 425. Statutory Interpretation. 2 Units.

Statutory law is the dominant source of contemporary law, and it is the form of law that lawyers are likely to confront most often in almost any area of practice. It is also an area of vibrant intellectual debate, as scholars, Supreme Court justices, and others debate the methods and aims of statutory interpretation. In this course, students will learn and apply the methods of statutory interpretation, such as the use of legislative history and the canons of construction. The goal will be to prepare students to be lawyers who can effectively identify, craft, and assess arguments and counter-arguments on behalf of a client about how a statute should be interpreted. We will also spend some time on the theoretical debates about textualist, purposive and dynamic interpretation, for example, but primarily to inform students' ability to assess and make arguments about how a statute should be interpreted. No laptops in class, except when designated by instructor. Elements used in grading: Class participation (30%), two 5-7 page (single-spaced) memos involving research, one due mid-quarter and one due at the end of the quarter (35% each).

LAW 427. Local Government Law. 3 Units.

This course will examine the source, scope and limits of local government power. It will consider the relationship of local governments to state and federal government and of the relationship of local governments to the individuals and communities within and around them. Specific themes will include the potential of local governments to be responsive democratic communities, the potential of local governments to become isolated or exclusive enclaves, and the effect of local governments on the metropolitan political economy. Using the casebook *Local Government Law* by Frug, Ford and Barron, the course will examine state and federal doctrine that affects local government, political/ social theory and urban planning/ development literature. Open to first-year Law School students with prior instructor approval. Special Instructions: Students may write papers in lieu of the final exam. Upon instructor consent, students interested in writing should enroll in Law 427-0-02. Students who do not receive a spot in section 02 may enroll in section 01. Elements used in grading: Exam or paper and class participation.

LAW 430. Trusts and Estates. 2 Units.

This course will cover the following topics: intestacy; will execution and revocation; will provisions and interpretations; restrictions on the right to devise; probate; creation, amendment and termination of trusts; revocable and irrevocable trusts; trust provisions; charitable trusts; trust administration; and substitutes and conservatorships. Elements used in grading: Final exam (In-School: open book, essay).

LAW 432. Modern Fossil Fuel Extraction. 2-3 Units.

This workshop seminar will provide students with the opportunity to examine and critique cutting-edge research and work in the field of environment, energy, and natural resources. Although it is open to all students, the seminar is designed especially for those with an interest in the field who wish to stay abreast of current issues, work, and ideas. In each class, an academic expert, policy maker, or practitioner will present their current research or work and engage in a robust discussion. Special Instructions: Grades will be based on class participation and; Option 1 (Section 01, 2 units) - You will receive a course credit if you choose to write reflection/discussion papers. Grading for this option is Mandatory P/R/F. Option 2 (Section 02 or 03, 2-3 units) - Students will have the option, to write reflection/discussion papers and a longer paper for Research (R) credit or Writing (W) credit, with consent of the instructor. If the longer paper involves independent research, then it is eligible for "R" credit. The instructor and student must agree whether the student will receive "R" credit or "W" credit. Students approved for "R" credit will be enrolled in Section 02 for 2-3 units depending on paper length, student approved for "W" credit will be enrolled in Section 03 for 2 units. Grading for this option is H/P/R/F. Elements used in grading: (1) Class participation and reflection/discussion papers (2) Class participation, reflection/discussion papers and longer papers for Writing/Research students. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 434. Contract Design: Principles and Practice. 2 Units.

Although transaction lawyers spend much time drafting contracts and related documents, they can contribute very significant value by designing transactions. Transactions should be tailored to the goals and circumstances of each set of parties, but there are some general principles that can guide the design process. This seminar examines some of these principles: such as the use of embedded options in contracts, of third parties, and of tailored procedures for dispute resolution and enforcement. Some of the readings and discussion will be at a fairly high level of abstraction, drawing on economic and sociological theories of contracting. The rest will closer to ground level, looking at particular types of transactions, such as franchising, construction, joint ventures, or start-up financing. We will also look at the process of innovation in contract design, including the role of lawyers and digital document production. Students will be required to write paper for the seminar, and encouraged to focus on a specific type of transaction. Special Instructions: Grades will be based on (1) short papers for "W" (Writing credit) or (2) an independent research paper for "R" (Research credit). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Short papers or research paper. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 436A. Supreme Court Litigation Clinic: Clinical Practice. 4 Units.

The Supreme Court Litigation Clinic will expose students to the joys and frustrations of litigation before the Supreme Court of the United States. The bulk of the clinic will be run as a small law firm working on live cases before the Court. Students will participate in drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting (the technical term is "kibbitzing") on drafts of briefs being filed by lawyers in other cases. The precise nature of the cases will depend on the Court's docket, but in recent Terms, the clinic's cases have involved federal criminal law and procedure, habeas corpus, constitutional and statutory antidiscrimination and employment law, bankruptcy law, and the First Amendment. Our aim is to involve students as fully as possible in this type of litigation. The Clinic begins with an intensive introduction to the distinctive nature of Supreme Court practice, including the key differences between merits arguments and the certiorari process, the role of amicus briefs, and the Supreme Court Rules. After that, seminar meetings will be devoted primarily to collaborative work on the cases the clinic is handling. While students will be primarily responsible for working in teams on one case at a time, they will also be expected to acquire familiarity with the issues raised in other students' cases and will both edit each others' substantive work and assist each other and the instructors with the technical production work attendant on filing briefs with the Supreme Court. The course will involve substantial amounts of legal research. The Supreme Court operates on a tight, and unyielding deadline, and students must be prepared both to complete their own work in a timely fashion and to assist one another and the instructors on other cases. The instructors will not ask students to do any kind of "grunt work" that they themselves will not also be handling, but grunt work there will be: proofreading, cite-checking, dealing with the joint appendix, and the like. The nature of the work product means that while students will average thirty hours per week on their case-related work, that work will surely be distributed unevenly across the quarter. Unlike most other courts, the Supreme Court has no student practice rules. Thus, students will not be able to argue cases before the Court. But they will participate in moot courts on their cases, as both advocates and Justices. Each student will also have the opportunity to travel to Washington to see the Court in session, preferably with respect to a case on which the student has worked. Ideally students will already have experience with persuasive doctrinal writing, through a course like Federal Pretrial Litigation or through intensive supervision during their summer jobs or other clinics. Admission to the Clinic is by consent of the instructors. Students will need to submit a writing sample that reflects their facility with doctrinal legal arguments and the name of at least one reference who can comment on their legal analytic ability. - - Special instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter

LAW 436B. Supreme Court Litigation Clinic: Clinical Methods. 4 Units.

The Supreme Court Litigation Clinic will expose students to the joys and frustrations of litigation before the Supreme Court of the United States. The bulk of the clinic will be run as a small law firm working on live cases before the Court. Students will participate in drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting (the technical term is "kibbitzing") on drafts of briefs being filed by lawyers in other cases. The precise nature of the cases will depend on the Court's docket, but in recent Terms, the clinic's cases have involved federal criminal law and procedure, habeas corpus, constitutional and statutory antidiscrimination and employment law, bankruptcy law, and the First Amendment. Our aim is to involve students as fully as possible in this type of litigation. The Clinic begins with an intensive introduction to the distinctive nature of Supreme Court practice, including the key differences between merits arguments and the certiorari process, the role of amicus briefs, and the Supreme Court Rules. After that, seminar meetings will be devoted primarily to collaborative work on the cases the clinic is handling. While students will be primarily responsible for working in teams on one case at a time, they will also be expected to acquire familiarity with the issues raised in other students' cases and will both edit each others' substantive work and assist each other and the instructors with the technical production work attendant on filing briefs with the Supreme Court. The course will involve substantial amounts of legal research. The Supreme Court operates on a tight, and unyielding deadline, and students must be prepared both to complete their own work in a timely fashion and to assist one another and the instructors on other cases. The instructors will not ask students to do any kind of "grunt work" that they themselves will not also be handling, but grunt work there will be: proofreading, cite-checking, dealing with the joint appendix, and the like. The nature of the work product means that while students will average thirty hours per week on their case-related work, that work will surely be distributed unevenly across the quarter. Unlike most other courts, the Supreme Court has no student practice rules. Thus, students will not be able to argue cases before the Court. But they will participate in moot courts on their cases, as both advocates and Justices. Each student will also have the opportunity to travel to Washington to see the Court in session, preferably with respect to a case on which the student has worked. Ideally students will already have experience with persuasive doctrinal writing, through a course like Federal Pretrial Litigation or through intensive supervision during their summer jobs or other clinics. Admission to the Clinic is by consent of the instructors. Students will need to submit a writing sample that reflects their facility with doctrinal legal arguments and the name of at least one reference who can comment on their legal analytic ability. - - Special instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter

LAW 436C. Supreme Court Litigation Clinic: Clinical Coursework. 4 Units.

The Supreme Court Litigation Clinic will expose students to the joys and frustrations of litigation before the Supreme Court of the United States. The bulk of the clinic will be run as a small law firm working on live cases before the Court. Students will participate in drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting (the technical term is "kibbitzing") on drafts of briefs being filed by lawyers in other cases. The precise nature of the cases will depend on the Court's docket, but in recent Terms, the clinic's cases have involved federal criminal law and procedure, habeas corpus, constitutional and statutory antidiscrimination and employment law, bankruptcy law, and the First Amendment. Our aim is to involve students as fully as possible in this type of litigation. The Clinic begins with an intensive introduction to the distinctive nature of Supreme Court practice, including the key differences between merits arguments and the certiorari process, the role of amicus briefs, and the Supreme Court Rules. After that, seminar meetings will be devoted primarily to collaborative work on the cases the clinic is handling. While students will be primarily responsible for working in teams on one case at a time, they will also be expected to acquire familiarity with the issues raised in other students' cases and will both edit each others' substantive work and assist each other and the instructors with the technical production work attendant on filing briefs with the Supreme Court. The course will involve substantial amounts of legal research. The Supreme Court operates on a tight, and unyielding deadline, and students must be prepared both to complete their own work in a timely fashion and to assist one another and the instructors on other cases. The instructors will not ask students to do any kind of "grunt work" that they themselves will not also be handling, but grunt work there will be: proofreading, cite-checking, dealing with the joint appendix, and the like. The nature of the work product means that while students will average thirty hours per week on their case-related work, that work will surely be distributed unevenly across the quarter. Unlike most other courts, the Supreme Court has no student practice rules. Thus, students will not be able to argue cases before the Court. But they will participate in moot courts on their cases, as both advocates and Justices. Each student will also have the opportunity to travel to Washington to see the Court in session, preferably with respect to a case on which the student has worked. Ideally students will already have experience with persuasive doctrinal writing, through a course like Federal Pretrial Litigation or through intensive supervision during their summer jobs or other clinics. Admission to the Clinic is by consent of the instructors. Students will need to submit a writing sample that reflects their facility with doctrinal legal arguments and the name of at least one reference who can comment on their legal analytic ability. - - Special instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities come and time goes on and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter

LAW 437. Water Law and Policy. 3 Units.

This course will study how society allocates and protects its most crucial natural resource -- water. The emphasis will be on current legal and policy debates, although we will also examine the history of water development and politics in the United States. Among the many issues that we will consider are: alternative means of responding to the growing worldwide demand for water; the appropriate role for the market and private companies in meeting society's water needs; protection of threatened groundwater resources; environmental limits on water development (including the Endangered Species Act and the "public trust" doctrine); Indian water rights; and interstate and international disputes over water. Students will be expected to participate actively in classroom discussions. Elements Used in Grading: Class participation, attendance and final exam.

LAW 439. Mind the Gap: Exploring Selected Areas of American Inequality. 2 Units.

This course will explore the equity of resource distribution and opportunity in the United States in the 21st century. We will explore and evaluate the common critique that the contemporary structure of various entities (such as schools, courts, and the legislature) contributes to increased inequality. Some of the likely topics to be covered in class, along with their concomitant impact on equity, include: language and identity; trade-offs between equality of opportunity and equality of outcome; stereotype threat; felon disenfranchisement; labor market inequality; urban vs. rural poverty; the erosion of mental health services; and how factors such as race, ethnicity, gender, and income can contribute to academic achievement gaps. The class will explore the substantive issues related to equality and inequality as well develop written and oral skills for advocacy, including drafting op-eds, position papers, and other written materials and preparing for oral presentations. Each student will be responsible for leading at least one class at San Quentin State Prison to a mixed class composed of Stanford and San Quentin prisoner students. Students will be also be expected to write weekly reflection papers in response to the assigned reading and to attend and participate heavily in each class discussion; they will also be expected to edit and provide individual feedback on the written assignments of the San Quentin students. In addition, attendance at a one day training conducted by the Prison University Project is mandatory. Class will meet on Fridays from 3:00 - 5:00pm. Grades will be based on a combination of active class participation and preparation, consistent attendance, and several written assignments. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form to the instructors; the form is available on the SLS Registrar's Office website (See Registration and then Law Students). See Consent Application Form for submission deadline.

LAW 441. European Legal History. 3 Units.

This seminar will explore major topics in European legal history from ancient Rome through the present: Roman law, canon law, feudalism, sixteenth- and seventeenth-century constitutionalism, modern natural law, the age of absolutism and the rise of the centralized, administrative state, the structure of Old Regime law and society and the radical changes brought about by revolution, the German historical school of jurisprudence, and the rise of the European Union and a new culture of international human rights. In exploring these topics, we will focus on certain core, recurring themes that continue profoundly to shape the world in which we live. These include the sources and nature of law (positive law vs. custom), the relationship between law and society, and the relationship between law and history. Classroom discussion will focus on selected primary- and secondary-source texts that we will read as a group. The course will be limited to 12 SLS students with 10 additional slots held for students enrolling in HISTORY 238E/338E. Elements used in grading: Brief analytical paper (6-8 pages, worth 35% of the total course grade) and final exam (worth 65% of the total course grade). Cross-listed with History (HISTORY 238E & HISTORY 338E).

LAW 444. Thinking Like a Policy Analyst: Introduction to Policy Analysis. 2 Units.

This seminar is designed primarily for students working on Policy Lab projects, but will be open to other students as well subject to a total enrollment of 15 students. It will be offered both the Autumn and Winter quarters during 2013-14, with any individual student eligible to enroll only in one quarter. You already know how to think like a lawyer, but if you are interested in policymaking, policy advocacy or policy research; whether in the public, nonprofit, or corporate sector; you need to know how to think like a policy analyst as well. This seminar, designed primarily for students beginning or continuing in Policy Lab practicums, has three purposes. First, it introduces students to the ways in which policy analysts approach public policy problems and controversies, focusing on perspectives that distinguish policy analysis from traditional legal analysis. Second, it introduces students to the tools of policy analysis, including approaches to collecting and analyzing information. Third, it provides hand-on lessons on communicating with policy makers orally and in writing. There is no text for the course. Readings for the course will include examples of policy analyses conducted to inform public policymaking. Students engaged in policy practicums will use their practicum experience as a basis for assessing the value of various policy analytic perspectives and research approaches. Students not engaged in policy practicums will pick a policy problem they are interested in and develop a plan for conducting a policy analysis relevant to this problem. Elements used in grading (Autumn): Attendance, class participation, three short reflection papers. Elements used in grading (Winter): Course paper and class participation. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 447. Communications Law: Broadcast and Cable Television. 3 Units.

Most people watch television on a regular basis (although not necessarily on TV). Television entertains, delivers the news, and provides an important forum for debating political issues. Focusing on communications law and first amendment law, the course will discuss how and why regulation shapes what we see on TV, and how it attempts to ensure that television can fulfill its functions for society. For example, why is cable television so expensive? Why can comedians swear on cable TV, but not on broadcast TV? Should regulators care as much about violence as they do about indecency? Can we trust the market to give the audience what it wants? Will the market provide content that is in the public interest, such as local news or educational programming, or do regulators need to intervene? Should we care if media outlets are increasingly owned by a few small conglomerates? And how does the Internet affect the need for ownership regulation? The course mostly focuses on the U.S., but highlights developments elsewhere where appropriate. Special instructions: Students may take Communications Law: Internet and Telephony and Communications Law: Broadcast and Cable Television in any order (neither is a prerequisite for the other). There are no prerequisites for this course. No technical background is required. Elements used in grading: Class participation, attendance, final exam.

LAW 448. Contemporary Issues in Constitutional Law. 2 Units.

This is an advanced constitutional law seminar for students who have already taken the introductory Constitutional Law course. The seminar will provide an opportunity for in-depth discussion of competing theories of constitutional interpretation, the role of the Supreme Court in our political system, and analysis of judicial behavior. Each week, these themes will be examined through the lens of a current "hot topic" in constitutional law - for example, the Affordable Care Act, affirmative action, the Second Amendment, the death penalty, executive power in the war on terrorism, campaign finance, immigration, same-sex marriage, and other topics. This is not a "spectator" class; all students will be expected to participate actively in class discussion each week. This is a good seminar for students interested in clerking or pursuing academia.

LAW 451. European Union Law. 2-3 Units.

The U.S. and the European Union (which comprises 28 European states and 500 million people) have the largest bilateral trade relationship in the world. About 60% of the world's GDP is generated on the Transatlantic Marketplace. U.S. companies rely on the EU market for more than half of their global foreign profits, and U.S. investment in the EU is currently three times greater than U.S. investment in the whole of Asia. The new Transatlantic Trade and Investment Partnership (TTIP), a free trade agreement currently under negotiation between the EU and the U.S., will further strengthen substantially the economic ties between the EU and the U.S. in the near future. In the past few years, even several proposed mergers between U.S. companies have been killed solely by the EU antitrust authorities, although approved by the U.S. antitrust regulators. In recent years, this has tremendously heightened the need for a sound understanding of the legal system of the EU, especially for business and technology lawyers. Responding to this need, this course will, first, examine the internationally unique legal system of the EU as such, as it is applicable to any field of substantive and procedural EU law. Thus, we will look at the legal nature and the different sources of EU law and its relationship with the national law of the EU Member States. We will cover the relevant EU law enforcement actions including state liability issues as well as the jurisdiction of both European Courts and relevant remedies in national courts. Secondly, we will explore the legal framework of doing business in the EU, from the perspective of a business entity as an internationally operating actor in a European business environment. In this context, we will focus on the most essential fields of EU business law, i.e. (a) the four fundamental economic freedoms of the European Internal Market for goods, services, capital and persons, (b) EU competition/antitrust law, as well as (c) EU e-commerce law. Special attention will be given to the question how companies established outside the EU can efficiently use EU business law to pursue their interests in the EU. Additional education and research opportunities for students in EU law, building on this course, can be found in the course syllabus. Special Instructions: Students have the option to write a research paper in lieu of the response papers (01). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation, response papers or research paper.

LAW 453A. State-Building and the Rule of Law Workshop: Advanced. 3 Units.

The Advanced Workshop on State-Building and the Rule of Law builds on the State-Building and Rule of Law Seminar offered in the fall quarter. Enrollment is by consent and limited to students who successfully completed the fall seminar and are members of one of the three Rule of Law Projects: the Afghanistan Legal Education Project (ALEP), the Rwanda Law and Development Project (RLDP), or the the Iraq Legal Education Initiative (ILEI). Project members will undertake research, writing, and programmatic responsibilities to support the work of their respective local partners in Afghanistan, Rwanda and Iraqi Kurdistan. Elements used in grading: Class Participation, Attendance, Written Assignments. Automatic grading penalty waived for writers. Writing (W) credit is for students entering prior to Autumn 2012. Same as: ALEP

LAW 453B. State-Building and the Rule of Law Workshop: Advanced. 3 Units.

The Advanced Workshop on State-Building and the Rule of Law builds on the State-Building and Rule of Law Seminar offered in the fall quarter. Enrollment is by consent and limited to students who successfully completed the fall seminar and are members of one of the four Rule of Law Projects: the Afghanistan Legal Education Project (ALEP), the Rwanda Law and Development Project (RLDP), the Timor Leste Legal Education Project (TLLEP), or the Iraq Legal Education Initiative (ILEI). The ALEP team will write textbooks and develop curriculum for, and provide program support to, the Department of Law at American University of Afghanistan. The RLDP team will conduct research and analysis culminating in a background paper on statutory interpretation for the Rwandan Law Review Commission. The TLLEP team will write textbooks and teaching manuals for use at the National Law School of Timor-Leste and the judicial training center. The ILEI team will write textbooks and materials to begin the process of building out a law program at the American University of Iraq, Sulaimani. Automatic grading penalty waived for writers. Writing (W) credit is for 3Ls only.

Same as: BLPP

LAW 453C. State-Building and the Rule of Law Workshop: Advanced. 3 Units.

The Advanced Workshop on State-Building and the Rule of Law builds on the State-Building and Rule of Law Seminar offered in the fall quarter. Enrollment is by consent and limited to students who successfully completed the fall seminar and are members of one of the four Rule of Law Projects: the Afghanistan Legal Education Project (ALEP), the Rwanda Law and Development Project (RLDP), the Timor Leste Legal Education Project (TLLEP), or the Iraq Legal Education Initiative (ILEI). The ALEP team will write textbooks and develop curriculum for, and provide program support to, the Department of Law at American University of Afghanistan. The RLDP team will conduct research and analysis culminating in a background paper on statutory interpretation for the Rwandan Law Review Commission. The TLLEP team will write textbooks and teaching manuals for use at the National Law School of Timor-Leste and the judicial training center. The ILEI team will write textbooks and materials to begin the process of building out a law program at the American University of Iraq, Sulaimani. Automatic grading penalty waived for writers. Writing (W) credit is for 3Ls only.

Same as: TLLEP

LAW 453D. State-Building and the Rule of Law Workshop: Advanced. 3 Units.

The Advanced Workshop on State-Building and the Rule of Law builds on the State-Building and Rule of Law Seminar offered in the fall quarter. Enrollment is by consent and limited to students who successfully completed the fall seminar and are members of one of the three Rule of Law Projects: the Afghanistan Legal Education Project (ALEP), the Rwanda Law and Development Project (RLDP), or the the Iraq Legal Education Initiative (ILEI). Project members will undertake research, writing, and programmatic responsibilities to support the work of their respective local partners in Afghanistan, Rwanda and Iraqi Kurdistan. Elements used in grading: Class Participation, Attendance, Written Assignments. Automatic grading penalty waived for writers. Writing (W) credit is for students entering prior to Autumn 2012.

Same as: ILEI

LAW 453E. State-Building and the Rule of Law Workshop: Advanced. 3 Units.

The Advanced Workshop on State-Building and the Rule of Law builds on the State-Building and Rule of Law Seminar offered in the fall quarter. Enrollment is by consent and limited to students who successfully completed the fall seminar and are members of one of the three Rule of Law Projects: the Afghanistan Legal Education Project (ALEP), the Rwanda Law and Development Project (RLDP), or the the Iraq Legal Education Initiative (ILEI). Project members will undertake research, writing, and programmatic responsibilities to support the work of their respective local partners in Afghanistan, Rwanda and Iraqi Kurdistan. Elements used in grading: Class Participation, Attendance, Written Assignments. Automatic grading penalty waived for writers. Writing (W) credit is for students entering prior to Autumn 2012.

Same as: RLDP

LAW 455. Energy Law. 3 Units.

The supply of a reliable, low-cost and clean energy supply for the United States is a key determinant of current and future prosperity. Perhaps as a result, electricity suppliers are among the most heavily regulated of large firms. This regulation is composed of a complex patchwork of overlapping state and federal regulation that is constantly evolving to meet emerging challenges to the energy system. In this course, students will acquire a basic understanding of the law of rate-based regulation of utilities. We will then examine the history of natural gas pipeline regulation in the United States, concluding with the introduction of market competition into US natural gas markets and the advent of shale gas. Next, we will cover the basics of the electricity system, including consumer demand, grid operations, and power plant technologies and economics. We will then revisit cost of service rate regulation as it has been applied in the electricity context. Next we will examine reform of both rate-regulated and wholesale market-based structures, focusing on various attempts to introduce market competition into aspects of the industry and to strengthen incentives for utility investment in energy efficiency. Finally, students will examine various approaches to subsidization of utility scale renewable energy and the growth of distributed energy. Throughout, the course will focus on the sometimes cooperative, sometimes competing, but ever evolving federal and state roles in regulating the supply of electric power. Students will write two 1000 word response papers to questions related to readings and outside speakers in addition to taking a final exam. Elements used in grading: Class participation (20%), written assignments (40%), and final exam (40%).

LAW 458. Health Law: The FDA. 3 Units.

This course will examine the Food and Drug Administration. It will focus largely on the FDA's regulation of drugs and biologics, but will also cover its regulation of medical devices, nutritional supplements, and, to some extent, its jurisdiction over special legal, social, and ethical issues arising from advances in the biosciences. Special Instructions: The class is open to all law or medical students. Graduate students may be admitted from other parts of the University by consent of the instructor. Substantial class attendance is required; in addition, the quality of class participation will play a small role in grading. Elements used in grading: Attendance, class participation, and final exam (In-school, open book). (Cross listed with Health Research and Policy (HRP 209).

LAW 459. Intellectual Property and Antitrust Law. 3 Units.

This is an advanced seminar focusing on antitrust law as it applies to the creation, licensing, and exercise of intellectual property rights. At least one IP or antitrust class is a prerequisite, and ideally both. Papers will be due before the Law School deadline. Draft papers will be due in time for student presentations. Elements use in grading: Class participation and final paper.

LAW 461. Foreign and International Legal Research. 2 Units.

This course will introduce students to concepts and skills used in international and foreign law research. Students will learn to construct successful research strategies for questions of foreign law, public international law, and private international law. Both primary and secondary authority will be covered in various formats. Students will understand how different legal systems and cultures influence the use and assessment of legal resources. The course will also equip students to critically evaluate current and future research tools. No pre-requisites or foreign language ability required. Advanced degree and non-law students are welcome to enroll in the course. Learning Outcomes - *Identify primary and secondary sources of materials on international law and foreign legal systems. *Develop effective research strategies using online and print resources. *Critically evaluate research tools for international and foreign legal research. *Appreciate cultural and historical influences on the development of legal systems and their relevance to legal research. *Understand the role of language and translation tools in researching foreign and international law. Elements used in grading: Class participation & attendance (10%), written assignments (70%) and final paper (20%).

LAW 465. Venture Capital I. 3 Units.

This course introduces the operation of the venture capital industry from both a theoretical and practical perspective. The course follows the start-up process from initial formation of a new High-Tech venture through its private capitalization, the navigation of typical operational or strategic hurdles/milestones, and potential exit through merger or initial public offering. It analyzes each step in the process from perspective of the entity, of the founder-employees, and of the venture backers. It also considers the incentive mechanisms and control structures used at each step of the transaction (and alternatives to these structures), with a focus on both the underlying economic and financial theory, as well as on pragmatic considerations in structuring the transactions. Students are required to complete a term sheet negotiation exercise, write a short paper on a current topic relevant to the industry (topics to be distributed), and and sit for an examination. Special Instructions: modest background in financial analysis or Excel, such as might be obtained in QM finance (Law 467), is a prerequisite for this course. Elements used in grading: Class assignments and final exam (In-School, Essay and Objective, closed book).

LAW 467. Quantitative Methods: Finance. 2 Units.

This course covers some of the central ideas in modern finance with a particular focus on the time value of money. Topics include present value and future value analysis, discounting, net present value, "IRR", bond valuations, and a critique of other project valuation methods. Along with a brief overview of "market fundamentals" and an introduction to the vocabulary of modern "popular finance" (as found in such publications as the Wall Street Journal), additional topics will include diversification, the risk-return trade-off, portfolio performance measurement, and market efficiency. Issues of arbitrage and tax considerations will be considered as time allows. Each topic is introduced with an emphasis on applications in legal settings. The course is intended to provide students with very little or no background in finance with the essential vocabulary, tools, and insights to spot "finance related issues" in various legal practice areas. The problem sets, class discussions, and applied hypotheticals should allow students to develop the skills necessary to ask the right questions when confronted with problems that involve elements of modern finance. Special Instructions: You are expected to have little or no background in finance or related areas prior to taking this course. Required math skills are very modest (low-level high school algebra, at most) and students will rely mainly on the use of Excel and/or financial calculators for simple calculations. Elements used in grading: Class participation, written assignments and final exam (In-School: closed book, objective).

LAW 468. Statistical Inference in Law. 3 Units.

Drawing an inference from quantitative evidence lies at the heart of many legal and policy decisions. This course provides the tools, concepts, and framework for lawyers to become sophisticated consumers of quantitative evidence and social science. Unlike traditional statistics courses, it will be taught using substantive case law as a springboard for considering quantitative evidence. The class is geared with students with no background, drawing only on high school algebra. Elements used in grading: Class participation, attendance, and assignments. Attendance is required to retain a seat in class.

LAW 471. Constitutional Law: Freedom of Speech. 3 Units.

A survey of First Amendment law, including a close study of text, the drafting and ratification process, and the development of modern First Amendment theory. The course will explore the multiple participants in the speech process, including the speaker, hearer, publisher, target and regulator, and ask why the law favors certain participants over others. The evolution of Supreme Court case law will be analyzed historically, with special emphasis on the relationship between free speech and democracy..

LAW 472. Externship Companion Seminar. 2 Units.

The practice of public interest law - whether in the criminal or civil context or a government or non-profit setting - requires an attorney to consider a host of issues distinct from one in private practice. How should decisions be made about priorities with limited resources? Where an organization has a broad social justice mission, where does litigation on behalf of individual clients or a group of clients fit in? Prior to initiating litigation or advancing a defense, what quantum of evidence should an attorney require? What role, if any, should an attorney's personal beliefs play in a course of representation? Through directed supervision of their externships in prosecutors', public defenders' or civil non-profit and government offices, as well as participation in weekly seminars, students will evaluate such questions in the context of their practical experience. Students are required to write weekly reflection papers of 3 to 5 pages and a 15 page paper at the end of the course. Elements used in grading: Attendance, class participation, weekly reflection papers and final reflection paper.

LAW 473. Externship, Special Circumstances. 12 Units.

Following approval of a student's application, the Special Circumstances Externship Program (SCEP) allows second and third year students to work for credit for one quarter in non-profit public interest, public policy, and government agencies outside of the Bay Area. Standards for approval of a SCEP placement are similar to those for Directed Research proposals, although they are higher. Because there is a preference for local civil and criminal SEP placements (see Law 474 and Law 475), your SCEP proposal must explain (a) how it meets the goals of the externship program; and (b) why a similar project cannot be accomplished in one of the placements offered in the Bay Area. SCEP placements outside the Bay Area must be full-time. Students wishing to undertake a SCEP placement obtain the supervision of a faculty member who will oversee their externship and an accompanying tutorial. For a full description of the SCEP, students should read the Externship Handbook, which is available from the Levin Center for Public Service and Public Interest Law or online at: <http://www.law.stanford.edu/organizations/programs-and-centers/john-and-terry-levin-center-for-public-service-and-public-interest-law/externship-program-0>. Students wishing to enroll in an externship must meet the various requirements that are set out in the Handbook. Interested students should speak to Jory Steele, Lecturer in Law and Director of Externship and Pro Bono Programs at jsteele@law.stanford.edu. Grading Elements used: Full participation and attendance, satisfactory evaluation by field placement supervisor, weekly reflection papers of three to five pages, and a final reflection paper of a length to be determined by your faculty supervisor.

LAW 473X. U.S. SEC Law Student Observer Program and Securities Regulation Seminar. 3 Units.

The U.S. SEC, Law Student Observer Program, is a one-semester volunteer/for-credit externship position offered to current law students selected by representatives of the SEC. The program provides exposure to the workings of the SEC and to the regulation of securities markets. Students are assigned to work with SEC staff members on a broad range of projects, including the investigation of industry and issuer practices, litigation of civil enforcement actions, and the drafting of proposed statutes and rules. In addition to working 40-hour weeks, students attend a weekly securities regulation seminar that includes lectures by SEC Commissioners and senior staff, and prominent members of the private bar. The topics for discussion at this seminar are chosen to complement the materials covered in basic securities regulation courses offered at the participating law schools.

LAW 474. Externship, Civil Law. 5-12 Units.

Following approval of a student's application, the Civil Standard Externship Program (SEP) allows second and third year students to obtain academic credit for externing in select non-profit public interest, public policy, and government agencies in the Bay Area for one quarter. The Civil SEP allows students to (a) gain experience in a field where a clinical course is not offered, or (b) pursue advanced work in an area of prior clinical practice. Placements can be either full time (40 hours per week) or part time, but no fewer than 16 hours per week. Because of other Law School requirements, students in their final quarter are limited to part-time externships of no more than 16 hours per week. For a complete description of the Civil SEP, students should read the Externship Handbook, which is available from the Levin Center for Public Service and Public Interest Law or online at: <http://www.law.stanford.edu/organizations/programs-and-centers/john-and-terry-levin-center-for-public-service-and-public-interest-law/externship-program-0>. Students wishing to enroll in an externship must meet various requirements that are set out in the Handbook. Interested students should speak to Jory Steele, Lecturer in Law and Director of Externship and Pro Bono Programs at jsteele@law.stanford.edu. Students participating in the Civil SEP must also concurrently enroll in the Externship Companion Seminar. In some cases, where other seminars would be more appropriate companion courses for a student's placement, the student can request to substitute a different course in the application process. Grading Elements used: Full participation and attendance, satisfactory evaluation by field placement supervisor, weekly reflection papers of three to five pages, as well as a final, longer reflection paper.

LAW 475. Externship, Criminal Law. 5-12 Units.

Following approval of a student's application, the Criminal Standard Externship Program (SEP) allows second and third year students to work for credit in criminal prosecutors' and defenders' offices in the Bay Area for one quarter. Placements can be either full time (40 hours per week) or part-time, but no fewer than 16 hours per week. Because of other Law School requirements, students in their final quarter are limited to part-time externships of no more than 16 hours per week. For a complete description of the Criminal SEP, students should read the Externship Handbook, which is available from the Levin Center for Public Service and Public Interest Law or online at: <http://www.law.stanford.edu/organizations/programs-and-centers/john-and-terry-levin-center-for-public-service-and-public-interest-law/externship-program-0>. Students wishing to enroll in an externship must meet various requirements that are set out in the Handbook. Interested students should speak to Jory Steele, Lecturer in Law and Director of Externship and Pro Bono Programs at jsteele@law.stanford.edu. Students participating in the Criminal SEP must also concurrently enroll in the Externship Companion Seminar. In some cases, where other seminars would be more appropriate companion courses for a student's placement, the student can request to substitute a different course in the application process. Grading Elements used: Full participation and attendance, satisfactory evaluation by field placement supervisor, weekly reflection papers of three to five pages, and a final, longer reflection paper.

LAW 476. Advanced Criminal Practice. 3 Units.

In this seminar, we will discuss the most pressing current issues and cases across the criminal justice spectrum, from arrest through appeal and collateral attack. Our focus will be on the practice of criminal law -- how prosecutors and defense lawyers actually develop and use the latest cases and arguments. The subjects that we will take up will include, for example, ineffective assistance and the death penalty, sentencing, the "drug court" development, public prosecution and white collar crime. Each student will choose a case from the Supreme Court's current criminal docket and write about the issues that either arose or should have arisen during any of the stages of the case. Understanding these issues will require a careful investigation of the case history and the way it is developed for the Supreme Court. Particular attention will be paid to the ethical issues that arise in practice. Our text for the course will be pre-assigned cases from the current Criminal Law Reporter, along with articles and litigation materials in connection with a particular topic. Students should use the class to develop the habit of keeping up with the constantly evolving law in the specialized fields of criminal law and criminal procedure.

LAW 477. Intellectual Property: Patent Litigation. 3 Units.

This patent litigation course offers students the opportunity to gain experience in oral and written advocacy, while becoming familiar with the most prevalent real world issues in such cases. It does so by simulating a patent action from complaint filing to appeal. Students take turns presenting mock oral arguments, which are held each class. Sitting Federal judges will critique student arguments and provide instruction during several classes. Hot issues in patent law are explored as litigation skills are developed. While not a prerequisite, completion of Introduction to Intellectual Property or Intellectual Property: Patents, is preferred. Elements used in grading: Elements used in oral arguments: papers.

LAW 478. IP Advanced Topics: The Future of Online Music and Online Video. 3 Units.

The online music and online video industries are undergoing profound changes. In online video, the rise of Netflix and Hulu are just two examples of this trend. This class will explore how the different technical, economic or regulatory decisions we make today will interact to shape the future of these industries, and what the different options under consideration will mean for specific companies in this space. Class sessions will consist of a mix of guest lectures by industry leaders and class discussions of the assigned readings. Throughout the class, the students will work in interdisciplinary groups on problems facing specific companies in the online and online video industry today. For the final project, the groups will address specific policy problems from the perspective of a specific company, with different groups representing companies on different sides of an issue.

LAW 479. International Law. 4 Units.

This course examines what diplomats and scholars once referred to as the "law of nations," as it has matured and evolved to adapt to today's complex and interdependent world. We will begin by considering fundamental questions about the nature of international law - the sources of international law (including treaties), the subjects of international law, the origins of international law in the sovereign equality of states, and the absence of mechanisms for the authoritative interpretation or enforcement of international law. We will explore core international law concepts and issues such as state responsibility and the bases upon which states may exercise jurisdiction. We will then examine the operation of international law in the U.S. legal system. In the second half of the course, we will look at a series of international law topics and issues, including some of particular interest today, such as mechanisms for the settlement of international disputes, international human rights law, the law governing coercion and the use of armed force, the law of armed conflict, international environmental law, and the emergence of a body of international criminal law and international criminal tribunals for its enforcement. Throughout, we will consider current issues and problems arising in the international arena and the extent to which international law actually affects the behavior of states. This course provides a general grounding in public international law and a foundation for more advanced or specialized international law courses. Elements used in grading: Class participation, optional paper, and final exam.

LAW 480. Law and Biosciences: Genetics. 3 Units.

This seminar will focus on ethical, legal, and social issues arising from advances in our knowledge of human genetics. These include forensic uses of genetics, genetic testing, widespread whole genome sequencing, the consequences of genetics for human reproduction, and the ethics of genomic biobanks for research, among other things. Students are required to write a research paper for this course. This class is crosslisted with HRP221. Special Instructions: The class is open to all law students and to other graduate students with consent of instructor. Substantial class attendance is required; in addition, the quality of class participation will play a small role in grading. Students will be required to submit an independent research paper. Elements used in grading: Class participation, attendance and final paper.

LAW 481. Communications Law: Internet and Telephony. 4 Units.

New developments in Internet and other technology enable new forms of innovation, content production and political participation that have the potential to significantly transform our economy, society and democratic system. This transformation will not happen automatically. Technical, legal and economic choices will affect whether the Internet can realize its potential or not. Communications law - the law that governs both the physical infrastructures for communications services such as cable and telephone networks as well as the communication services which are provided over these infrastructures - has become one of the most important arenas in which choices affecting the future of the information society are made. The debates over network neutrality (whether network providers should be able to restrict the applications and content that their Internet service customers can access over the network) or the right ways to foster broadband deployment are examples of this trend. At the same time, the Internet's ability to support a variety of different communications services such as telephony, information services or video over the same physical network infrastructure challenges the existing communications law, which is based on the assumption that different physical infrastructures offer different communications services. What are the features of the Internet that are at the core of its economic, social, cultural and political potential? What can regulators and legislators do to allow the Internet to realize this potential? And how can they allow applications like Internet telephony and traditional telephony to coexist without giving one an unfair advantage over the other? The course will address how current law deals with these questions, but also explore what regulators and legislators may do to better deal with the challenges posed by the Internet. The course is mostly focused on the US, but highlights developments elsewhere where appropriate. Special Instructions: Students may take Communications Law: Internet and Telephony and Communications Law: Broadcast and Cable Television in any order (neither is a prerequisite for the other). There are no prerequisites for this course. No technical background is required. Elements used in grading: Class participation, attendance, final exam.

LAW 483. Deal Litigation Seminar. 2-3 Units.

This seminar is designed as an introduction to mergers and acquisitions litigation. The course aims to provide both a practical and doctrinal perspective on M&A-related litigation and will rely heavily on readings and issues derived from practice in the Delaware courts where much contemporary deal litigation occurs. Students will be asked to apply cases and legal principles in various practical situations that may arise in a transactional litigation practice. Familiarity with basic corporate law principles is assumed. Classes and readings. The first segment of the course will introduce basic doctrinal principles of M&A law and provide an introduction to the litigator's role in the transactional setting. The remaining sessions will revolve around three detailed M&A case studies, with seminar members divided into group roles. The first week of each case study will involve the negotiation and structuring of an M&A transaction. The second week will involve litigation relating to the transaction. Reading for these sessions will include case scenarios, supporting materials, and additional relevant case law and articles. The attendance and active participation of seminar members is essential. Readings for all classes will be provided in spiral-bound volumes distributed in class. Written assignments and grading. Students will be expected to (i) write a final paper; (ii) prepare two additional short written assignments associated with the case study assignments (such as marking up draft documents or preparing court papers); and (iii) participate actively in class. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. Students taking the seminar for R credit can take the seminar for either 2 or 3 units, depending on the paper length. Corporations (Law 242) is a prerequisite. Elements used in grading: Attendance, class participation, written assignments and paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 487. The Evolution of Finance. 3 Units.

This course discusses the financial crisis of 2008-9, developments since that time, and the future of finance. We consider how regulation, technology, and the changing world economy will create challenges and opportunities. We have guest speakers for about half of the classes. The list changes from year to year, but 2013's speakers included Tanya Beder, Sue Decker, Jacob Goldfield, Tom Kempner, Ana Marshall, Vincent Reinhart, Larry Summers, and Kevin Warsh. Elements used in grading: Group Project/Paper. Mandatory attendance. Absences impact grade. Participation 25% Project/Paper 75%. Cross-listed with Graduate School of Business (MGTECON 343).

LAW 488. Legal Aspects of Autonomous Driving. 2-3 Units.

Self-driving cars and trucks are rapidly entering the mainstream. They raise key legal and policy questions, which this seminar explores through source materials (from case law to treaties), academic scholarship, and industry speakers. Topics include state and federal regulation, public and private standards, liability and insurance, privacy and security, and social norms. Because the course is intended to meaningfully advance—rather than to merely present—legal analysis of this emerging technology.

LAW 490. Reproductive Justice: Law, Policy and Advocacy. 2 Units.

This course offers an opportunity to explore constitutional doctrines on childbearing and to consider contemporary strategies for advancing reproductive justice. We will examine federal court decisions defining reproductive rights, including cases involving conflicts between reproductive freedom, religious liberty and freedom of speech. We will consider the limits of federal constitutional protection for vulnerable women's reproductive choices (prisoners, teenagers, women who need public assistance and soldiers). In light of those limitations, we will consider alternative strategies to strengthen reproductive freedom: state constitutional litigation, legislation, administrative advocacy, communications, organizing and initiative campaigns. Each of these will be paired with a current reproductive rights controversy, such as the federal ban on abortion in military facilities, insurance coverage of contraception, teenagers access to confidential reproductive health care, shackling of pregnant inmates and abstinence-only sex education. Reproductive justice advocates, including litigators, communications experts and empirical health researchers will make guest appearances. The success of this course depends on lively class participation. Students will write a short piece on each week's topic using a different advocacy style (such as a legislative fact sheet, blog post, initiative ballot argument, op-ed article) and will make oral presentations in class.

LAW 491. Myth, Law, and Practice. 2 Units.

Collective myths from a variety of traditions and cultures capture enduring psychological truths about human choices and the human condition. Lawyers at various stages in their careers have their own personal myths, sometimes conscious and sometimes not. These personal myths embody key tendencies that determine or heavily influence each lawyer's personal and professional path. This course examines both collective myths that capture relevant archetypal human tendencies and the personal myths along with the associated histories of individual lawyers. It offers a space and time for each student to consider his or her own personal and professional direction through the course materials, class interactions, and a series of reflection papers. The course benefits from the collaboration of Michael Guasperini, a Ph.D. mythologist and lawyer whose primary vocation is working intimately with lawyers and firms during periods of personal and institutional transition. Mr. Guasperini has deep experience with the personal lives of hundreds of lawyers at various ages and levels of professional development. Elements used in grading: A series of reflection papers totaling at least 18-pages. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 492. Multi-Party Litigation. 3 Units.

This introduction to aggregative litigation will cover joinder of claims and parties, class actions, and multidistrict litigation, as well as related topics such as preclusion and brief coverage of remedies and choice of law. The focus will be both doctrinal and practice-oriented, and we will also consider broader questions of how the civil justice system should respond to mass harms as well as proposals for reform. This course is strongly recommended for students planning a practice in private or public civil litigation, managing or supervising litigation, or a judicial clerkship. It provides a basis for advanced courses such as complex litigation. Elements used in grading: Class participation, assignments and final exam. This course is open to first-year Law School students.

LAW 493. Entrepreneurship, Leadership and the Law Practicum. 2 Units.

Starting or advising a growing social enterprise requires on-the-ground experience. This class brings theory and case studies examined in Entrepreneurship, Leadership and Law in Social Enterprise to use through placements as consultants with local social enterprises. Students will make connections in the community; learn creative and hands-on problem solving skills; teamwork and communication skills; and be inspired to innovate and break away from the traditional lawyer path.

LAW 496. Legal Studies Workshop. 1 Unit.

The Legal Studies Workshop is designed to support students working on a piece of legal scholarship with an eye to publication. The workshop will meet every other week throughout the academic year. Students may sign up for any combination of quarters, and will receive one credit for each quarter they are enrolled. Each session will be devoted to presentations of one or two student works-in-progress. Every student is expected to present his or her own work at least once in the academic year, and to provide constructive oral feedback on others'. Attendance is mandatory (except of course for extenuating circumstances). Other faculty will participate on an informal basis when their expertise will be helpful for a particular paper. There are no written requirements for the course, and no requirement that the work presented be original to the Workshop. Students may wish to use the Workshop as an opportunity to expand on seminar papers or pursue independent research projects for which they are getting separate credit through one of the research tracks (e.g., directed research, dissertation). Whether students are working on a new project or revising an old, the expectation is that students will develop their topics independent of the course. Students who would like to participate in the Workshop but feel they need help in developing a workable research topic should consult Profs. Meyler and Ho ahead of time. Elements used in grading: Class participation and attendance.

LAW 498. Designing Liberation Technologies. 3-4 Units.

Small project teams will work with selected NGOs to design new technologies for promoting development and democracy. They will conduct observations to identify needs, generate concepts, create prototypes, and test their appropriateness. Some projects may continue past the quarter towards full-scale implementation. Taught through the Hasso Plattner Institute of Design at Stanford (d.school.stanford.edu). This course is cross-listed with the Computer Science and Political Science Departments (Same as CS 379L and POLISCI 337T). Enrollment is limited to a total of 16 students (under all course numbers combined), by consent of instructor. Students may enroll for 3 credits or 4 credits with additional assignments. Consent Application: To apply for this course, students must complete and submit a consent application available at <http://bit.ly/libtech2014>. See Consent Application Form for submission deadline and additional course information. Elements used in grading: Attendance and participation in all phases of the team project, from conception through execution. (Cross-listed as CS 379L and POLISCI 337T).

LAW 499. Intellectual Property: Trade Secrets. 3 Units.

Industry increasingly emphasizes technology as a means of achieving efficiency and competitive success. The law must provide an environment that encourages commercial investment in research, but that also protects an individual's right to change employment or compete directly with a former employer. This course is designed to explore the theoretical and practical aspects of protecting information as a trade secret. It will examine the basic legal doctrines and social issues which define this field, and will address the process of trade secret litigation. It will focus on a number of topics of current interest, such as state and federal legislation, "inevitable disclosure," non-competition agreements, corporate programs to protect trade secrets, and criminal sanctions." Elements used in grading: Class participation and final exam.

LAW 500. Modern American Legal Thought. 3 Units.

The course is a survey of the theories of law and adjudication that have been most important in this country since the Civil War, concluding with an introduction to presently significant schools of legal thought. The past schools of thought we treat are Formalist Legal Science, Sociological Jurisprudence, American Legal Realism, and Legal Process. The more recent and still active movements include such as Law and Moral Philosophy, Law and Economics, Critical Legal Studies, Feminist Jurisprudence, Public Choice Theory, and Neo-formalism. The readings are drawn primarily from primary materials - the important contemporary manifestos and critiques of the schools of thought studied, along with writings that involve their application or reveal their influence. Among the recurring issues treated are: How political is law? How objective? How much do and should courts legislate? Is law mostly rules? Principles? Policies? Decisions? How much should law be bound up with other intellectual disciplines? What should legal education be like? Elements used in grading: Final Exam.

LAW 504. International Business Negotiation. 3 Units.

This course is structured around a quarter-long, simulated negotiation exercise which is intended to provide an in-depth study of the structuring and negotiating of an international business transaction. This class will be taught in counterpart with a class at Berkeley Law School. Students in this class will represent a U.S. pharmaceutical company, and the students in the class at Berkeley will represent an African agricultural production company. The two companies are interested in working together to exploit a new technology developed by the pharmaceutical company that uses the cassava produced by the African agricultural production company. The form of their collaboration could be a joint venture, a licensing agreement or a long term supply contract. The negotiations between the two classes will take place through written exchanges and through real-time negotiation which will be conducted both in-person and via videoconferences. The purpose of the course is to provide students with an opportunity (i) to experience the sequential development of a business transaction over an extended negotiation, (ii) to study the businesses and legal issues and strategies that impact the negotiation, (iii) to gain insight into the dynamics of negotiating and structuring international business transactions, (iv) to learn about the role that lawyers and law play in these negotiations, (v) to give students experience in drafting communications, and (vi) to provide negotiating experience in a context that replicates actual legal practice with an unfamiliar opposing party (here, the students at Berkeley). Students will also learn about the legal and business issues that may arise in joint ventures, supply agreements and licensing agreements. The thrust of this course is class participation and active involvement in the negotiations process. Students are expected to spend time outside of class, working in teams, to prepare for class discussions involving the written exchanges, as well as preparing for the live negotiations. Class discussions will focus on the strategy for, and progress of, the negotiations, as well as the substantive legal, business and policy matters that impact on the negotiations. In addition to the regular Monday class, classes will meet for the live negotiations on two Thursday evenings on-campus at 7:00 PM (10/16 and 10/30) and three Saturday mornings at 10:30 AM (10/11, 10/25 and 11/15) in the San Francisco office of DLA Piper (555 Mission Street; close to Montgomery St. BART station). Due to the Thursday and Saturday classes, this class will conclude on November 17. The course will be limited by lottery to eight (8) law students (additional students from engineering or business may also participate). Attention Non-Law Students: You must complete and submit a Non-Law Student Course Add Request Form to the Law School Registrar's Office (Room 100). See Stanford Non-Law Student Course Registration on the SLS Registrar's Office website. Prerequisites: A course in basic negotiations (e.g., Law 615) or comparable prior experience is recommended. A primer on basic negotiations skills will be offered at a time TBD as an alternative for students who have not had a prior negotiations class or experience. Elements used in grading: Class participation, written assignments and final paper.

LAW 508. Law and Social Change in the Global Context. 3 Units.

This colloquium will examine the impact of human rights and rule of law strategies on social change in the global context. Over the past two decades, the establishment of international criminal courts and the expansion of regional human rights tribunals have significantly improved the enforceability of international human rights law in many regions of the world. Within a similar timeframe, building the rule of law, especially in transitional societies, has found an increasingly important place on the development agenda of international organizations, governmental development agencies and private foundations. One issue that remains unclear is the impact of human rights enforceability on the reform of domestic justice systems. During the first half of the course, students will read and discuss articles that provide an overall framework for understanding the field of international human rights and the field of rule of law, including the most common critiques of both fields as they are currently practiced. In the latter half of the course, students will hear examine case studies and hear perspectives from leading public interest attorneys about how they are deploying human rights mechanisms and engaging with the process of legal reform in their respective countries. There will be a focus on equal treatment and the lack of discrimination on the basis of race or ethnicity as a case study. The attorneys will offer on-the-ground observations of both the complex relationship between human rights and rule of law, and the potential and limitations of both approaches. Students will be required to participate in a symposium of leading international practitioners that addresses the same topic, and to synthesize lessons learned from the symposium as their final writing assignment. Special instructions: Requirements will include class participation, a class presentation and (1) either short written weekly reflection papers (about 3-4 pages) for and a short research paper (about 5 pages) for iquest;Wiquest; credit or (2) a long paper (approximately 30 pages) for "R" credit with consent of the instructor. Writing (W) credit is for 3Ls only.

LAW 509. Facilitation for Attorneys. 2 Units.

This course is designed to help students develop an understanding of the practice of facilitation in the legal context and to develop skills as facilitators. As the practice of law becomes more complex, it includes more and more situations where groups of people need to work together. Common examples include: planning complex legal strategies, developing firm policies, coordinating work among attorneys and staff, working with corporations or other multi-person clients, shareholder meetings, public commissions and councils, corporate and non-profit Board of Directors meetings. Countless hours are spent in meetings - a typical lawyer in the United States can expect to spend at least 10,000 hours in meetings during his or her working life. This course will help students improve the quality of both the processes and products of meetings, as a facilitator, leader, or meeting participant. Class Schedule dates: Sunday Oct 26 from 8:30 - 5:30, Friday Oct. 31 from 1-6, and Sunday Nov. 9 from 8:30 - 5:30. Elements used in grading: Class attendance, participation and final paper.

LAW 511. Legal Cultures and Legal Professionals in Latin America and Latin Europe. 2 Units.

The Latin countries of Europe and Latin America are the most direct inheritors of Roman language and law. They have made very important contributions to the history of law and mankind. They have not only an important legal tradition iquest;the civil law tradition- but also some countries of the area among the fast growing economies of the world and are undergoing quick social change. This course proposes to give a broad picture of the transformation of law and legal thinking, and the relation between law and society in this important part of the world.

LAW 512. Intellectual Property: Licensing. 2 Units.

In this course we cover the major aspects of intellectual property licenses. We will cover patent, copyright, trademark and trade secret licenses in a variety of industries. We will focus on agreements governed by US federal and state law, but will cover select issues in cross border transactions. Topics include: grant language, upstream and downstream immunities, change of control events, indemnities, and insolvency. Using a case law-based approach, we will examine the interrelationship between contract language and background law. Introduction to Intellectual Property or consent of the instructor is a prerequisite for this course.

LAW 514. California Coast: Science, Policy and Law. 4 Units.

This interdisciplinary course integrates the legal, science, and policy dimensions of characterizing and managing our coastal resources in California. Our focus is on the land-sea interface as we explore contemporary coastal land use and marine resource decision-making. Among the focal issues we will examine are: coastal pollution, public health, ecosystem management; public access; private development; local community and state infrastructure; natural systems and significant threats; resource extraction; and conservation, mitigation and restoration. Students will learn the fundamental physics, chemistry, and biology of the coastal zone, tools for exploring data collected in the coastal ocean (time series analysis), as well as the institutional framework that shapes public and private decision-making affecting coastal resources. This course will take a "place-based" approach. Special Instructions: THIS COURSE IS TAUGHT AS A HIGH LEVEL GRADUATE-STYLE COURSE WITH EXTENSIVE IN-CLASS DISCUSSION THAT REQUIRES CAREFUL PREPARATION FOR EACH CLASS SESSION. Students will be expected to participate fully in field studies designed to provide a personal understanding of how experts from different disciplines confront and work to resolve coastal policy questions. At least three mandatory field trips are required in this course. Elements used in grading: Participation, including class session attendance and field trip attendance, as well as writing and quantitative assignments. (Cross-listed with CEE 175A/275A, EARTHSYS 175/275).

LAW 515. Sustainable Energy: Business Opportunities and Public Policy. 3 Units.

This course examines trends and opportunities in the sustainable energy sector with a particular focus on low carbon energy. We examine these trends in the context of technological change, emerging business opportunities and the parameters set by public policy. Specific topics to be examined include: > The State of the Global Cleantech Industry.> The Impact of Regulatory Policies and Tax Subsidies.> Cost Competitiveness of Alternative Energy Technologies.> VC Perspective on Sustainable Energy Start-ups.> Project Finance > Fossil Fuels and Carbon Capture.> Renewable Energy, including Solar PV and Biofuels.> Energy Efficiency and Storage. Elements used in grading: Active class participation (30% of grade), case studies (30% of grade) and a course project (group project) to be delivered at the end of the fall quarter (40% of grade). The course project can alternatively (i) develop a (rough) business plan, (ii) analyze an existing business or technology in the sustainable energy domain, or (iii) analyze the impact of an existing regulation or proposed policy. Enrollment is capped at 60 students. The class is open to all MBA and Law School students. 10 seats will be set aside for graduate students from outside the two schools. These students are required to obtain instructors' permission for enrollment. Compressed class: Fall quarter, weeks 3-5 and 7, Mo., Wed., Fri. 4:00-6:15 p.m., Oct 6-24 and Nov 3-7. Graduate School of Business (GSBGEN 332).

LAW 517. Why Intellectual Property?: Rationales and Critiques of IP Law. 2 Units.

Why do societies decide to grant special legal protection to various types of creative works? A number of answers have been given over the years. Some are utilitarian: we grant these rights because doing so maximizes social welfare. Some are deontological: we grant rights because this is morally required in a just society. We will examine these various justifications, as well as variants on them. We will also ask how a society, having decided to grant some version of IP rights, ought best structure them. Should they be true property rights, with all or most of the powers this implies (creator control over uses, right to compensation from exploitation, etc.), or something else? Would a state-backed reward system work better, so that compensation is divorced from individual control? Should compensation for successful creators be limited or capped, as part of a wider attempt to moderate the distributional impacts of granting individual property rights; or must we tolerate big winners; as an inducement or symbolic reward for other creators? We will address these and related questions by reading two sets of materials: (1) classic treatments of property rights (Locke, Kant, etc.) and social justice (Rawls); and (2) material from the contemporary literature on IP theory. We may also host some of the most interesting scholars working in the field of IP theory today, to come and explain their thinking and their work.

LAW 518. International Public Interest Lawyering Colloquium. 2-3 Units.

Over the past two decades, the establishment of international criminal courts and the expansion of regional human rights tribunals have significantly improved the enforceability of international human rights law in many regions of the world. Within a similar timeframe, building the rule of law, especially in transitional societies, has found an increasingly important place on the development agenda of international organizations, governmental development agencies and private foundations. One issue that remains unclear is the impact of human rights enforceability on the reform of domestic justice systems. This colloquium will examine the relationship between international human rights and domestic rule of law in transitional societies from the perspective of public interest attorneys who are seeking to achieve justice for clients who are low-income and marginalized. During the first half of the course, students will read and discuss articles that provide an overall framework for understanding the field of international human rights and the field of rule of law, including the most common critiques of both fields as they are currently practiced. In the latter half of the course, students will hear perspectives from leading public interest attorneys about how they are deploying human rights mechanisms and engaging with the process of legal reform in their respective countries. There will be a focus on gender equality and protecting the human rights of women as a case study. The attorneys will offer on-the-ground observations of both the complex relationship between human rights and rule of law, and the potential and limitations of both approaches. Students will be required to participate in a symposium of leading international practitioners that addresses the same topic, and to synthesize lessons learned from the symposium as their final writing assignment.

LAW 519. 21st Century Professional Skills and Practice Management. 2 Units.

This course will help students to develop the professional management skills that are essential for a successful legal career. The course will focus on team dynamics and leadership; effectively communicating with clients, colleagues, other parties and tribunals; client development and service; managing expectations and unexpected adversity; and the economics of law practice, including forecasting demand for legal services and project management. For the final paper, students will create a comprehensive, personal plan outlining the substantive knowledge, professional skills, and business focus they need to build a fulfilling law practice. Assignments and simulations will demonstrate and model various skills and instructors will provide real-time feedback to students on class exercises. The course is not limited to any particular type of practice (size or substantive area). Elements used in grading: Class participation and attendance, course exercises and written assignments.

LAW 520. Betrayal and Loyalty, Treason and Trust. 2 Units.

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. Elements used in grading: Class Participation, Attendance, Final Paper. This course is cross-listed with PHIL 174L/274L ETHICSOC 174L/274L.

LAW 522. Private Equity Investing. 3 Units.

This course will concern itself with the central issues related to private equity investing. Topics to be covered include the following: valuation, pricing and structuring of private investments; leveraged buyouts and other transactions involving multitiered capital structures; the structure and governance of PE funds; conceptual issues (such as option theory, asymmetric information and bounded rationality) relevant in this realm; and private equity as a distinct asset class. The primary pedagogical objective is to have students learn skills and tools used in the private equity arena including, inter alia, financial analysis, conducting a multipronged due diligence process, spreadsheet modeling and the crafting of legal documents. Case studies requiring the assessment of actual transactions will be utilized. We will have a number of guest speakers during the term, and will use various materials illustrative of what one would encounter in private equity deals and funds. Special Instructions: In order to enroll in Private Equity Investing students must concurrently enroll in PEI: Quantitative Skills Seminar (Law 721; 1 unit). In other words, no student may enroll in either Law 522 or Law 721 without also enrolling in the other. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class attendance, participation and written assignments.

LAW 524. Mental Health Law. 3 Units.

This seminar explores topics in mental health law with special emphasis on liberty issues. After a brief introduction to mental disorders, their treatment and the mental health profession, the seminar sessions will explore topics such as: civil commitment, criminal responsibility, competency determinations, and the right to refuse and consent to psychiatric treatment. A research paper is required. Elements used in grading: Final Paper.

LAW 527. Juvenile Justice and Social Policy. 3 Units.

Juveniles are accorded special status under the American legal system. This introductory course will examine the historical precedents and philosophical reasons for treating juveniles differently from adults, and review empirical evidence about child development that can illuminate the reasons for their special status within the court system. Students will learn about the distribution of juvenile delinquency and the impact of significant social and institutional influences on delinquency: family, school, peers, and drugs. The course will also provide a detailed overview of the juvenile system, from its beginning to the current state of the institution, which will include a review of police work with juveniles, pretrial procedures, and the juvenile court and corrections systems. Major court rulings that have shaped contemporary juvenile justice will be presented. Finally, the course will consider dispositional options available to Courts, and will identify the most effective in reducing delinquency. By the conclusion of this course, students should have an understanding of the juvenile justice system and how it compares with the adult justice system, what programs work to reduce recidivism, and be cognizant of some of the major legal and policy issues confronting that system today. The course format will combine lecture, group discussions, and guest presentations. Students may also have the opportunity to observe the juvenile justice system first hand by attending a juvenile court session, visiting a correctional facility for adjudicated delinquents, and hearing directly from those who work with high-risk youth on probation or in the community. Written Work. Each student will write four reflection papers, 5-7 pages each (about 1,700 words) over the quarter. Due dates will be listed in the class syllabus. Elements used in grading: Final grades will be based on the four reflection papers (20% each) and class participation (20%). This course is open to 2Ls, and 3Ls in the Law School.

LAW 528. Economic Analysis of Law. 4 Units.

This course will provide a broad overview of the scholarly field known as "law and economics." The focus will be on how legal rules and institutions can correct market failures. We will discuss the economic function of contracts and, when contracts fail or are not feasible, the role of legal remedies to resolve disputes. We will also discuss at some length the choice between encouraging private parties to initiate legal actions to correct externalities and governmental actors, such as regulatory authorities. Extensive attention will be given to the economics of litigation, and to how private incentives to bring lawsuits differ from the social value of litigation. The economic motive to commit crimes, and the optimal governmental response to crime, will be studied in depth. Specific topics within the preceding broad themes include: the Coase Theorem; the tradeoff between the certainty and severity of punishment; the choice between ex ante and ex post sanctions; negligence versus strict liability; property rules; remedies for breach of contract; and the American rule versus the English rule for allocating litigation costs. There is no formal economics prerequisite to take this course, though some prior training in economics will be helpful. Elements used in grading: Final exam. Midterm exam grade will be used to boost your final grade if you do better on the midterm exam than on the final exam. Cross-listed with Public Policy (PUBLPOL 302B).

LAW 531. Wine and the Law. 2-3 Units.

The wine industry is the subject of intense activity in many legal subject areas, including constitutional law, intellectual property, environmental and land use regulation, trade protectionism, and internet commerce. This seminar surveys the legal landscape of this multibillion dollar industry, focusing on contemporary debates and developments in judicial, legislative, and administrative arenas. Course materials will consist of a blend of judicial opinions, governmental materials, and secondary sources. The instructor specializes in litigation concerning the California wine industry, and the course will feature several guest speakers addressing the economic, political, and legal aspects of the subject in its state, national, and international dimensions. A paper will be required of all students on some topic of their choosing concerning the course subject matter. Students may earn an optional third unit by writing a longer paper. Special Instructions: Students may earn credit in this seminar in one of two alternative ways, both of which will be graded under the Honors/Pass system. The first alternative is to write a series of short commentaries (about 4-5 pages each) on the material covered in four weeks of your choosing. This alternative will satisfy the Law School's "W" writing requirement. If you elect this option, you may earn two credits. The second alternative is to write a single research paper on a topic of your choosing relating to the subject matter of the course. This alternative will satisfy the Law School's "R" research requirement. If you elect the second alternative, you may earn two or three credits; the required length of the paper is approximately 20 pages for two credits and approximately 30 pages for three credits. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation, attendance and final paper. Constitutional law is a prerequisite. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 532. Understanding the Legislative Process: American Legislative Institutions in Analytical Perspective. 3 Units.

Statutes are central to the legal system in the United States and virtually every other country, but they are generated through an intricate legislative process that is often poorly understood and has in recent years been subject to intense criticism. The primary goal of this course is to explore certain categories, procedures, and norms used in the U.S. Congress. The class will also consider how the U.S. legislative process functions relative to approaches in other countries (particularly advanced industrialized countries with mature legislative and executive institutions), and will critically examine some of the concerns that have been raised among scholars and commentators about the efficacy of the U.S. legislative process. Specific topics covered in the course will include the legislative budgeting and appropriations process; legal (including constitutional) interpretation in the legislature; oversight of executive and administrative action; legislative agenda-setting and other counter-majoritarian features of the lawmaking process; and the division of labor between legislative chambers, committees, and subcommittees. Students will have an option of either choosing between writing 4 short response papers (4-5 pp. each), or one longer paper for writing "W" credit for 3Ls only. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the W requirement, with consent of the instructor. Special Instructions Writing (W) credit is for 3Ls only. Elements Used in Grading: Class participation, attendance, four short response papers or final paper.

LAW 534. Law and Psychology. 3 Units.

This course will examine the implications of psychological theory and research for normative legal theory and for contemporary legal policies, procedures, and practices. The course will draw on contemporary cognitive, social, and clinical psychology to address the concepts of intent, responsibility, deterrence, retribution, morality, and procedural and distributive justice. We will examine evidence law (e.g. eyewitness testimony, polygraphy, expert testimony, psychiatric diagnosis and prediction), procedure (e.g., trial conduct, jury selection, settlement negotiations, alternative dispute resolution), and various topics in criminal law, torts, contracts, property, discrimination, family law, and other areas. We will compare "rational actor" and psychological perspectives on decision making by juries, judges, attorneys, and litigants. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Series of shorter papers or final independent research paper totaling 28-pages. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 537. The United States Senate as a Legal Institution. 3 Units.

This course will familiarize students with major, and/or emerging legal and constitutional issues concerning the U.S. Senate. In so doing, it will examine: 1) the Senate's nature as a complex legal institution, and 2) the issue of the Senate's legitimacy in the context of the current and largely unprecedented criticism of the Senate from all parts of the political spectrum. This first portion of the course will consider institutional-legitimacy issues facing the Senate, including the appointment of senators to fill vacancies as well as disputes concerning Senate rules and procedures such as the filibuster and holds. The second part of the course will explore how the Senate interfaces with the Constitution and the Supreme Court. It will examine how senators should regard the issue of constitutionality in voting on legislation, be it campaign-finance reform, internet decency, or health care. This part of the course will also consider how senators should approach proposed constitutional amendments. The final portion of the course will review the wide range of issues that have emerged in recent years regarding the constitutional relationship between the Senate and the Executive Branch, including the increasingly acrimonious issue of the standard to apply to executive appointments under the advice and consent power. Particular emphasis on this part of the course will be given to issues that have gained greater prominence since 9/11, including the relationship between enacted, constitutional legislation and the presidential assertion of Article II powers, as well as the Senate's abdication of its Article I war-declaration power.

LAW 538. Sociology of Law. 3-4 Units.

This course explores major issues and debates in the sociology of law. Topics include historical perspectives on the origins of law; rationality and legal sanctions; normative decision making and morality; cognitive decision making; crime and deviance, with particular attention to the problem of mass incarceration; the "law in action" versus the "law on the books;" organizational responses to law, particularly in the context of labor and employment; the roles of lawyers, judges, and juries; and law and social change with particular emphasis on the American civil rights movement. Special Instructions: Students are expected to attend a weekly TA-led discussion section in addition to lecture. Sections will be scheduled after the start of term at times when all students can attend. Paper requirements are flexible. Cross listed with the Sociology Department (Soc 136/236). See "Special Instructions" in course description above. Elements Used in Grading: Class participation, paper proposal, three short papers and a final paper (see syllabus for details).

LAW 540. Litigation and Institutional Design. 2-3 Units.

This seminar will focus on issues of institutional design as they relate to complex litigation in the contemporary American legal system. Topics addressed will include explanations for the general move away from regulation and toward litigation in recent decades, the legal and policy implications of that trend, and contemporary efforts to retrench or remake the system. We will examine these topics from a number of substantive and procedural angles using case law, readings, and case studies. We will explore such disparate substantive areas of law as employment discrimination, securities regulation, qui tam actions, and mass torts. We will also discuss trans-substantive topics such as the class action device, private enforcement of public law (through regimes that deputize "private attorneys general" as enforcers), and federal regulatory pre-emption. Though the seminar will integrate knowledge from a number of fields of law and from other disciplines, emphasis will be given to the functional analysis of practical problems of institutional design. (Note: This course was previously titled "Reconstructing the Litigation State.") Grades will be based on class participation and either (1) several short reflection papers or (2) an independent research paper with consent of the instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Writing (W) credit is for 3Ls only. Elements used in grading: Class participation, attendance, reflection papers or research paper.

LAW 541. Legal Profession Workshop: Deconstructing Big Law. 3 Units.

Wondering what life in a large law firm will be like in this age of radical change in the delivery of legal services? How the new economics are shaping the structure and management of large law firms? How law firms are re-thinking professional development and advancement within firms? What the globalization of legal services portends for your future? The goal of the workshop is to bring research and practical experience to bear on helping you think about how to build a professional career in an era of professional change.

LAW 543. Entrepreneurship, Leadership and Law in Social Enterprises. 2 Units.

Many believe that society's greatest challenges have already been solved by social entrepreneurs and the challenge is how to take their ideas to scale. However, it has become increasingly difficult to start and sustain social ventures. The lines between the public and private sectors have become increasingly blurry as best practices in the social sector now include innovation, strategy and accountability. This course will expose students to the work of social entrepreneurs in social enterprises - focusing primarily on domestic non-profit organizations. Using the "case study method" typically used in MBA programs, students will examine the challenges of starting, counseling, serving, funding and scaling social ventures through the eyes of the entrepreneur, investor, attorney and community leader. The course will explore the intricacies of remaining mission driven, talent, board relations, managing and sustaining growth, the changing role of corporate governance, and leveraging private sector partnerships and resources. Students will also explore innovative public / private sector partnerships and the challenges and opportunities of engaging diverse partners with differing agendas. The course will include guest speakers from the fields of law, business and the social sector. Throughout, students will explore the valuable roles that attorneys can and have played in such ventures. Students will be expected to attend, participate actively, present to the class and write reflection papers. Elements used in grading: Reflection Papers.

LAW 545. Alternate Dispute Resolution: Law, Practice, and Policy. 3 Units.

Lawyers' representation of their clients increasingly calls for skills within a broad range of alternative dispute resolution processes. In this course, you will learn about the variety of dispute resolution procedures that operate under the ADR umbrella, within and outside of the court system (including mediation and arbitration). The goal is for students to understand the law and policy behind these alternatives relative to court adjudication, to be able to select the appropriate process for a client, and to effectively represent that client in the selected process. Guests include third party neutrals and advocates from a range of contexts, including federal court, private mediation, private and public arbitration, and corporate legal counsel.

LAW 546. Alternative Dispute Resolution: Practicum. 2 Units.

Effective client representation increasingly calls for lawyers with skill within a broad range of alternative dispute resolution processes. In this course, you will have the opportunity to observe 2-3 ADR processes being handled by Bay Area third-party neutral practitioners. Students in the class will meet periodically to review relevant law and policy, and to discuss observed cases. Grades will be based on seminar participation and 3 short papers. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Co- or Prerequisites: Mediation or Arbitration. Elements used in grading: Class participation, attendance and written assignments.

LAW 554. International Commercial Arbitration. 2 Units.

This course is designed to provide students with an introduction to the theory and practice of international commercial arbitration, the preferred method of dispute resolution in international trade and commerce. It will familiarize students with the framework of international treaties and federal and state laws that undergird the international arbitral system and explore U.S. jurisprudence on the respective roles of courts and arbitral tribunals in resolving disputes subject to international arbitration. In addition the course will analyze alternatives in drafting international arbitration clauses, including the applicable arbitration rules, the significance of the agreed-upon place of arbitration, the number of arbitrators, and the method of their selection. The course will also impart a practical, in-depth understanding of each of the principal stages of arbitration, including the enforcement of the arbitration agreement; initiation of the arbitral proceedings; the availability of provisional remedies; the conduct of the arbitration from the pleading stage through discovery and briefing to the hearing; the arbitral tribunal's preparation of the award; and the judicial enforcement proceedings that conclude the process. Although the course will focus on the practice of international arbitration from the U.S. perspective, it will also introduce students to perspectives from other leading civil and common law jurisdictions. Elements used in grading: Class Attendance, Class Participation, Final Exam.

LAW 555. The Plaintiffs' Lawyer: Institutional Constraints and Ethical Challenges. 3 Units.

Plaintiffs' lawyers are the interpreters and gatekeepers of the civil justice system. They alone sift through possible claims and decide which will, or will not, be filed, and they alone shepherd personal injury clients through the baffling maze that is contemporary civil litigation. Because of their pivotal role, to study "the plaintiffs lawyer" is to study many of the most controversial and important issues at the intersection of tort law, civil procedure, and legal ethics. In this course, we will study who personal injury lawyers are, how they find clients, how they fund litigation, and how they usher complex cases to conclusion. In so doing, we will address: the role and regulation of lawyers, the use and abuse of the contingency fee, the legality and normative consequences of solicitation and attorney advertising, the propriety of secret settlements, the rise and impact of "alternative litigation finance," and the difficult ethical and practical issues posed by class actions, aggregate actions, and multidistrict litigations (MDLs). The final segment of the course will involve a series of case studies, where students will have the opportunity to see the course's themes echoed and expressed in recent real-world controversies. Specifically, we will study litigation involving the diet drug fen-phen, the pain reliever Vioxx, and Chevron's operations in the Ecuadorian rainforest. Elements used in grading: Class participation, reflection papers, final paper, and group presentation. The final paper will be due shortly after the course's conclusion.

LAW 556. Counterterrorism Law and Institutions. 2 Units.

This seminar will explore a range of legal and policy questions in U.S. law related to the prevention of terrorism. Topics include intelligence-gathering, investigations, and the prosecution of suspects in U.S. courts, including controversies surrounding the use of informants, material support laws, racial and religious profiling, electronic surveillance, terrorist watchlists, and terrorism trials. In exploring these controversies, the course focuses on several core themes: 1) the contested relationship between rights and security; 2) the question of institutional choice in national security decision-making and oversight; and 3) the challenge of assessing the efficacy of counterterrorism measures. The course pays special attention to the policy controversies that affect U.S. communities, including minority and immigrant communities. To develop skills central to the work of practicing lawyers, students will write two short papers that simulate the actual work assignments of lawyers for government agencies, human rights groups, or other interested parties. For instance, students might draft a local ordinance on police intelligence-gathering, prepare a memo for a national security agency head or member of Congress, or design an administrative mechanism for resolving watchlist complaints. These assignments, for Writing (W) or Professional Writing (PW) credit, will be due before the end of the quarter. Alternatively, students may opt to take the seminar for Research (R) credit with the professor's approval, according to the standard requirements and deadlines. In addition to completing the writing assignments, students are expected to read thoroughly and contribute to a thoughtful and lively discussion each class. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation and two short papers or research paper. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 557. Direct Democracy. 2-3 Units.

In recent years, the use of ballot measures has sharply risen, and initiatives and referenda have featured prominently in contested debates over immigration, affirmative action, abortion, same sex marriage and term limits. This seminar will focus on direct democracy as a method of lawmaking. Our principal focus will be on initiatives and referenda, but we will allocate some time to the recall, as well. We will consider the history, practice, theoretical justifications, and constitutional dimensions of direct democracy, as well as how direct democracy interacts with representative democracy. We will also explore many legal questions that have arisen in as ballot measures have been used as instruments of governance and policy. Topics will include whether direct democracy comports with the federal constitution; judicial review and interpretation of ballot measures; minority rights under direct democracy; election rules relating to signature gathering, qualifying ballot measures and campaign finance; and the role of interest groups. I anticipate one or more guest lecturers. Each student will present on one particular ballot measure that is linked to that week's topics. Students will write either multiple response papers (for W credit) or a final research paper (for R credit) on a topic to be worked out with the instructor. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the seminar for R credit can take the seminar for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation, written assignments, multiple response papers or a final paper. Writing (W) credit is for 3Ls only.

LAW 558. Workshop on International Security, Law, and Social Science. 1 Unit.

Societies throughout the world face pressing security and international cooperation problems involving insurgency, transnational crime, risk regulation, migration, arms control, and related areas. This seminar, based at Stanford's university-wide Center for International Security and Cooperation covers a variety of issues of interest for a multi-disciplinary audience of social scientists, lawyers and legal scholars, and natural scientists, among others. Issues include nuclear weapons proliferation and arms control, war and civil conflict, international and transnational organizations, governance, counter-terrorism, biosecurity and global public health, and migration.

LAW 560. Mental Health Law: Forensics. 3 Units.

It is estimated that nearly one-third of Americans experience a diagnosable mental disorder each year. This course is designed to provide law students with a working knowledge of the major areas of mental health and illness, as well as a basic understanding of legal issues affecting the practice of psychology and psychiatry. Basic concepts of clinical psychiatry and psychopathology will be highlighted throughout the course. We will also address legal issues that pertain to the needs and rights of individuals with a mental disorder and explore the delivery of mental health services, the regulation of mental health professionals, and the relationship between society and individuals with a mental disability. Whenever appropriate, landmark cases will be discussed and their impact in the practice of mental health delivery (i.e., psychiatry and psychology) and on the practice of law, will be discussed. This course is intended to be interactive and while the core of the course is pre-determined, some of the content will be tailored to address interests and needs of participants. The structure of most sessions will begin with case presentations highlighting the day's topic, followed by a didactic portion from the instructor, ending with an interactive discussion between class members and invited panelists. Grades will be based on class participation, group participation in a mock deposition/trial, and a research paper for R credit- the topic for the paper is to be agreed upon between the student and the course director. Elements used in grading: Class participation, attendance, group participation in a mock deposition/trial and final paper.

LAW 562. Comparative Civil Rights. 4 Units.

This course will compare civil rights laws in the United States to those in several other countries in Europe and the developing world. We will focus on how differing national histories, priorities, politics and demographics have led to distinct approaches to anti-discrimination as well as on how civil rights movements have influenced and borrowed from each other. Special Instructions: The course will be taught using a "flipped classroom" format: students will complete a series of on line class segments that include video interviews with experts from around the world, texts and quizzes. The on line materials will allow flexibility so that students can focus in greater depth on areas of interest as well as review foundational material on American anti discrimination law, international law and international human rights. Classroom time will be dedicated to discussion and questions. Students have the option to write papers for either Writing (W) or Research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance and final paper. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 563. Beyond the Common Law: Tort Reform and Tort Alternatives. 2-3 Units.

Over the past century, tort law has been under sustained attack. Using a broad mix of case law, case studies, and scholarly analysis, this seminar will interrogate those attacks-including their historical roots, their theoretical justifications, and their practical effects. We will first study "replacement reforms"-attempts to jettison the common law in favor of alternative compensation mechanisms, including workers' compensation, auto no-fault, the September 11th Victim Compensation Fund, and the Vaccine Injury Compensation Program, housed within the U.S. Court of Claims. Second, we will study modern tort reform initiatives, often dubbed "discouragement reforms," which have chiseled away at damages and chilled personal injury victims' incentives and capacity to seek relief. Finally, we will study the United States Supreme Court's own tort reform activity, including recent jurisprudence limiting punitive damages and granting broad preemptive effect to agency actions. Through this analysis, students will develop a deeper and richer understanding of the tort system, its contemporary operation and excesses, and the uneasy but important place tort law- and civil litigation more generally-occupies in contemporary American society. Special Instructions: Grades will be based on class attendance, class participation, and either several short reflection papers (section (01)) or an independent research paper (section (02)). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation, class attendance, panel group questions, reflection papers or research paper. Writing (W) credit is for students entering prior to Autumn 2012. Early drop deadline.

LAW 565. Immigration Law and the Constitutional Rights of Non-Citizens. 3 Units.

This survey course will provide a foundation in immigration law, the system of admission and removal, and constitutional principles relating to immigration. While surveying the laws and norms governing immigration and the regulation of non-citizens, we will explore their application to selected current topics by drawing on the instructor's extensive experience litigating civil rights cases on behalf of non-citizens. These current topics may include: detention of immigrants; state and local laws relating to immigrants; extraterritorial application of the Constitution; and the intersection of immigration and criminal law, including criminal grounds of deportability, immigration-related crimes, and Fourth Amendment issues arising in immigration enforcement. No prior course or background in immigration law is required, but familiarity with basic constitutional law and criminal procedure will be helpful. Elements used in grading: Class participation and attendance (20%), final exam (limited open book) (80%).

LAW 572. Social Justice Impact Litigation: Issues and Strategies. 2 Units.

This seminar is designed to examine strategic and legal issues related to litigating impact and social justice cases that advance the constitutional and civil rights of vulnerable communities. The course will be informed by the instructor's three decades of experience litigating class action and appellate cases, including in the Supreme Court, on behalf of immigrants and civil rights plaintiffs as the founder and former director of the ACLU national Immigrants' Rights Project. We will consider some key doctrinal issues as a prelude to exploring litigation strategy and approaches through a variety of case studies, pending litigation, and guest lecturers. Among the issues we may examine are: selecting and using test cases; strategic pleading; class action problems; ethical questions; the role of amicus briefs; suits for damages versus injunctive relief; standing and mootness; settlement strategies; coalition litigation; use of public advocacy and media; the impact of litigation on policymakers and government officials; and the role litigation in furthering legislative action. Some guest speakers will be invited. This seminar is not appropriate for 1L students. Enrollment is limited. Grading will be based on class participation and written work of at least 18 pages. In consultation with the instructor at the beginning of the course, students will have the option of choosing either to submit a final paper or a series of reflection or analytical pieces responding to the seminar readings. All students enrolled in the course are eligible for Writing (W) credit. With the instructor's prior consent, a limited number of students may be approved for Research (R) credit for writing a substantial research paper on an approved topic. After the term begins, students approved for R credit will transfer from section (01) into section (02). Elements used in grading: Class participation (50%) and written submissions (50%). Writing (W) credit is for students entering prior to Autumn 2012. The seminar is not open to 1L students. --- CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. There are no prerequisites but familiarity with constitutional litigation and federal jurisdictional issues is helpful. See Consent Application Form for submission deadline.

LAW 576. Law and Sexuality. 2-3 Units.

This seminar will focus on how the law regulates sexuality. We will approach the material as an exercise in advanced constitutional law, exploring how courts have used--or might use--federal or state constitutional provisions to address issues regarding a wide array of issues involving sexuality. The core of the class will relate to contemporary controversies concerning sexual orientation and gender identity (including, for example, regulation of sexual conduct, defining sexual identity, the Boy Scouts' policy, marriage and parenting rights of same-sex couples, among others). But we will also discuss other issues, including controversies about sex education and polygamy. We will maintain an interdisciplinary focus throughout as we consider how social, cultural, and political forces shape, and are shaped by, legal doctrine. Special attention will be paid to the unfolding debate on same-sex marriage as a case study in the contested role of courts as engines of social change. All students taking the seminar for 2 credits will write a final research paper of approximately 18 pages (for R credit). Students who wish to write a longer R paper (approx. 26 pages) may enroll in the seminar for 3 credits. Elements used in grading: Class participation and final paper.

LAW 577. Regulation of the Political Process. 3 Units.

This course is intended to give students a basic understanding of the themes in the legal regulation of elections and politics. We will cover all the major Supreme Court cases on topics of voting rights, reapportionment/redistricting, ballot access, regulation of political parties, campaign finance, and the 2000 presidential election controversy. The course pays particular attention to competing political philosophies and empirical assumptions that underlie the Court's reasoning while still focusing on the cases as litigation tools used to serve political ends. Elements used in grading: Class participation and exam. Cross-listed with Communication (COMM 361) and Political Science (POLISCI 327C).

LAW 583. International Investment Law. 2 Units.

International investment law and arbitration is one of the fastest-developing areas of international law. It is an area that combines elements of treaty and customary international law, public policy, and private dispute resolution. In the past decade, there has been a dramatic increase in the number of bilateral investment treaties and other agreements with investment-related provisions, followed by a sharp rise in the number of disputes between private investors and sovereign states under those specialized legal regimes. In particular, investment arbitration under the auspices of the World Bank's International Centre for Settlement of Investment Disputes (ICSID) is booming, with some 419 arbitration and conciliation proceedings instituted under the ICSID Convention and Additional Facility Rules as of 31 December 2012. Due to the widespread geographical participation of states and private investors in investment arbitration, involving significant amounts of money in every conceivable investment sector--from oil, gas & mining, construction, transportation to the financial sector--the particularities and dynamics of investment treaty law and arbitration are becoming increasingly important to foreign investors, sovereign states, and the global economy that is increasingly fueled by foreign investment. The rise of international investment law and arbitration has also bred a new and exciting practice area in global law firms, where teams of lawyers act on behalf of investors against sovereign states, or defending sovereign states against investor claims, before international arbitral tribunals. This course will cover four broad areas: (I) the historic, theoretical and policy grounds underpinning international investment law; (II) the substantive obligations and standards governing the investor-state relationship; (III) the growth of investor-state arbitration and its impact on international law; and (IV) the wider issues of fairness and functionality of investment treaty law and investor-state dispute resolution. The course uses materials from international investment treaty texts, case law, and commentaries to enable students to evaluate and apply legal doctrine to future situations. As international investment law and investment arbitration is a dynamic, unsettled, and controversial body of law, this course will highlight different and sometimes conflicting interpretations and decisions in the area, and invite students to analyze, discuss, and form their own views on key issues. Elements used in grading: Class participation and final paper.

LAW 586. Islamic Law. 4 Units.

Topics include marriage, divorce, inheritance, ritual, war, rebellion, abortion, and relations with non-Muslims. The course begins with the premodern period, in which jurists were organized in legal traditions called *madhabs*; schools of law. After examining the nature and functions of these institutions, we turn to the present era to study the relationship between customary law, state law, and the Islamic legal heritage in Egypt and Indonesia. The course explores Muslim laws and legal institutions and the factors that have shaped them, including social values and customs, politics, legal precedents, and textual interpretation. Elements used in grading: Participation & final paper. Cross-listed with Religious Studies (RELIGST 201/301).

LAW 588. Sports Law. 3 Units.

This seminar covers various legal and business aspects of professional sports, the Olympics and college athletics. Topics covered may include antitrust law, labor law, collective bargaining, torts, contracts, agency, constitutional law, administrative law and intellectual property. Class lecture and discussion will be supplemented with speakers from the sports industry, with an emphasis on current and future sports law issues. Students who have taken Labor Law (Law 301) will be given priority. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from the exam section (01) to the paper section (02) with consent of the instructor. Elements used in grading: attendance, participation, one-day take-home exam or final paper. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 590. Modern Capital Markets and the Financial Crisis. 4 Units.
 Money: Shadow Banking, Dark Financial Matter and the Future of Finance.
 This course introduces law students to the structure of the shadow banking system and related financial markets. Emphasis is placed on the securitization process, the swaps markets (including credit default swaps, total returns swaps, interest rate, and currency swaps), repo agreements, forwards, futures, and related institutions such as clearing houses and exchanges. The course will consider the role that these markets played in the recent and ongoing financial crisis, their potential implications for future crises, and several of the regulatory initiatives proposed by the Dodd Frank Act. Much of the course will operate through the lens of a series of case studies including the Greek debt crisis, Harvard's loss of \$500 million in the swaps market, the AIG bailout, and JPMorgan's loss of \$2 billion in its hedge book. Special Instructions: If you have taken Law 559: Modern Securities Regulation (Sonsini) and/or Law 542: Modern Securities Fraud Litigation (Eth), you may take Law 590: Modern Capital Markets (Grundfest). Elements used in grading: Class attendance, participation and exam.

LAW 591. Securities Regulation: Raising Capital in U.S. Markets, from Start-up through IPO and Beyond. 4 Units.
 A complex web of securities regulations governs the process by which businesses raise capital in the United States. This course reviews the legal regime governing capital formation, from angel financing and venture capital rounds that fuel start-up activity in Silicon Valley, through the initial public offerings (IPOs) by which companies "go public" (with special reference to the recent Alibaba IPO), and reporting obligations that arise once firms are publicly traded. The course also considers the evolving role of on-line securities placement markets, such as Angel List. In addition, the course examines the "Rule 144A market" through which many of the world's largest entities raise billions of dollars a year in U.S. markets, without ever becoming subject to SEC public disclosure requirements. Elements used in grading: Final exam.

LAW 592. Law, Race, and Inequality. 2-3 Units.
 This course will examine the application of constitutional and statutory antidiscrimination law to race related controversies across a variety of settings. After some exploration of the historical origins of statutory and constitutional antidiscrimination law, the course will then consider antidiscrimination law as applied to contemporary controversies in specific settings, which may include criminal justice, college admissions, political participation, primary/secondary education, employment, housing, hate speech, and the formation of family relationships. The readings will be varied and will include judicial opinions, scholarly commentary, and social science research. Throughout, we will aim to understand both the specific challenges of regulating race in particular contexts, and the broader (and conflicting) conceptions of racial justice that inform law, policy and morality. Students in the seminar will write a substantial research paper of either 18 pages to receive 2 units of credit or 26 pages to receive 3 credits. Elements used in grading: Class participation and research paper.

LAW 593. Terrorism and the Courts. 3 Units.
 The emergence of international terrorism and governments' responses to it have led to novel questions for courts at the intersection of constitutional, criminal, international, and procedural law. This seminar will consider a series of interrelated problems that have arisen in federal courts over the treatment and punishment of suspected terrorists and compensation for victims. Topics will include habeas litigation by detainees; the creation and use of non-Article III courts such as military commissions as alternatives to criminal prosecution; congressional attempts to withdraw jurisdiction from federal courts over litigation involving terrorism; separation of powers issues involving the roles of the President, Congress, and the courts in the treatment and punishment of suspected terrorists; compensation claims by victims of terrorism (through statutory compensation funds, litigation against foreign states under the Foreign Sovereign Immunities Act, and tort litigation against individuals and entities); techniques for handling complex litigation involving terrorism; the Alien Tort Statute; and civil litigation by detainees over their treatment. The course is designed to be complementary to Professor Shirin Sinnar's Counterterrorism and the Law. Students are encouraged to take both courses. Grading will be based on class participation, a paper, and an oral presentation of the paper topic to the class. Papers meeting the requirements for Research (R) credit will be eligible for R credit with the consent of the instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Special Instructions: If the course is over-subscribed preference will be given to third year students, then to students who have relevant background in federal courts, national security, international law, or other related topics, then to second year students without such background, then to first year students. Selection within those categories will be by lottery. Students wishing to have prior coursework or experience considered in case of oversubscription should submit a short statement describing their background. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class participation, written assignments, final paper and oral presentation. This course is open to first-year Law School students. Automatic grading penalty waived for writers. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 600. Federal Indian Law. 3 Units.
 This course offers an overview of federal Indian law through a study of cases, statutes, and historical material. It focuses on the interlocking relationships of tribes, states, and the federal government with special emphasis on economic development, religious freedom, and environmental justice. Elements used in grading: Final Exam.

LAW 602. Religion and the First Amendment. 3 Units.
 This course covers the major doctrines and decisions interpreting the provisions of the First Amendment affecting religion, especially the free exercise and establishment clauses. Special emphasis is placed on the historical, philosophical, and theological roots of first amendment principles, and it also studies the briefs and arguments in a case currently in litigation.

LAW 603. Environmental Law and Policy. 3 Units.

This course provides an introduction to federal environmental law, regulation, and policy in the United States. The course emphasizes the cooperative and competing roles that the federal and state governments play in implementing environmental law in the United States. The course encourages students to adopt a comparative and dynamic view of environmental protection under U.S. law. We begin with a discussion of the property law roots of environmental law. Next we briefly touch on some aspects of U.S. administrative law that are essential to understanding the material that follows (students should feel free to take this class without having taken Administrative Law). This is followed by a discussion of the risk assessment and cost-benefit frameworks essential to understanding the current U.S. approach to environmental problems. We conclude this segment with a comparison of two approaches to chemical safety regulation - the U.S. Toxic Substances Control Act and the EU REACH directive. Next, we focus on three key substantive federal environmental statutes: the Clean Air Act, the Clean Water Act, and the Endangered Species Act. Next, we turn to the National Environmental Policy Act to understand how environmental concerns are included in the process of making agency decisions. The course concludes with a discussion of current EPA efforts to address emissions of greenhouse gases under the Clean Air Act. Special Instructions: Substantial participation is expected and class participation constitutes twenty percent (20%) of the overall grade for the course. In addition, students are expected to complete two 1000 word written assignments during the course that will constitute forty percent (40%) of the overall grade. Finally, an in-school exam will, similar in format and length to the written assignments, constitute the remaining forty percent (40%) of the overall grade. Elements used in grading: Class participation (20%), written assignments (40%) and final exam (40%).

LAW 605. International Environmental Law. 3 Units.

This course examines the legal, scientific, political, economic, and organizational issues associated with the creation of international environmental regimes. The principal emphasis will be on the issue of climate change, with a focus on the current regime(s) and the post-Kyoto negotiations, now underway. The course will also address the Montreal Protocol for Ozone Depleting Substances, the International Convention for Regulation of Whaling, and the U.N. Convention on Straddling Fish Stocks and Highly Migratory Fish Stocks. The course examines the choice of treaty instrument, as well as the implementation and evolution of environmental regimes. The course also looks closely at the structure and performance of environmental markets as solutions to global commons problems. Finally, close attention is paid to equity and development issues that are critical in bridging north-south divides on international environmental issues. Substantial student participation is expected and class participation will constitute twenty percent (20%) of the overall grade for the course. Elements used in grading: Class participation and final paper.

LAW 606. Supreme Court Simulation Seminar. 3 Units.

This seminar provides students with the opportunity to analyze, argue, hear oral arguments and draft opinions in cases that are currently pending before the Supreme Court of the United States. Professor Larry Marshall will serve as the instructor in the seminar, but many of the Law School's esteemed group of Supreme Court litigators will be participating in one or more of the sessions. The 18 students in the seminar will be divided into two courts. One of these courts will sit five times and the other will sit four times. During each sitting, the court will hear arguments in a case currently pending before the Supreme Court. The cases chosen will provide a mix of constitutional and statutory issues, as well as a mix between criminal and civil cases. Each student will be assigned the role of a particular Justice for the entire quarter. Each student's task while sitting on cases is to do his or her best to understand that particular justice, based on that justice's prior opinions and judicial philosophy. In this sense, the seminar is intended to help promote insight into the role of judicial personality and philosophy within the decisional process. The weekly seminars will proceed as follows: In preparation for each week's session, all students (whether they are the two students arguing that week, the nine students judging that week, or the seven students observing that week) will read the lower courts' decisions, the briefs (the party briefs and selected amicus briefs) and the major precedents implicated. During the first portion of each week's session (approximately one hour), two of the students (who are members of the Court that is not sitting that week) will present oral arguments to the nine "justices" sitting that week. The arguments will be based on the briefs that were actually filed in the case. During the second segment of each week's session (approximately 45 minutes), the "justices" who are sitting that week will "conference" the case while the other non-sitting students, students who argued, instructors and guests will observe. Again, each student will be in the role of a particular justice. At the end of the "conference," the opinion-writing will be assigned to one "justice" in the majority and one "justice" in the dissent. During the final portion of each session (approximately one hour), the instructors, guests and students will engage in a broad discussion of what they just observed. This may include analysis of the briefing, discussion about the oral argument, reflections on the "conference," and, more generally, a discussion about the case and its significance. After each class, the student assigned to draft the majority opinion will have two weeks to circulate a draft to the "Court." The student writing the dissent will then have two weeks to circulate his or her opinion. The other sitting "justices" can join one of these opinions, request some changes as a condition of joining, or decide to write separately. Over the course of the Quarter, then, each student will argue one case, sit on four or five cases, and draft at least one opinion.

LAW 610. Trial Advocacy Workshop. 5 Units.

This lawyering skills course gives students an orientation to and constant practice in most basic pretrial and trial advocacy skills areas. Topics include: taking and defending depositions, motion practice, trial evidence, including admission of trial exhibits in evidence and use of prior witness statements to refresh and impeach a witness, jury selection and voir dire, opening statements, direct and cross-examination of witnesses, and closing arguments. Students will try a full jury case through to verdict with use of jurors and before a real judge in the Superior Court in Palo Alto at the end of the course. Students will also have a chance to watch the jurors deliberate and talk with them after their verdict. The course takes place during seven weeks of the Autumn Quarter with two classes (one lecture and one workshop) per week on most weeks from 4:15-9:00 (these usually occur on T, W, or Th, plus an occasional M), plus two Saturday workshops and the final weekend of jury trials, Saturday and Sunday November 15 and 16. Each day's ending time will vary; most sessions will end before 9:00. For a detailed schedule, contact Stephanie Basso at sbasso@law.stanford.edu. The format for each topic begins with a lecture/discussion featuring video vignettes of various techniques and a live demonstration by an expert trial lawyer. Following the discussion portion of each topic are small group sessions during which each student practices the skills involved. Constructive feedback is given after each exercise by two of our faculty of very experienced Bay Area litigators and judges. Most exercises are also videoed for further one-on-one critique by another faculty member. The course ends with full jury trials. The central philosophy of the workshop is that skills are best acquired in an experiential manner by seeing and doing. Frequent short, well-defined exercises followed by immediate constructive feedback in a non-competitive, non-threatening atmosphere provide the core of the program. The workshop directors are Tim Hallahan, Sallie Kim and Jeff Kobrick. Tim has taught similar programs at Harvard Law School, the University of San Francisco School of Law, Boalt Hall, the California Continuing Education of the Bar, and in private and public interest law firms around the country. Sallie is a partner in a civil litigation firm and taught a class at SLS previously and served as Associate Dean for Student Affairs previously. Jeff is a partner in a civil litigation firm and has taught practical litigation skills courses at Harvard and Stanford Law Schools for a number of years. Special Instructions: If you haven't taken Evidence you must contact Mr. Hallahan before the course begins for some brief pre-course reading assignments. There are no papers or tests, but attendance at every session is required. Since we will begin our trial advocacy exercises on the first day of class, all students who are interested in taking the course (whether enrolled or on the wait-list) need to be present for the first class. (Students who are not present will be dropped from the class or waiting list unless they have made previous arrangements with the professor.) Add-drop decisions need to be resolved at the first class; no drops will be permitted thereafter. Exceptions to this rule will be made by petition only. Mandatory attendance. Elements used in grading: Attendance and in-class assignments.

LAW 612. Constitutional Law: Speech and Religion. 4 Units.

This is a course about the freedoms of speech, press, religion, association, and assembly under the First Amendment. Two-thirds of the course will be about freedoms of speech, press, and assembly. We will examine historical context, doctrinal development, and current caselaw. We will ask why government regulates speech (to prevent harms? to protect sensibilities? to redistribute power? to advance the interests and ideas of the politically powerful?), how government regulates speech (by aiming at messages? by aiming at markets? by aiming at when and where speech takes place? by conditioning subsidies?), and what justifications are ever sufficient for limiting speech. We will include consideration of the institutional press and new technologies including the Internet, as well as the rights of private organizations to determine their membership and organization. About a third of the course will be about religion. We will ask how the twin constraints of the Free Exercise and Establishment Clauses relate, looking especially at notions of neutrality, voluntarism, separation, and accommodation. Elements used in grading: Exam.

LAW 613. Dispute Systems Design. 3 Units.

Lawyers are often called upon to help design systems for managing and resolving conflicts that support or supplant existing legal structures. The crisis of September 11 led Congress to pass a law creating the September 11 Fund; a California Supreme Court challenge to its method of resolving health care disputes led Kaiser Permanente to reform its arbitration system; years of atrocities committed against the people of South Africa, Guatemala and many other countries led to the formation of truth commissions. Lawyers helped to structure these and many other conflict resolution systems. We'll use a case study model to survey different kinds of conflict prevention, management and resolution systems, and examine different factors in their design. Special Instructions: Grades will be based on class participation and Option 1 (section 01) a series of short essays and a short research paper; or Option 2 (section 02) a long research paper involving independent research. Students electing option 2 (section 02) will be graded on the H/P/R/F system and will receive Research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Negotiation Seminar (LAW 615) strongly preferred but not required. Elements used in grading: Class participation, attendance, written assignments and final paper. Attendance at the first class is mandatory.

LAW 615. Negotiation. 3 Units.

As a lawyer, you will probably negotiate more than you do anything else. You will negotiate not just over cases, but any time that you need something that you cannot get alone. You will negotiate with your boss, your clients, your secretary, and all of their counterparts (plus the lawyers) on the other side. You will negotiate with "the system" whether it is the court, the government, the structure of society, or the law. You will also continue to negotiate with your family, your friends, and yourself. This course is designed to: (1) develop your understanding of negotiation, and your awareness of yourself as a negotiator; (2) give you some tools and concepts for analyzing and preparing for negotiations; (3) enhance your negotiating skills through frequent role plays, reflection, and feedback; and (4) teach you how to keep learning from your own negotiation experience. In addition to negotiation skills and theory, you will be introduced to issues of representation, ethics, and the place of negotiation in our legal system. The Negotiation Seminar is an intense, interactive course. We will require weekly preparation of readings, simulations, and written assignments. Basically, you will learn by reading about specific research and doing simulated negotiations -- figuring out with the rest of the class what works and what does not, writing about what you're learning, and trying again. Because participation in the simulations is central to the course, attendance at all classes is required. Since we will begin our simulation exercises on the first day of class, all students who are interested in taking the course (whether enrolled or on the wait-list) need to be present for the first class. (Students who are not present will be dropped from the class or waiting list unless they have made previous arrangements with the professor.) Add-drop decisions need to be resolved at the first class; no drops will be permitted thereafter. Once you commit to the class, you must complete it or receive a failing grade. Exceptions to this rule will be made by petition only. Petitions of this type must be extraordinarily strong in order to be granted. Elements used in grading: Class participation, attendance and written assignments.

LAW 616. Complex Litigation. 3 Units.

This course will examine the variety of procedures used to develop and manage large-scale litigation within and outside the U.S., and the policy controversies surrounding them. Topics include class actions, multidistrict litigation, pretrial procedure, special trial and evidentiary issues, judicial case management, issues of federalism, problems of absent and future claimants, settlement issues, alternate dispute resolution techniques within litigation, and proposals for law reform. Much of the course will consider these topics as they play out in current cases, with guest lectures by judges, lawyers, and others from the U.S. and elsewhere. Early in the quarter each student will choose a recent or ongoing complex litigation to investigate. (A list of candidate litigations will be provided, but students are free to choose any complex litigation that interests them.) During the quarter, students will conduct research on the litigation including, where possible, contacting key participants for information and perspective. This research will serve as the basis for in-class discussion, focusing on different aspects of the litigation as the quarter progresses. Students will hand in 3 papers during the course of the quarter, for review and comment, but not for grading. Regular reading assignments will be tailored to allow time for this on-going student research. Elements used in grading: Final paper and class participation.

LAW 617. Public Interest Law and Practice. 2-3 Units.

This course will examine the history, theoretical frameworks, strategies and political position of public interest law practice and attorneys in the United States. We will consider the role of lawyers and the legal system in advancing reforms; different career paths of public interest lawyers; ethical issues related to working as a lawyer within a social movement; the personal impacts of this type of career choice; and strategies employed by lawyering in differing settings, from issue-based non-profits to government agencies, and private public interest law firms or legal services groups. Readings will include law review articles, legal pleadings and case studies that allow analysis and exploration of the tensions and challenges that exist within the legal system for public interest practitioners. Students will also be exposed to practical skills outside of litigation that social justice lawyers should understand. Students will be asked to produce several short papers throughout the quarter. For an additional credit and Research credit, students will be asked to produce a substantially longer paper on a related topic and can be excused from some of the shorter assignments. Students taking the seminar for Research credit can take the seminar for either 2 or 3 units, depending on the paper length. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, class participation, written assignments. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 620A. Criminal Prosecution Clinic: Clinical Practice. 4 Units.

Clinic students prosecute cases at the San Jose Superior Court under the guidance of Santa Clara County prosecutors. They formulate case strategy, identify and interview witnesses, and advocate before the court at evidentiary motions or preliminary hearings. The cases, almost always felonies, include drug offenses, thefts, burglaries, assaults, weapons possession, and a range of less common crimes. Police witnesses are most common, though students sometimes offer testimony from crime victims. When defendants testify or offer other witnesses, they face cross-examination by clinic students. Students spend at least three full days a week in the D.A.'s office. All six students must spend all day on Tuesdays and Wednesdays on site. Each student also must choose a third on-site day, when the student will work closely with the student's on-site supervisor. The six students need not all choose the same third day, but each student must pick a day that stays constant through the term. There generally will be two class sessions each week—a three-hour on-campus class and a lunchtime seminar in the D.A.'s office. At the beginning of the term classes focus on skills training, including direct and cross-examination, admission of physical evidence, and argument. Toward the end of the term the focus shifts to an examination and critique of the local mechanisms of criminal justice. Topics include the impact of race, gender, and class on the quality of justice; the institutional strengths and weaknesses of the actors in the system; prison conditions and prison reform; and the ethical issues that confront prosecutors and defense lawyers. Students typically tour the Santa Clara County jail and crime lab, San Quentin Prison, and the Chaderjian Youth Correctional Facility in Stockton and have the option to spend an evening on a police ride-along. Students must submit regular written reflections on their experiences in and observations of the local justice system. Their assigned cases often will demand written court filings. During most weeks students will meet one-on-one with the faculty supervisor. Evidence is a prerequisite. In rare cases a concurrent clinic module in evidence can fulfill this requirement. Courses in criminal procedure (investigation) and trial advocacy are strongly encouraged. Class attendance is mandatory, and class participation will be considered in grading. Students will be asked to commit to the course in the summer of 2014; dropping the course after committing will not be permitted. Students will earn twelve credits. The clinical quarter begins the first day of classes and runs through the final day of exam period. Students should not plan personal travel during the Monday-to-Friday workweek without permission from on-site and faculty supervisors. Students are expected to be available by email or cell phone during workday hours Monday through Friday. Students are expected to devote at least thirty-five hours per week to various facets of this work. In some weeks casework may demand longer hours. Students will be awarded three separate grades, each reflecting four credits, for clinical practice, clinical methods, and clinical coursework. Grading is on the H/P system. Please also refer to special instructions for the general structure of clinical courses. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in

LAW 620B. Criminal Prosecution Clinic: Clinical Methods. 4 Units.

Clinic students prosecute cases at the San Jose Superior Court under the guidance of Santa Clara County prosecutors. They formulate case strategy, identify and interview witnesses, and advocate before the court at evidentiary motions or preliminary hearings. The cases, almost always felonies, include drug offenses, thefts, burglaries, assaults, weapons possession, and a range of less common crimes. Police witnesses are most common, though students sometimes offer testimony from crime victims. When defendants testify or offer other witnesses, they face cross-examination by clinic students. Students spend at least three full days a week in the D.A.'s office. All six students must spend all day on Tuesdays and Wednesdays on site. Each student also must choose a third on-site day, when the student will work closely with the student's on-site supervisor. The six students need not all choose the same third day, but each student must pick a day that stays constant through the term. There generally will be two class sessions each week—a three-hour on-campus class and a lunchtime seminar in the D.A.'s office. At the beginning of the term classes focus on skills training, including direct and cross-examination, admission of physical evidence, and argument. Toward the end of the term the focus shifts to an examination and critique of the local mechanisms of criminal justice. Topics include the impact of race, gender, and class on the quality of justice; the institutional strengths and weaknesses of the actors in the system; prison conditions and prison reform; and the ethical issues that confront prosecutors and defense lawyers. Students typically tour the Santa Clara County jail and crime lab, San Quentin Prison, and the Chaderjian Youth Correctional Facility in Stockton and have the option to spend an evening on a police ride-along. Students must submit regular written reflections on their experiences in and observations of the local justice system. Their assigned cases often will demand written court filings. During most weeks students will meet one-on-one with the faculty supervisor. Evidence is a prerequisite. In rare cases a concurrent clinic module in evidence can fulfill this requirement. Courses in criminal procedure (investigation) and trial advocacy are strongly encouraged. Class attendance is mandatory, and class participation will be considered in grading. Students will be asked to commit to the course in the summer of 2014; dropping the course after committing will not be permitted. Students will earn twelve credits. The clinical quarter begins the first day of classes and runs through the final day of exam period. Students should not plan personal travel during the Monday-to-Friday workweek without permission from on-site and faculty supervisors. Students are expected to be available by email or cell phone during workday hours Monday through Friday. Students are expected to devote at least thirty-five hours per week to various facets of this work. In some weeks casework may demand longer hours. Students will be awarded three separate grades, each reflecting four credits, for clinical practice, clinical methods, and clinical coursework. Grading is on the H/P system. Please also refer to special instructions for the general structure of clinical courses. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in

LAW 620C. Criminal Prosecution Clinic: Clinical Coursework. 4 Units.

Clinic students prosecute cases at the San Jose Superior Court under the guidance of Santa Clara County prosecutors. They formulate case strategy, identify and interview witnesses, and advocate before the court at evidentiary motions or preliminary hearings. The cases, almost always felonies, include drug offenses, thefts, burglaries, assaults, weapons possession, and a range of less common crimes. Police witnesses are most common, though students sometimes offer testimony from crime victims. When defendants testify or offer other witnesses, they face cross-examination by clinic students. Students spend at least three full days a week in the D.A.'s office. All six students must spend all day on Tuesdays and Wednesdays on site. Each student also must choose a third on-site day, when the student will work closely with the student's on-site supervisor. The six students need not all choose the same third day, but each student must pick a day that stays constant through the term. There generally will be two class sessions each week—a three-hour on-campus class and a lunchtime seminar in the D.A.'s office. At the beginning of the term classes focus on skills training, including direct and cross-examination, admission of physical evidence, and argument. Toward the end of the term the focus shifts to an examination and critique of the local mechanisms of criminal justice. Topics include the impact of race, gender, and class on the quality of justice; the institutional strengths and weaknesses of the actors in the system; prison conditions and prison reform; and the ethical issues that confront prosecutors and defense lawyers. Students typically tour the Santa Clara County jail and crime lab, San Quentin Prison, and the Chaderjian Youth Correctional Facility in Stockton and have the option to spend an evening on a police ride-along. Students must submit regular written reflections on their experiences in and observations of the local justice system. Their assigned cases often will demand written court filings. During most weeks students will meet one-on-one with the faculty supervisor. Evidence is a prerequisite. In rare cases a concurrent clinic module in evidence can fulfill this requirement. Courses in criminal procedure (investigation) and trial advocacy are strongly encouraged. Class attendance is mandatory, and class participation will be considered in grading. Students will be asked to commit to the course in the summer of 2014; dropping the course after committing will not be permitted. Students will earn twelve credits. The clinical quarter begins the first day of classes and runs through the final day of exam period. Students should not plan personal travel during the Monday-to-Friday workweek without permission from on-site and faculty supervisors. Students are expected to be available by email or cell phone during workday hours Monday through Friday. Students are expected to devote at least thirty-five hours per week to various facets of this work. In some weeks casework may demand longer hours. Students will be awarded three separate grades, each reflecting four credits, for clinical practice, clinical methods, and clinical coursework. Grading is on the H/P system. Please also refer to special instructions for the general structure of clinical courses. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in

LAW 621. Sentencing and Corrections. 3 Units.

This introductory course will familiarize students with the history, structure, and performance of America's sentencing and corrections system. Sentencing is the process by which criminal sanctions are imposed in individual cases following criminal convictions. Corrections deals with the implementation and evaluation of criminal sentences after they are handed down. In fact, the two subject areas are inseparable. The course will examine sentencing and corrections from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will explore sentencing theories and their application, the nature, scope and function of corrections, the impact of mass incarceration on crime and communities, the effectiveness of rehabilitation, the relationship between sanctions and crime, and the consequences of prisoner reentry. These topics will be considered as they play out in current political and policy debates. Guest lectures may include presentations by legal professionals, victims, offenders, and correctional leaders. We also plan to visit a correctional facility. This course is open to 1Ls, 2Ls, and 3Ls in the Law School. Special Instructions: Grades will be based on class participation and (1) weekly reflection papers of 3-5 pages each week for each of our speakers/topics or (2) a long research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the research (R) requirement, with consent of the instructor. Elements used in grading: Weekly reflection papers or research paper.

LAW 622A. Environmental Law Clinic: Clinical Practice. 4 Units.

Students enrolled in the Clinic provide legal assistance to national, regional and grassroots non-profit organizations on a variety of environmental issues, with a focus on complex natural resource conservation and biodiversity matters at the interface of law, science and policy. Working under the direct supervision of practicing environmental attorneys, Clinic students help screen new matters and potential clients; formulate strategies; research and develop factual and legal issues; and prosecute administrative and litigation proceedings. During the term, students may meet with clients, opposing counsel or agency decision-makers; review administrative records; develop expert testimony; draft comment letters, petitions, pleading or briefs; and/or attend and participate in administrative and court hearings. In regular one-on-one meetings with supervising faculty, there is a heavy emphasis on learning how to write persuasively and present oral arguments. In addition, students participate in a regular seminar where we examine strategic, ethical and substantive issues arising out of the Clinic's work. The Clinic is a particularly good place to learn how to conduct effective legal research, marshal facts in support of legal arguments, and, above all, write well. We practice at all levels of state and federal court and before many local, state and federal administrative agencies. Our work involves extensive motions practice and brief writing, and often involves administrative petitions and policy papers. Our work is inherently cross-disciplinary. No prior environmental experience or background is necessary, but an interest in learning about environmental and natural resources law is important. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, professionalism, timeliness, initiative, and follow-through on project work and other class requirements. Writing (W) credit is for students entering prior to Autumn

LAW 622B. Environmental Law Clinic: Clinical Methods. 4 Units.

Students enrolled in the Clinic provide legal assistance to national, regional and grassroots non-profit organizations on a variety of environmental issues, with a focus on complex natural resource conservation and biodiversity matters at the interface of law, science and policy. Working under the direct supervision of practicing environmental attorneys, Clinic students help screen new matters and potential clients; formulate strategies; research and develop factual and legal issues; and prosecute administrative and litigation proceedings. During the term, students may meet with clients, opposing counsel or agency decision-makers; review administrative records; develop expert testimony; draft comment letters, petitions, pleading or briefs; and/or attend and participate in administrative and court hearings. In regular one-on-one meetings with supervising faculty, there is a heavy emphasis on learning how to write persuasively and present oral arguments. In addition, students participate in a regular seminar where we examine strategic, ethical and substantive issues arising out of the Clinic's work. The Clinic is a particularly good place to learn how to conduct effective legal research, marshal facts in support of legal arguments, and, above all, write well. We practice at all levels of state and federal court and before many local, state and federal administrative agencies. Our work involves extensive motions practice and brief writing, and often involves administrative petitions and policy papers. Our work is inherently cross-disciplinary. No prior environmental experience or background is necessary, but an interest in learning about environmental and natural resources law is important. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, professionalism, timeliness, initiative, and follow-through on project work and other class requirements. Writing (W) credit is for students entering prior to Autumn

LAW 622C. Environmental Law Clinic: Clinical Coursework. 4 Units.

Students enrolled in the Clinic provide legal assistance to national, regional and grassroots non-profit organizations on a variety of environmental issues, with a focus on complex natural resource conservation and biodiversity matters at the interface of law, science and policy. Working under the direct supervision of practicing environmental attorneys, Clinic students help screen new matters and potential clients; formulate strategies; research and develop factual and legal issues; and prosecute administrative and litigation proceedings. During the term, students may meet with clients, opposing counsel or agency decision-makers; review administrative records; develop expert testimony; draft comment letters, petitions, pleading or briefs; and/or attend and participate in administrative and court hearings. In regular one-on-one meetings with supervising faculty, there is a heavy emphasis on learning how to write persuasively and present oral arguments. In addition, students participate in a regular seminar where we examine strategic, ethical and substantive issues arising out of the Clinic's work. The Clinic is a particularly good place to learn how to conduct effective legal research, marshal facts in support of legal arguments, and, above all, write well. We practice at all levels of state and federal court and before many local, state and federal administrative agencies. Our work involves extensive motions practice and brief writing, and often involves administrative petitions and policy papers. Our work is inherently cross-disciplinary. No prior environmental experience or background is necessary, but an interest in learning about environmental and natural resources law is important. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, professionalism, timeliness, initiative, and follow-through on project work and other class requirements. Writing (W) credit is for students entering prior to Autumn

LAW 623. Advanced Environmental Law Clinic. 2-7 Units.

The Advanced Environmental Law Clinic provides students who have already taken the Environmental Law Clinic the opportunity to continue intense individual project work. Advanced students often work on matters they worked on as full-time students, but they also have the chance to work on new matters and develop new skills. Advanced students work closely with supervising faculty on their designated projects and are expected to take increasing responsibility for managing their work and representing clients. In addition, advanced students often serve as mentors to less experienced full-time students and thereby receive training in basic team building and supervision. Advanced students may arrange to receive between two and seven credits. No student may receive more than 27 total clinical credits during the course of the student's law school career. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 626. Legislative Simulation: The Federal Budget. 3 Units.

How does a bill really become a law? This course is about the formal and informal American legislative and budget process. The course is part lecture, part simulation. You will learn the formal processes that govern legislating and White House policymaking, including: how a President decides what policy to propose; Congressional committee markups; House and Senate floor debate, rules, and the amendment process; conference committees; and Presidential signatures and vetoes. You will then learn how legislative coalitions are built and broken, how and why bargaining occurs, the roles of interest groups and lobbyists, how an Executive Branch tries to influence Congress, how political parties and elections influence legislative behavior, and how the press and personalities influence all of the above. While this is primarily a class about policymaking process, we will learn enough about federal budget policy to make your participation in budget legislative simulations more effective. Can your class solve America's long-term budget problems when your counterparts in Washington have so far been ineffective at doing so? Elements used in grading: Class participation (for lectures and the simulations), attendance and written assignments (memos).

LAW 628A. Oral Argument Workshop. 2 Units.

Building on the skills developed in Federal Litigation, this simulation course will give students the unique opportunity to argue and judge pretrial motions from actual federal court cases. The instructor will provide the written briefs, and each week half the class will argue and half the class will judge a motion. Preparation will require reading the cases cited in the briefs and coming to class ready either to present an argument (attorneys) or interrogate counsel (judges). Students will critique each other both orally and in writing, and the instructor will provide oral critiques of all arguments. The goals of this class are: to train students to argue in court; to provide them with a chance to polish their public speaking skills and practice thinking on their feet; to prepare students to engage in challenging dialogue with both colleagues and future clients; and to improve self-confidence. Thus, while the context of the course is litigation, the objectives are much broader than the mastery of litigation technique. This course is not open to first year Law School students. Priority will be given to those students who commit to taking the class if given consent to enroll. Please indicate your commitment on the consent form. Elements used in grading: Class attendance, participation, and preparation. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 628B. Oral Argument Workshop. 1 Unit.

This course is offered in conjunction with "OAP" (Law 628-A-01). All students registered in Law 628-A-01 have the option to take an additional unit. The focus of this component will be on oral presentation skills and will consist primarily of interactive exercises designed to enhance voice and body control, increase poise, reduce anxiety, and improve overall effectiveness in public speaking. Doree Allen, the Director of the Oral Communication Program at Stanford's Center for Teaching and Learning, along with guest lecturers from throughout the university, will lead these classes with the goal of giving students an opportunity to improve their oral presentation skills in a supportive and fun environment.

LAW 629. Spanish For Lawyers. 3 Units.

The Spanish and Cultural Competency for Lawyers course offers an opportunity for students to enhance their existing Spanish communication skills in legal practice. The course will cover specific Spanish vocabulary necessary to communicate in a variety of legal settings from direct client representation in administrative and judicial proceedings to community education and policy reform efforts. The course will also provide exposure to the linguistic and cultural diversity of Latino communities and improve cultural competency for client interaction and communication. The course will emphasize speaking and listening skills, however, students will also be responsible for reading and writing assignments. Student Eligibility: Students must already have basic proficiency in Spanish. The goal of the class is to strengthen existing Spanish language skills. The class is aimed at learning Spanish legal vocabulary and developing culturally competent communication skills. To verify basic Spanish proficiency, the instructor may seek to speak with students by phone prior to admitting them.

LAW 632A. Religious Liberty Clinic: Practice. 4 Units.

The Religious Liberty Clinic provides students a dynamic, real-world experience representing a diverse group of clients in disputes arising from a wide range of religious beliefs, practices, and customs, and in a variety of circumstances. Students learn in class and apply in practice the laws affecting religious liberty, whether statutory or constitutional, and counsel individual or institutional clients and litigate on their behalf with excellence, professionalism, and maturity. Students can expect to handle a discrete accommodation project-e.g., represent a prisoner, student, or employee facing obstacles in the practice of his or her faith-and participate in a longer-term project involving the exercise of religion-e.g., represent a church, synagogue, or mosque with zoning issues. Opportunities to draft amicus briefs also arise. The clinic involves administrative, trial, and appellate work-though time constraints may not permit each student to work in all areas. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Clinical case/project work, clinical performance, seminar preparation and participation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 632B. Religious Liberty Clinic: Clinical Methods. 4 Units.

The Religious Liberty Clinic provides students a dynamic, real-world experience representing a diverse group of clients in disputes arising from a wide range of religious beliefs, practices, and customs, and in a variety of circumstances. Students learn in class and apply in practice the laws affecting religious liberty, whether statutory or constitutional, and counsel individual or institutional clients and litigate on their behalf with excellence, professionalism, and maturity. Students can expect to handle a discrete accommodation project-e.g., represent a prisoner, student, or employee facing obstacles in the practice of his or her faith-and participate in a longer-term project involving the exercise of religion-e.g., represent a church, synagogue, or mosque with zoning issues. Opportunities to draft amicus briefs also arise. The clinic involves administrative, trial, and appellate work-though time constraints may not permit each student to work in all areas. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Clinical case/project work, clinical performance, seminar preparation and participation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 632C. Religious Liberty Clinic: Clinical Coursework. 4 Units.

The Religious Liberty Clinic provides students a dynamic, real-world experience representing a diverse group of clients in disputes arising from a wide range of religious beliefs, practices, and customs, and in a variety of circumstances. Students learn in class and apply in practice the laws affecting religious liberty, whether statutory or constitutional, and counsel individual or institutional clients and litigate on their behalf with excellence, professionalism, and maturity. Students can expect to handle a discrete accommodation project-e.g., represent a prisoner, student, or employee facing obstacles in the practice of his or her faith-and participate in a longer-term project involving the exercise of religion-e.g., represent a church, synagogue, or mosque with zoning issues. Opportunities to draft amicus briefs also arise. The clinic involves administrative, trial, and appellate work-though time constraints may not permit each student to work in all areas. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Clinical case/project work, clinical performance, seminar preparation and participation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 635. The Future of Labor Law & Policy. 2 Units.

The course covers the current and past NLRB political crises, with particular focus upon rule making initiatives; union tactics and efforts to organize domestics, home care workers, agricultural and white collar workers, independent contractors and the problems peculiar to such; right-to-work legislation, particularly recent initiatives in Michigan and Indiana; the impact of recent Supreme Court and other decisions on union ability to participate in the political process; new legislation restricting public employee union activity, with particular focus on Wisconsin and union efforts to invoke the First Amendment; the First Amendment rights of free speech in the workplace in the public sector, and social media and free speech in the private sector; new and innovative dispute resolution procedures involving union recognition and discrimination issues as well as rights and interest arbitration and mediation; the globalization of labor disputes. Students will write a final paper. There are no prerequisites to this seminar, and students need not have had basic Labor Law to take it. This course prerequisite Sports Law. Students who complete this seminar will have preference for enrollment in Sports Law when it is next offered in 2014-15. This course is open to first year Law School students. Elements used in grading: Class participation and a final paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 638. Mediation. 3 Units.

In recent years, individuals and their lawyers have increasingly turned to mediation to resolve disputes. In mediation, the parties to the dispute, who may be represented by lawyers, are in charge of the outcome. With the assistance of a mediator they may be able to reach agreements at any stage in a dispute, in some cases avoiding litigation altogether, in other cases agreeing when the case is on appeal. This course will introduce you to the theory and practice of mediation. You will learn about the mediation process primarily by experiencing it in roleplay and hands-on exercises. The course also includes readings and discussions, brief lectures, demonstrations, student presentations, and videotapes. You will mediate disputes based on actual cases, and be coached in small groups by Bay Area mediators. The course goals are to understand the nature of conflict and principles of conflict management, to develop the communication skills essential to effective mediation, to evaluate various mediation models and mediator styles, to consider the policy and ethical implications of the expanding use of mediation, and to develop the skills necessary to represent clients in mediation. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Prerequisite: Negotiation (LAW 615). Mandatory attendance at first class and attendance as required by the instructor. Elements used in grading: Class participation, attendance, assignments.

LAW 639. Lawyering and Social Intelligence. 3 Units.

Building a successful legal career or practice involves both technical expertise as well as relational skills. Becoming a trusted advisor or effective advocate is essentially an interpersonal process that relies upon social and emotional skills, such as listening in ways that gain client trust and engagement or delivering tough messages in ways that reduce defensiveness and increase mutual problem solving. These skills can be learned. Unlike conceptual knowledge, they are acquired through practicing new behaviors that expand skills or undo old habits. Adult learning is strengthened through experiencing the concept in action, reflecting upon the experience and practicing it. I will construct such exercises for use in class as well as in workgroups outside of class. This course will introduce students to simple frameworks that raise awareness and understanding of social intelligence and expose them to a process of learning they can employ in their everyday interactions for continued growth and development.

Special Instructions: This course develops student skills and not simply conceptual knowledge. Learning will come from consistent class attendance and a willingness to participate actively - not only in occasional role plays but primarily as one's self, practicing new behaviors that build skill sets. Written assignments will be brief weekly reflections on personal learning. Since I will establish workgroups following the first day of class, all students who are interested in taking this course (whether enrolled or on the wait-list) need to be present for the first class. (Students who are not present will be dropped from the class or waiting list unless they have made previous arrangements with the professor.) Add-drop decisions need to be made at the conclusion of the first class; no drops will be permitted thereafter as learning will depend upon intact workgroups throughout the quarter. Once you commit to the class, you must complete it or receive a failing grade. Exceptions to this rule will be made by petition only.

Elements used in grading: Class participation, attendance, written assignments.

LAW 640A. Community Law Clinic: Clinical Practice. 4 Units.

The CLC is the closest thing to a general legal services office among Stanford's clinical offerings. Based in East Palo Alto, the CLC provides students with the opportunity to provide direct legal services to low-income residents, while thinking critically about the role of lawyers and lawyering in addressing the problems of America's so-called "working poor." The Clinic's practice is in four areas: (1) housing (eviction defense and Section 8 termination); (2) wage and hour and related workers' rights; (3) social security and disability benefits; and (4) criminal record expungement. Each student handles his or her own caseload, which is comprised of cases matters in all of the practice areas. The practice areas are selected and designed to lie at the intersection where the community's unmet legal needs and students' learning needs correspond. The clinic's docket is fundamentally a trial docket. Students have first-chair responsibility for their cases, and perform all of the lawyering tasks necessary to advance their clients' interests, including interviewing, counseling, negotiation, fact investigation, legal research, and representation in the court and agency settings that hear the clients' cases. Skills emphasized include those trial lawyering skills, as well as time management and developing client-centered lawyering practices. Students may also have the chance to participate in outreach or policy-level projects, such as representing the clinic on a state or regional committee on a substantive issue, doing community education workshops at sites around the Peninsula, and/or legislative research and advocacy. In the clinic seminar and in regular supervision, students are encouraged to interrogate the effectiveness of the legal system at delivering "justice" for their clients and to explore creative ways that legal knowledge can be deployed to attack the social problems attendant to low wages, substandard and unstable housing, and other features of low-income life in Silicon Valley.

Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend four or five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment

LAW 640B. Community Law Clinic: Clinical Methods. 4 Units.

The CLC is the closest thing to a general legal services office among Stanford's clinical offerings. Based in East Palo Alto, the CLC provides students with the opportunity to provide direct legal services to low-income residents, while thinking critically about the role of lawyers and lawyering in addressing the problems of America's so-called "working poor." The Clinic's practice is in four areas: (1) housing (eviction defense and Section 8 termination); (2) wage and hour and related workers' rights; (3) social security and disability benefits; and (4) criminal record expungement. Each student handles his or her own caseload, which is comprised of cases matters in all of the practice areas. The practice areas are selected and designed to lie at the intersection where the community's unmet legal needs and students' learning needs correspond. The clinic's docket is fundamentally a trial docket. Students have first-chair responsibility for their cases, and perform all of the lawyering tasks necessary to advance their clients' interests, including interviewing, counseling, negotiation, fact investigation, legal research, and representation in the court and agency settings that hear the clients' cases. Skills emphasized include those trial lawyering skills, as well as time management and developing client-centered lawyering practices. Students may also have the chance to participate in outreach or policy-level projects, such as representing the clinic on a state or regional committee on a substantive issue, doing community education workshops at sites around the Peninsula, and/or legislative research and advocacy. In the clinic seminar and in regular supervision, students are encouraged to interrogate the effectiveness of the legal system at delivering "justice" for their clients and to explore creative ways that legal knowledge can be deployed to attack the social problems attendant to low wages, substandard and unstable housing, and other features of low-income life in Silicon Valley. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend four or five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment

LAW 640C. Community Law Clinic: Clinical Coursework. 4 Units.

The CLC is the closest thing to a general legal services office among Stanford's clinical offerings. Based in East Palo Alto, the CLC provides students with the opportunity to provide direct legal services to low-income residents, while thinking critically about the role of lawyers and lawyering in addressing the problems of America's so-called "working poor." The Clinic's practice is in four areas: (1) housing (eviction defense and Section 8 termination); (2) wage and hour and related workers' rights; (3) social security and disability benefits; and (4) criminal record expungement. Each student handles his or her own caseload, which is comprised of cases matters in all of the practice areas. The practice areas are selected and designed to lie at the intersection where the community's unmet legal needs and students' learning needs correspond. The clinic's docket is fundamentally a trial docket. Students have first-chair responsibility for their cases, and perform all of the lawyering tasks necessary to advance their clients' interests, including interviewing, counseling, negotiation, fact investigation, legal research, and representation in the court and agency settings that hear the clients' cases. Skills emphasized include those trial lawyering skills, as well as time management and developing client-centered lawyering practices. Students may also have the chance to participate in outreach or policy-level projects, such as representing the clinic on a state or regional committee on a substantive issue, doing community education workshops at sites around the Peninsula, and/or legislative research and advocacy. In the clinic seminar and in regular supervision, students are encouraged to interrogate the effectiveness of the legal system at delivering "justice" for their clients and to explore creative ways that legal knowledge can be deployed to attack the social problems attendant to low wages, substandard and unstable housing, and other features of low-income life in Silicon Valley. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend four or five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment

LAW 641. Constitutional Litigation. 3 Units.

This is a part doctrinal, part simulation course. The course is sometimes called "constitutional torts" or "civil rights litigation," reflecting its focus on one of the central ways in which constitutional claims are actually litigated: in lawsuits against public officials and local governments. The bulk of the course looks at litigation under 42 U.S.C. sec; 1983. We will consider topics such as what it means to act "under color of state law;" absolute and qualified immunities; government liability for the acts of individual officials; remedies for constitutional violations, including monetary and injunctive relief; and the remedial issue nearest and dearest to many lawyers' hearts: attorney's fees awards. Though we will learn the doctrine, we will do so with a focus on lawyering, both in a litigation context and in counseling clients in the shadow of litigation. A considerable amount of class time will be spent working in small groups on simulation and other exercises. Special Instructions: I ask that you limit laptop use to the classes in which we need them for simulation exercises. Elements used in grading: Class participation, written assignments, and final exam (30% class participation, 30% a 3-5 page memo involving research and due mid-quarter; 40% final exam. One-day take-home and open-book.).

LAW 642. Advanced Community Law Clinic. 2-7 Units.

The Advanced Community Law Clinic offers law students who already have some significant civil clinical experience the opportunity to work under supervision on more advanced projects and cases being handled by the Stanford Community Law Clinic, including litigation and other matters. Advanced Clinic students will also work with Clinical Supervising Attorneys to provide direction and guidance to those enrolled in the Community Law Clinic for the first time, in areas in which Advanced Clinic students have already acquired some expertise. In addition, Advanced Clinic students may function as team leaders on larger projects in which the Clinic is engaged. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Special Instructions: Completion of the Community Law Clinic (Law 640) or its equivalent is a prerequisite for the advanced clinic. Elements used in grading: Participation, reflective paper and project. Writing (W) credit is for 3Ls only.

LAW 643. Medical-Legal Issues in Children's Health. 4 Units.

(Same as PEDS211) This service-learning seminar is open to law and medical students interested in exploring the link between poverty and children's health, and how the professions can work together to improve health outcomes for low-income children. The course consists of four components: (1) weekly class meetings in which we will discuss a series of medical-legal issues (e.g., asthma, immigration, health insurance, etc.) with guest lecturers from the medical and legal fields, selected for their expertise on each topic.; (2) intake interviews with patient families at Lucile Packard Children's Hospital or the Ravenswood Family Health Center in East Palo Alto, and an analysis of their medical-legal issues; (3) a group project focused on a local or state-level medical-legal policy issue (e.g., obesity prevention); and (4) a final paper that law and medical students will co-write in pairs. The course is linked to the Peninsula Family Advocacy Program. You can learn more about it at www.peninsulafap.org.

LAW 644. Disability: Law, Human Rights and Justice. 3 Units.

This is a survey course of disability rights law, with an emphasis on federal and state statutes and case law, and some exposure to international human rights law and the contemporary concept of "disability justice." Areas of concentration are employment, government services, public accommodations, education, housing, mental health treatment and involuntary commitment, and personal autonomy. We will review such statutes as the Americans with Disabilities Act (ADA), Rehabilitation Act (Sec. 504), Individuals with Disabilities Education Act (IDEA), Fair Housing Act Amendments, California Developmental Services ("Lanterman") Act and the UN Convention on the Rights of Persons with Disabilities. The course examines disability from a civil and human rights perspective and has a "cross-disability" orientation insofar as it addresses the legal interests of persons with mobility and communication impairments, as well as intellectual and psycho-social disabilities. Exploration of the legal doctrine will be complemented with practical skills exercises and presentations by guest speakers. Special Instructions: Grades will be based on class participation and (1) short reflection essays on the readings and a short research paper for Writing (W) credit or (2) a long independent research paper for Research (R) credit. The student must consult with the instructor on the paper's topic, scope and format. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation (40%), short reflection essays and short research paper (60%) or a long independent research paper (60%). Writing (W) credit is for students entering prior to Autumn 2012. - - - NOTE: The first class meets on Sept. 24, Erev Rosh Hashonah (Eve of Jewish New Year). If you are unable to attend, the instructor will provide an accommodation to ensure that you are not disadvantaged. Please contact him before Sept. 17 at 510.387.3956.

LAW 645. Reading The Constitution. 2 Units.

This seminar is devoted to a careful reading of the entire text of the U.S. Constitution, from the Preamble to the 27th Amendment. From "We the People," through the structure of government, to the Bill of Rights, the Reconstruction amendments, and Progressive and Modern Era Amendments, the text of the Constitution tells an overall story about America's supreme law that is rich, intricate, and surprising, yet too often neglected, even in law school. In addition to the text itself, we will consult historical materials from the drafting and ratification of the parts under consideration each week. And throughout the seminar, we will occasionally step back to consider and assess various classic statements by scholars, judges, and presidents about how to best read the Constitution. The goal of the course is the title of the course: to read the Constitution with attentive and open eyes; to become familiar with its text, even the parts that are rarely litigated; to learn some of the history of its creation, even the stories that do not fill amicus briefs; to consider how the different clauses and sections may relate to each other; and to examine several different methods of reading the Constitution as a whole. Elements used in grading: Class Participation, Written Assignments, Final Paper.

LAW 649A. Cyberlaw/Fair Use Clinic: Advanced. 4 Units.

This is a hands-on, project-oriented seminar, in which students work on a wide range of cyberlaw projects with lawyers from the Center for Internet and Society's Fair Use Project and with lawyers from the Electronic Frontier Foundation. There are significant faculty-student interactions through meetings to discuss the projects and an associated bi-monthly discussion seminar covering advanced cyberlaw topics. This clinical program provides law students with the opportunity to represent clients in cutting-edge issues of intellectual property and technology law, in the public interest. Through the hands-on experience of representing clients (under the supervision of the faculty) in various fora, students learn professional responsibility and advocacy skills, substantive law and procedural rules related to their projects, and examine the concept of the public interest in intellectual property and technology law. Clients vary widely, and may be individual artists; technologists; non-profit institutions; coalitions; etc. In the past, students have drafted amicus briefs, counseled nonprofits on public-interest initiatives, created a patent licensing scheme, represented independent and documentary filmmakers who are pursuing legislation in Congress, and counseled artists developing new technology-based art forms, among other projects. Thus, the skills each student learns also vary according to project. The classroom component explores public interest practice in tech law in various fora, and spends significant time on student projects.

LAW 649B. Cyberlaw/Fair Use Clinic: Advanced. 3 Units.

This is a hands-on, project-oriented seminar, in which students work on a wide range of cyberlaw projects with lawyers from the Center for Internet and Society's Fair Use Project and with lawyers from the Electronic Frontier Foundation. There are significant faculty-student interactions through meetings to discuss the projects and an associated bi-monthly discussion seminar covering advanced cyberlaw topics. This clinical program provides law students with the opportunity to represent clients in cutting-edge issues of intellectual property and technology law, in the public interest. Through the hands-on experience of representing clients (under the supervision of the faculty) in various fora, students learn professional responsibility and advocacy skills, substantive law and procedural rules related to their projects, and examine the concept of the public interest in intellectual property and technology law. Clients vary widely, and may be individual artists; technologists; non-profit institutions; coalitions; etc. In the past, students have drafted amicus briefs, counseled nonprofits on public-interest initiatives, created a patent licensing scheme, represented independent and documentary filmmakers who are pursuing legislation in Congress, and counseled artists developing new technology-based art forms, among other projects. Thus, the skills each student learns also vary according to project. The classroom component explores public interest practice in tech law in various fora, and spends significant time on student projects. After completing the initial 7-unit Cyberlaw/Fair Use Clinic: Advanced course, students may enroll again for either 3 or 4 credits by consent of the instructor.

LAW 650. Advanced Negotiation: Public Policy. 3 Units.

Advanced Negotiation courses are designed to take students beyond the two-party, lawyer-client negotiations that were the focus of the Negotiation Seminar, to examine many facets of negotiation complexity, both in terms of the participants and topics. This section of Advanced Negotiation will focus on multi-party negotiations, working in teams, group decision-making, and negotiating on behalf of stakeholder organizations to solve complex problems. We will study negotiations and stakeholder dialogue processes involving a diverse set of public and private actors. In the context of both real and simulated case studies, we will address diverse public policy issues, both domestic (including civil rights, racial justice, economic inequality and natural resources management) and international (negotiating bilateral and multilateral agreements, including global security environmental treaties). The goals of the class are twofold, for students (1) to acquire an added theoretical base beyond what was covered in the Negotiation Seminar through which to analyze, prepare for, participate in and facilitate more complex, multiparty negotiations, and (2) to expand skills through deeper examination of various actual negotiation cases and complex simulations. Special Instructions: Attendance at and participation in the simulations is required. Passing is dependent upon active participation, submission of several assigned short reflection papers, and completion of a substantial group paper and presentation analyzing a selected case (a completed or ongoing multi-party public policy dialogue) and the team's internal negotiation process. Prerequisite: Negotiation Seminar (Law 615) or its substantial equivalent. Advanced degree students (and graduate students in other departments and programs) are encouraged to enroll provided that they have previous negotiation training or equivalent practice experience. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students approved for "R" credit will be graded on the H/P/R/F system. Elements used in grading: Class participation and engagement, including simulations; attendance; preparation for and contributions to discussion; short written assignments; final project involving group and individual components.

LAW 652. Animal Law. 2 Units.

This course presents a survey of the historical and current status of this rapidly developing specialty. In brief, animal law encompasses all areas of the law in which the nature -- legal, social or biological -- of nonhuman animals is an important factor. It is an objective and logical specialization of a challenging area -- one with a growing number of cases and laws, increasing public and practical interest, and significantly different historical, legal and philosophical foundations than most other courses. Topics covered include animal cruelty, animals as property, tort claims regarding animals, farm animals, animals in entertainment, and federal issues regarding animals. The Animal Law course has been described as intellectually stimulating and ethically challenging, and synthesizes a wide range of legal concepts, and the course materials apply traditional ideas to animals in new ways. Students have called it a great bar review class, because concepts from many areas of law are covered with respect to their application to animals and their interests. More and more firms, large and small, are providing pro bono (and paying) work in the animal law area, as the field gains momentum and reputability in the legal community. Mr. Wagman is a partner at Schiff Hardin in San Francisco, with a full-time animal law practice, representing organizations and individuals in a wide range of cases. He is one of the authors of the Animal Law casebook, and has been practicing animal law for most of his 20-year career. His practice includes litigation, consultation, legislative work, and extensive writing and lecturing on various animal law topics. The class includes regular updates on his current cases, as well as real-life experiences from the front lines of the animal law frontier. Special Instructions: Students have the option to write an independent research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Final exam or 18 page independent research paper.

LAW 653. Corporate Law: Theory and Practice. 2 Units.

This class will bring leading academics and members of the corporate bar, business and investment communities, judges and regulators to the law school to discuss new research, as well as new practice and regulatory issues. The idea is to engage students in the theoretical and policy debates and to understand how these concerns affect business and the practice of law.

LAW 654. Law and Biosciences Workshop. 1 Unit.

This workshop seminar will provide students with the opportunity to examine and critique cutting-edge research and work in the field of law and the biosciences presented by different speakers from Stanford and elsewhere. Although it is open to all students, the seminar is designed especially for those with an interest in the field who wish to stay abreast of current issues, work, and ideas. In each class, an academic expert, policy maker, or practitioner will present his or her current research or work and engage in a robust discussion. A second version of the class will be held in winter quarter that will also be worth one unit; students may take both the fall and winter classes. This class will meet four times for two hours, 15 minutes during the fall term and the winter term. This class is open to first-year Law School students in the winter term. Elements used in grading: Class participation, attendance, written assignments and final paper.

LAW 656. International Conflict Resolution. 3 Units.

This seminar examines the challenges of managing and resolving violent inter-group and international conflicts. Employing an interdisciplinary approach drawing on social psychology, political science, game theory, and international law, the course identifies various tactical, psychological, and structural barriers that can impede the achievement of efficient solutions to conflicts. We will explore a conceptual framework for conflict management and resolution that draws not only on theoretical insights, but also builds on historical examples and practical experience in the realm of conflict resolution. This approach focuses on the following questions: (1) how can the parties to conflict develop a vision of a mutually bearable shared future; (2) how can parties develop trust in the enemy; (3) how can each side be persuaded, as part of a negotiated settlement, to accept losses that it will find very painful; and (4) how do we overcome the perceptions of injustice that each side are likely to have towards any compromise solution? Among the conceptual issues we will examine include the problem of spoilers who seek to sabotage agreements, the role of mediators, the role international legal rules can play in facilitating or impeding conflict resolution, and the advantages and disadvantages of unilateral versus and reciprocal measures in advancing conflict resolution efforts. Particular conflicts we will explore include the Northern Ireland conflict, the Israeli-Palestinian conflict, and the U.S.-Soviet Cold War rivalry. Special Instructions: Total enrollment in this course will be limited to 20. Initial Law student enrollment will be limited to 10. International Policy Studies students will be given priority to enroll in this course. The remaining spaces will be filled (and the number of Law School students to be admitted will be determined) after the first class. Students may not add this class after the first class without the consent of the instructor. This course is cross-listed with the International Policy Studies and Psychology Departments (Same as IPS 250 and PSYCH 383). Special Instructions: Section 01: Grades will be based on class presentation, short presentation paper, class participation, and final paper. Section 02: Five students will have the option, to write an independent research paper for Research (R) credit, with consent of the instructor, in lieu of the final paper for section 01. Other course requirements -- class presentation, short presentation paper and class participation. Elements used in grading: Class presentation, short presentation paper, class participation, and final paper. This course is open to first-year Law School students.

LAW 658A. International Human Rights and Conflict Resolution Clinic: Clinical Practice. 4 Units.

In the past half-century, human rights advocates have transformed a marginal utopian ideal into a central element of global discourse, if not practice. This course examines the actors and organizations behind this remarkable development, as well as the vast challenges faced by advocates in the recent past and today. Increasingly, human rights as a framework has become essential to a broad range of situations of tension and conflict. This course interrogates the nature of engagement by human rights practitioners, as well as approaches adopted by those focused on the management of violent conflict. What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in rights promotion and defense? How is conflict resolution consistent with human rights advocacy? When and where are these approaches in tension? The course also develops advocacy skills through in-class sessions, role play exercises and engagement in, and critical assessment of clinical projects in human rights. Class sessions introduce students to human rights advocacy and conflict management techniques through discussion of the readings and related issues, as well as through student presentations critiquing their participation in supervised clinical projects. The readings and seminar sessions expose students to some of the practical manifestations of the main debates and dilemmas within the human rights and conflict resolution movement(s). These include several of the ethical and strategic issues that arise in the course of doing fact-finding and advocacy and balancing the often differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the (frequently non-western) developing world. The readings also consider tensions within the field of conflict resolution, as well as between conflict resolution and human rights. Several class sessions will focus on fact-finding and advocacy skills. One or more of these sessions will be full-day, role play exercises. In these full-day sessions, students will engage in human rights research, documentation, negotiation and dispute management exercises, and advocacy role-playing. In some sessions, part of the class will be devoted to presentations by students and clinical 'rounds'. These presentations will consider one or more issues that arise in the course of students' own engagement in advocacy projects through the International Human Rights and Conflict Resolution Clinic. During the course of the quarter, students will also be required to draft several brief fact-finding/advocacy pieces (these will be explained in class), and write short, critical reflection papers (2-4 pages, double-spaced, or 500-1,000 words, thought pieces) on the readings. Special Instructions: - - General Structure of Clinical Courses. The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits.

LAW 658B. International Human Rights and Conflict Resolution Clinic: Clinical Methods. 4 Units.

In the past half-century, human rights advocates have transformed a marginal utopian ideal into a central element of global discourse, if not practice. This course examines the actors and organizations behind this remarkable development, as well as the vast challenges faced by advocates in the recent past and today. Increasingly, human rights as a framework has become essential to a broad range of situations of tension and conflict. This course interrogates the nature of engagement by human rights practitioners, as well as approaches adopted by those focused on the management of violent conflict. What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in rights promotion and defense? How is conflict resolution consistent with human rights advocacy? When and where are these approaches in tension? The course also develops advocacy skills through in-class sessions, role play exercises and engagement in, and critical assessment of clinical projects in human rights. Class sessions introduce students to human rights advocacy and conflict management techniques through discussion of the readings and related issues, as well as through student presentations critiquing their participation in supervised clinical projects. The readings and seminar sessions expose students to some of the practical manifestations of the main debates and dilemmas within the human rights and conflict resolution movement(s). These include several of the ethical and strategic issues that arise in the course of doing fact-finding and advocacy and balancing the often differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the (frequently non-western) developing world. The readings also consider tensions within the field of conflict resolution, as well as between conflict resolution and human rights. Several class sessions will focus on fact-finding and advocacy skills. One or more of these sessions will be full-day, role play exercises. In these full-day sessions, students will engage in human rights research, documentation, negotiation and dispute management exercises, and advocacy role-playing. In some sessions, part of the class will be devoted to presentations by students and clinical 'rounds'. These presentations will consider one or more issues that arise in the course of students' own engagement in advocacy projects through the International Human Rights and Conflict Resolution Clinic. During the course of the quarter, students will also be required to draft several brief fact-finding/advocacy pieces (these will be explained in class), and write short, critical reflection papers (2-4 pages, double-spaced, or 500-1,000 words, thought pieces) on the readings. Special Instructions: - - General Structure of Clinical Courses. The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits.

LAW 658C. International Human Rights and Conflict Resolution Clinic: Clinical Coursework. 4 Units.

In the past half-century, human rights advocates have transformed a marginal utopian ideal into a central element of global discourse, if not practice. This course examines the actors and organizations behind this remarkable development, as well as the vast challenges faced by advocates in the recent past and today. Increasingly, human rights as a framework has become essential to a broad range of situations of tension and conflict. This course interrogates the nature of engagement by human rights practitioners, as well as approaches adopted by those focused on the management of violent conflict. What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in rights promotion and defense? How is conflict resolution consistent with human rights advocacy? When and where are these approaches in tension? The course also develops advocacy skills through in-class sessions, role play exercises and engagement in, and critical assessment of clinical projects in human rights. Class sessions introduce students to human rights advocacy and conflict management techniques through discussion of the readings and related issues, as well as through student presentations critiquing their participation in supervised clinical projects. The readings and seminar sessions expose students to some of the practical manifestations of the main debates and dilemmas within the human rights and conflict resolution movement(s). These include several of the ethical and strategic issues that arise in the course of doing fact-finding and advocacy and balancing the often differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the (frequently non-western) developing world. The readings also consider tensions within the field of conflict resolution, as well as between conflict resolution and human rights. Several class sessions will focus on fact-finding and advocacy skills. One or more of these sessions will be full-day, role play exercises. In these full-day sessions, students will engage in human rights research, documentation, negotiation and dispute management exercises, and advocacy role-playing. In some sessions, part of the class will be devoted to presentations by students and clinical 'rounds'. These presentations will consider one or more issues that arise in the course of students' own engagement in advocacy projects through the International Human Rights and Conflict Resolution Clinic. During the course of the quarter, students will also be required to draft several brief fact-finding/advocacy pieces (these will be explained in class), and write short, critical reflection papers (2-4 pages, double-spaced, or 500-1,000 words, thought pieces) on the readings. Special Instructions: - - General Structure of Clinical Courses. The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits.

LAW 659. Advanced Negotiation: Transactions. 3 Units.

Complex and multi-party negotiations permeate law practice and life. Advanced Negotiation is designed to take students beyond the two-party, lawyer-client negotiations that were the focus of the Negotiation Seminar, to examine many facets of negotiation complexity, both in terms of the participants and topics. Advanced Negotiation: Transactions will focus on more complex negotiations, as well as multi-party negotiations, working in teams, and negotiating on behalf of complex organizations (e.g., governments, corporations, unions) on diverse issues, including: intellectual property; cross-border and public-private transactions; restructuring agreements. The goals of the class are twofold, for students (1) to acquire an added theoretical base beyond what was covered in the Negotiation Seminar through which to analyze and prepare for negotiations, and (2) to expand their skills through deeper examination of various actual negotiation cases and complex simulations. Special Instructions: Attendance at and participation in the simulations is required. Passing is dependent upon active participation, a series of short papers and in-class presentation. Prerequisite: Negotiation Seminar (Law 615) or its substantial equivalent. Elements used in grading: Attendance, participation, in-class negotiations and out-of-class preparation, and short papers.

LAW 660A. Youth and Education Advocacy Clinic: Clinical Practice. 4 Units.

The Youth and Education Advocacy Clinic offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students will have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters will have the opportunity to handle all aspects of their clients' cases. Students working in this area will interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work will offer students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters will interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. - - Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. - - Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. - - The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. - - Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, students may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS

LAW 660B. Youth and Education Law Project: Clinical Methods. 4 Units.

The Youth and Education Advocacy Clinic offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students will have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters will have the opportunity to handle all aspects of their clients' cases. Students working in this area will interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work will offer students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters will interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. - - Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. - - Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. - - The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. - - Enrollment in a clinic is binding; once selected into a clinic, a student has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS

LAW 660C. Youth and Education Law Project: Clinical Coursework. 4 Units.

The Youth and Education Advocacy Clinic offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students will have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters will have the opportunity to handle all aspects of their clients' cases. Students working in this area will interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work will offer students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters will interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. - - Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. - - Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. - - The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. - - Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS

LAW 661. Advanced Negotiation: International. 3 Units.

Building on skills developed, tools acquired and theory learned in the Gould Center's basic negotiation course, this advanced seminar explores how lawyers, diplomats, NGOs and citizen advocates can successfully negotiate bilateral agreements and multilateral agreements in the international field. We will study the unique process dynamics of international treaty-making, cross-border agreement negotiations, and multi-party consensus building processes. We will explore the role of power, culture, agency, and strategy in international negotiation, and we will analyze the design and conduct of effective negotiation campaigns. We will examine negotiation processes in the context of geopolitical relations, nuclear arms control, US-Mexico border management, environmental regimes, foreign investment, natural resource development, human rights, commercial disputes, and corporate social responsibility. Our approach will involve analysis of in-depth case studies and participation in complex role-playing exercises (including at one intensive simulation to be negotiated out of class over several weeks). These cases and exercises involve negotiations between state parties as well as negotiations, although our study will also include some attention to negotiations involving non-state actors, including business corporations, NGOs, and indigenous communities. A number of class sessions will include interaction with guest participants including international lawyers, scholarly experts, diplomats, senior corporate officers and NGO leaders. Prerequisite: Negotiation Seminar (LAW 615), its substantial academic equivalent, or substantial experience in the field.

LAW 662. Advanced Youth and Education Advocacy Clinic. 2-7 Units.

The Youth and Education Advocacy Advanced Clinic provides an opportunity for students who have already successfully completed the Education Advocacy Clinic to continue their advocacy work in the Clinic and/or to pursue a discrete project related to educational equity advocacy. Examples of projects include policy research on specific topics (e.g., the provision of mental health services to youth with disabilities in the schools, the impact of school discipline policies on youth of color, or equal educational opportunities for English Language Learners); investigation and preparation for impact litigation; and community education and outreach on a specific education-related issue. All projects will be jointly designed by the instructor and the advanced student. Advanced students will also continue to participate in the Clinic's discussion of cases during case rounds. Special instructions: Admission is by consent of instructor. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Elements used in grading: Projects and class participation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 663. Advanced International Human Rights and Conflict Resolution Clinic. 2-7 Units.

The International Human Rights and Conflict Resolution Advanced Clinic offers the opportunity for students who have already successfully completed an International Human Rights and Development Clinic to pursue one or more specific projects in conjunction with the Clinic, either independently or in collaboration with colleague(s) enrolled in the regular clinic. Any travel will be strictly contingent on the Advanced Clinical student's availability and the needs of the project. Advanced Clinical students are expected to participate in as much of the regular clinical seminar and seminar simulations as possible given pre-existing scheduling constraints. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Elements used in grading: Project work, writing assignments, case preparation, attendance and class participation. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 664. Advanced Legal Writing: Business Transactions. 3 Units.

This course offers students practical preparation in the skills needed to be an effective transactional lawyer. Students will learn to draft clear, effective, plain language contracts and to analyze other transactional writing used to manage complex business transactions. The class will appeal to students interested in working in a law firm and practicing transactional law (of any type) and those interested in business litigation who would like to gain an understanding of contract provisions. The course offers a wide range of realistic drafting problems--completed both inside and outside of class. Students will also (i) develop sensitivity to the expectations of the attorneys and clients with whom they will be working, (ii) learn how to research the applicability of contract provisions, and (iii) sharpen their analytical skills in the context of contracts. SPECIAL INSTRUCTIONS: Students on the waitlist for the course will be admitted if spots are available on the basis of priority and Degree of Study. Early drop deadline: Students may not drop this course after first week of class. Corporations (Law 242) is a prerequisite for all but LLM (CGP) students. A substantial mark-up of a contract is due on the last day of class. Elements used in grading: Class participation, attendance, written assignments and final paper. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 665. Advanced Legal Writing: Legislative Drafting and Analysis. 3 Units.

This course is designed to give students practical preparation in how to draft and analyze federal legislation. It should appeal to students interested in interpreting, drafting, or implementing laws. The course offers students realistic legislative drafting problems and an opportunity to research the legislative process of an enacted law of their choosing. Through these drafting assignments and study, students will learn in detail the dynamic and fascinating political process of how laws are enacted in the United States and how to draft effectively within such a process. Students will gain unique, foundational tools and skills necessary to draft effective, clear legislation and to analyze and interpret laws of any kind. Writing (W) credit is for 3Ls only. Elements used in grading: Class participation, attendance, written assignments and final paper.

LAW 668. Legal Technology and Informatics. 2-3 Units.

Legal technology is rapidly transforming both the practice and nature of law. This class seeks to explore both the current trends and the future possibilities of this transformation, as we begin to train the future generation of technology savvy lawyers, and technologists who understand the intricacies and potential of what the law could be. Legal informatics could be defined as a computational perspective of law: where does legal information reside, how is it manipulated, and which algorithms and data structures are used in various legal functions? Note that there are no prerequisites for this class beyond an interest in the subject. There are numerous examples of technologically driven legal transformation. Case law search has moved from hard copy to closed digital systems such as Westlaw and LexisNexis, and into free cloud-based systems such as Google Scholar and Wikipedia. More and more statutes are available online. Changes can be seen in e-discovery, privacy, the delivery of (online) legal services, and the budding legal technology startup community. As a result, questions arise as to the proper statutory and ethical boundaries between humans and machines in implementing legal activities. Beyond the current and near-term technologies, however, are core academic and philosophical questions that will have increasing import as machines gain in sophistication and capability. For example, although the law differentiates between the responsibility assignable to minors compared to adults, we are far from identifying the point at which an agent or robot is morally responsible for its own actions, as opposed to the responsibility being assigned to its creator.

LAW 669. Narrative Skills and the Law. 3 Units.

A lawyer who communicates not only in a cerebrally persuasive way, but also in an emotionally gripping way, has an enormous strategic advantage. Judges, jurors, and clients are all human beings, susceptible to compelling stories like everyone else. This course - conducted by a television and film writer who is also a lawyer with experience in all three branches of government, private practice, political campaigns, and a labor union - teaches how to compose an engaging story and how to apply those skills to a variety of legal situations. The first part of the course will cover the art of storytelling on both a theoretical and a practical track. On the theoretical track, students will study story drive; narrative structure; beginnings, middles, and ends; openings; plot and character; exposition; and transitions. The class will have a healthy amount of assigned reading and viewing that illustrate each of these components in literature, drama, and film. On the practical track, students will undertake writing exercises that parallel the theoretical discussion, to develop a first-hand facility with those facets of storytelling. In the second part of the course, students will apply their storytelling insights and skills to specific legal situations: A criminal case. An appellate case. A legislative proposal. A labor negotiation. A public relations crisis. Students will discuss in depth their narrative approaches to these situations, along with those taken by lawyers in other cases in the respective areas. By the end of the course students will have a powerful tool few of their peers will possess, and be able to approach their day-to-day professional challenges in a more effective and confident way.

LAW 670. White Collar Crime. 3 Units.

This course explores the law of economic and political crimes associated with the rubric "white collar crime." The class is divided thematically between mens rea issues and substantive issues. Among the substantive areas which are covered are: obstruction of justice, perjury, bribery and gratuities, mail and wire fraud, securities fraud, and money laundering. We will study specific federal statutes in considerable detail, while also speculating about the jurisprudence underlying these crimes, and related issues of prosecutorial discretion and attorney ethics. Special instructions: Students may write a paper in lieu of the final exam for Research credit. Elements used in grading: Class participation and final exam or paper. Also, classroom participation may be taken into account to some very small degree. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor.

LAW 671. Critical Theory. 3 Units.

This course will review the most important developments in critical theory as it relates to law and jurisprudence. It will begin with a brief review of the critical tradition in Western philosophy including thinkers such as Friedrich Nietzsche, Karl Marx, Max Weber, Jean Paul Sartre and Michel Foucault. We will then look at the influence of this critical tradition in American legal theory, tracing the critical turn through the American legal realists, Critical Legal Studies and the emergence of identity based critical movements such as Critical Race Theory, Critical Feminist Theory and Critical Approaches to Sexual Orientation. The class will conclude by examining the theories of Giorgio Agamben, Jacques Ranciere, and Niklas Luhmann and considering their possible legal implications. Special Instructions: The paper for this course will satisfy the Writing requirement. Students also have the option to write an independent research paper for Research credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation and final paper. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 673. Advanced Legal Writing: Drafting and Negotiating Sports Law Transactions. 3 Units.

This seminar focuses on the drafting and negotiation of certain sports law transaction documents. Examples of documents to be discussed in the seminar are suite license agreements, sponsorship agreements, naming rights agreements, sports team acquisition agreements and media rights agreements. This seminar is intended to be "hands-on" with all students having the opportunity to experience being a "sports law attorney." The class room environment is intended to simulate the experiences that a junior attorney would encounter in a law firm or corporate legal setting. The major emphasis of this seminar will be on how sports transaction documents are drafted, negotiated, revised and finalized. In addition to a discussion of some of the specific sports transaction documents and the drafting and negotiation techniques related to those documents, there will be general discussions of other sports law related issues. Depending on availability and timing, the seminar may also feature periodic sports practitioners (e.g., general counsel for professional sports teams or organizations) as guest speakers to discuss their sports law experiences and their perspective on some of the documentation covered by this seminar. There will be no exams but instead there will be three independent writing assignments which will require the students to draft transaction documents based on forms from actual sports transactions. The final assignment will be a group assignment consisting of drafting, negotiating and finalizing a sports transaction document. There will also be periodic negotiation sessions. Special Instructions: Attendance at all class sessions is mandatory. Enrolled and waitlisted students must attend the first class meeting to be enrolled in the course and waitlisted students must continue to attend classes until they are either enrolled or until the final determination of their waitlist status is made. Late papers are subject to grading penalties. Elements used in grading: Class participation (quality not quantity), attendance, written drafting assignments, and the final negotiation/drafting assignment. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 674. Advanced Legal Writing: Litigation. 3 Units.

Building on the skills developed in Federal Litigation, this course will give students additional practice with legal analysis, argument structure, and writing in the pre-trial litigation context. Students will draft an office memo, summary judgment brief, and pleadings in an internet school speech case. Students also will complete short writing exercises in and out of class to practice skills such as omitting surplus words, preferring active voice, using concrete words, punctuating carefully, etc. The goals of this class are to help students organize facts and principles in a succinct and logical way and to deepen their understanding of the legal reasoning process. The course should appeal to students interested in litigation practice and those wishing to hone their writing skills. Elements used in grading: Class participation, attendance and written assignments. Writing (W) credit is for students entering prior to Autumn 2012. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 675. Human Trafficking: Historical, Legal, and Medical Perspectives. 3 Units.

Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution and labor exploitation, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning and offers an optional service-learning component. Elements used in grading: Attendance; participation; written assignments; and final exam. This class is cross-listed with Feminist, Gender and Sexuality Studies (FEMGEN 5C, FEMGEN 105C), History (HISTORY 5C, 105C), Human Biology (HUMBIO 178T), International Relations (INTNLREL 105C) & School of Medicine General (SOMGEN 205).

LAW 676. Rethinking Refugee Communities. 2 Units.

Tens of millions of people have been forcibly uprooted by conflict or persecution worldwide. Although some of these people obtain asylum in advanced industrialized countries, a far larger number remain as refugees and internally-displaced people living in hastily-built refugee communities in the developing world. This project-based, interdisciplinary class is focused on exploring alternatives to improve the planning, design, and governance of refugee communities. It considers some of the legal, design, engineering, and governance challenges associated with communities of refugees and other forced migrants. The goal is to exercise and enhance students' ability to deal with multifaceted complex issues by developing recommendations that can be implemented by the Office of the United Nations High Commissioner for Refugees (UNHCR).

LAW 677. Professional Responsibility. 3 Units.

This course introduces students to the goals, rules and responsibilities of the American legal profession and its members. The course is designed around the premise that the subject of professional responsibility is the single most relevant to students' future careers as members of the bar. These issues come up on a constant basis and it is critical that lawyers be alert to spotting them when they arise and be educated in the methods of resolving them. As such, the course will address many of the most commonly recurring issues that arise, such as confidentiality, conflicts of interest, candor to the courts and others, the role of the attorney as counselor, the structure of the attorney-client relationship, issues around billing, the tension between "cause lawyering" and individual representation, and lawyers' duty to serve the underrepresented. In addition, we will delve into some more personal ethical issues that reflect on why students have chosen law as a profession and how lawyers compose careers that promote or frustrate those goals. Students will be responsible for submitting a reflection paper (three-to-five pages each) after each week of the course. Each memo will be due by the Friday of the following week. Special Instructions: Grades will be based on the papers submitted, with the instructor retaining the right to take class participation into account. Attendance is mandatory and students must seek instructor approval for any absences not due to illness. This course is offered to foreign graduate students. It is taught on an accelerated basis over the course of three weeks between September 2, 2014 and September 19, 2014. Thus, the course meets on average nine hours per week. The exact meeting times will be set once the graduate students' schedules are set. Elements used in grading: Attendance, class participation and written memos. Limited to LLMs, JSMs and exchange students. Required for LLMs.

LAW 678. Introduction to Microeconomics. 3 Units.

COURSE SUBSTANCE: It is no secret that economic ideas are being used increasingly in law school courses, in law practice, and in a wide variety of other fields that a law school graduate might choose to pursue - antitrust, corporate, environmental, tax, labor, and securities are just some of the immediate examples that come to mind. While many Stanford Law School students have already taken courses in economics as undergraduates, or might even have majored in economics, many of you have not. This course is offered to "bring you up to speed" so that you will not be at a disadvantage in other courses at the Law School that draw on economic ideas (or, just as importantly, not be at a disadvantage when you graduate and you encounter economic ideas and arguments on the job or in life.) So, what is economics, exactly? All societies face the problem of scarcity - there are not enough resources to satisfy people's desires for all things. Economics studies how individuals and societies deal with scarcity and the mechanisms for deciding what to produce, how to produce it, and who gets the output. It is as simple and complex as that! As you can imagine, the practical applications are nearly endless. Please note that the course focus will be microeconomics - the branch of economics that focuses on the economic behavior of individual decision-making units, such as households and firms, and how these individual decisions fit together. (I will not discuss macroeconomics in this course - i.e. the behavior of the economy as a whole, particularly inflation, unemployment, and business cycles.) More specifically, I will spend the vast majority of the course taking you through the basic supply and demand model of markets - what it is, where it came from, how and when it works, and when it does not work so well. With that base, I can branch out accordingly to help you apply it to a wide variety of relevant issues. Though I will not focus specifically on how economic ideas have been used in a legal context (there is another course and seminar that does that), I will make some effort to link the economic ideas we discuss directly to legal topics. **COURSE PROCEDURE:** My primary goal is to teach you the fundamental principles of microeconomics by (1) providing you the relevant schema to understand the basic tools of economic analysis; and by (2) drilling you extensively with problems, cases, current events, and other applied materials so as to help you develop the ability to use these tools and truly make them your own. A heavy emphasis will be placed on building a conceptual understanding of some key economic models, looking closely at the underlying assumptions of those models, and engaging in the process of questioning and relaxing those assumptions in the context of actual "real life" issues. Please do not mistake the analytical rigor I will require, to mean that we will use sophisticated mathematics. To the contrary, I believe that most powerful economic principles should be highly intuitive and non-quantitative.

LAW 679. The Rule of Law - The Foundation of Functional Communities. 2 Units.

We will seek to determine a useful meaning of the notion of the rule of law to identify some measurement of adherence and to explore the importance of the rule of law in terms of economic, socio-political and human development. We will focus on accountable government; just laws; open processes for the enactment, administration and enforcement of laws and effective dispute resolution. Readings and discussion will include the works of ancient philosophers, political theorists and jurists from the 17th to the 20th century, modern political economists and contemporary scholars. This seminar will feature several experts in the field as guest lectures and requires three reaction papers from all participants. Special Instructions: Writing (W) credit is for 3Ls only. Elements Used in Grading: Class participation, written assignments and series of short reaction papers.

LAW 680. Pivotal Moments in American Institutions and Public Law, 1791-Present. 3 Units.

(Same as PoliSci 323) American lawyers and policymakers work today in a system of institutions that are strikingly unique in comparative and historical terms. With some exceptions, that system is characterized by relatively stable political and legal institutions, low levels of explicit corruption, high bureaucratic capacity in public organizations, and relatively open, impersonal access to political, policymaking, and legal institutions. Although these characteristics are now often taken for granted, the process through which they emerged remains remarkably opaque. In the 1780s under the Articles of Confederation, the United States was a poor developing country on the fringe of the Atlantic community with limited capacity and a striking inability to provide basic public goods, such as security. One hundred years later, it well along the way to becoming the richest nation in the world. How did this transformation occur? Drawing on judicial opinions, legal scholarship, political science, economics, and history, this course explores how institutions evolved to create such a system. It traces the problem of institutional development through several critical periods in the history of American public law, including the emergence of the Constitution, the events leading up to and following the Civil War, the Progressive era, World War II, institutional changes occurring roughly during 1964-75, and the emergence of the modern administrative state. Although the primarily focus is on the American experience, we place these developments in comparative context as well.

LAW 681A. Better: Improving Decision-Making, Achievement, and Performance. 1 Unit.

This discussion group will explore how recent insights from psychology and related fields can help make us better students, better professionals, better leaders, and better people. We will consider works dealing with happiness, decision-making, learning, persuasion, success, and achievement. The reading list will include some or all of the following: Jonathan Haidt, *The Happiness Hypothesis*; Atul Gawande, *Better: A Surgeon's Notes on Performance*; Paul Tough, *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character*; Richard Thaler & Cass Sunstein, *Nudge: Improving Decisions about Health, Wealth, and Happiness*; Annie Murphy Paul, *Brilliant: The New Science of Smart*; and Adam Grant, *Give and Take*. Begin in Autumn Quarter and run through Winter Quarter. Class meeting dates: Tuesday evenings from 7:30 - 9:30, exact dates TBD. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681B. Can Philosophical Insights or Empirical Knowledge Help Us Make Hard Choices?. 1 Unit.

We will explore both two overarching themes and five specific problems that I hope are intrinsically interesting. The first general question is whether philosophical inquiries on big issues - e.g. what it means to be well-off; what obligations do we have to strangers who are radically worse off than we are; when should we observe rights-based limits on our pursuit of aggregate welfare; what does it mean to coerce another party - help us make choices when it is not obvious what we should do. The second, related question is whether empirical knowledge - e.g. psychological, economic - might help us, in addition, instead, or no more than philosophical insight. The specific questions we will focus on have little in common, other than that they are not easily answered. Some refer to decisions that seem wholly self-regarding, others that seem to refer to obligations to others. Some involve acting in professional role, some out of role. Some seem plainly important, others might seem more trivial. And it is possible, of course, that you will come to believe that philosophers or empiricists may have more to say about some of the issues that we discuss than others. The five questions I tentatively plan on exploring are: (a) how a late adolescent patient (or a doctor advising that patient) ought to choose between an operation that will significantly improve various aspects of her life over the next thirty years but poses a substantial risk of leaving her wheelchair-dependent in middle age and an operation that will lead to impaired functioning for the next few decades but mobile without mechanical aids past the age of 50 (b) how we can evaluate claims that virtually all of us living in economically prosperous countries are obliged to give away a substantial chunk of our income to save the lives of very poor people around the world (c) how we should evaluate the propriety of torture designed to elicit information about planned criminal/terrorist activities that might arguably save those who would be harmed if the plans came to fruition (d) how an attorney in a big law firm ought to determine when and whether it is appropriate to ask an administrative assistant to do work that is not directly related to the production of legal services (e.g. pick up laundry from the cleaners) and whether (and if so, why) the answer to that question is sensitive to the gender of the attorney and the attorney's administrative assistant, and finally, (e) whether existing rules governing the conduct of war that draw significant distinctions between killing soldiers and killing civilians and between killing civilians intentionally rather than knowingly are sensible. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681C. Group Behavior. 1 Unit.

This discussion group will look at how ethical choices are shaped by organizational and group cultures. We'll read about some famous psychological experiments such as the Milgram and Zimbardo experiments; and some studies of decisions made in corporate organizations, government bureaucracies, and a battalion of ordinary middle-class Germans tasked with hunting down Jews; and talk about what insights from this work may be relevant to lawyers' ethics and working lives. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

LAW 681D. How Can You Represent Those People?. 1 Unit.

This discussion group will consider why a lawyer might devote herself or himself to representing people accused of crime. We will explore a range of possible answers, from guaranteeing procedural fairness to appreciating the factual indeterminacy inherent in our world to fighting racial or class-based injustice. Course materials will likely include fiction (such as *Atonement* by Ian McEwan); nonfiction essays; as well as a couple of recent films (*Bernie* and *The House I Live In*). Lisa Douglass, lecturer and staff attorney in the Stanford Community Law Clinic, will help lead the discussions. Class meeting dates: To be determined by instructor. Discussions in Ethical and Professional Values Courses Ranking Form: To apply for this course, students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students). See Ranking Form for instructions and submission deadline.

LAW 681E. Human Rights and Film. 1 Unit.

This 'Discussion' group will focus on the treatment of human rights issues in films. After reviewing brief, selected readings that provide essential background, the group will view a film (one per session, for five sessions) that focuses on issues of social conflict and human rights. The film showings will be held at Prof. Cavallaro's home (near campus). Afterwards, students will consider the human rights matters addressed in the film. Films include 'Battle of Algiers' and 'La Historia Oficial' (The Official Story, Argentina 1985). Winter Quarter. Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681F. Law, Narrative, and Boundaries. 1 Unit.

As citizens and as professionals, lawyers work in a world marked and shaped by salient social boundaries. Some kinds of differences - of politics, religion/religiosity, race, ethnicity, language, wealth, gender, sexuality and other attributes - can be profoundly divisive. Broadly speaking, this class is inspired by the complex cultural and political challenge of managing these differences; a challenge that lawyers have a unique opportunity to address. The particular lens through which we will investigate this issue involves those who cross, or reflect upon in novel ways, some of these boundaries. As we read and discuss narrative accounts, we will consider what light they shed on how social and legal boundaries are created, evolve, and take on particular meanings. We will ask how law constructs or enforces lines, and how those practices change when the line itself gets blurry. Materials will include fiction and nonfiction, prose and film, on subjects such as: stories of "passing" (involving race and gender); the Thomas Jefferson-Sally Hemings relationship; attempts by Palestinians and Israelis to live peacefully with one another in the cooperative village of Wahat al-Salam/Neve Shalom; various narratives about life on both sides of the U.S.-Mexican border; and stories about the intersection of religion and sexuality. We will supplement the narratives with some theoretical material that looks at how law can shape, define, and enforce boundaries.

LAW 681G. Searching for Balance. 1 Unit.

This discussion group will explore the topic of work-life balance, in particular how women and men in law and other demanding professions negotiate the demands of work and family. Readings will include a wide range of perspectives - current social science research, contemporary fiction, feminist theory, debate in the popular media, comparative studies of other countries. We will consider the factors that make work-life balance so elusive, including government policies (eg, maternity leave and child care); gender roles in the family; the institutional culture and structure of particular workplaces; differences related to race, ethnicity and economic status; and individual choices that men and women make about how to lead lives that they find meaningful.

LAW 681H. Issues in Philanthropy. 1 Unit.

We will explore selected topics, encompassing some subset of the following: the roles of the philanthropic and nonprofit sectors in society; the justifications for tax-subsidized philanthropy; whether giving to the poor is morally obligatory or discretionary; barriers to the practice of strategic philanthropy; evaluating philanthropic outcomes; impact investing; the role of corporate philanthropy; and whether foundations should be designed and run to exist in perpetuity or to spend down corpus over a finite lifetime. Winter Quarter. Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681I. The Sea Around Us: Ethical, Physical, and Emotional Connections Between Humans and the Ocean. 1 Unit.

This colloquium examines current ocean law and policy issues through a series of readings of seminal works about ethical, physical, and emotional relationships of human beings to the marine world. Through the lenses offered by several classic readings, we will examine and reinterpret the challenges of fisheries collapse, climate change, shipping, marine spatial planning, biodiversity conservation, and the management of land-sea interactions. The course is open to all law students and will be particularly interesting for those interested in studying and solving key issues of ocean policy and management, from coastal adaptation to fisheries management to cumulative impacts assessments to the relationship of human beings and the sea. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681J. When Bad Things are Done by Good People. 1 Unit.

Some people live their lives in a manner that would lead few to declare them good people. From Tony Soprano to Saddam Hussein to Bernie Madoff, we are all familiar with individuals who have made crime and violence a constant in their lives. There are far more people, though, who try generally to live good lives, but find themselves having acted or having failed to act in ways that are widely condemned as evil. Over the course of our five meetings, we will be looking (through some books, reports and films) at case studies of such circumstances, ranging from clergy and others in authority who covered up evidence of sexual abuse, prosecutors who ignored evidence of wrongful convictions, lawyers who turned blind eyes to client misconduct, and soldiers who committed acts they would have once found unimaginable. We will also look at a contrasting case study of individuals who resisted great pressure and kept their moral compasses well-calibrated. Throughout our inquiry, we will reflect in particular on the power of institutions and authority in affecting ethical mores. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

LAW 681K. Confidence, Influence and Leadership. 1 Unit.

For the past two years, the name of this reading group was Why are People So Sure? For this year, we have changed the name--and the emphasis to a degree. As in the past, we will discuss books that address the phenomenon of people having great confidence in their beliefs or opinions, even when there is a reasonable possibility that they are wrong. For example, many arguments about politics or policy involve highly complex factual assumptions and predictions. Despite the difficulty of assessing the validity of factual assumptions and forecasting the consequences of any particular decision, many people maintain great confidence in the correctness of their beliefs. Why is that? In addition, some people are very successful in influencing other people with respect to such beliefs or opinions. How do they do that, and what makes their audience susceptible to being convinced? In the extreme, what allows this sort of person to be a leader or at least a "thought leader" (to use what regrettably seems to be a new entry into our lexicon)? In this discussion group, we will read books that engage these questions in diverse ways. Students that join the group will be expected to be full participants in the discussion. Neither of us is an expert in the topic and neither of us expects to have any more to say than you will. So please join us only if you find this format appealing. Another requirement of the group will be to create a written log, or summary, of what we read and discuss. We will all share responsibility for writing this. Begin in Autumn Quarter and run through Winter Quarter. Class meeting dates: To be determined by instructor. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681L. Constitutional Law and Lawyers in Context. 1 Unit.

In this discussion group, we will go beyond judicial opinions to read books about some of the leading cases in constitutional law and the lawyers who litigated them. In the course of doing so, we will discuss what insights about constitutional law and lawyering can be distilled from exploring the historical context, participants, origins and aftermaths of some major cases and issues. The books will include Gilbert King's *Devil in the Grove* (about Thurgood Marshall's role in defending the "Groveland Boys" against accusations of rape in Florida in the 1940's); Anthony Lewis's *Gideon's Trumpet* (about *Gideon v. Wainwright*), Dale Carpenter's *Flagrant Conduct* (about *Lawrence v. Texas*); David Garrow's *Liberty and Sexuality: The Right to Privacy and the Making of Roe v. Wade* (about *Griswold v. Connecticut* and *Roe v. Wade*) and Victoria Nourse's *In Reckless Hands* (about *Skinner v. Oklahoma*). Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: Wednesday evenings, 7:30-9:30 pm, on Jan. 21, Feb. 18, March 4, April 15, and May 13. Discussions will be held at Professor Schacter's home in Menlo Park. Elements used in grading: Class attendance at all sessions and class participation. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students). See Ranking Form for instructions and submission deadline.

LAW 681M. Legal Fictions. 1 Unit.

This discussion group will look at questions of value and meaning in the lives of lawyers through the window of works of fiction. We will discuss one book each evening. Subject to change, the list includes: Russell Banks, *The Sweet Hereafter*; Albert Camus, *The Fall*; James Gould Cozzens, *The Possessed*; Leo Tolstoy, *The Death of Ivan Ilyich*; and Scott Turow, *Presumed Innocent*. Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. Discussions in Ethical and Professional Values Courses Ranking Form: To apply for this course, students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students). See Ranking Form for instructions and submission deadline.

LAW 681N. Law and Performance. 1 Unit.

From the rhetorical fireworks of the classic American trial scene to the band Pussy Riot's "aesthetic resistance" in Russia, law and performance have been entangled in more and less officially sanctioned ways. This discussion seminar will address questions at the intersection of law and performance, such as: What are the ethical implications of performance in the legal context?; When does or should freedom of performance come into conflict with the norms of a well-ordered society?; Can examining methods of musical interpretation help us to adjudicate between originalism and living constitutionalism?; and; What can drama reveal to us about the law? Among other readings will be included Jack Balkin's work on opera and constitutional interpretation, Kenji Yoshino's "The City and the Poet," Hannah Arendt's *Eichmann in Jerusalem*, and Desmond Manderson's "Making a Point and Making a Noise: A Punk Prayer." Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. Discussions in Ethical and Professional Values Courses Ranking Form: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681O. The Law of Democracy. 1 Unit.

This seminar will cover topics in the general area of law and politics, specifically the law concerning elections. The discussions will focus on the following five case studies: Redistricting; *Bush v. Gore* and the 2000 election; Campaign Finance; Party Primaries and Conventions; and The Voting Rights Act. Although we will discuss court cases, much of the seminar will include "war stories" from those involved in the cases or legislative battles. Students who plan to enroll in "Regulation of the Political Process" are encouraged to take this discussion seminar as well. But that class is not a prerequisite for this seminar. Note: Los Altos location is not walkable. Winter Quarter. Class meeting dates: TBD. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681P. Personal Satisfaction in Legal Practice. 1 Unit.

This discussion group will explore satisfaction in professional practice. Readings will explore the conditions of current practice, with an emphasis on law firms, and what can be learned from research on happiness. Books to be excerpted may include Nancy Levit and Douglas Linder, *The Happy Lawyer*, Steven Harper, *The Lawyer Bubble*, Sonja Lyubomirsky, *The Way of Happiness*, Daniel Gilbert, *Stumbling on Happiness*, Martin Seligman, *Authentic Happiness*, Bryant Garth, *After the JD*, Milton Reagan, *Eat What You Kill*, and Nash and Stevenson, *Just Enough*. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. Elements used in grading: Class attendance at all sessions and class participation. Discussions in Ethical and Professional Values Courses Ranking Form: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681Q. Failure. 1 Unit.

Lawyers are charged with prosecuting and defending the civil and criminal failings of others. In client counseling and transactional representation, we are charged with helping our clients avoid failure. And as professionals, we are enjoined to avoid failures ourselves. So we spend our careers in and around failure - anticipating it, reconstructing it, and seeking to prevent and remedy it. This seminar explores the human experience of failure in both legal and non-legal settings. What are the circumstances (structural and cognitive) that appear to lead to personal, professional, legal, political, and moral failures? How does the law shape social understandings of what failure is? What kinds of failures appear to support the belief that failure is (almost always) avoidable, and thus the fault of individuals who experience failure? Why do other failures seem inevitable? What is the narrative structure and allure of representations of failure as a condition of success? How are failure and the harms that flow from the experience of failure remembered or forgotten by individuals and groups who cause failure and those who attempt to redress it? Sources for the seminar will range from cases dealing with professional malpractice and cultural histories of professional ideology to poetry, constitutional history, theories of creative destruction, and responses to mass atrocities. Begins in Winter Quarter and runs through Spring Quarter. Class meeting dates: Five evening sessions to be determined by instructor in coordination with enrolled students. Elements used in grading: Class attendance at all sessions and class participation. To apply for this course, 2L, 3L and Advanced Degree students must complete an application form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See form for instructions and submission deadline.

LAW 681R. The Arrest, Trial, and Execution of Jesus of Nazareth. 1 Unit.

Patterned on a seminar taught by Professor Joseph Weiler at NYU Law School, this discussion seminar will study the most famous criminal case in the history of the world: the arrest, trial, and execution of Jesus of Nazareth. In five two-hour sessions at Professor McConnell's home, we will cover (1) Jesus's arrest in the the Garden of Gethsemane, (2) his trial before Jewish authorities, (3) his trial before Roman authorities, and (4) his execution, with (5) one session left for general considerations. (We will not delve into the reports of his resurrection.) We will focus on the nature of the charges against Jesus, the legal procedures employed, the evidence and the defense, the relation between imperial and local authorities, the relation between religious and secular law, the ethical roles of the individuals involved, and the mode of execution. Our primary text will be Raymond E. Brown, *The Death of the Messiah* (Yale University Press 2004), a scholarly two-volume study drawing on all the extant historical sources. Among the questions we are likely to discuss are: Was the trial fair by the standards of the day? Was Jesus guilty of any of the charges? What were the authorities - and particularly Pilate - trying to accomplish? What was the role of the mob? Was Roman law a constraining influence, or the opposite? What was Jesus's own perspective on the proceedings? How reliable and/or plausible are the sources? Although this subject is of religious and spiritual concern to some, including (in all likelihood) some students taking the seminar, the seminar will not consider the material in a religious way, but instead as a legal event. The instructor hopes that the class will be religiously diverse, and especially encourages non-Christian students to enroll. Discussion will, of course, be conducted in a way that is comfortable for persons of all shades of belief and disbelief. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. Elements use in grading: Class attendance at all sessions and class participation. Discussions in Ethical and Professional Values Courses Ranking Form: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681S. Plato's Republic. 1 Unit.

We will discuss Plato's Republic with a focus on its treatment of law, justice, equality, and legal institutions. After the first session, on Book One, students will take turns co-leading the discussions. Limited to eight students, the seminar will meet in the instructor's home. Begin in Winter Quarter and run through Spring Quarter. The class will meet in the evening, on a weekday. Exact meeting time and dates to be determined by consensus of the participants. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 681T. Law and the Humanities Discussion Seminar. 1 Unit.

There have been a number of efforts to define what "law and the humanities" comprehends, some including history and philosophy as disciplines juxtaposed with law and others insisting on a narrower version of the field. A newer movement led by Chris Tomlins has rejected the "law and" model entirely and insists instead on formulating interdisciplinary work in law as "law as." This discussion seminar will examine inductively what law and the humanities might mean and the significance of its contribution by considering a number of essays and articles that could be thought of as work in law and the humanities. Each session will be devoted to a pair of writings around topics like "Law and Literature," "Legal History," and "Law and Performance." Questions to be considered include the role of law within these projects, the audience being addressed, the larger social significance of the arguments being made, and the extent to which the pieces are grounded in a particular discipline or set of disciplines or float above disciplinary formations. Begin in Winter Quarter and run through Spring Quarter. Class meeting dates: To be determined by instructor. Elements use in grading: Class attendance at all sessions and class participation. Discussions in Ethical and Professional Values Courses Ranking Form: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline.

LAW 682. Advanced Criminal Law and Public Policy II: A Research Practicum. 3 Units.

Written Work. Students will expand upon the research begun in Petersilia's Fall 2012 class, turning their fall research papers into academic journal articles, ready for submission. This course meets the SLS writing (W) graduation requirement. This course is a follow on to the Fall 2012 course taught by Professor Petersilia. In that course, each student conducted research on an aspect of California sentencing and/or corrections. The Winter 2013 class will be designed for students who wish to expand their research projects with an eye towards journal publication. This class will also devote significant time to developing policy recommendations and delivering formal briefings to high level policymakers.

LAW 683. The Future of Human Rights: Law, Politics, and Social Justice in a Multipolar, Multimedia World. 2 Units.

Human rights law and practice are being transformed by geopolitical, technological and economic forces that unsettle the actors, strategies, and legal standards that dominated the field in the twentieth century. In this seminar, we will take stock of key global developments that underlie such a transformation, and analyze their impact on the future of human rights, as follows:

nn1. The rise of emerging powers (such as Brazil, China and India) and the relative decline of Europe and the U.S. point to a multipolar world order. Together with the proliferation of international regulations (such as transnational corporations' codes of conduct, legal standards advanced by coalitions of NGOs, and decisions of international bodies such as the WTO and UN agencies), this trend results in a legal and political arena that is both broader and more fragmented. In this new context, states and NGOs in the Global North no longer control the creation and implementation of human rights standards, while new actors (from transnational social movements to Global South states and NGOs) emerge as influential voices.

nn2. Information and communication technologies present new challenges and opportunities for human rights. As the mobilizations catalyzed by the Arab Spring have shown, tools such as social networks, video documentaries, digital reporting, online learning and long-distance education can accelerate political change, reduce the informational disadvantages suffered by marginalized groups, and bring together national, regional and global groups capable of making a direct impact on the protection of rights.

nn3. The range of actors and legal and political strategies has been considerably expanded. Time-honored strategies such as naming and shaming recalcitrant states are being complemented with newer strategies for transnational research, information circulation, and training, which involve a host of different actors, including social movements, online media outlets, inter-governmental organizations, universities and virtual activist networks.

The seminar will be divided into three sections, each dealing with one of these transformations. Each section, in turn, will be divided into two discussion sessions and one lecture by a leading scholar and/or practitioner.

The seminar will revolve around the discussion of the assigned readings and materials, as well as presentations by students and guest speakers. Grades will be based on an in-class presentation and a final paper.

LAW 684. Conflicts, Ethics, and the Academy. 3 Units.

(Same as ETHICSOC 301) This experimental course looks at conflicts of interest and ethical issues as they arise within academic work. The participants will be drawn from schools and departments across the University in the hope that they will offer different examples of, and perspectives on, the issues we discuss. Topics will include the conflicts that arise from sponsored research, including choices of topics, shaping of conclusions, and nondisclosure agreements; issues of informed consent with respect to human subjects research, and the special issues raised by research conducted outside the United States; the ethics of the classroom and conflicts of interest implicating professor-student relationships. Representative readings will likely include Marcia Angell's work, *Drug Companies and Doctors: A Story of Corruption*, N.Y. Rev. Books, Jan. 15, 2009, and *Is Academic Medicine for Sale?* 342 N. Engl. J. Med. 1516 (2000) (and responses); William R. Freudenburg, *Seeding Science, Courting Conclusions: Reexamining the Intersection of Science, Corporate Cash, and the Law*, 20 *Sociological Forum* 3 (2005); Max Weber, *Science as a Vocation*; legal cases; the movie "Inside Job"; and conflict of interest policies adopted by various universities and professional organizations.

LAW 685. The American Legal Profession. 3 Units.

This course will deal with selected aspects of the history, organization, economics, ethics, and possible futures of the legal profession in the United States. Likely topics will include, in addition to the ABA's Model Rules of Professional Conduct: demographic changes in the profession, the evolution of law firms, bar associations, and law schools from the early twentieth century to the present; the development of corporate law, personal injury, mass torts, prosecutorial and criminal defense practices, and the "public-interest" bar; the dominant professional ethic of adversary-advocacy, and its critics; the regulation of lawyers; the economics of the market for legal services; the organization and culture of law firm practice; the role of the role of the lawyer as counselor; and the export of American lawyering models abroad. Take-home examination, with option of writing a research paper. Special Instructions: Students have the option to write a long research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, final paper or final exam.

LAW 686. Advanced Legal Writing: Business Transactions, Technology and Social Enterprise. 3 Units.

This course is designed to give students practical preparation in drafting and analyzing contracts and drafting with an eye toward addressing both client requirements and negotiation concerns. It should especially appeal to students interested in working in house and practicing transactional law (be it in a traditional for-profit or a social enterprise - with a focus on technology, telecom, social enterprise and collaborative arrangements.). The course offers a wide range of realistic legal writing and drafting problems--completed both inside and outside of class. These drafting assignments will help students improve their writing, drafting, and editing skills and develop their sensitivity to the expectations of the attorneys and clients for whom they will be working as well as the impact of their drafting on the other side. Students will also have an opportunity to collectively interview "clients" for the purpose of determining drafting priorities. In the course, students will learn the foundational tools necessary to analyze a variety of business agreements. Students will learn how to write clear, effective, plain language contracts. Special Instructions: Students on the waitlist for the course will be admitted if spots are available on the basis of priority and Degree of Study. Students may not drop this course after the second day of class. Corporations (Law 242) is a prerequisite for all but LLM (CGP) students. A substantial mark-up of a contract is due on the last day of class.

LAW 688. Advanced Religious Liberty Clinic. 2-7 Units.

Advanced clinic allows students who have taken the Religious Liberty Clinic to continue working on cases. Participation in rounds is required. Advanced clinic may be taken for 2-7 units; general rule of thumb is 4 hours of work per week per unit. Students may not enroll in any clinic (basic or advanced) which would result in earning more than 27 clinical credits during their law school enrollment. Elements used in grading: Class participation, written assignments, and case work. Students must have taken Religious Liberty Clinic. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 690. Advanced Topics in Administrative Law. 2 Units.

This seminar will cover advanced topics in administrative law, including the law of government information, the role of cost benefit analysis, and schools of regulatory reform. Students electing "W" credit will write a series of response papers; students electing "R" credit will write a research paper pertaining to administrative law. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Prior course in Administrative Law required. Writing (W) credit is for 3Ls only. Elements used in grading: Class participation, attendance, written assignments and final paper.

LAW 692. Modern Surveillance Law. 2 Units.

This seminar is an in depth look at modern government surveillance policies and practices. Taught by Richard Salgado, director of law enforcement and information security at Google, Inc, and a former prosecutor at the U.S. Department of Justice's Computer Crime and Intellectual Property Section and Todd Hinnen, a partner at Perkins Coie and a former head of U.S. Department of Justice's National Security Division, the course will cover the technology, law and policy of government surveillance of the Internet and other communications technologies. We will focus on U.S. law, but also address the relationship with other jurisdictions. Technologies covered will include wiretapping, stored data collection and mining, location tracking and drones and legal regimes will include the Fourth Amendment, Electronic Communications Privacy Act, the USA Patriot Act, CALEA and the Foreign Intelligence Surveillance Act. Elements used in grading: Class participation, attendance, written assignments and final paper. Writing (W) credit is for students entering prior to Autumn 2012.

LAW 693. Law and Politics Workshop. 2-3 Units.

This workshop will feature guest speakers who are political scientists or law professors specializing in the legal regulation of politics. Students will be responsible for response papers to each scholarly paper presented. On weeks without guest speakers, topics to be covered will include election law, administrative law, legislation, judicial behavior and public opinion, as well as the political science relevant to those areas of law. The final grade will be determined by class participation (10%), response papers (30%) and final research paper (60%). Students can take the course for R credit for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation (10%), Response papers (30%) and final paper of no less than 18 pages for 2 units of credit and 26 pages for 3 units of credit (60%). (Cross-listed as POLISCI 321).

LAW 694. The Law of War. 3 Units.

The course explores the international law regime governing war, including the law that regulates when states may resort to force and the constraints on the conduct of warfare itself. We will begin by considering when states may permissibly use force, and how changing security threats, including terrorism, the proliferation of weapons of mass destruction, and the commission of widespread humanitarian atrocities challenge and are reshaping the legal framework on recourse to force. We will then explore the rules governing the conduct of military operations, including the constraints on the means and methods of war, the rules governing the treatment of detainees, and the protections extended to civilians and noncombatants in armed conflict. A particular focus of the class will be the application of these rules in non-traditional, asymmetric conflicts between states and terrorist and other non-state groups. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements Used in Grading: Class participation, written assignments, research paper or final exam.

LAW 695. International Human Rights: Media and Education. 2 Units.

This course will explore the role of media and communications in the human rights field, and in particular human rights education. The central focus of the course will be the development by the students of an online education program in international human rights law, which will be made available on the Stanford Law School Human Rights Center website. Students will research effective methods of communication and presentation, as well as the applicable law and will work in small groups to develop multimedia online education modules. Enrollment is by consent of the instructor, and some prior coursework or experience in international law is required. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Elements used in grading: Class participation and written assignments.

LAW 696. Computer Security and Privacy. 2 Units.

This seminar surveys the legal environment for technology security and privacy. We will emphasize areas of law that are frequently invoked, hotly contested, or ripe for reform. Specific topics will include trespass offenses (CFAA and DMCA), consumer protection against deficient security, breach notification, privacy policies, communications safeguards (ECPA), and compelled disclosure to law enforcement and intelligence agencies (Title III and FISA). The material will draw upon high profile and challenging cases, including the prosecutions of Aaron Swartz and Bradley Manning, the contempt citation against Lavabit, and class actions against Apple, Facebook, and Google. Students will have the option of completing a series of short written assignments or one research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. A background in computer science is not required for this course. Writing (W) credit is for 3Ls only. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 697. Comparative Law and Society. 2 Units.

By the mid 20th century, the legal map of the world recognized four main traditions: civil law, common law, socialist, and Islamic law. In early 21st century, the main socialist countries have disappeared and globalization has produced a pronounced convergence between common law and civil law. We also became aware that comparative law has to compare more than law and has to include the social and political context of the law. The comparative method is important, but the substance to be compared has changed. This course introduces students to the main historical experiences of law using the comparative method and law and society materials. They will find a new way of looking at Roman, medieval, or 19th century law because its "monuments" are placed in social perspective. The method will be used to reconstruct the contemporary ideas of human rights and rule of law in the context of specific countries. Students will have two writing obligations: (1) brief reflective essays on assigned readings and (2) a research paper. Starting in session 2, students will prepare brief reflective essays on the required reading (or readings) for the session and submit them to the professors and other students 24 hours prior to the beginning of the session. Assigned readings will all be in English. Additional readings may be in other languages. For the research paper the student will, with professorial approval, choose a country and a topic and discuss the work in progress with the professors at least twice during the quarter. It should not exceed 5,000 words. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: The short essays or article presentations will be one leg of the students' evaluation (50%). The other leg will be the final research essay (50%). Writing (W) credit is for students entering prior to Autumn 2012.

LAW 698. Education Law and Policy. 3 Units.

This seminar will explore the current state of education law and policy, with an emphasis on legal environment for charter schools. Students will have an opportunity to discuss cutting edge issues in education reform with leaders and policy-makers from charter school operators, union leaders, researchers, and innovators. Special Instructions: Grades will be based on class participation and (1) weekly reflection papers of 3-5 pages each week for each of our speakers/topics or (2) a long research paper. Writing credit is for 3Ls only. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. The course is open to first-year Law School students. Writing (W) credit is for 3Ls only. Elements used in grading: Weekly Reflection Papers or Research Paper.

LAW 699. Arbitration in America. 3 Units.

Transactional lawyers and litigation counsel alike will face arbitration as a significant option for resolving their clients' legal disputes. This course covers the development of alternative dispute resolution in the U.S., with an emphasis on arbitration under the Federal Arbitration Act (FAA). It describes how the federal and state governments have gradually come to accept and now favor the private settlement of commercial disputes based on consent of parties. It examines the many different contexts and industries in which arbitration is conducted, including government-mandated programs for labor disputes, systems established by specific industries such as the diamond trade and professional sports associations, the construction industry, and commercial disputes in general; more controversial is the use of arbitration for consumer, class action and employment disputes. This historic reversal of power over adjudication from government to the private sector has alleviated the delays and uncertainties of judicial litigation, and has created a huge and growing legal field of attorneys, arbitrators, and service providers fashioning and administering systems ranging in complexity from the most formal mega dispute with full discovery to the resolution of mini disputes through mechanically applied algorithms. Allowing private parties to agree on the law and procedures that govern their disputes has led, moreover, to numerous clashes of interests, including evasion of public policies established by legislation. How to deal with alleged violations of public policy, errors of law, erroneous findings of fact, unfair procedures, unequal negotiating power, and arbitrator bias are among the continuing and complex difficulties currently faced by courts and legislatures. The US Supreme Court's recent attempts to deal with several aspects of these difficulties will be considered. We will also examine the less heralded but highly significant use of mediation as a relatively speedy and inexpensive method for private dispute resolution, and the recent development of hybrid systems and other innovations. Elements used in grading: Class participation, attendance, written assignments and final exam.

LAW 701. SPILS Law and Society Seminar. 3 Units.

This seminar is restricted to students who are in the SPILS program. The seminar deals with the relationship between legal systems and the societies in which they are embedded. The materials are drawn from studies of many different societies. Among the issues dealt with are: What influence does culture have on the operation of legal systems? What are the social forces which produce particular forms of law? What impact do legal interventions have on society and on human behavior? Elements used in grading: Exam. Enrollment is restricted to SPILS program students.

LAW 703. Corporate Governance and Practice Seminar. 2 Units.

The seminar on corporate governance meets in the Autumn and Winter quarters and forms the core of the LL.M. Program in Corporate Governance & Practice. Attendance and active participation are important to the success of the seminar and an important factor in the overall grade. Students are expected to have carefully read and reviewed assigned materials in advance of each session. Students may be also asked to prepare brief presentations to help guide discussions. Students will be required to submit reflection papers (2 to 3 pages in length) that evaluate, critique, and discuss some or all of the key topics reviewed in the previous week's session. Elements used in grading: Class participation, attendance and assignments. This course is required for and limited to students in the Corporate Governance and Practice LL.M. Program.

LAW 704. Law, Science, and Technology Colloquium. 2 Units.

The Law, Science & Technology Colloquium offers students in the Law, Science & Technology LLM Program the opportunity to discuss cutting-edge legal issues at the intersection of law and technology with leading experts in the field, including Stanford faculty, visiting scholars, technology and IP lawyers, entrepreneurs, and executives from Silicon Valley technology companies. During most class meetings, an invited guest lecturer will present research, a paper, or their experiences to the class on a specific topic related to law, science, and technology. Following these presentations, all students will participate with the lecturer in a class discussion based on assigned readings, the presentation, and students' own experience in the area. Attendance and preparation are vital to the success of the Colloquium and, accordingly, will constitute an important factor in the overall grade. Also, each student will individually write weekly commentary papers that evaluate, critique, and/or discuss key issues from the assigned reading. Elements used in grading: Class participation, attendance and weekly commentary papers. Satisfies the colloquium requirement for Law, Science, and Technology LLM (LST) candidates. Open to LLM students.

LAW 705. SPILS Masters Thesis. 4 Units.

The writing of a work of original scholarship in the area of research of the student's choosing is necessary requirement of the JSM degree. During the winter quarter students are expected to submit two draft chapters: 1) any chapter of the fellow's choice by the end of January; and 2) a draft of the empirical research result's chapter by the appropriate date in the winter quarter as determined by the instructor. Elements used in grading: Thesis. This course is exclusive to SPILS students. The thesis is required for JSM graduation.

LAW 706. Environmental Law and Policy Colloquium. 2 Units.

The Environmental Law & Policy Colloquium offers LLM students the opportunity to discuss cutting-edge legal topics related to, among others, the environment, natural resources management, or energy policy. The colloquium meets in all three quarters. During the autumn quarter, students will engage in group policy discussions. During the winter quarter, a leading expert in the field - a faculty member, a lawyer, a public official, a member of an advocacy groups, or an entrepreneur - will present his or her research, a paper, or his or her experiences to the class on a specific topic. Following these presentations, all students will participate with the lecturer in a class discussion based on assigned readings, the presentation, and students' own experience in the area. During the spring quarter, the students will present their research papers focused on the solution of an environmental or energy issue. Attendance and active participation are important to the success of the seminar and an important factor in the overall grade. Students are expected to have carefully read and reviewed assigned materials in advance of each session. During the first quarter, students will work in teams and will have to submit memos in preparation for the policy discussion. During the second quarter, students will individually write weekly commentary papers to be submitted before the lecture evaluating, critiquing, and/or discussing key issues from the assigned reading(s). In the third quarter, students are expected to present their papers and comment on the other students' research. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. This course is required for and limited to students in the Environmental Law & Policy LLM. Program.

LAW 707. SPILS Research Methods Workshop. 2 Units.

This is a mandatory course for SPILS Fellows as part of the program's core curriculum. Its main goal is to offer students an interdisciplinary perspective about socio-legal research, and research tools for implementing their individual research projects. This Winter term workshop will complement the Research Design for Empirical Legal Studies Seminar taken in the Autumn by 1) expanding and elaborating on some of the methods analyzed during the seminar; and 2) assisting students in using such methods towards their individual research project. The workshop will consist of specialized sessions, most of them tailored towards the work of empirical research that occurs after the data collection phase. During the quarter the fellows are expected to submit drafts of different chapters of their thesis. If appropriate, the workshop may also include group and/or individual sessions designed to address the very specific needs of the research undertaken by the SPILS Fellows. Elements used in grading: Class participation, attendance and written assignments. Enrollment is restricted to SPILS fellows. The seminar is required for JSM graduation.

LAW 708. Advanced Legal Writing for American Practice. 3 Units.

This course orients LLM and JSM students to a range of legal writing genres used by American lawyers in practice and by law students in papers and exams. At the core of these genres are the techniques of legal research, objective and persuasive legal writing, and related legal analysis, as practiced in American law offices and courts. The course presents students with realistic legal writing scenarios that they address in and out of class. Students prepare an analytical memorandum, advising a hypothetical corporate client, and a short brief for a mediator. The assignments are designed to help students adapt their writing skills by incorporating methods that American lawyers use to analyze typical legal problems and to advocate on behalf of their clients. Special Instructions: Students must participate in one conference with the instructor, outside regular class hours, to be arranged at a mutually convenient time. Only LLM and JSM students may enroll in this class via Axess. If the class is oversubscribed, a lottery system will be used the first week of class to determine the final class list. This course is limited to LLM and advanced degree students only. Elements used in grading: Class participation, attendance, and written and oral assignments.

LAW 709. Introduction to American Law. 3 Units.

This course is designed to introduce international students in the Exchange and Advanced Degree Programs (LL.M. and SPILS) to the key principles of American law. The course provides an overview of distinctive features of the U.S. legal system, including its history, procedures and institutions. Topics include the role of precedent in the common law, due process, trial by jury, equal protection, and federalism. The course is offered in September, before the start of the regular law school quarter. Special Instructions: Required for LL.M. but optional for the SPILS and Exchange Program students. Open to LL.M., SPILS and SLS Exchange Program students only. The class starts on September 2 and runs through September 19. Final exam will be scheduled on Friday, September 19. Elements used in grading: Class attendance, participation, short written assignment and final exam. LLM/SPILS students only.

LAW 712. Research Design for Empirical Legal Studies. 3-4 Units.

Empirical legal studies have become popular in the U.S. and are now spreading to non-U.S. law faculties as well. Usually the term applies to analyses of quantitative data and the researcher relies on data collected by others. But the term "empirical" properly encompasses both qualitative and quantitative data, including interviews, legal documents, survey research and experimental results. Analysts interested in using such data need to understand how they were collected, in order to decide what data can appropriately be used to answer different kinds of questions. Often to answer the questions of interest, a researcher needs to collect new data, which poses challenging questions about how to design an empirical research study. Answering these questions appropriately is important to ensure publication in a peer reviewed journal, which are becoming increasingly important to legal academia. This seminar will introduce students to the wide range of research methods that can be used to answer empirical questions, provide a framework for choosing among methods, and explain how to use the methods. The project for the quarter is to design an empirical research study on a topic of your choice. Special Instructions: JD students can take the class for 3-4 units. SPILS students must take this class for 4 units. Students taking the course for 4 units must attend the additional session on Thursday, which is option for others. After the term begins, JD students accepted into the course can transfer from section (01) into section (02), which can potentially satisfy the R requirement, with consent of the instructor. Consent Application for JD students: To apply for this course, JD students must e-mail Professor Hensler at dhensler@stanford.edu. This course is REQUIRED for all SPILS fellows and BY CONSENT for all other students. Elements used in grading: Class participation, attendance, written assignments and final paper.

LAW 721. Private Equity Investing: Quantitative Skills Seminar. 1 Unit.

This course has been created to supplement Law 522, Private Equity Investing. The focus will be on the quantitative aspects of private equity investing. The primary pedagogical objective is to have students learn the skills required to do financial analysis and spreadsheet modeling. Students will develop a thorough understanding of "the time value of money" and the concepts of present value, internal rates of return, and the discounting of cash flows and annuity streams. The key principles of entrepreneurial finance and deal arithmetic will be presented, including the implied valuation of an investment, blended returns, the math of multitiered capital structures, contingent claims analysis, DCF valuation techniques, investment fund economics, option mechanics and variable pricing mechanisms. Mastery of these fundamentals will allow students to develop and strengthen their ability to prepare forecasts, craft deal structures and run the numbers on real world transactions. Special Instructions: In order to enroll in PEI: Quantitative Skills students must concurrently enroll in Private Equity Investing (LAW 522). In other words, no student may enroll in either Law 522 or Law 721 without also enrolling in the other. Students accepted to enroll in Private Equity Investing (for which a Consent Application Form is required) will automatically be able to enroll in LAW 721. Law 721 will be graded on a Mandatory Pass/Restricted Credit/Fail (MP/R/F) basis. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 722. Contracts: American Law. 4 Units.

This course will provide advanced-degree students with coverage of Contracts law comparable to the fall course offered for first-year JD students. The course will identify the scope and purpose of the legal protection accorded to interests predicated on contract. We will focus on problems of contract formation, enforceability, interpretation, performance and excuses for non-performance, and remedies for breach. The course will cover both the U.S. common law of contracts and the basics of UCC Article 2 (sales of goods). Not open to JD students. Open only to students in the SLS Advanced Degree Programs. Elements used in grading: Class Participation, Attendance, Final Exam.

LAW 724. Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals. 2 Units.

The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government, and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change...), leadership, and the law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: Ebola; Facebook's mood manipulation research and teen suicides from social media bullying; Google's European "right to be forgotten" and China policy and driverless cars; Space X (Elon Musk's voyages to Mars); ISIS' interaction with international NGOs; sexual assault on US University campuses and in the US military; the ethics of corporate social responsibility (through companies such as L'Oréal, Whole Foods and Walmart); immigration reform; corporate and financial sector scandals; and non-profit sector ethics challenges. Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities beyond speaking in class). Strong emphasis on critical thinking and testing ideas in real world contexts. There will be a limited number of openings above the set enrollment limit of 40 students. If the enrollment limit is reached, students wishing to take the course should contact Dr. Susan Liautaud at susanl1@stanford.edu. The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with Public Policy 103F), and Science, Technology, and Society and satisfies the Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. NOTE: This course does not meet the SLS Ethics requirement. Elements used in grading: Class Participation, Attendance, Written Assignments, and Final Paper. Ethics in Society (ETHICSOC 234R), Public Policy (PUBLPOL 134, PUBLPOL 234).

LAW 726. Negotiation on the Ground: Discussions at the Intersection of Theory and Practice. 1 Unit.

We can read any number of books about negotiation, but how do the concepts and principles play out in the real world? This dinner colloquium will meet with distinguished negotiators working in a variety of fields to reflect on and draw lessons from their deep and diverse experience. Guests for this year will speak on: studio and talent perspectives in entertainment negotiations, business and legal perspectives in biotechnology companies, public/private policy negotiations in natural resource management, criminal justice, and California health policy. Pre-Requisite: Negotiation Seminar or substantial equivalent. Schedule: Wednesday, 5:30-8:00pm. There will be five presentation/dinner discussion sessions during the Winter Quarter, of which students are required to attend four. Elements used in grading: Class Participation and Attendance.

LAW 727. Health Law: Quality and Safety of Care. 3 Units.

Concerns about the quality of health care, along with concerns about its cost and accessibility, are the focal points of American health policy. This course will consider how legislators, courts, and professional groups attempt to safeguard the quality and safety of the health care patients receive. The course approaches "regulation" in a broad sense. We will cover regimes for determining who may deliver health care services (e.g. licensing and accreditation agencies), legal and ethical obligations providers owe to patients (e.g. confidentiality, informed consent), individual and institutional liability for substandard care, and various proposals for reforming the medical malpractice system. We will also discuss the Patient Protection and Affordable Care Act (aka, "Obamacare"), which is launching many new initiatives aimed at assuring or improving health care quality. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Exam or Final Paper. (Cross-listed with School of Medicine - MED 209).

LAW 728. Stolen Art. 2 Units.

Public fascination with stolen art is evident from its almost daily coverage in the media, including the New York Times, the Wall Street Journal, the Art Newspaper, the Art Crime Journal, and numerous online sources. What is less evident is the extent to which apparently disparate art, cultural heritage and law topics share a significant stolen art interest. The course will deal with five currently lively stolen art topics: Imperialism; the Holocaust; Indigenous Art; Collectors and Museums; and the Illicit Trade in Antiquities. Law students and graduate students in other fields at Stanford (Art History, Anthropology, Archaeology, Classics, and others) will be eligible to take the course. Grades will be based on research papers (up to five students may write research papers) or final examinations. Special Instructions: Students have the option to write a research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Final Exam or Final Research Paper.

LAW 729. Legal Informatics. 2-3 Units.

The legal system is undergoing rapid change due to - among other forces - expanding use of information technology in legal services as well as globalization of the legal industry. This class offers an overview of how technology is used in legal today's legal practice and how it will be changing the landscape of the legal profession and the law more broadly in the foreseeable future. Through this class students gain an understanding of the unique challenges and opportunities the legal system and the legal industry are facing and learn about innovative new systems seeking to address them. Students will be introduced to technologies that are commonly used for legal research, as well matter management and client management by law firms as well as in-house departments. Students will also be familiarized with the next generation of innovative systems and platforms that challenge the way law has been practiced to date, but also promise to increase the efficiency of our legal system. The class modules include: (i) Legal Document Management (including electronic legal research, e-discovery, specialized legal databases), (ii) Legal Infrastructure (including: case management, legal lead generation, managing the firms legal business process and legal process outsourcing), and (iii) Computational Law (including: legal expert systems, computable contracts, and unauthorized practice of law issues). Expert guest-speakers from academia and industry will provide for a diverse and interdisciplinary experience. Successful legal technology entrepreneurs and thought leaders in the legal technology space will provide a practical angle to the discussion. Special Instructions: Grades will be based on class participation including class preparation (25% of grade) and one of the following two options: Option 1 (section 01): Legal Technology Project (individual or group). Students will be presented with a series of research problems posed by industry partners of CodeX - The Stanford Center for Legal Informatics (<http://codex.stanford.edu>). Students can select a project and, individually or as part of a team, address the posed problem in form of a written report or by preparing a technical demonstration project/prototype that aims to solve the problem posed by the industry partner (75% of grade); or Option 2 (section 02): independent research paper (75% of grade). Students shall write an independent research paper on a legal informatics topic. You are invited to propose a topic and a working title and to discuss your topic ideas with us. The topic and the working title of the research paper must be approved by the instructors, before you start your detailed research. Independent research papers require by definition that students include other research materials besides the introductory and advanced readings for class. Students electing option 2 will receive Research (R) credit. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the length of the research paper. If you wish to earn 2 units, the research paper shall be at least 18 pages in length (double-spaced, 12-point font size, 1-inch margins). If you wish to earn 3 units, the research paper shall be at least 26 pages in length (double-spaced, 12-point font size, 1-inch margins). Each student can choose one of the above two options, whichever he/she prefers. After the term begins, students electing option 2 can transfer from section (01) into section (02), with consent of the instructor. There are no prerequisites for this class. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. (Cross-listed with Computer Science - CS 204).

LAW 730. Advanced Legal Writing: Technology Transactions. 3 Units.

This course covers the foundations of drafting contracts in a modern commercial setting, primarily through weekly hands-on writing exercises that illustrate business problems commonly found in today's technology transactions law practice. Topics to be addressed will include basic contract anatomy, common clause ambiguities, structuring for readable "flow", and drafting-for-negotiation techniques. Final examination will involve crafting a full-length technology license agreement from a rough term sheet that appears to have been pecked out on some sort of mobile device. No prior business law coursework, intellectual property background, or martial arts proficiency required. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam.

LAW 731. Current Issues in Network Neutrality. 2 Units.

Do we need network neutrality rules and, if yes, what should they be? After more than ten years, this question is still hotly debated around the world. Network neutrality rules limit the ability of Internet service providers to interfere with the applications, content and services on their networks; they allow users to decide how they want to use the Internet without interference from Internet service providers. In the US, the recent decision by the Court of Appeals for the DC Circuit in *Verizon v. FCC* has re-opened the debate. In December 2010, the Federal Communications Commission (FCC) adopted the Open Internet Order, which enacted binding network neutrality rules for the first time. In January of this year, the Court of Appeals for the D.C. Circuit struck down the core provisions of the Open Internet Order - the rules against blocking and discrimination. As a result of this ruling, Internet service providers like Verizon, AT&T or Cox Cable that connect users to the Internet are now free to block any content, service or application they want. They can slow down selected applications, speed up others, or ask application or content providers like Netflix or Spotify to pay fees to reach their users. These practices would fundamentally change how we experience the Internet. In the wake of the Court's decision, policy makers, stakeholders and observers in the US are debating how to best ensure that the Internet remains open and free. In February, the Federal Communications Commission opened a new docket to collect public input on the best way to proceed. In Europe, the European Commission, the European Parliament and the member states are currently considering which approach to network neutrality they should take. The Brazilian Parliament is in the process of adopting network neutrality rules. This seminar aims to enable students to participate in the ongoing policy debates over network neutrality in the US and abroad. Class sessions will explore whether there is a need for network neutrality rules and, if yes, what kind of rules a network neutrality regime should include. For example, should network neutrality rules only ban blocking, or also discrimination? And if yes, what kind of differential treatment should be banned? Should Internet service providers be allowed to charge application or content providers for prioritized or otherwise enhanced access to their Internet service customers? How can we find network neutrality rules that allow network providers to manage their networks and that allow innovation in the network, while protecting the interests of users and application developers? Does competition in the market for Internet services remove the need for network neutrality rules? And finally, what is the best way to move forward in the US? Students will work in groups on written assignments that explore specific questions from the perspective of particular Internet companies or interest groups. Students are expected to attend all sessions of the class and participate in the class discussion. Special Instructions: Students may submit consent applications to enroll in the "Current Issues in Network Neutrality" seminar and the "Next Steps in Network Neutrality" policy lab practicum. Students concurrently accepted in the seminar and the policy practicum will research and write parts of white papers and comments to the Federal Communications Commission that will help policy makers assess the available options. Students will be required to attend the seminar and participate in the discussion, but will not do any of the written assignments for the seminar. Students enrolled in the seminar and the practicum will have the option to write papers for W, PW, or R credit in the practicum, with instructor consent. The class is open to law students and students from other parts of the university. It does not require any technical background. Elements used in grading: Class participation, attendance, written assignments. Writing (W) credit is for 3Ls only. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline.

LAW 733. Topics in American Legal Practice. 1 Unit.

This course is designed to introduce international JD students to American legal practice. It will begin in the spring quarter and continue into the fall quarter, and will require the writing of a paper. Elements used in grading: Final Paper.

LAW 735. Cities in Distress. 2-3 Units.

In 2013, the City Detroit became the 28th city to declare municipal bankruptcy or to enter a receivership for fiscal crisis since late 2008, a window of time that has seen five of the six largest municipal bankruptcies in American history. This course will focus on these cities and the legal tools available to facilitate their restructuring and recovery. Subjects will include: (1) the basics of local finance; (2) an introduction to the primary causes of local fiscal distress; and (3) tools for state and federal governance of city finances and financial distress (including audits and other oversight mechanisms, state regulation, municipal bankruptcy, and state receiverships). The course will feature readings focused on law and cities across the country, including in California, Pennsylvania, Michigan, and North Carolina. A special unit in the course will focus squarely on the city of Detroit's bankruptcy. Grades will be based on class participation and (1) weekly reflection papers of 3-5 pages each week for each of our speakers/topics or (2) a long research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements Used in Grading: Class Participation, Attendance, Written Assignments, Final Paper.

LAW 736. Comparative Venture Capital - China. 2 Units.

This course is taught in conjunction with Law 736A. Students may enroll for this course alone or for both this course and Law 736A. Law 736 is intended to introduce students to the legal and financial principles underlying venture capital investment in start-up enterprises and innovative technologies. A special emphasis of this course will be a comparative analysis of the ways in which the various legal and financial structures employed by venture capitalists are replicated in other legal environments, with a focus on the largest venture capital and IPO market in the world - China. The first eight weeks of the course will coincide with the first eight weeks of Winter Quarter, and will be conducted at Stanford Law School. Class sessions will be comprised of lectures regarding the basic concepts and structures, as well as seminar discussions with venture capital industry participants. Elements used in grading: Final exam, attendance and class participation. Special Instructions: Enrollment in the Beijing option is limited to 12 students (See Law 736A for application instructions and deadline).

LAW 736A. Comparative Venture Capital - China: Field Study. 1 Unit.

This is the Stanford Center at Peking University in Beijing component of Comparative Venture Capital - China (Law 736). For details, see course description for Law 736. During spring break 2015, the course will be held at the Stanford Center at Peking University in Beijing, and will consist of meetings and seminars with lawyers, entrepreneurs, and venture capitalists active in the Chinese venture capital market. Students will also tour start-up enterprises made possible with venture investments. Enrollment is limited to 12 students. PLEASE NOTE: Students will need a passport and a visa to travel to Beijing. Elements used in grading: class participation and short writing assignments. APPLICATION: To apply for this course, students must complete and e-mail the Application Form available on the SLS Registrar's Office website (see Registration) to the SLS Registrar's Office. See Application Form for submission deadline.

LAW 738. American Constitutional History from the Civil War to the War on Poverty. 3 Units.

American Constitutional History from the Civil War to the Cold War. This course will address U.S. constitutional history from the post-Civil War Reconstruction period through the mid-20th century. Because of the breadth of the subject matter, the view will necessarily be partial. In particular we will take as our focus the way the Constitution has provided a point of political mobilization for social movements challenging economic and social inequality. Topics covered include: Civil War Reconstruction and restoration; the rise of corporate capitalism and efforts to constrain it; Progressive Era regulation; the New Deal challenge to federalism and the anti-New Deal backlash; government spending; the World Wars and emergency powers; Civil Liberties including speech and privacy; and the beginning of the Civil Rights Era. Readings will include both legal and historical materials with a focus on the relationship between law and society. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Paper extensions will be granted with instructor permission. No automatic grading penalty for late papers. Cross-listed with History (HISTORY 155).

LAW 739. International Deals: The Economic Structure of Business Transactions. 4 Units.

This course applies economic theory to the practice of structuring contracts. In the first part of the course, we read economics articles and case studies, focusing on problems of imperfect information. In the second part, we explore the connection between economic theory and contracting practice by dividing into groups to study a current deal. Groups examine a deal in detail and make a presentation to the class. We then hear from the lawyer or principal who worked on that deal. When it works, the students' and the practitioners' analyses are complimentary and enlightening. This year, we will focus on deals with an international component. In the past, we have examined cross-border joint ventures, movie and television financings, biotech alliances, venture capital financings, private equity investments, and architectural services. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam. Prerequisite: Corporations. If necessary, Corporations can be taken concurrently.

LAW 740. Guns, Drugs, Prisons, and Other Empirical Debates in Law and Policy. 2 Units.

Empirical debates are often crucial to decisions by judges and policymakers. This course will focus on some of these debates with the goal of both informing students on the substantive issues and helping them to develop the ability to understand and evaluate empirical studies by reading major studies on the issues of guns, drugs, prisons and a variety of other hotly contested empirical issues in law and policy. Although we will be reading actual statistical/econometric studies, there is no pre-requisite for the class since it is not a hard-core quantitative empirical methods class, but rather is designed to develop the ability to be a thoughtful consumer of empirical research. The goal is to provide information that judges, litigators, policymakers, and informed citizens would find useful in understanding the strengths and weaknesses of empirical evidence. The final in-class exam will involve a critique of an actual empirical paper. One page comment papers will be written for each class. Depending on the size of the class, we may also have student presentations of certain papers.

LAW 741. Introduction to Law and Economics. 1 Unit.

This course will introduce students to the "law and economics" way of thinking about the legal system. It is designed primarily for students who have little or no prior training in economics and who are unlikely to take more advanced courses in the field (such as the 4 unit Law 528, "Economic Analysis of Law"). This class will meet for six 1.5 hour sessions during the first part of the quarter. We will examine the core bodies of law taught to first-year law students: tort law, contract law, property law, criminal law, and civil procedure. For each of these bodies of law, the economic approach will be described in non-technical terms and then this approach will be used to examine a key case or key issue within that body of law. First-year law students are especially welcome in this course. There are no prerequisites to take this course. Elements used in grading: Final exam (open-book). The open-book exam will be given in class two weeks after the final lecture.

LAW 742. Federalism. 2-3 Units.

This course is an overview of legal and policy issues connected to federalism. We will examine a set of core theoretical questions - the values federalism serves; the relationship of federalism and individual and minority rights; and the role of judges in enforcing federalism through judicial review - across a wide range of contemporary legal debates (e.g., same-sex marriage, medical marijuana, immigration, voting rights). While much of the seminar will focus on the United States, we will also consider federalism in comparative context by examining the constitutions and legal doctrines of other regimes. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the seminar for R credit can take the seminar for either 2 or 3 units, depending on the paper length. Elements used in grading: Class Participation, Written Assignments or Research Paper.

LAW 743. Advanced Legal Writing for American Courts. 3 Units.

This course orients LLM, advanced degree students, and JD students to a range of legal writing genres used by lawyers in practice before American courts and by courts in their decision making. At the core of these genres are the techniques of legal research, objective and persuasive legal writing, and related legal analysis. The course presents students with realistic legal writing scenarios that they address in and out of class. Students perform legal research and prepare an analytical memorandum advising a hypothetical judge and write a short letter brief. These assignments are designed to help students adapt their writing skills by incorporating methods that American lawyers use to analyze typical legal problems and to advocate on behalf of their clients and that American judges use to evaluate the cases before them. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 744. Moral Minds. 2 Units.

Recent psychological advances in our understanding of the cognitive and social origins of morality cast a new light on age-old questions about ethics, such as: How did our moral sense evolve in our species? How does it develop over our lifetime? How much does our culture, religion, or politics determine our moral values? What is the role of intuition and emotion in moral judgment? How "logical" is moral judgment? How do other people's moral choices affect us? Does character matter or is behavior entirely dictated by the situations we find ourselves in? If it is purely situational, are we morally responsible for anything? How far will we go to convince ourselves that we are good and moral? We will review empirical answers to these questions suggested by behavioral research, and explore their implications for ethics. Open to all graduate students, including advanced degree candidates at the professional schools (law, business, medicine, computer science, education, etc.). Enrollment limited to 16 by consent of instructors. Elements used in grading: Class Participation, Attendance, Readings. CONSENT APPLICATION: Students enrolled in the course will be selected through an application process. The application can be found at <http://web.stanford.edu/~arnewman/MoralMinds.fb>, and is due at 11:59 p.m. on November 14, 2014. Cross-listed with Ethics in Society (ETHICSOC 304) and Psychology (PSYCH 264).

LAW 745. Intellectual Property: International and Comparative Copyright. 3 Units.

Music, motion pictures, books and computer programs are protected instantly upon their creation and without further ado under the copyright laws of 159+ countries. One great challenge for lawyers is to determine who owns the rights to these works across countries with differing legal systems. Another challenge is to determine what rights and remedies attach to these works, and what exceptions to rights apply, across countries that assign different policy weights to the interests of creators and users. Few copyright licenses today fail to reach across borders, and copyright litigation increasingly calls for an understanding of foreign law. This course will focus on the counselling considerations that surround the exploitation of foreign and domestic copyrighted works, respectively, in domestic and foreign markets through licensing, litigation, or both. The course will survey the principal legal systems and international treaty arrangements for the protection of copyrighted works as well as questions of jurisdiction, territoriality, national treatment, and choice of law. There will be no exam in the course, but rather four problem sets that will be discussed in separate class sessions. Students may select which three of the problem sets they wish to have graded. Elements used in grading: In-class problem sets.

LAW 746. Climate Change Policy: Economic, Legal, and Political Analysis. 4 Units.

This course will advance students' understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Beyond focusing on economic issues and legal constraints, it will address the political economy of various emissions-reduction strategies. The course will consider policy efforts at the local, national, and international levels. Theoretical contributions as well as empirical analyses will be considered. Specific topics include: interactions among overlapping climate policies and between new policies and pre-existing legal or regulatory frameworks; the role that jurisdictional or geographic scale can play in influencing the performance of climate policy approaches; and numerical modeling and statistical analyses of climate change policies. Elements used in grading: Class Participation, Written Assignments, Final Exam. Cross-listed with Economics (ECON 159).

LAW 747. Law, Slavery and Race. 3 Units.

This course will explore the interaction of law, slavery and race in the United States, as well as from a comparative perspective. We will read original documents, including excerpts of trial transcripts, appellate opinions, treatises, codes, and first-person narratives. We will study the way law, politics and culture interacted to shape the institution of slavery and the development of modern conceptions of race. Course lectures and discussions will focus on questions such as: Did different legal regimes (Spanish, French, British) foster different systems of race and slavery in the Americas? How did/does law work "on the ground" to shape the production of racial hierarchy and creation of racial identities? In what ways did slavery influence the U.S. Constitution? How has race shaped citizenship in the U.S., and how can we compare it to other constitutional regimes? The course will begin with the origins of New World slavery, race and racism, and move chronologically to the present day. All students will be required to read and to participate in classroom discussion (obviously, attendance is required). Students will prepare two questions for discussion for 12 out of 20 class meetings; participation and discussion questions together will count for 25% of the grade. For students taking the exam, there will be a one-day take-home essay exam. Alternatively, students may write a final paper based on original research, of approximately 26 pages in length. A prospectus and rough draft will be required, for 5% and 10% of the grade respectively. The final exam or paper will be worth 75% of the grade (including the prospectus and rough draft). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper or Final Exam. Cross-listed with African & African American Studies (AFRICAAM 254D), Comparative Studies in Race & Ethnicity (CSRE 154D) and History (HISTORY 254D) & (HISTORY 354).

LAW 748. Comparative Class Actions. 1 Unit.

Although many lawyers regard the class action as a quintessential U.S. procedure, more than two dozen countries in North and South America, Northern, Central and Western Europe, Australia, Asia, Africa and the Mid-East have adopted some form of modern representative class action, and the number of jurisdictions with class actions is continuing to increase. Although the U.S. Supreme Court has steadily narrowed the scope for U.S. class actions, other jurisdictions see the procedure as appropriate for resolving securities, antitrust, consumer and personal injury claims. Some jurisdictions have invited business to resolve transnational claims against them in their own domestic courts, and plaintiff attorneys who cannot obtain class certification in U.S. courts coordinate non-class mass actions with class action attorneys outside the U.S. Stanford is collaborating with the University of Windsor (Ontario) and Tilburg University (the Netherlands) law schools to offer a 1-credit seminar on these developments. Using a combination of synchronous and asynchronous on-line communication, faculty and students at the 3 law schools will describe and analyze differences and similarities among the 3 countries (quite different) class action regimes. The class will meet weekly (sometimes separately by school and sometimes with faculty and students from the 3 schools together virtually) and SLS students will work with students at the other 2 institutions to research issues that cut across all three jurisdictions. This is a great opportunity to discover how lawyers in non-U.S. jurisdictions think about problems that arise trans-nationally, and some of the student you encounter in the seminar may be the practitioners you will litigate besides or against in future global litigation. Elements used in grading: Class Participation, Attendance, Written Assignments. CONSENT APPLICATION: Students interested in this course should contact Professor Hensler directly via email at dhensler@stanford.edu.

LAW 749. Global Litigation. 3 Units.

A securities class action is resolved in the NJ federal court for US investors and in the Amsterdam Court of Appeals for all other investors worldwide. Apple sues Samsung for patent infringement in N.D. CA and Samsung counter-sues in Korea, Japan and Germany. Merck is sued for injuries arising from its prescription drug, Vioxx, in the U.S., Canada and Australia, and the Australian lawyers are directed to challenge an otherwise unproblematic judicial ruling because of its possible impact on the U.S. litigation; meanwhile class certification is denied in the U.S. but granted in Canada. Philip Morris' Hong Kong subsidiary files a claim in an international arbitration tribunal charging that Australia's public health protection statute regarding tobacco marketing violates Australia's bilateral investment treaty with Hong Kong. Lawyers who received a \$9 billion judgment from Ecuadorian courts against Chevron for environmental damage fight to enforce it in courts in Argentina, Brazil and Canada while Chevron's lawyers file a RICO suit against the plaintiff lawyer in the federal court for the N.Y.S.D. With the globalization of the economy we are seeing the globalization of litigation and the emergence of a new class of "global lawyers" who advise clients on litigation risks and opportunities in jurisdictions with different substantive law, procedural rules and legal and judicial cultures. This seminar will consider the doctrinal, procedural and practical challenges that arise when litigation goes global. We will consider the high profile cases in which these issues have played out in recent years and meet some of the lawyers who are creating a new virtual international court system for the resolution of global disputes. Special Instructions: Students in this course may if they wish also register for a 1-credit course on comparative class actions (Law 748), which will be taught collaboratively with faculty and students in U. Windsor (Ontario) and Tilburg University (the Netherlands). Elements used in grading: Class Participation, Attendance, Final Paper.

LAW 750. Topics in Complex Litigation. 1 Unit.

This course is an introduction to complex litigation and institutional design in the contemporary American legal system including the general move away from regulation and toward litigation in recent decades, the legal and policy implications of that trend, and contemporary efforts to retrench or remake the system.

LAW 751. Just and Unjust Wars. 2 Units.

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Enrollment will be limited to 20 students -- 10 from SLS who will be selected by lottery and 10 from H&S. Elements used in grading: Class Participation, Written Assignments, Final Exam. Cross-listed with Ethics in Society (ETHICSOC 205R), (ETHICSOC 305R) & Philosophy (PHIL 205R), (PHIL 305R).

LAW 752. International Criminal Justice. 2 Units.

The establishment of a global system of international justice reveals that the promises made during the Nuremberg era are not mere history. Over the past decade, the international community has undertaken a considerable investment in enforcing international criminal law in conflict and post-conflict situations with the establishment of the international criminal tribunals for the former Yugoslavia, Rwanda, Sierra Leone, East Timor, Cambodia, and Lebanon. As these ad hoc institutions wind down, the International Criminal Court (ICC) has become fully functional, although it is plagued by challenges to its legitimacy, erratic state cooperation, and persistent perceptions of inefficacy and inefficiency. Moreover, the global commitment to international justice remains inconsistent as calls for criminal accountability for the situations in Sri Lanka, South Sudan, and Syria-among others-go unanswered. This intensive mini-course in the new September Term will introduce students to the law, institutions, and actors that constitute the system of international criminal justice and to the political environment in which it operates. The classroom component (offered at Stanford during the first week of the course) will offer an elemental analysis of international crimes as they have evolved in international law and focus on the challenges of interpreting these norms in a criminal prosecution. Jurisprudence from the various international tribunals will be scrutinized with an emphasis on understanding the prosecution's burden, available defenses, and sources of proof. The course will culminate in a visit to The Hague in the second week of the course, during which time students will meet with principals from the tribunals, including prosecutors, judges, administrators, and members of the defense bar. In addition to the substance of international criminal law, this course will also serve as an introduction to international legal reasoning, law-making, and institutional design. It will complement existing courses at the Law School covering comparative law, international organizations, international human rights, and public international law. Elements used in grading: The course grade will be based on a series of short papers and active in-class engagement with the assigned materials. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 753. Intellectual Property: Patent and Technology Licensing. 3 Units.

This course covers the fundamentals of the law and practice of licensing of patents and technology. Licensing is the principal means by which rights in patents and technology are shared, exploited and monetized. It is fundamental to business models throughout the technology industry and beyond, including in software, mobile, consumer devices, semiconductors and pharmaceuticals. We cover (1) the business drivers and models for licensing patents and technology, (2) the core concepts and current trends of licensing law (both Federal Circuit and Supreme Court), and (3) key issues in structuring, drafting and negotiating patent and technology licenses. We also cover how the "patent troll" and "patent reform" debates may affect licensing law and practice. We will emphasize the practical aspects of licensing patents and technology, and licensing in its broader context in relation to corporate, litigation, intellectual property and antitrust practices. Elements used in grading: Class Participation, Final Exam.

LAW 754. Current Issues in Corporate Governance. 2 Units.

Corporate governance has become a constant fixture of the legal and policy debates of our time. It not only figured prominently in the Sarbanes-Oxley Act of 2002 and the Dodd-Frank Act of 2010, the sweeping regulatory reforms of the last decade, but its reach has been far broader at both domestic and international levels. For a vast array of economic and social problems - from economic growth and systemic risk to rising inequality - improved corporate governance surfaced as a favored policy response. This seminar explores the central debates in this area with respect to issues such as board independence, shareholder voting and the role of proxy advisors, institutional investor activism, executive compensation, the question of short-termism, and board diversity. We will read works from the legal and economic literature and focus on current controversies. Special Instructions: Students have the option to write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), with consent of the instructor. Elements used in grading: Class Participation, Written Assignments and Final Exam or Final Paper.

LAW 755. Deals in Latin America. 2 Units.

This course addresses value creation by business lawyers by examining how private parties structure their business transactions in Latin America, with a special emphasis on Brazil. It will focus, in particular, on the extent to which deal structures that are prevalent in the United States can travel well, or require adjusting, to this particular context. The first part of the course will explore barriers to contracting, such as risk and uncertainty, information problems, contract enforceability, and the Latin American legal and economic environments, as well as the tools available to overcome those barriers. The second part of the course will examine how the patterns of corporate ownership and control prevailing in the region shape the style and structure of business deals. Throughout the course, we will apply these concepts to a series of transactions that reflect the changing economic landscape in Latin America. This course is taught in conjunction with Law 755A. Students may enroll for this course alone or for both this course and Law 755A. As one of the new SLS Overseas Courses, the first eight weeks of the course will coincide with the first eight weeks of the Winter Quarter, and will be conducted at Stanford Law School. Students will have the option of participating in a one-week extension of the course in Satilde;o Paulo during spring break for an additional credit. While in Satilde;o Paulo, the class will meet local lawyers, clients, and regulators to discuss Brazilian deals in joint sessions with students from FGV Law School. The overseas portion of the course will be co-taught with George Triantis. Elements used in grading: Class Participation, Written Assignments, Final Exam. Special instructions: Enrollment in the Satilde;o Paulo option is limited to 12 students (See Law 755A for application instructions and deadline).

LAW 755A. Deals in Latin America: Field Study. 1 Unit.

This is the Satilde;o Paulo component of Deals in Latin America (Law 755). The course will be held at FGV Law School in Satilde;o Paulo (FGV Direito SP), and will consist of meetings with local lawyers, clients, and regulators to discuss Brazilian deals in joint sessions with students from FGV Law School. Enrollment is limited to 12 students, and will be graded on the basis of participation and a short reflection paper. See Law 755 for enrollment instructions. APPLICATION: To apply for this course, students must complete and e-mail the Application Form available on the SLS Registrar's Office website (see Registration) to the SLS Registrar's Office. See Application Form for submission deadline.

LAW 756. Sentencing and Policy. 3 Units.

This introductory course will familiarize students with the history, structure, and performance of America's sentencing system. Sentencing is the process by which criminal sanctions are imposed in individual cases following criminal convictions. The course will examine sentencing from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will also explore sentencing theories and their application (in both federal and state structures), the impact of sentencing policy on mass incarceration, and the relationship between sentencing and crime. These topics will be considered as they play out in current political and policy debates. Guest lectures may include presentations by legal professionals, victims, and offenders. This course is open to 1Ls, 2Ls, and 3Ls in the Law School. NOTE: Students who previously took Sentencing and Corrections (621) should not enroll in this course, as it would be duplicative. Elements used in grading. Students are asked to write two reflection papers (dates specified in the syllabus). Those two reflection papers constitute 50% of the grade; the final one-day take home exam constitutes the other 50%. Class participation will be used as a "tipping factor."

LAW 757. Corrections, Punishment, and Public Policy. 3 Units.

This introductory course will familiarize students with the history, structure, and performance of America's corrections system. Corrections deals with the implementation and evaluation of criminal sentences after they are handed down. This course will cover probation, jails, prison, parole, and prisoner reentry. We will also discuss special populations (e.g., mentally ill, sex offenders), mass incarceration, and how the widespread impacts of America's prison expansion. The course will examine corrections from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will explore correctional theories and their application, the nature, scope and function of corrections, the impact of mass incarceration on crime and communities, what works in rehabilitation, and how to help offenders reintegrate after a prison term. These topics will be considered as they play out in current political and policy debates. Guest lectures may include presentations by legal professionals, victims, offenders, and correctional leaders. We also plan to visit a correctional facility. This course is open to 1Ls, 2Ls, and 3Ls in the Law School. Students who have previously taken Petersilia's Sentencing and Corrections course (SLS 621-0-01) should not enroll in this class, as it would be duplicative. Students are asked to write two reflection papers (dates will be specified in the syllabus). Those two reflection papers constitute 50% of the grade; the final one-day take home exam constitutes the other 50%. Class participation will be used as a "tipping factor."

LAW 758. Introduction to Financial Institutions. 3 Units.

Introduction to financial institutions reviews a broad range of institutions that accept money from savers and invest that money in stocks, bonds or other assets. The course will explain how each of these institutions provide services to their clients and how each is regulated by government agencies. The course will cover pass-through institutions where the savers receive the return on their investments minus management expenses -- mutual funds, hedge funds and sovereign funds. It also covers institutions offering savers some form of guaranteed returns -- banks, insurance companies and Fannie Mae. Finally, the course will cover pension plans, both defined contribution and defined benefit plans. The course is geared to the non-financial expert with background notes as well as case studies on actual institutions. The course is taught from the viewpoint of someone advising or dealing with these institutions, as well as a public official deciding upon regulatory policy. Elements used in grading: Class Participation, Attendance, Final Exam. The instructor will bring to the course years of experience as head of two global financial companies.

LAW 759. Law, Leadership, and Social Change. 3 Units.

This course will examine the responsibilities and challenges for those who occupy leadership roles and for those seeking to use law as a vehicle for social change. Topics will include characteristics and styles of leadership, organizational dynamics, forms of influence, decision making, conflict management, innovation, diversity, ethical responsibilities, scandal, civil and human rights, and public interest law. Materials will include cutting-edge research, case histories, problems, exercises, and media clips. Class sessions will include visitors who have occupied leadership roles. Requirements will include class participation, and either short written weekly reflection papers (2 to 3 pages and a short research paper (about 5 pages) or (2) a long paper (approximately 26-30 pages). After the term begins, students can transfer from section (01) into section (02), which meets the R requirement. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper.

LAW 760. Law and Visual Culture. 3 Units.

Why doesn't the Supreme Court allow video cameras in oral argument? Why do jurors find video recordings more believable than live testimony? Is a computer generated re-enactment evidence? This course tracks the legal reception of modern visual representation from the confusion about the admissibility of photographs in the late 19th century (is it like a drawing? is it like eyewitness testimony?) to the debate about cameras in the courtroom in the late 20th century (do judges and jurors decide differently when the proceedings are subject to public scrutiny?) to the frequent and strategic deployment of visual media in pretrial and litigation practice today. We will pursue a variety of approaches to the topic, ranging from the discussion of film theory to guest lectures by practicing attorneys. Elements Used in Grading: Class Participation, Attendance, Written Assignments, Final Paper.

LAW 761. Introduction to Legal Design. 4 Units.

Intro to Legal Design is a 9-week course for law students & other graduate students to reimagine how legal services are delivered, & learn how to use human-centered design methods to create breakthrough solutions to complex problems. The students will work with project partners - including legal aid groups, courts, and private law firms -- on 2 legal service challenges to help the partners solve real problems they & their users face. For each challenge, students will work on interdisciplinary teams, with close coaching from designers, engineers & lawyers. Students will learn design methods and use their respective expertise to design new innovations that make legal services more accessible & engaging. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 762. Health Law: Improving Public Health. 3 Units.

This course examines how the law can be used to improve the public's health. The major themes explored are, what authority does the government have to regulate in the interest of public health? How are individual rights balanced against this authority? What are the benefits and pitfalls of using laws and litigation to achieve public health goals? The course investigates these issues as they operate in a range of specific contexts in public health, including the control and prevention of infectious disease; laws aimed at preventing obesity and associated noncommunicable diseases; tobacco regulation; ensuring access to medical care; reproductive health; lawsuits against tobacco, food, and gun companies; and public health emergencies. In these contexts, we will ask and answer questions such as, what do the Constitution and key statutes permit? What makes a good public health law? What does public health evidence tell us about the likely effectiveness of particular legal interventions? What ethical and economic arguments justify government intervention to shape individuals' and companies' health-related behaviors? Instruction is through interactive lectures with a significant amount of class discussion and some group exercises. Class Participation, Written Assignments, Final Exam. Cross-listed with Medicine (MED 237).

LAW 763. International Trade and Development in the Global Economy. 3 Units.

This course focuses on the intersection of two key objectives of the international order and international economic law: the promotion of central rules, regimes and policies for the stabilization and liberalization of international trade; and the encouragement of economic growth and development in poor countries. The course begins with the primary multilateral trade organization, the World Trade Organization (WTO), and its predecessor, the General Agreement on Tariffs and Trade (GATT). The course then proceeds to regional trade and investment regimes: agreements affecting particular areas of the developing world, with special emphasis on U.S. trade law and policy in respect of those regions. Throughout, the course will examine high-profile case studies, as well as consider current events, such as U.S. negotiations on the Trans-Pacific Partnership and the Transatlantic Trade and Investment Partnership. Elements used in grading: Class Participation, Written Assignments, Final Exam.

LAW 764. Current Issues in Insurance Law. 2 Units.

This seminar will consider a range of important issues involving tort and contract aspects of insurance law. Each week will focus on a different topic. Topics may include the application of contra proferentem and reasonable expectations doctrines, bad faith litigation, duty to settle, prominent issues in asbestos litigation, remedies for misrepresentation, limitations on insurability, and the proper role for regulation of insurance policies. Readings will consist of a mix of important cases and academic articles. After the first week, students will take the lead in class discussion of each topic. Grading will be based on a combination of class participation and, at the student's option, (1) weekly response papers or (2) a single longer paper. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Attendance, Written Assignments or Final Paper.

LAW 765. The Welfare State. 3-5 Units.

Much has been written in recent years about the decline of the welfare state. Numerous adjectives have been applied to describe a trend toward austerity -- death, demise, withering, reversal. One writer suggested that the welfare state had not died, it had merely "moved to Asia" along with industrialization. This seminar introduces students to the key literature, questions, and debates about the modern welfare state. We will consider the emergence, growth, and current status of the welfare state, primarily in Western Europe and North America. The course will examine classical theories about markets and the emergence of social provision. We will also consider the leading theoretical and empirical research addressing the emergence of the welfare state, looking at the American case in comparative perspective. Attention will be paid to social and political factors on state development including political parties, labor markets, gender, demographic change, and immigration. We will then turn to the trend toward austerity and retrenchment, and the effect of globalization for the future of the welfare state. Course Requirements. Participation/Discussion (25%). Students are responsible to complete all readings and to come to class prepared to actively participate in discussion. Each student is responsible to lead a portion of the discussion twice per quarter. Short Reaction Papers (25%). All students must complete 5 reaction papers related to the weekly readings of 2 to 3 pages in length. Reaction papers will include a list of questions to be addressed in that week's discussion. All reaction papers must be posted to coursework in advance of class so that the student(s) leading that week's discussion can incorporate the questions into that week's discussion. Final Options (50%). Students have the option of completing one final paper of 20 pages in length OR 4 essays of 5-6 pages each addressing the readings in weeks that the student did NOT complete reaction papers. Topics for 20 page papers must be approved by me in advance, and may be related to a student's dissertation or master's research or may be a stand-alone topic. Papers may take the form of a research proposal and need not contain original empirical research. Shorter papers should engage thoroughly with the literature on the selected topic, and should bring additional sources other than those read for class to bear on the topic of choice. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline. Cross-listed with Sociology (SOC 254 & SOC 354).

LAW 766. Going Global: Advising Clients in a Global Economy. 3 Units.

Lawyers are increasingly asked to advise clients with global operations. This course will provide a foundation for understanding the challenges faced by business entities that operate around the world and that are therefore subject to multiple and sometimes inconsistent national laws. We will review the types of laws that apply to cross-border and multinational transactions, as well as how variations in culture and legal systems affect the substance and application of those laws. We will also examine how treaties, international agreements and informal or political norms can constrain or supplement these laws and review the risks of doing business in communities whose laws are ineffective or unreliable. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam.

LAW 767. Internet and Society: The Technologies and Politics of Control. 2 Units.

This course offers an intensive introduction to the field of cyberlaw. We will investigate the evolving nature of online architecture and activities, and the ways in which the legal toolbox has been, and will be, leveraged to influence them. Course themes include the complex interaction between Internet governance organizations and sovereign states, the search for balance between the ease of disseminating information online and the interest of copyright holders, privacy advocates, and others in controlling that dissemination, and the roles of intermediaries and platforms in shaping what people can and cannot do online. By application. Please note special compressed meeting times. No prerequisites. Special Instructions: The course will run from Sunday, January 4, 2015 to Friday, January 16, 2015. It will comprise 10 students from Stanford Law School and 10 students from Harvard Law School, including any cross-registrants from other Stanford or Harvard schools. There will be an opening Sunday set of activities; one approximately two-hour session each weekday in that period; and potentially one Saturday session, including field trips. Students enrolled in the course from both schools will be selected through an application process. CONSENT APPLICATION: The application can be found at <http://brk.mn/InternetandSociety>, and is due at 11:59 p.m. on Friday, October 10, 2014. Elements used in grading: Class Participation, Attendance, Final Paper.

LAW 768. Environmental Justice. 3 Units.

This course will introduce environmental justice as a social movement, including its central substantive concerns (the needs of humans in the built environment rather than the need to protect the environment from humans) and its methods (community-based political organizing rather than professionalized judicial or legislative action). The bulk of the course will then pursue a broader conception of environmental justice today by using social science research, theory, and case studies to investigate the civil rights and poverty aspects of environmental safety and natural resources. The course will include units on: (1) toxic exposure and public health disparities stemming from the disproportionate siting of locally-unwanted land uses in poor neighborhoods of color; (2) access to natural resources and basic public services, including clean water, wastewater disposal, and open space; (3) tools in environmental justice advocacy (including community-based lawyering, Title VI of the Civil Rights Act of 1964, the Fair Housing Act, common law nuisance actions, and transactional lawyering); (4) environmental justice issues in Indian Country, and (5) environmental justice issues in climate change policy. Much of the course material, including student presentations, will be grounded in the experiences and advocacy histories of specific communities, both urban and rural, across the country. Grades will be based on class participation and (1) weekly reflection papers of 3-5 pages each week for each of our topics or (2) a long research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. Students who opt for a long research paper may, if they so choose, conduct substantial legal research responsive to a non-profit environmental justice organization's legal needs. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper.

LAW 769. Copyright and Content in the Digital Age. 3 Units.

The digital age has brought about unprecedented opportunity and upheaval in the creation and distribution of content. This seminar will examine digital disruptions to the business models of content creators and industries, and the corresponding impact of the Internet on copyright law, largely through the lens of the litigation involving Google Books. That litigation, which has been active in the courts for almost a decade, is a microcosm of the vast issues that have faced content owners and consumers in the digital age: new technologies to reproduce and distribute works, evolving concepts of fair use, changing consumer norms, massive disruptions to economic interests, increased access to information, concerns about piracy, and threats to competition. We will examine issues related to copyright and content in the digital age by focusing not only on legal claims and defenses, but also litigation strategy, business strategy, policy strategy and public relations strategy, all of which play an important part in the art of lawyering today. The seminar will explore in depth the many contours of the Google Books litigation, including transformative fair use, the problem of orphan works, the rise of ebooks, non-display use and the proposed class action settlement of the case, which was rejected by the district court in 2011. We will also examine digital developments in other content industries (movie, music and newspaper) and focus on two related book issues: the ebook antitrust case against both publishers and Apple and the frequent disputes between publishers and Amazon. The seminar will include visitors who have been involved in the issues being studied. Grading will be based upon weekly reflections, class participation and (for those opting for Research credit) a long paper based on independent research. Some copyright experience is recommended. The course is open to graduate students throughout the university, especially the Graduate School of Business, the Department of Communication and the Journalism Program, by consent of the instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructor. See Consent Application Form for submission deadline. Elements used in grading: Class Participation and Written Assignments or Research paper.

LAW 770. Analyzing Alternative Laws and Policies for Psychoactive Drugs Seminar. 3 Units.

Two states have already legalized marijuana (WA and CO) and several more may do so in the next few years. These state initiatives pose unresolved legal questions (because of the clash with federal law and international treaty obligations), and major undecided design issues about what form a legal market should take. We will examine the topic using many different lenses, including moral philosophy, welfare economics, neuroscience and medicine, criminal justice, and political analysis. We will draw on many analytic methods including epidemiology, econometrics, quasi-experimentation, simulation modeling, case studies, and reasoning by analogy (tobacco, alcohol, prostitution, gambling). Among the policy levers we will consider are education and moral suasion, criminal justice, traditional risk regulation and street-level harm reduction, and taxation. Special Instructions: Students will have the option to combine this seminar with a practicum for two additional units with instructor consent. Students who take the practicum component will work as a team to prepare a written report and briefing for an actual policy client (to be determined). Only students enrolled in the Analyzing Alternative Laws and Policies for Psychoactive Drugs seminar may enroll in the Analyzing Alternative Laws and Policies for Psychoactive Drugs practicum component. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam.

LAW 772. Career Development: Alchemy, Law, and Practice. 2 Units.

Career development is embedded in life development. This course offers a space and time for each student to consider both through course materials, class interactions, and a series of reflection papers. The course includes one class facilitated in collaboration with the Office of Career Services focusing on a formal assessment via one or more psychological tests offered to each student. The materials for other class meetings are thought provoking works that have proven to be salient for considering career and life direction. Images and material from alchemy that embody what many consider to be a primary set of symbols for personal transformation provide a backdrop for the course. The course benefits from the collaboration of Michael Guasperini, a mythologist and lawyer whose primary vocation is working intimately with lawyers and firms during periods of personal and institutional transition. Mr. Guasperini has deep experience with the personal lives of hundreds of lawyers at various ages and levels of professional development, providing a valuable and practical perspective for self-reflection. Elements used in grading: Written Assignments (reflection papers).

LAW 773. Law and Society in Late Imperial China. 3 Units.

Our purpose in this colloquium is to understand how law in the Qing dynasty (1644-1912) functioned as an instrument of autocratic power, a field of interaction between state and society, and a vital feature of social life. To this end, we shall survey Qing law "from the top down" (the perspective of the imperial center, its ideology, and its political imperatives), but also "from the bottom up" (the perspective of quotidian practice at the local level). We shall explore the friction between ideology and practice within the dynasty's formal legal system, but also the field of customary practice that flourished outside the formal system, sometimes in conflict with it. Readings have been selected to introduce the work of major historians (in English) and to cover a range of basic concepts and problems in this field. One important theme is how scholarly interpretation and debate have changed over time, especially as a result of the opening of Qing legal archives for research. Another theme is the question of what concepts and vocabulary are most appropriate for this field of study. What are the advantages and disadvantages of analyzing the Chinese legal tradition in comparison to the West? Is it possible to understand it "on its own terms"? Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Cross-listed with History (HISTORY 392B) & Chinese Literature (CHINLIT 392B).

LAW 774. Clean Energy Project Development and Finance. 3 Units.

This case study-oriented course will focus on the critical skills needed to evaluate, develop, finance (on a non-recourse basis), and complete standalone energy and infrastructure projects. The primary course materials will be documents from several representative projects - e.g. wind and carbon capture - covering key areas including market and feasibility studies, environmental permitting and regulatory decisions, financial disclosure from bank and bond transactions, and construction, input, and offtake contracts. Documents from executed transactions are highly customized. By taking a forensic approach, looking at several different deals, we can learn how project developers, financiers, and lawyers work to get deals over the finish line that meet the demands of the market, the requirements of the law, and (sometimes) broader societal goals. Elements used in grading: Participation 50% Projects/Papers 50%. Case and Problem Discussion. All + waitlist must attend. Absences impact grade. Cross-listed with Graduate School of Business (GSBGEN 335).

LAW 775. Information Privacy Law. 2 Units.

Today almost all modern businesses need advice about information privacy law. While the roots of privacy law in the US started with a right to be let alone, modern business models, the needs of the administrative state, law enforcement priorities, and our own behavior complicate approaches based solely upon seclusion or secrecy. This course will explore the roots of US privacy law, its evolution in the 20th century, and the challenges of regulating information in the modern era where institutions and individuals need and reveal information constantly, but also seek basic dignity and safety from harm. Privacy law is comprised of torts, contracts, constitutional law, statutory law, soft law norms, and emerging technologies. We will discuss all of these things, as well as incorporate developments in the news. Elements used in grading: Class Participation and Final Exam.

LAW 776. U.S. and International Issues in the Changing Arctic. 3 Units.

This seminar will explore domestic and international issues that are arising in the Arctic, including territorial rights; energy development in the Arctic (including the role of multi-national oil companies, country-specific regulatory standards and response capabilities); the rights of indigenous peoples; mutual aid agreements; and climate change impacts, including the opening of new shipping routes, increased coastal erosion, the loss of permafrost, impacts on traditional subsistence activities, and the like. The seminar is particularly timely, as the U.S. will be taking over Chairmanship of the 8 nation Arctic Council next year and setting a substantive agenda for the international community. Special Instructions: Students in Section (01) will write reflection papers on topics of interest. After the term begins, students accepted into the course can transfer from section (01) into section (02), and have the option to write a longer paper for Research (R) credit with consent of instructor. Elements used in grading: Class Participation and Reflection or Research Papers.

LAW 778. Launching Moonshots: Legal Counseling for New Technologies. 2 Units.

This seminar course will explore some of the most interesting and challenging legal issues involved in launching new and innovative technologies from the perspective of an in-house counsel. These include issues of international law, privacy and security, jurisdiction for cross-border services, and regulation of cutting-edge products such as self-driving cars, wearable computing, a global fleet of balloons, and other "moonshot" technologies. The course will feature guest presentations by practicing lawyers and technologists in the field. Through advanced case studies, students will gain exposure to real-world product counseling in a dynamic sector. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper.

LAW 780. Advanced Three Strikes Project: Criminal Justice Reform & Individual Representation. 3 Units.

NOTE: The Three Strikes Project open to new students in the Autumn and Spring Quarters only. Only students who have previously enrolled in the Three Strikes Project may apply to enroll in the Advanced Three Strikes Project in Winter Quarter 2015. Any student may apply to enroll in the course in Autumn Quarter 2014 or Spring Quarter 2015 (no previous enrollment required). This seminar offers a unique opportunity to study criminal justice reform in real time. California's "Three Strikes and You're Out" sentencing law is one of the most infamous criminal laws in America. In 2012, California voters enacted an overhaul of the recidivist sentencing law ("Proposition 36"), which was drafted in part by SLS students enrolled in the Three Strikes Project. This November, a new ballot measure based on Proposition 36 will be voted on by California voters. In this seminar, students will read and discuss a variety of cases and articles, examining the evolution of the Three Strikes statute as a case study in the history, politics, practical considerations and legal regulation of sentencing in the United States. We will also follow the new ballot measure ("Safe Neighborhoods & Schools Act") and its potential changes and impact on California's evolving criminal justice system. In addition to studying the law, students will have an opportunity to test their skills in the field, assisting in the representation of inmates currently serving life sentences under the Three Strikes law. Students will visit the client in prison, conduct factual investigation in the field, and draft petitions on the client's behalf. Students will also contribute to ongoing policy work to ensure the effective implementation of Prop. 36 and related reforms. The Three Strikes Project is an ongoing, fast-paced organization that depends on the hard work and contributions of law students enrolled in the seminar. This course offers the opportunity to both study the theory behind the law, and to hone practical litigation and advocacy skills in and out of the courtroom. In Autumn Quarter, the seminar will meet for 3 hours per week. Students will also meet for 1 hour individually and in teams with Project director Mike Romano each week to discuss their work on their projects. CONSENT APPLICATION: Interested students must apply to enroll in the seminar by sending a one-page statement of interest and resume by email with the subject line "application" to Mike Romano (mromano@stanford.edu). Applications will be considered on a rolling basis. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 781. Philanthropy and Civil Society. 1 Unit.

Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 3 units. Cross-listed with Education (EDUC 374), Political Science (POLISCI 334) and Sociology (SOC 374).

LAW 782. U.S. Human Rights NGOs and International Human Rights. 1 Unit.

Many US human rights non-government organizations, including the US philanthropic sector, work on international human rights. The US government also engages with the private sector in "partnerships" that twins US foreign aid human rights action with corporate expertise. This weekly series will feature speakers who lead these human rights NGOs, philanthropic enterprises, and corporate partnerships, and also policy experts and scholars, to explore the pro's and con's of this scenario. Cross-listed with Ethics in Society (ETHICSOC 15R), International Policy Studies (IPS 271A), Medicine (MED 225) and Political Science (POLISCI 203).

LAW 784. Critical Race Theory. 1 Unit.

This course will consider one of the newest intellectual currents within American Legal Theory -- Critical Race Theory. Emerging during the 1980s, critical race scholars made many controversial claims about law and legal education -- among them that race and racial inequality suffused American law and society, that structural racial subordination remained endemic, and that both liberal and critical legal theories marginalized the voices of racial minorities. Course readings will be taken from both classic works of Critical Race Theory and newer interventions in the field, as well as scholarship criticizing or otherwise engaging with Critical Race Theory from outside or at the margins of the field. The class will meet 7:15PM to 9:15PM on January 5, 6, 7 and 12, 13. Elements used in grading: Class Participation, Written Assignments.

LAW 785. Current Issues in Tax Practice. 2 Units.

This course will introduce students to major issues in tax practice. Each class will be co-taught by one or more leading practitioners in the tax bar, with other members of the bar attending. Subjects include international tax, intellectual property and tax, tax litigation, state and local taxation, working for the government in tax, tax lobbying and working in a corporate tax department. Class will meet at my home (with take-out dinner provided). The class offers students a good opportunity to connect their SLS tax courses to real-world tax issues and practitioners. Elements used in grading: Class Participation, Attendance, Written Assignments.

LAW 786. International Justice. 3 Units.

This course will examine the arc of an atrocity. It begins with an introduction to the interdisciplinary scholarship on the causes and enablers of mass violence-genocide, war crimes, terrorism, and state repression. It then considers political and legal responses ranging from humanitarian intervention (within and without the Responsibility to Protect framework), sanctions, commissions of inquiry, and accountability mechanisms, including criminal trials before international and domestic tribunals. The course will also explore the range of transitional justice mechanisms available to policymakers as societies emerge from periods of violence and repression, including truth commissions, lustrations, and amnesties. Coming full circle, the course will evaluate current efforts aimed at atrocity prevention, rather than response, including President Obama's; atrocities prevention initiative. Readings address the philosophical underpinnings of justice, questions of institutional design, and the way in which different societies have balanced competing policy imperatives. Elements used in grading: Class Participation, Final Paper. Cross-listed with International Policy Studies (IPS 208A).

LAW 787. Reinventing American Criminal Justice Systems. 3 Units.

The scandal of criminal justice in the United States is by now a familiar one, its facts well known. As the late William J. Stuntz wrote in *The Collapse of American Criminal Justice*: "Rule of law has vanished in America's criminal justice system. Prosecutors decide whom to punish; most accused never face a jury; policing is inconsistent; plea bargaining is rampant; and draconian sentencing fills prisons with mostly minority defendants." There is no controversy that change is needed, and many believe we are now at a policy turning point. For the first time in nearly 40 years, prison populations are declining and a variety of forces-fiscal, political, and evidentiary-have finally come together to create broad-based support for reconstituting components of the American criminal justice system. But good intentions are not enough, and a policy opportunity is not the same thing as a policy success. This historic opportunity requires a thoughtfully planned, multidisciplinary effort. This seminar is designed to engage in that effort. Each student will be asked to select a particular area of potential reform (e.g., police, prisons, prosecution, sentencing, plea bargaining, parole release, risk prediction, juvenile justice, mental health, drug policy, racial disparities, parole), and to offer a comprehensive concrete proposal for change. The final paper will offer a ten-point plan for reconstituting that particular component of the criminal justice system. The concrete proposals must be justified in terms of the pertinent legal and empirical research. The goal of each paper is to provide policymakers with a practical blueprint for choosing a different criminal justice future. This course is designed for students who wish to delve deeply into specific areas of criminal justice reform, and have an interest in policy reform, empirical research, and advocacy. Elements used in grading: Final Paper. Automatic grading penalty is waived. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

LAW 788. Race, Policing and Prosecutors: Perspectives, Problems, and Possibilities. 1 Unit.

Prompted by the killings of Tamir Rice in Cleveland, Ohio, Michael Brown in Ferguson, Missouri, and Eric Garner in Staten Island, New York, this 1 unit mini-course will draw on a wide array of materials to examine the challenges and injustices that arise at the intersection of race and policing in the United States. The first part of the course will consider alternative accounts of the central problems at the intersection of race and law enforcement, and will explore the roots of distrust between minority communities and law enforcement agencies. The course will examine the social, psychological, historical and institutional roots of these problems. The second part of the course will survey various reform proposals. What are the possibilities and limits of civil rights actions? Is reform best undertaken by courts or legislatures? By the federal government or by states? Some reforms focus on prosecutors, e.g. limiting prosecutorial discretion, eliminating grand juries. Other reforms focus on policing, e.g. racial sensitivity or procedural justice training, requiring body cameras, creating more racially representative police forces. To what extent should solutions be pursued through new forms of democratic oversight and accountability (such as police civilian review boards) or through community organizing efforts. Does racially just and effective policing require controlling and constraining the police, or working collaboratively with law enforcement agencies? This 1 unit course is Mandatory Pass/Fail, and will meet only three times during the course of the quarter. Attendance and participation at each class session is required. Prior to each class session, each student will post questions, observations or reflections that will provide the basis for class discussion. The class will meet from 2-5 pm the following Fridays: January 16, February 6, and February 27. Elements used in grading: Class Participation, Attendance & Written Assignments.

LAW 789. Transnational Corporations and Human Rights. 2 Units.

Apple's use of child labor; Goldcorp's operations in Guatemala; the complicity of Dow Chemical/Union Carbide in the Bhopal chemical disaster; Shell's involvement in the executions of activists protesting the company's environmental and development policies in Nigeria. These are just a few examples of alleged corporate malfeasance that have emerged on the international stage. The purpose of this seminar is to introduce students to the debate concerning the accountability of transnational corporations that are complicit in rights-violating activities. At the international level, there has been a striking new strategy in the protection of human rights: a transition from focusing solely on rights-violations committed by governments to a detailed examination of transnational corporate conduct. Indeed, it has now become trite to say that particular corporations have directly or indirectly participated in violations of human rights. In order to address the fundamental question of whether corporations should in fact be socially responsible, the seminar will begin with an introduction to corporate theory. Students will then explore some of the key issues in the debate. Namely, whether transnational corporations can properly be included under the international law of state responsibility; mechanisms for self-regulation (e.g. voluntary corporate codes of conduct); the utility of the U.S. Alien Tort Claims Act; the advantages and disadvantages of U.N. initiatives (e.g. the work of the former U.N. Special Representative on Business and Human Rights); and the relevance of domestic corporate and securities law mechanisms (e.g. shareholder proposals and social disclosure). The course will provide a comparative analysis of the U.S. and Canadian experiences, in particular. Special Instructions: The use of laptop computers (or other similar electronic note-taking devices) is not permitted. Elements used in grading: Grading will be based on class participation (including student presentations) and a final research paper.

LAW 790. Separation of Powers and Executive Branch Legal Interpretation. 2 Units.

This course will explore the parameters of the executive-congressional relationship, with a special focus on the mechanisms through which the Executive Branch engages in legal interpretation. We will examine the case law that structures the relationship between the political branches, as well as congressional efforts to constrain executive power, such as through appropriations and oversight. But we will be most concerned with how the Executive conceptualizes and implements its "Take Care" responsibilities and its relationship to Congress, through its own forms of constitutional interpretation and when implementing statutes and exercising enforcement discretion. We will begin with the question-what is executive power? We then will study the work of different interpreters within the Executive Branch, such as the Office of Legal Counsel, the White House Counsel, OIRA, and the agencies, mindful of the fact that the branch is a "they," not an "it." We will conclude by studying various policy dilemmas that have required the Executive to conceptualize and assert a view of its authority within the constitutional system, including its use of prosecutorial discretion and its foreign affairs, war, and Commander-in-Chief powers. Readings will consist of executive branch and congressional documents, case law, and secondary literature. Elements used in grading: Grades will be based on class participation and each student's choice of either (1) series of 3-5 page reflection papers or (2) final research paper of approximately 5000 words for "R" (Research credit). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor.

LAW 791. Implications of Post-1994 Conflicts in Great Lakes Region of Africa: an American Perspective. 3 Units.

Seminar will explore the post-1994 conflicts in the Great Lakes Region from the perspective of the former US Special Envoy to the region. Particular emphasis will be placed on the intensified regional and international efforts to resolve these conflicts since the M23 rebellion of 2012. It will consider the implications these activities have for the region, legal accountability, international peacekeeping and the conduct of American foreign policy. The seminar will include the following segments: 1) the origins and nature of the post-1994 conflicts and recent efforts to resolve them with particular attention to the relationship between modern Congolese history and the Rwandan genocide and the peace-making efforts initiated by the Peace, Security and Cooperation Framework agreement of February 2013; 2) accountability for conflict-related crimes committed in the region including sex and gender-based crimes and the legal and other regimes established to address conflict minerals; and 3) the broader implications of the conflict for American foreign policy in Africa, in particular, and in general, and lessons learned about the way in which such policy is formulated; as well as the implications of this conflict for international peace-making and peace-keeping efforts. The course is cross-listed for IPS and law school students. Special instructions: The class will be limited to 12 IPS students and five law students. Elements used in grading: Class participation, Attendance, Final Paper. Cross-listed with International Policy Studies (IPS 252).

LAW 792. Advanced Legal Writing: Public Interest Litigation. 3 Units.

Public-interest litigation is often an uphill battle. Civil rights plaintiffs have difficulty prevailing even when their fact-patterns are sympathetic, as can be seen in contexts from sexual harassment lawsuits to wage to hour claims and from police brutality and prison conditions cases to transnational human rights complaints. Yet when public interest impact litigation does succeed it can enable or even galvanize social movements-both domestic and international-and meaningfully change the legal landscape. This class will focus on the skills necessary to litigate public interest lawsuits, and, in particular, public interest impact litigation. We will focus on marrying research and analysis of statutory text and case law and harnessing the creativity necessary to win such lawsuits by using those research and analytical results to write two briefs from the perspective of public interest or pro-bono advocates. Along the way, we will examine some of the most important briefs of the twentieth and twenty-first centuries in various public interest contexts to unpack the rhetorical and analytical skills needed to persuade judges across the ideological spectrum. Grading will be based on a Mandatory P/R/F system, taking into account research and writing as well as class participation. SPECIAL INSTRUCTIONS: Students on the waitlist for the course will be admitted if spots are available on the basis of priority. Early drop deadline: Students may not drop this course after first week of class.

LAW 793. Constitutional Litigation and Public Policy: Race and Criminal Justice. 2 Units.

This course will examine the ways in which race and perceptions of race influence our criminal-justice system, with an emphasis on interactions between individuals and the police. Topics will include racial profiling, stop-and-frisk tactics, police use of force, the over- and under-policing of communities of color, and the impact of the war on drugs on these communities. We will discuss the doctrinal, policy, and practical issues that these topics raise, as well as the question of how to effectively use litigation and other types of advocacy to address problems within the criminal-justice system. My goal is for students in the course not only to gain an understanding of the subject matter but also to develop their litigation, writing, and advocacy skills. Readings will include Michelle Alexander's *The New Jim Crow*, Randall Kennedy's *Race, Crime, and the Law*, as well as cases and articles. Students will be required to write a number of short papers. Grades will be based on those papers and on class participation.

LAW 794. Introduction to Finance. 2 Units.

This course is a basic introduction to the principles of finance and is intended as a primer on principles of valuation that are useful in everything from settlement negotiations to family law. No prior knowledge of finance will be assumed. If you want an introduction to corporate finance and won't take the full 3 credit course, this is for you. The first part of the course (approximately 6 weeks) will consist of on-line modules and problem sets that you will complete on your own and in small groups. We will cover topics such as: earnings, cash flows, income statements, interest rates, time value of money, estimating firm value, risk and return and the cost of capital. We will provide a framework for answering questions such as: how much is this project (or firm) worth? How should the firm raise money for a new investment? There will be weekly problem sets and you will get experience with building a simple model (excel spreadsheet) that will help you estimate the value of a potential new project. The second part of the course will consist of in-class discussions of case studies that apply these valuation principles to particular legal settings: e.g. valuing settlement offers, merger proposals, appraisal proceedings, and the efficient capital markets hypothesis. We hope that this flexible format will allow more students to take finance. If you wish, you can take this course and then later take Corporate Finance 1. The class will meet 2:15PM to 3:45PM on April 2, May 14, May 21, and May 28. Additional small group meetings will be scheduled with the instructor. On-line component. Elements used in grading: Written Assignments, Final Exam.

LAW 802. TGR: Dissertation. 0 Units.

Law, Nonprofessional Courses

LAWGEN 10SC. One in Five: The Law, Policy, and Politics of Campus Sexual Assault. 2 Units.

Trigger Warning: Over the past two years, the issue of campus sexual assault has exploded into the public discourse. While definitive figures are difficult to obtain due to the necessarily private nature of these events, several recent studies estimate that between 20-25% of college women experience sexual assault. Survivors have come forward across the country with harrowing stories of assault followed by an insensitive or indifferent response from college administrators, launching one of the most successful, and surprising, social movements in recent memory. As a result, the federal government has stepped up its civil rights enforcement in this area, with 94 colleges and universities currently under investigation for allegedly mishandling student sexual assault complaints. This courses focuses on the legal, policy, and political issues surrounding sexual assault on college campuses. We will spend the first week of the course learning some background about sexual violence and the efforts to implement legal protections for women. We will study the basic legal frameworks governing campus assault, focusing on the relevant federal laws such as Title IX and the Clery Act. Starting the second week we will travel first to New York City, and then to Washington D.C., where we will meet with journalists, activists, experts, policymakers, elected officials, and others who are actively involved in shaping the national response to this issue. Confirmed guests speakers include New York Times reporter Emily Bazelon; Catherine Lhamon, the Assistant Secretary of Education for Civil Rights; and the Office of Senator Kristin Gillibrand (D.N.Y.). On our return to campus students will create and present final projects. Travel expenses to NYC and DC (except incidentals) are provided by Sophomore College. Students are expected to do all readings, and participate in all class sessions, meals, field trips, films, and discussions. Requirements include three short papers, preparing and helping to lead discussions with outside speakers, and the development and presentation of a final group-designed project which can include a multi-media or artistic component. The subject matter of this course is sensitive and students are expected to treat the material with maturity. Moreover, much of the reading and subject matter may be upsetting and/or triggering for students who identify as survivors. There is no therapeutic component for this course, although supportive campus resources and Title IX staff are available for those who need them. Please consider this prior to enrolling in the course. For more info see: <http://www.nytimes.com/roomfordebate/2014/12/12/justice-and-fairness-in-campus-rape-cases/transparency-and-sensitivity-work-together-to-stop-campus-rape>. Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

LAWGEN 102Q. Pre-field Course for Alternative Spring Break. 1 Unit.

Pre-field course for undergraduates participating in the Alternative Spring Break program.

LAWGEN 105Q. Law and Popular Culture. 3 Units.

(Same as AMSTUD 105Q) This seminar focuses on the interface between two important subjects: law and popular culture. Before class, students will see a series of films or television shows relating to law, lawyers, and the legal system. There is also a weekly homework assignment based on materials in the assigned text and the assigned film or TV show. We will discuss the pop culture treatment of subjects such as the adversary system, good and bad lawyers, female and gay lawyers, the work life of lawyers, legal education, ethical issues, the jury system, and criminal and civil justice. The seminar discussions will draw on film theory and film-making technique to deepen understanding of the interrelationship between law and popular culture. The discussions will illuminate the ways in which pop culture products both reflect and change social views about law and lawyers. The assigned text is Michael Asimow & Shannon Mader, "Law & Popular Culture: A Course Book" (Peter Lang, 2d edition, 2013).

LAWGEN 111Q. Introduction to International Human Rights. 3 Units.

This course will study the main international human rights declarations, treaties, covenants, committees, courts and tribunals. It will look at the effect of nation states, regional bodies, and key economic and military organizations upon human rights. Categories of rights -- civil, political, social, economic and cultural -- will be analyzed, with a particular focus on the rights of women and children, and the right to culture.

LAWGEN 112N. Law and Inequality. 3 Units.

Most Americans know that discrimination on the basis of race, sex and religion is unlawful. Seems simple enough. But advertisements in the back of newspapers still announce: Single White Female Seeks Single White Male? Isn't that discrimination on the basis of race and sex? Most businesses don't consider men for women's locker room or bathroom attendant. And why aren't those men and women's bathrooms and locker rooms illegal segregation? After all we know what would happened if some business set up separate bathrooms for blacks and whites. Isn't it discrimination for an employer to insist that men wear a jacket and tie and women to wear nylons and a skirt? Why are some forms of discrimination unlawful and others not? Why is discrimination against short people, overweight people or people with annoying personalities not against the law? We'll answer these and many other questions by looking court cases, legal theory and philosophy. We may also have conversations with guest lecturers who work in civil rights enforcement and the seminar may include a field trip to visit the offices of civil rights lawyers (lawyers tend to be busy people so these opportunities will depend on their schedules.) No prerequisites other than an open mind and a willingness to delve into unfamiliar material. Evaluation will be based on class participation and a short final paper.

LAWGEN 112Q. Law and Inequality. 3 Units.

Most Americans know that discrimination on the basis of race, sex and religion is unlawful. Seems simple enough. But advertisements in the back of newspapers still announce: Single White Female Seeks Single White Male? Isn't that discrimination on the basis of race and sex? Most businesses don't consider men for women's locker room or bathroom attendant. And why aren't those men and women's bathrooms and locker rooms illegal segregation? After all we know what would happened if some business set up separate bathrooms for blacks and whites. Isn't it discrimination for an employer to insist that men wear a jacket and tie and women to wear nylons and a skirt? Why are some forms of discrimination unlawful and others not? Why is discrimination against short people, overweight people or people with annoying personalities not against the law? We'll answer these and many other questions by looking court cases, legal theory and philosophy. We may also have conversations with guest lecturers who work in civil rights enforcement and the seminar may include a field trip to visit the offices of civil rights lawyers (lawyers tend to be busy people so these opportunities will depend on their schedules.) No prerequisites other than an open mind and a willingness to delve into unfamiliar material. Evaluation will be based on class participation and a short final paper.

LAWGEN 114Q. Dilemmas of Regulating Race and Inequality in American Society. 3 Units.

Is race an irrelevant characteristic to which we should all be blind? Do only racists pay attention to race? Or must we take account of race, as one Supreme Court Justice has urged, in order to get beyond it? Indeed, is race something that we should want to "get beyond"? This seminar will consider the nature and extent of racial inequality, and how we as a society might and should respond to it. We will consider specific dilemmas regarding the propriety of taking account of race, in, for example, placing children with adoptive parents, selecting individuals for police investigation, hiring and college admissions. Readings will be drawn from law, history and social science. The goal of the course is to enable you to think more deeply about the moral, social and practical dimensions of how to regulate race in specific settings.

LAWGEN 115N. Human Rights Advocacy. 3 Units.

What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in human rights advocacy? In the space of sixty years, human rights advocates have transformed a marginal utopian ideal into a central element of global discussion, if not practice. In this seminar we will examine the actors and organizations behind this remarkable development as well as the vast challenges faced by advocates in the recent past and today. Together, we will learn to be critical of, as well as to think, and act, like human rights advocates. This seminar will introduce you to some the main debates and dilemmas within the human rights movement. We will consider and understand the differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the frequently non-western) developing world, as well as tensions between and among rights advocates along other important dimensions (civil and political vs. economic, social and cultural rights; rights promotion through engagement of powerful actors vs. challenging structures of power, etc.). The seminar seeks to develop your ability: 1) to understand human rights and social justice issues as contested political, legal and cultural phenomena; 2) to review advocacy texts, videos and other interventions critically; 3) to appreciate the political dimensions of efforts to promote human rights; 4) to understand how recent history constrains and structures options and possibilities for social intervention to promote rights and justice. During the course of the quarter you will be required to submit several short reflection papers and develop a human rights advocacy campaign.

LAWGEN 120. Ethics, Leadership and Public Policy. 3 Units.

This course is primarily for Stanford undergraduates. This course will explore the ethical challenges facing leaders in business, law, and public policy. Through problems, case histories and background readings, the course will examine the qualities of ethical leadership, the situational pressures that undermine it, and the structural initiatives that can reinforce it. Topics to be considered will include: the nature and styles of leadership; the role of values in leadership; ethical decision making and influence; authority and moral accountability in the war against terror; financial, political and sexual scandals; diversity in leadership and affirmative action; leadership and social change in civil rights and same sex marriage campaigns; global leadership on corporate social responsibility and international human rights; the moral case for philanthropy, and problems of paternalism. Course Requirements; Two short (five) papers on the readings (each 15 percent of grade); consistent and constructive class participation (20 percent of grade) and one final paper (ten pages) on an ethical issue in leadership (50 percent of grade).

LAWGEN 206Q. Thinking Like a Lawyer. 3-4 Units.

(Same as GSBGEN 382.) Open to and limited to non-Law graduate students at the University, this course will provide non-law students an analytical framework for understanding the core concepts of the law and familiarize students with how lawyers analyze and structure their work. This course will be taught by Vice Dean Mark Kelman and Law School faculty in their areas of expertise, with one to two classes devoted to each topic. It will introduce students to some of the foundational principles of law and will review topics such as contracts, litigation, intellectual property, securities and employment law. Students must also attend an additional TA-led discussion section each week. There will be no final exam, but completion of problem sets on various topics as well as class and section participation will be used to determine grading. 3 problem sets are required for all students. For 4 units, an additional assignment must be completed. All readings will be provided on Coursework. TGR students welcome. TGR students welcome. Elements used in grading: Class attendance and written assignments.

LAWGEN 209Q. Community Police Academy. 1 Unit.

Course description: This nine-week course aims to demystify public safety, build trust, and develop partnerships between the police department and the community it serves. Each session is taught by a different deputy and is designed to expand each participant's knowledge of the duties, responsibilities, decisions, and constraints that law enforcement officers face. Topics include laws of arrest, search and seizure, alcohol laws (as seen in a DUI wet lab), patrol procedures, officer safety, vehicle stops, CSI vs. reality, emergency communications, defensive tactics, and deadly force. In addition to the weekly class, participants are invited to attend field trips for more in-depth experiences. Past field trips have included the coroner's office, Palo Alto Communications dispatch center, pursuit driving simulators, and the San Jose Main Jail. The course is open to all Stanford students, staff, and residents over 18 years of age. While this course is open to all students throughout the University, the units will not count toward the requirements for a law degree. Special Instructions: Live Scan Check.

LAWGEN 210Q. International Human Rights: Interdisciplinary Project Work. 3 Units.

Students enrolled in this course will work on international human rights projects relating to water/sanitation from an interdisciplinary perspective. Enrollment in this section is limited to non-law students, who will work with law students on clinical projects.

Linguistics Courses

LINGUIST 1. Introduction to Linguistics. 4 Units.

The cognitive organization of linguistic structure and the social nature of language use. Why language learning is difficult. Why computers have trouble understanding human languages. How languages differ from one another. How and why speakers of the same language speak differently. How language is used strategically. *** Sections are mandatory. Please sign up for one of the sections at enrollment.

LINGUIST 3. Glamour of Grammar. 3-4 Units.

In this course, we will dispel many a mystery of English grammar, often presented as a dull and dreary subject in schools: we will see that the words *quest*; *glamorous*; *quest*; and *quest*; *grammatical*; *quest*; come from the same root meaning *quest*; *mysterious* or *occult*; *quest*; and we will ask: Why is there *quest*; *stupidity*; *quest*; but not *quest*; *smart*; *quest*;? Why can we *quest*; *blacken*; *quest*; fish or *quest*; *whiten*; *quest*; teeth, but not *quest*; *pink*; *quest*; or *quest*; *green*; *quest*; anything? Who makes up new words anyway? How do we put words together into meaningful sentences? And how do we understand the nuances of English without much direct instruction? While the focus of this course is on English grammar, we will also see that other languages possess grammars that are based on the same principles and constraints.

LINGUIST 5N. What's Your Accent? Investigations in Acoustic Phonetics. 3 Units.

Preference to freshmen. Phonetic variation across accents of English; experimental design; practical experience examining accents of seminar participants; acoustic analysis of speech using Praat.

LINGUIST 10N. Experimental Phonetics. 4 Units.

Everyday, we face variation in language. As readers, we see words printed in different fonts, sizes, and typefaces, typically static on a page. As listeners, we hear a speech signal riddled with variation. We are exposed to words, but a single word is produced differently each time it is uttered. These words stream by listeners at a rate of about 5 syllables per second, further complicating the listeners' task. How listeners map a speech signal into meaning despite massive variation is an issue central to linguistic theory. The field of experimental phonetics investigates how listeners take words that often vary drastically and understand them as quickly and adeptly as they do. This class introduces students to acoustic and auditory phonetics. As a class, we will carry out a project in experimental phonetics aimed at understanding how different realizations of words are able to be understood by listeners. Throughout the course, students will read background literature, become familiar with the Stanford Linguistics Lab, and learn to use software integral to the design, data collection, and data analysis of experiments. Each week, we will have two meetings, one in a seminar setting and one in the lab.

LINGUIST 36. The Arabic Language and Culture. 3 Units.

(Formerly AMELANG 36). Arabic language from historical, social, strategic, and linguistic perspectives. History of the Arabic language and the stability of classical Arabic over the last 15 centuries. Why the functionality of classical Arabic has not changed as Latin, Old English, and Middle English have. Social aspects of the Arabic language, Ferguson's notion of diglossia. The main varieties of Arabic, differences among them, and when and where they are spoken. Role of Arabic and culture in current world politics, culture, and economy. Linguistic properties of Arabic such as root-based morphology, lexical ambiguity, and syntactic structure relating it to current linguistic theories.

Same as: LINGUIST 270

LINGUIST 44N. Living with Two Languages. 3 Units.

Preference to freshmen. The nature of bi- and multilingualism with emphasis on the social and educational effects in the U.S. and worldwide, in individual versus society, and in child and adult. The social, cognitive, psycholinguistic, and neurological consequences of bilingualism. Participation in planning and carrying out a research project in language use and bilingualism.

LINGUIST 47N. Languages, Dialects, Speakers. 3 Units.

Preference to freshmen. Variation and change in languages from around the world; the roots, historical development, and linguistic and social structures of variation; how languages differ from one another and how issues in linguistics connect to other social and cultural issues; the systematic study of language.

LINGUIST 52N. Spoken Sexuality: Language and the Social Construction of Sexuality. 3 Units.

The many ways language is used in the construction of sexuality and sexual identity. How language is used as a resource for performing and perceiving sexual identity. Drawing on linguistic analyses of pronunciation, word choice, and grammar, questions such as: Is there a gay accent? Why isn't there a lesbian accent? How do transgendered people modify their linguistic behavior when transitioning? How are unmarked (heterosexual) identities linguistically constructed? Sexuality as an issue of identity, as well as of desire. Iconic relations between elements of language such as breathy voice quality and high pitch, and aspects of desire such as arousal and excitement. How language encodes ideologies about sexuality; how language is used to talk about sexuality in public discourses about gay marriage and bullying, as well as in personal narratives of coming out. How language encodes dominant ideologies about sexuality, evident in labels for sexual minorities as well as terminology for sex acts. Discussions of readings, explorations of how sexuality is portrayed in popular media, and analyses of primary data. Final research paper on a topic of student choice.

Same as: FEMGEN 52N

LINGUIST 63N. The Language of Comics. 3 Units.

This seminar will explore language as represented in cartoons and comics such as Bizarro, Dilbert and Zits, how we interpret it, and why we find comics funny. We will explore and analyze language play, genderspeak and teenspeak; peeving about usage; new and spreading usages.

LINGUIST 65. African American Vernacular English. 3-5 Units.

The English vernacular spoken by African Americans in big city settings, and its relation to Creole English dialects spoken on the S. Carolina Sea Islands (Gullah), in the Caribbean, and in W. Africa. The history of expressive uses of African American English (in soundin' and rappin'), and its educational implications. Service Learning Course (certified by Haas Center).

Same as: AFRICAAM 21

LINGUIST 66. Vernacular English and Reading. 4-5 Units.

Discusses some of the literature on the relation between use of vernacular English varieties (e.g. African American Vernacular English, Chicano English) and the development of literacy (especially in Standard English). But our primary focus is on improving the reading skills of African American and Latino students in local schools through the Reading Road program developed at the University of Pennsylvania. Students must commit to tutoring one or more elementary students weekly, using the program. L65 AAVE recommended, but not required.

Same as: LINGUIST 266

LINGUIST 83Q. Translation. 3 Units.

Preference to sophomores. What is a translation? The increased need for translations in the modern world due to factors such as tourism and terrorism, localization and globalization, diplomacy and treaties, law and religion, and literature and science. How to meet this need; different kinds of translation for different purposes; what makes one translation better than another; why some texts are more difficult to translate than others. Can some of this work be done by machines? Are there things that cannot be said in some languages?.

LINGUIST 90. Teaching Spoken English. 3-4 Units.

Practical approach to teaching English to non-native speakers. Teaching principles and the features of English which present difficulties. Preparation of lessons, practice teaching in class, and tutoring of non-native speaker.

LINGUIST 105. Phonetics. 3-4 Units.

The study of speech sounds: how to produce them, how to perceive them, and their acoustic properties. The influence of production and perception systems on sound change and phonological patterns. Acoustic analysis and experimental techniques. Lab exercises. Prerequisite: 110 or equivalent, or consent of instructor.

Same as: LINGUIST 205A

LINGUIST 106. Introduction to Speech Perception. 4 Units.

Basics of acoustic phonetics and audition. What do listeners perceive when they perceive speech. Examine current research including: the categorical perception of speech, cross-language speech perception, infant speech perception. Theoretical questions of interest to speech perception researchers and experimental methods used in the field.

LINGUIST 110. Introduction to Phonetics and Phonology. 4 Units.

Differences in the sounds of the world's languages and how these sounds are made by the human vocal tract. Theories that account for cross-linguistic similarities in the face of differences.

LINGUIST 112. Seminar in Phonology. 2-4 Units.

Topics vary each year. Previous topics include variation in the phonology of words according to their contexts within larger expressions and the place of these phenomena in a theory of grammar. May be repeated for credit.

Same as: LINGUIST 212A

LINGUIST 116. Morphology. 4 Units.

A survey of words including their structures, pronunciations, meanings, and syntactic possibilities in a wide sampling of languages to provide a laboratory for investigating the nature of morphology.

LINGUIST 120. Introduction to Syntax. 4 Units.

Grammatical constructions, primarily English, and their consequences for a general theory of language. Practical experience in forming and testing linguistic hypotheses, reading, and constructing rules.

LINGUIST 121. Crosslinguistic Syntax. 4 Units.

A data-driven introduction to the methods of syntactic analysis, and their results. Emphasis is on understanding how languages are systematically alike and different in their basic sentence structure. Focuses on building up syntactic argumentation skills via the collective development of a partial formal theory of sentence structure, which attempts to model native speaker knowledge. Draws on data from a diverse array of the world's languages, including but not limited to English. Enrollment in the discussion section is required. Prerequisites: Linguistics 1, or Linguistics 120, or permission of instructor. Satisfies the WIM requirement for Linguistics majors.

LINGUIST 124. Introduction to Lexical Function Grammar. 2-4 Units.

Presentation of a formal model of grammar designed to allow precise, computationally tractable descriptions of cross-linguistic variation in syntactic structure. Concentration on the formal properties of the model, its flexibility in teasing out language specific and possibly universal characteristics of natural languages and the place of syntax as a component within a larger linguistic architecture. Prerequisite: 120 or consent of instructor.

Same as: LINGUIST 224

LINGUIST 130A. Introduction to Semantics and Pragmatics. 4 Units.

Linguistic meaning and its role in communication. Topics include ambiguity, vagueness, presupposition, intonational meaning, and Grice's theory of conversational implicature. Applications to issues in politics, the law, philosophy, advertising, and natural language processing. Those who have not taken logic, such as PHIL 150 or 151, should also enroll in 130C. Pre- or corequisite: 120, 121, consent of instructor, or graduate standing in Linguistics.

Same as: LINGUIST 230A

LINGUIST 130B. Introduction to Lexical Semantics. 3-4 Units.

Introduction to basic concepts and issues in the linguistic study of word meaning. The course focuses on the core semantic properties and internal organization of the four major word classes in natural languages: nouns, adjectives, prepositions, verbs. This course draws on material from English and other languages to illustrate the range of word meanings found across languages and to investigate possible word meanings. Prerequisites: Linguist 1 or equivalent or permission of the instructor. Linguist 130A is not a prerequisite for this course.

LINGUIST 130C. Logic Laboratory. 1 Unit.

Typically taken in conjunction with 130A/230A.

Same as: LINGUIST 230E

LINGUIST 134A. The Structure of Discourse: Theory and Applications. 2-4 Units.

In this course we will address the structure of language above the sentence concentrating initially on: n(1) defining the minimal units of discourse structure n(2) recursive rules of combination of minimal units (i.e. discourse iquest;syntaxiquest;n(3) representations of discourse level phenomenon(4) the nature and structure of spoken and written formal and informal discourse genres and Speech events in English and other languages including stories, explanations, literary works etc. on the one hand, and socially constructed occasions of speaking such as classes, doctor patient interactions, and informal conversation on the other.

Same as: LINGUIST 234

LINGUIST 140. Language Acquisition I. 4 Units.

Processes of language acquisition in early childhood; stages in development; theoretical issues and research questions. Practical experience in data collection. Satisfies the WIM requirement for Linguistics if requested.

Same as: LINGUIST 240

LINGUIST 141. Language and Gesture. 3 Units.

History of work on gesture, gestural systems associated with particular languages/cultures, and with specific activities - music, sports, traffic management, stock exchanges, etc. Examine gesture developmentally and how gesture is represented in painting and animation.

LINGUIST 142. Heritage Languages. 3-4 Units.

The linguistic and cultural properties of Heritage languages, which are partially acquired and supplanted by a dominant language in childhood. Topics: Syntactic, phonological and morphological properties of heritage languages, implications from experimental HL research for language universals, cultural vs. linguistic knowledge, the role of schooling in HL competence, influence of the dominant language on the HL, and pedagogical issues for HL learners in the classroom.

Same as: LINGUIST 242

LINGUIST 143. Sign Languages. 4 Units.

The linguistic structure of sign languages. How sign languages from around the world differ, and what properties they share. Accents and dialects in sign languages. How sign languages are similar to and different from spoken languages. How and why sign languages have emerged.

LINGUIST 144. Minds and Machines. 4 Units.

An overview of the interdisciplinary study of cognition, information, communication, and language, with an emphasis on foundational issues: What are minds? What is computation? What are rationality and intelligence? Can we predict human behavior? Can computers be truly intelligent? How do people and technology interact, and how might they do so in the future? Lectures focus on how the methods of philosophy, mathematics, empirical research, and computational modeling are used to study minds and machines. Undergraduates considering a major in symbolic systems should take this course as early as possible in their program of study.

Same as: PHIL 99, PSYCH 35, SYMSYS 100

LINGUIST 150. Language in Society. 4-5 Units.

How language and society affect each other. Class, age, ethnic, and gender differences in speech. Prestige and stigma associated with different ways of speaking and the politics of language. The strategic use of language. Stylistic practice; how speakers use language to construct styles and adapt their language to different audiences and social contexts. Satisfies the WIM requirement for Linguistics if taken for 5units.

LINGUIST 152. Sociolinguistics and Pidgin Creole Studies. 2-4 Units.

Introduction to pidgins and creoles, organized around the main stages in the pidgin-creole life cycle: pidginization, creolization, and decreolization. Focus is on transformations in the English language as it was transported from Britain to Africa, Asia, the Caribbean, and the Pacific. Resultant pidginized and creolized varieties such as Nigerian Pidgin English, Chinese Pidgin English, New Guinea Tok Pisin, Suriname Sranan, and the creole continua of Guyana, Jamaica, and Hawaii. Also French, Dutch, Portuguese, Chinook, Motu, and Sango.

Same as: LINGUIST 252

LINGUIST 153. Language, Power & Politics. 3-4 Units.

The integral role language plays in politics; how power operates in linguistic practices and political interaction. Critical examination of how language is used to articulate, maintain and subvert relations of power in society, emphasizing language in the media, the political rhetoric associated with war, and the construction of "truthquest"; in politics. The role of ethnographic analysis in aiding sociolinguistic understandings of how social actors use and (re)interpret political language.

LINGUIST 154. Sociolinguistics of Language Contact. 2-4 Units.

The role of contact between speakers of different languages in processes of language borrowing, convergence, and shift. Attending both to linguistic aspects and social contexts, examine: second-language acquisition, bilingualism, code-switching, lexical and grammatical borrowing, first language attrition, language death, and the creation of new contact varieties such as jargons, mixed languages, pidgins, and creoles. Prerequisite: background in linguistics, at least one course in linguistics.

Same as: LINGUIST 254

LINGUIST 155. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, CSRE 121X, EDUC 121X

LINGUIST 155F. Seminar in Sociolinguistics: Language and Social Interaction. 1-4 Unit.

Figures of personhood, personas, character types, and stereotypes in the study of linguistic variation. What are the significant differences among these types? Are these social types merely the vehicles through which social meanings travel or do they constitute the meanings themselves?.

Same as: LINGUIST 255F

LINGUIST 156. Language and Gender. 4 Units.

The role of language in the construction of gender, the maintenance of the gender order, and social change. Field projects explore hypotheses about the interaction of language and gender. No knowledge of linguistics required.

Same as: FEMGEN 156X

LINGUIST 157. Sociophonetics. 1-4 Unit.

The study of phonetic aspects of sociolinguistic variation and the social significance of phonetic variation. Acoustic analysis of vowels, consonants, prosody, and voice quality. Hands-on work on collaborative research project. Prerequisite: 110 or equivalent, or consent of instructor.

Same as: LINGUIST 257

LINGUIST 159. American Dialects. 2-4 Units.

What is a dialect, and who speaks one? This course will focus on the fundamentals of linguistic study and dialectology through examinations of regional, social and ethnic dialects in the United States. The course will examine dialect variation on many linguistic levels, from variation in individual words (pop v. soda) to variation in how vowels are pronounced. Historical development of U.S. dialects, linguistic change, perceptual dialectology, and prestige and stigma of dialects will be discussed. Students will participate in real variation research to gain experience with quantitative data in examining the influence of social factors on dialect variation.

LINGUIST 160. Introduction to Language Change. 4 Units.

Principles of historical linguistics; the nature of language change. Kinds and causes of change, variation and diffusion of changes through populations, differentiation of dialects and languages, determination and classification of historical relationships among languages, the reconstruction of ancestral languages and intermediate changes, parallels with cultural and genetic evolutionary theory, and implications of variation and change for the description and explanation of language in general. Prerequisite: introductory course in linguistics.

LINGUIST 162. History Through Language. 3-4 Units.

What we can learn about the human past through human language, especially where proper historical records are absent. Studying population migrations through language spread. Different types of change in different social environments: grammatical "simplification" of imperial languages vs. complexity of tribal languages. Effects of contact on languages. Methods for reconstructing linguistic past: comparative method, linguistic paleontology, computational phylogenetic methods.

LINGUIST 163. History of the English Language. 5 Units.

This course traces the history of the English language from its roots through its earliest written records into the present. It will trace the fundamental changes that English has undergone in terms of morphology, phonology, syntax, semantics, and vocabulary. It will also explore some of the social, cultural, and historical forces that affect language. The course emphasizes the pre-modern history of English.

LINGUIST 163A. Endangered Languages and Language Revitalization. 3-4 Units.

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages. Same as: ANTHRO 163A, ANTHRO 263A, LINGUIST 263, NATIVEAM 163

LINGUIST 167. Languages of the World. 3-4 Units.

The diversity of human languages, their sound systems, vocabularies, and grammars. Tracing historical relationships between languages and language families. Parallels with genetic evolutionary theory. Language policy, endangered languages and heritage languages. Classification of sign languages.

LINGUIST 171. Iberian Languages: Structure, Variation & Context. 3 Units.

The course will center on Iberian languages with a special focus on Catalan. We will consider the relation between language structure and other factors, such as language variation in space and time, and sociological and political factors. Topics will include a contrastive analysis of selected features of Iberian languages, a survey of dialectal variation in some of the languages of the area and of their external linguistic history.

LINGUIST 173. The Structure of Russian. 2-4 Units.

A synchronic overview of contemporary standard Russian, including its sound system, word formation and grammatical structure. Emphasis is on problems presented by Russian for current linguistic theory. The acquisition of Russian as a first language.

Same as: LINGUIST 273

LINGUIST 180. From Languages to Information. 3-4 Units.

Extracting meaning, information, and structure from human language text, speech, web pages, genome sequences, social networks, or any less structured information. Methods include: string algorithms, edit distance, language modeling, naive Bayes, inverted indices, vector semantics. Applications such as question answering, sentiment analysis, information retrieval, text classification, social network models, machine translation, genomic sequence alignment, spell checking, speech processing. Prerequisite: CS103, CS107, CS109.

Same as: CS 124, LINGUIST 280

LINGUIST 181. Grammar Engineering. 1-4 Unit.

Hands-on techniques for implementation of linguistic grammars, drawing on grammatical theory and engineering skills. The implementation of constraints in morphology, syntax, and semantics, working within a unification-based lexicalist framework. Focus is on developing small grammars for English and at least one other language. Prerequisite: basic syntactic theory or 120. No programming skills required.

Same as: LINGUIST 281

LINGUIST 182. Computational Theories of Syntax. 3-4 Units.

Salient features of modern syntactic theories, including HPSG, LFG, and TAG, motivated by computational concerns. Impact of work within these frameworks on the design of algorithms in computational linguistics, and its influence in both linguistics and computer science. Topics include: notions of unification; unification algorithms and their relation to linguistic theory; agenda-driven chart processing for analysis and synthesis; the interface with morphology, the lexicon, and semantics; and applications, notably machine translation.

Same as: LINGUIST 282

LINGUIST 183. Programming and Algorithms for Natural Language Processing. 3-4 Units.

Construction of computer programs for linguistic processes such as string search, morphological, syntactic, and semantic analysis and generation, and simple machine translation. Emphasis is on the algorithms that have proved most useful for solving such problems.

Same as: LINGUIST 283

LINGUIST 185. Writing Systems in a Digital Age. 2-3 Units.

Introduction to the variety of writing systems and their behaviors. Classification of all existing scripts as alphabetic, syllabic, ideographic; unifying and differentiating features within each group. How writing captures human language in various ways. The development of the alphabet, from ancient Semitic scripts to modern times. How writing systems are extended to additional languages. Chinese writing, its characteristics and sphere of influence. Japanese writing as a hybrid system that includes Chinese. Korean writing as an ideally designed script. The Indian system of writing as the foundation of numerous Asian syllabic scripts. Unicode as global standard for encoding text in all languages. Font technology: the emulation of human writing in the digital realm. nBasic knowledge of phonetics recommended. Knowledge of foreign languages helpful.

Same as: LINGUIST 284A

LINGUIST 188. Natural Language Understanding. 3-4 Units.

Project-oriented class focused on developing systems and algorithms for robust machine understanding of human language. Draws on theoretical concepts from linguistics, natural language processing, and machine learning. Topics include lexical semantics, distributed representations of meaning, relation extraction, semantic parsing, sentiment analysis, and dialogue agents, with special lectures on developing projects, presenting research results, and making connections with industry. Prerequisites: one of LINGUIST 180, CS 124, CS 224N, CS224S, or CS221; and logical/ semantics such as LINGUIST 130A or B, CS 157, or PHIL150.

Same as: CS 224U, LINGUIST 288

LINGUIST 191. Linguistics and the Teaching of English as a Second/ Foreign Language. 4-5 Units.

Methodology and techniques for teaching languages, using concepts from linguistics and second language acquisition theory and research. Focus is on teaching English, but most principles and techniques applicable to any language. Optional 1-unit seminar in computer-assisted language learning.

Same as: LINGUIST 291

LINGUIST 195A. Undergraduate Research Workshop. 1 Unit.

Designed for undergraduates beginning or working on research projects in linguistics. Participants present and receive feedback on their projects and receive tips on the research and writing process.

LINGUIST 196. Introduction to Research for Undergraduates. 1 Unit.
Research seminar for undergraduate students interested in linguistics. Presentations by Stanford linguistics faculty and graduate students who will discuss their own research projects.

LINGUIST 197A. Undergraduate Research Seminar. 2-3 Units.
May be repeat for credit.

LINGUIST 198. Honors Research. 1-15 Unit.
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LINGUIST 199. Independent Study. 1-15 Unit.
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LINGUIST 200. Foundations of Linguistic Theory. 4 Units.
Theories that have shaped contemporary linguistics; recurrent themes and descriptive practice. Strong background in Linguistics or permission of instructor.

LINGUIST 204. Philosophy of Linguistics. 4 Units.
Philosophical issues raised by contemporary work in linguistics. Topics include: the subject matter of linguistics (especially internalism vs. externalism), methodology and data (especially the role of quantitative methods and the reliance on intuitions), the relationship between language and thought (varieties of Whorfianism and anti-Whorfianism), nativist arguments about language acquisition, and language evolution.
Same as: PHIL 369, SYMSYS 204

LINGUIST 205A. Phonetics. 3-4 Units.
The study of speech sounds: how to produce them, how to perceive them, and their acoustic properties. The influence of production and perception systems on sound change and phonological patterns. Acoustic analysis and experimental techniques. Lab exercises. Prerequisite: 110 or equivalent, or consent of instructor.
Same as: LINGUIST 105

LINGUIST 205B. Advanced Phonetics. 2-4 Units.
Prerequisite: LINGUIST 205A.

LINGUIST 207. Seminar in Phonetics: The perception and recognition of clear and casual speech.. 2-4 Units.
Through readings and discussion, we will focus on two questions in this seminar:n(1) Is the balance of top-down versus bottom-up information different when processing careful vs. casual speech?n(2) What provides more information to a listener - Half of a clearly-articulated word, or an entire reduced word?nThis is not a project-based seminar, but the seminar is linked to an ongoing research project, and we will use that project to ground how a researcher might go about addressing the above questions. We will refer to our in-progress project to provide concrete examples of (a) testable, theoretically-grounded hypotheses, (b) appropriately matched methods/design, (c) benefits/costs of different types of statistical methods, and (d) supported vs. speculative accounts. The seminar is heavily based on reading and discussion, but will be supplemented by the practical issues associated with a related project. At the end of the seminar, students will have a basic understanding of the literature related to the topic, what gaps/inconsistencies exist in that work, and how to pursue those gaps, if interested. A research proposal is required at the end of the quarter.

LINGUIST 210A. Phonology. 3-4 Units.
Introduction to phonological theory and analysis based on cross-linguistic evidence. Topics: phonological representations including features, syllables, metrical structure; phonological processes including assimilation and dissimilation; and phonological typology and universals; Optimality Theory.

LINGUIST 210B. Advanced Phonology. 1-4 Unit.
A comparison of Stratal OT, Transderivational OT, and rule-based approaches, primarily on the empirical basis of stress, syllable structure, and prosodic organization. Course may be repeated once.

LINGUIST 211. Metrics. 1-4 Unit.
Principles of versification from a linguistic point of view. Traditional and optimality-theoretic approaches. The canonical system of English metrics, and its varieties and offshoots. The typology of metrical systems and its linguistic basis. The ideology of normative prosodic discourse in relation to changing poetic practice.

LINGUIST 212A. Seminar in Phonology. 2-4 Units.
Topics vary each year. Previous topics include variation in the phonology of words according to their contexts within larger expressions and the place of these phenomena in a theory of grammar. May be repeated for credit.
Same as: LINGUIST 112

LINGUIST 212B. Seminar in Phonology. 1-4 Unit.
May be repeated for credit.

LINGUIST 213. Corpus Phonology. 2-4 Units.
An introduction to constructing and using phonologically annotated corpora to test phonological hypotheses. Hands-on experience in corpus manipulation and phonological modeling.

LINGUIST 214. Phonology Workshop. 1-2 Unit.
May be repeated for credit.

LINGUIST 217. Morphosyntax. 2-4 Units.
The role of morphology in grammar: how word structure serves syntax in the expression of meaning. Lexical semantics, Theta-roles, argument structure, and grammatical relations. Licensing: case, agreement, word order, and their interaction.

LINGUIST 218. Seminar on Morphological Theories. 2-4 Units.
Word formation and the lexicon: empirical generalizations and theoretical approaches. Lexicalist and Distributed Morphology. How words are built and interpreted: constituency and headedness, morpheme order and scope, the mirror principle, bracketing paradoxes, the hierarchy of functional categories. Paradigms, blocking, gaps, periphrasis, syncretism. Locality, head movement vs. selection, constraints on allomorphy, incorporation, polysynthesis, cliticization and prosodic re-ordering phenomena.

LINGUIST 219. Frequency and the Grammar of Alternations. 1-4 Unit.
Variationist, and psycholinguistic studies of how syntactic alternations (for example, the English dative, genitive, and passive) develop in time and space.

LINGUIST 221A. Foundations of English Grammar. 1-4 Unit.
A systematic introduction to the formal analysis of English grammar using the framework of head-driven phrase structure grammar (HPSG). Topics: feature structure modeling, lexical and phrasal organization in terms of type hierarchies and constraint inheritance, clausal types, patterns of complementation, the auxiliary system, extraction dependencies, wh-constructions, and the syntax-semantics interface.

LINGUIST 221B. Studies in Universal Grammar. 1-4 Unit.
Focus is on grammatical analysis of individual languages. Builds directly on the theoretical foundations presented in 221A. Topics vary each year.

LINGUIST 222A. Foundations of Syntactic Theory I. 3-4 Units.
The roles of the verb and the lexicon in the determination of sentence syntax and their treatment in modern grammatical theories. Empirical underpinnings of core phenomena, including the argument/adjunct distinction, argument structure and argument realization, control and raising, operations on argument structure and grammatical function changing rules. Motivations for a lexicalist approach rooted in principles of lexical expression and subcategorization satisfaction. Prerequisite: 120 or permission of instructor.

LINGUIST 222B. Foundations of Syntactic Theory II. 2-4 Units.
The nature of unbounded dependency constructions and their treatment in modern grammatical theories. Filler-gap dependencies, island constraints, and the relation between grammar and processing. Prerequisite: 222A.

LINGUIST 223. Introduction to Minimalist Syntax. 3-4 Units.

Introduces the basics of Minimalist architecture and structure-building operations, with attention to the communication of syntax with the phonological and semantic interfaces. Topics include phrase structure, locality and phases, phrasal and head movement, functional categories, and features. A previous graduate-level syntax course, or permission of the instructor required.

LINGUIST 224. Introduction to Lexical Function Grammar. 2-4 Units.

Presentation of a formal model of grammar designed to allow precise, computationally tractable descriptions of cross-linguistic variation in syntactic structure. Concentration on the formal properties of the model, its flexibility in teasing out language specific and possibly universal characteristics of natural languages and the place of syntax as a component within a larger linguistic architecture. Prerequisite: 120 or consent of instructor.

Same as: LINGUIST 124

LINGUIST 224A. From Text to Natural Reasoning. 1-4 Unit.

To reason about textual information we rely extensively on extra-linguistic information but the syntactic structure and lexical items used also play a role in guiding us to conclusions. In by now traditional semantic practice the contributions of those are treated in model theoretic terms. But formulas of first or higher order logic do not come with effective procedures for the reasoning that is required to draw inferences or answer questions given some natural language input. Natural Reasoning is a cover term we use for a family of proof-theoretic formal approaches that are currently used by computational linguists. The course will give an overview of proof-theoretic logic as applied to natural language, discuss some of the computational systems that incorporate this view (Stanford's NatLog, Bar Ilan's Biutee, Parc's Bridge) and conclude with a critical view of the linguistic generalizations that underlie these approaches and means to improve them or mitigate their shortcomings. The examples of natural reasoning will mainly be in the domain of monotonicity reasoning and reasoning about the factuality of events.

LINGUIST 224B. Advanced Topics in Lexical Functional Grammar. 1-4 Unit.

May be repeated for credit.

LINGUIST 225. Seminar in Syntax: Head Movement. 2-4 Units.

Seminar on advanced topics in syntax. Topics may vary from year to year. May be repeated for credit. May be repeated for credit.

LINGUIST 227C. Projects in Syntax. 2-4 Units.

Group research projects using quantitative syntactic data from texts, recordings, experiments, or historical records. Skills in extracting, graphically exploring, and analyzing naturalistic syntactic data, and in presenting results. May be repeated for credit. Prerequisite: 229A, B, or D, or equivalent.

LINGUIST 229A. Laboratory Syntax I. 1-4 Unit.

Critiques of the empirical foundations of syntax. The roles of introspective, usage-based, experimental, and typological evidence. Modern methods of data collection and analysis used in syntax. Hands-on, practical work with data sets. May be repeated for credit.

LINGUIST 229B. Laboratory Syntax II. 1-4 Unit.

Hands-on use of methods for handling syntactic data, including corpus work on ecologically natural data and controlled experimental paradigms. Explanatory models of syntactic processing and their relation to theories of grammar. May be repeated for credit.

LINGUIST 229C. Laboratory Syntax III. 1-4 Unit.

Hands-on use of methods for handling syntactic data, including corpus work on ecologically natural data and controlled experimental paradigms. Explanatory models of syntactic processing and their relation to theories of grammar. May be repeated for credit.

LINGUIST 229D. Empirical Syntax Research Seminar. 1-2 Unit.

Recent work in syntax that employs data-rich methods like corpora and laboratory studies, emphasizing research by seminar participants. May be repeated for credit.

LINGUIST 230A. Introduction to Semantics and Pragmatics. 4 Units.

Linguistic meaning and its role in communication. Topics include ambiguity, vagueness, presupposition, intonational meaning, and Grice's theory of conversational implicature. Applications to issues in politics, the law, philosophy, advertising, and natural language processing. Those who have not taken logic, such as PHIL 150 or 151, should also enroll in 130C. Pre- or corequisite: 120, 121, consent of instructor, or graduate standing in Linguistics.

Same as: LINGUIST 130A

LINGUIST 230B. Semantics and Pragmatics I. 2-4 Units.

Expands on 130A/230A. Detailed study of selected topics in formal semantics and pragmatics. Prerequisites: LINGUIST 130A/230A or permission from instructor.

LINGUIST 230C. Semantics and Pragmatics II. 1-4 Unit.**LINGUIST 230D. Semantics Research Seminar. 1 Unit.**

Maybe repeated for credit.

LINGUIST 230E. Logic Laboratory. 1 Unit.

Typically taken in conjunction with 130A/230A.

Same as: LINGUIST 130C

LINGUIST 232A. Lexical Semantics. 2-4 Units.

Introduction to issues in word meaning, focused primarily around verbs. Overview of the core semantic properties of verbs and the organization of the verb lexicon. Approaches to lexical semantic representation, including semantic role lists, proto-roles, and causal and aspectual theories of event conceptualization.

LINGUIST 232B. Seminar in Lexical Semantics: Lexical Categories. 1-4 Unit.

Current topic: A review of recent research into the nature of lexical categories. Topics include languages said to lack lexical category distinctions, languages lacking full lexical category inventories, and methodological issues facing investigations of lexical categories. Data will be drawn from various languages and several semantic domains. May be repeated for credit with different content. May be repeated for credit.

LINGUIST 234. The Structure of Discourse: Theory and Applications. 2-4 Units.

In this course we will address the structure of language above the sentence concentrating initially on: nn(1) defining the minimal units of discourse structure n(2) recursive rules of combination of minimal units (i.e. discourse iquest;syntaxiquest;n(3) representations of discourse level phenomenon(4) the nature and structure of spoken and written formal and informal discourse genres and Speech events in English and other languages including stories, explanations, literary works etc. on the one hand, and socially constructed occasions of speaking such as classes, doctor patient interactions, and informal conversation on the other.

Same as: LINGUIST 134A

LINGUIST 235. Semantic Fieldwork. 2-4 Units.

Techniques for evidence from less well-studied languages within formal semantic theory. Semantic phenomena, and techniques for investigating them, including scope, quantifiers, pronouns, focus, tense, aspect, mood, evidentiality, and information structure. Practical work on a language.

LINGUIST 236. SEM IN SEMANTICS: Reasoning with Quantifiers. 4 Units.

Description: Team project-oriented class exploring linguistic, psychological, and computational models of how people reason about statements involving quantifiers and related devices, including negation and negative polarity items, superlatives, and definite descriptions. One-third of the class time will be devoted to covering core material and recent papers; the remaining two-thirds will be for project development with guidance from the instructors. Prerequisite: LINGUIST 230B or permission from the instructors.

Same as: PSYCH 236C

LINGUIST 237. Seminar in Semantics: Gradation & Modality. 1-4 Unit.

Discussion of major semantic theories of modality and gradation, with special attention to empirical and logical issues that arise from the study of gradable modals.

LINGUIST 239. Semantics and Pragmatics Research Seminar. 1-2 Unit.

Presentation of ongoing research in semantics. May be repeated for credit.

LINGUIST 240. Language Acquisition I. 4 Units.

Processes of language acquisition in early childhood; stages in development; theoretical issues and research questions. Practical experience in data collection. Satisfies the WIM requirement for Linguistics if requested.

Same as: LINGUIST 140

LINGUIST 241. Language Acquisition II. 4 Units.

Pragmatics and acquisition. May be repeated for credit.

LINGUIST 242. Heritage Languages. 3-4 Units.

The linguistic and cultural properties of Heritage languages, which are partially acquired and supplanted by a dominant language in childhood. Topics: Syntactic, phonological and morphological properties of heritage languages, implications from experimental HL research for language universals, cultural vs. linguistic knowledge, the role of schooling in HL competence, influence of the dominant language on the HL, and pedagogical issues for HL learners in the classroom.

Same as: LINGUIST 142

LINGUIST 245. Experimental Design for Linguistics. 4 Units.

Hypothesis formation, confound avoidance, power, general methods, and analysis of results. Students complete a pilot experiment; write-up; peer review; presentation.

LINGUIST 246. Foundations of Psycholinguistics. 4 Units.

Basic readings in language processing and language use, with a historical dimension; discussion each week in class of the relevant papers.

LINGUIST 249. Language Processing. 2-4 Units.

Understanding spoken or written language requires the rapid, incremental processing of novel compositional structures, as well as the integration of the incoming language stream with multiple sources of information, such as the prior discourse, physical context, social information, etc. How are humans able to efficiently accomplish this task? To address this question, this course will consider principles of sentence and discourse processing that guide language understanding and features of sentence & discourse structure that facilitate comprehension. Specific topics are likely to include reference processing, memory & forgetting, individual differences in comprehension ability, the role of context, and computational models of language comprehension.

LINGUIST 250. Sociolinguistic Theory and Analysis. 3-4 Units.

Methods of modeling the patterned variation of language in society. Emphasis is on variation, its relation to social structure and practice, and its role in linguistic change. Intersection between quantitative and qualitative analysis, combining insights of sociology and linguistic anthropology with quantitative linguistic data. Prerequisite: graduate standing in Linguistics or consent of instructor.

LINGUIST 251. Sociolinguistic Field Methods. 3-5 Units.

Strengths and weaknesses of the principal methods of data collection in sociolinguistics.

LINGUIST 252. Sociolinguistics and Pidgin Creole Studies. 2-4 Units.

Introduction to pidgins and creoles, organized around the main stages in the pidgin-creole life cycle: pidginization, creolization, and decreolization. Focus is on transformations in the English language as it was transported from Britain to Africa, Asia, the Caribbean, and the Pacific. Resultant pidginized and creolized varieties such as Nigerian Pidgin English, Chinese Pidgin English, New Guinea Tok Pisin, Suriname Sranan, and the creole continua of Guyana, Jamaica, and Hawaii. Also French, Dutch, Portuguese, Chinook, Motu, and Sango.

Same as: LINGUIST 152

LINGUIST 253. Race, Ethnicity, and Language. 3-4 Units.

This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations participate in similar, yet different, ways of "doing race" through language, interaction and culture. Readings draw heavily from perspectives in (linguistic) anthropology and sociolinguistics. Prerequisite: consent of instructor.

Same as: ANTHRO 320A, EDUC 389X

LINGUIST 254. Sociolinguistics of Language Contact. 2-4 Units.

The role of contact between speakers of different languages in processes of language borrowing, convergence, and shift. Attending both to linguistic aspects and social contexts, examine: second-language acquisition, bilingualism, code-switching, lexical and grammatical borrowing, first language attrition, language death, and the creation of new contact varieties such as jargons, mixed languages, pidgins, and creoles. Prerequisite: background in linguistics, at least one course in linguistics.

Same as: LINGUIST 154

LINGUIST 255A. Seminar in Sociolinguistics: California Dialectology. 1-4 Unit.

Topics vary by quarter. Current topic is based on sociolinguistic interviews gathered in the first two field seasons of the Voices of California project. May be repeated for credit.

LINGUIST 255B. Sociolinguistics Classics and Community Studies. 3-5 Units.

This course discusses some of the major community studies in sociolinguistics (e.g. Labov in NYC, Wolfram in Detroit, Trudgill in Norwich, Milroy in Belfast, and a selection of others up to the present) and the work of other classic sociolinguistic figures (e.g. Romaine, Hymes) who contributed in other ways. Our goal is to reach a deep understanding and critique of their methods, findings and ideas, to improve our own research and our responses to new developments in the field.

LINGUIST 255C. Seminar in Sociolinguistics: Sociogrammar. 2-4 Units.

Seminar style course exploring the literature on sociolinguistic variation in morphology and syntax from the 1960s to the present, and its implication for (socio)linguistic theory, especially in relation to (and in contrast with) socio-phonetics.

LINGUIST 255D. Seminar in Sociolinguistics: Character Types in Sociolinguistics. 1-4 Unit.

Figures of personhood, personas, character types, and stereotypes in the study of linguistic variation. What are the significant differences among these types? Are these social types merely the vehicles through which social meanings travel or do they constitute the meanings themselves?.

LINGUIST 255E. Seminar in Sociolinguistics: Complicating Representations. 2-4 Units.

In this seminar, we will explore the interface between social theory and spoken language understanding. In doing so, we expect to complicate simplistic notions of representations and question what language users store and how they link sound patterns with linguistic and social meaning. Through deep readings of the literature and discussions, we hope to arrive at a number of individual project proposals that take what we know about spoken language understanding to inform our understanding of complex representations that integrate language and the social world.

LINGUIST 255F. Seminar in Sociolinguistics: Language and Social Interaction. 1-4 Unit.

Figures of personhood, personas, character types, and stereotypes in the study of linguistic variation. What are the significant differences among these types? Are these social types merely the vehicles through which social meanings travel or do they constitute the meanings themselves?.

Same as: LINGUIST 155F

LINGUIST 256. Language, Gender and Sexuality. 1-4 Unit.

The role of language in constructing gender and sexuality. Historical overview of major theoretical perspectives and debates (difference vs. dominance, identity vs. desire) and discussion of new directions (affect, embodiment, figures of personhood, experimental approaches). Previous coursework in sociolinguistics recommended. Prerequisites: LING 250 and 110 or the equivalent.

LINGUIST 257. Sociophonetics. 1-4 Unit.

The study of phonetic aspects of sociolinguistic variation and the social significance of phonetic variation. Acoustic analysis of vowels, consonants, prosody, and voice quality. Hands-on work on collaborative research project. Prerequisite: 110 or equivalent, or consent of instructor.

Same as: LINGUIST 157

LINGUIST 258. Analysis of Variation. 1-4 Unit.

The quantitative study of linguistic variability in time, space, and society emphasizing social constraints in variation. Hands-on work with variable data. Prerequisites: 105/205 and 250, or consent of instructor.

LINGUIST 259. Topics in Sociolinguistics. 2-4 Units.

Topics vary by quarter. Current topic is Sociophonetics. Repeatable for credit. This seminar explores new methods of collecting and analyzing sociophonetic data in an experimental setting, including electroglottography, aerodynamic measures, speech resynthesis, and perception study tasks. Requirements include both collaborative and individual research projects.

LINGUIST 260A. Historical Morphology and Phonology. 4 Units.

Sound change and analogical change in the perspective of linguistic theory. Internal and comparative reconstruction.

LINGUIST 260B. Historical Morphosyntax. 2-4 Units.

Morphological and syntactic variation and change. Reanalysis, grammaticalization. The use of corpora and quantitative evidence.

LINGUIST 263. Endangered Languages and Language Revitalization. 3-4 Units.

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages. Same as: ANTHRO 163A, ANTHRO 263A, LINGUIST 163A, NATIVEAM 163

LINGUIST 264. English Transplanted, English Transformed: Pidgins and Creoles. 2-4 Units.

English varieties around the world, including white vernacular dialects and creole, pidgin, and indiginized Englishes. Emphasis is on the historical circumstances of origin, linguistic characteristics, and social setting in colonial and postcolonial societies. Theoretical issues pertaining to language contact, language shift, and pidgin and creole formation.

LINGUIST 265. African American Vernacular English. 2-5 Units.

Linguistics 265 is a new, advanced course on African American Vernacular English, intended for graduate students in Linguistics, Education and other fields, and for undergraduate majors in Linguistics. Students who have taken Linguistics 65 or its equivalent, or who have had an undergraduate introduction to linguistics, are also eligible to take this course. The course will discuss in detail some of the descriptive, historical and sociolinguistic literature on AAVE, beginning with the classic book length works on AAVE written by William Labov, Walt Wolfram and Ralph Fasold, but including some of the most recent research-based articles on the subject in current and recent journals. Research interests of students in the course will help to determine the specific foci within these broad parameters.

LINGUIST 266. Vernacular English and Reading. 4-5 Units.

Discusses some of the literature on the relation between use of vernacular English varieties (e.g. African American Vernacular English, Chicano English) and the development of literacy (especially in Standard English). But our primary focus is on improving the reading skills of African American and Latino students in local schools through the Reading Road program developed at the University of Pennsylvania. Students must commit to tutoring one or more elementary students weekly, using the program. L65 AAVE recommended, but not required. Same as: LINGUIST 66

LINGUIST 270. The Arabic Language and Culture. 3 Units.

(Formerly AMELANG 36). Arabic language from historical, social, strategic, and linguistic perspectives. History of the Arabic language and the stability of classical Arabic over the last 15 centuries. Why the functionality of classical Arabic has not changed as Latin, Old English, and Middle English have. Social aspects of the Arabic language, Ferguson's notion of diglossia. The main varieties of Arabic, differences among them, and when and where they are spoken. Role of Arabic and culture in current world politics, culture, and economy. Linguistic properties of Arabic such as root-based morphology, lexical ambiguity, and syntactic structure relating it to current linguistic theories.

Same as: LINGUIST 36

LINGUIST 271. Structure of Basque. 2-4 Units.

Introduction to key topics in Basque morphology, syntax, semantics and how they bear on current theoretical debates. Topics covered may include basic clause structure and word order, case-marking and ergativity, the expression of motion and location.

LINGUIST 272. Structure of Finnish. 2-4 Units.

Central topics in Finnish morphology, syntax, and semantics and how they bear on current theoretical debates. Topics: clause structure; case; aspect; word order.

LINGUIST 273. The Structure of Russian. 2-4 Units.

A synchronic overview of contemporary standard Russian, including its sound system, word formation and grammatical structure. Emphasis is on problems presented by Russian for current linguistic theory. The acquisition of Russian as a first language.

Same as: LINGUIST 173

LINGUIST 274B. Field Methods II. 3-4 Units.

First course in series with 274C, with a focus on phonetic topics in a targeted language. Prerequisite: one quarter of phonology and one quarter of syntax or permission of instructor. Graduate students are heavily encouraged to make a commitment to both 274B and 274C in the same year.

LINGUIST 274C. Linguistic Field Methods: Syntax. 3-4 Units.

Prerequisites include one quarter of phonology and one quarter of syntax or permission of instructor. Graduate students are heavily encouraged to make a commitment to both 274B and 274C in the same year.

LINGUIST 275. Probability and Statistics for linguists. 2-4 Units.

Introduction to probability and statistical inference, with a focus on conceptual and practical issues relevant to theoretical, experimental, and corpus linguistics. Data analysis and modeling using R. Course project will involve reproducing a published modeling result or statistical analysis in full detail.

LINGUIST 276. Quantitative Methods in Linguistics. 2-4 Units.

Introduction to methods for collecting and analyzing quantitative linguistic data, with a primary focus on the use of corpora in exploring theoretical questions in various areas of linguistics. Topics include the access and retrieval of corpus data (including web-based corpora), data annotation, and statistical modeling. Practical experience with R, Python scripting, and setting up online experiments through Amazon Mechanical Turk.

LINGUIST 277. Laboratory Methods in Psycholinguistics. 2-4 Units.

Issues that commonly arise in the design and implementation of linguistic experiments and in the statistical analysis of empirical results. Topics in experimental design include selection of stimuli, blocking, and power analysis and sample size calculation. How to fit and interpret statistical models using the multilevel regression and Bayesian inference, as implemented in software packages R and Bugs. Topics include interpretation of model coefficients for fixed and random effects, collinearity, model criticism, as well as comparison and reporting of models. Theoretical issues worked out at lab sessions using examples from experiments and corpus studies, including those provided by students.

LINGUIST 278. Programming for Linguists. 1-4 Unit.

Computer programming techniques for collecting and analyzing data in linguistic research. Introduction to the UNIX, regular expressions, and Python scripting. Hands-on experience gathering, formatting, and manipulating corpus, field, and experimental data, combining data from multiple sources, and working with existing tools. Knowledge of computer programming not required.

LINGUIST 280. From Languages to Information. 3-4 Units.

Extracting meaning, information, and structure from human language text, speech, web pages, genome sequences, social networks, or any less structured information. Methods include: string algorithms, edit distance, language modeling, naive Bayes, inverted indices, vector semantics. Applications such as question answering, sentiment analysis, information retrieval, text classification, social network models, machine translation, genomic sequence alignment, spell checking, speech processing. Prerequisite: CS103, CS107, CS109.

Same as: CS 124, LINGUIST 180

LINGUIST 281. Grammar Engineering. 1-4 Unit.

Hands-on techniques for implementation of linguistic grammars, drawing on grammatical theory and engineering skills. The implementation of constraints in morphology, syntax, and semantics, working within a unification-based lexicalist framework. Focus is on developing small grammars for English and at least one other language. Prerequisite: basic syntactic theory or 120. No programming skills required.

Same as: LINGUIST 181

LINGUIST 282. Computational Theories of Syntax. 3-4 Units.

Salient features of modern syntactic theories, including HPSG, LFG, and TAG, motivated by computational concerns. Impact of work within these frameworks on the design of algorithms in computational linguistics, and its influence in both linguistics and computer science. Topics include: notions of unification; unification algorithms and their relation to linguistic theory; agenda-driven chart processing for analysis and synthesis; the interface with morphology, the lexicon, and semantics; and applications, notably machine translation.

Same as: LINGUIST 182

LINGUIST 283. Programming and Algorithms for Natural Language Processing. 3-4 Units.

Construction of computer programs for linguistic processes such as string search, morphological, syntactic, and semantic analysis and generation, and simple machine translation. Emphasis is on the algorithms that have proved most useful for solving such problems.

Same as: LINGUIST 183

LINGUIST 284. Natural Language Processing. 3-4 Units.

Methods for processing human language information and the underlying computational properties of natural languages. Syntactic and semantic processing from linguistic and algorithmic perspectives. Focus is on modern quantitative techniques in NLP: using large corpora, statistical models for acquisition, translation, and interpretation; and representative systems.

Prerequisites: CS124 or CS121/221.

Same as: CS 224N

LINGUIST 284A. Writing Systems in a Digital Age. 2-3 Units.

Introduction to the variety of writing systems and their behaviors. Classification of all existing scripts as alphabetic, syllabic, ideographic; unifying and differentiating features within each group. How writing captures human language in various ways. The development of the alphabet, from ancient Semitic scripts to modern times. How writing systems are extended to additional languages. Chinese writing, its characteristics and sphere of influence. Japanese writing as a hybrid system that includes Chinese. Korean writing as an ideally designed script. The Indian system of writing as the foundation of numerous Asian syllabic scripts. Unicode as global standard for encoding text in all languages. Font technology: the emulation of human writing in the digital realm. nBasic knowledge of phonetics recommended. Knowledge of foreign languages helpful.

Same as: LINGUIST 185

LINGUIST 286. Information Retrieval and Web Search. 3 Units.

Text information retrieval systems; efficient text indexing; Boolean, vector space, and probabilistic retrieval models; ranking and rank aggregation; evaluating IR systems. Text clustering and classification: classification algorithms, latent semantic indexing, taxonomy induction; Web search engines including crawling and indexing, link-based algorithms, and web metadata. Prerequisites: CS 107, CS 109, CS 161.

Same as: CS 276

LINGUIST 287. Extracting Social Meaning and Sentiment. 3 Units.

Methods for extracting social meaning (speaker perspectives, emotions and attitudes) from text and speech. Topics include sentiment analysis and summarization, detection of deception, sarcasm, emotion, and personality. nAnalysis of meaning-bearing characteristics of the speaker and topic, including text, discourse, prosodic and other cues. Prerequisite: CS 124 or 221 or 229 or permission of instructors.

LINGUIST 288. Natural Language Understanding. 3-4 Units.

Project-oriented class focused on developing systems and algorithms for robust machine understanding of human language. Draws on theoretical concepts from linguistics, natural language processing, and machine learning. Topics include lexical semantics, distributed representations of meaning, relation extraction, semantic parsing, sentiment analysis, and dialogue agents, with special lectures on developing projects, presenting research results, and making connections with industry. Prerequisites: one of LINGUIST 180, CS 124, CS 224N, CS224S, or CS221; and logical/ semantics such as LINGUIST 130A or B, CS 157, or PHIL150. Same as: CS 224U, LINGUIST 188

LINGUIST 289. Topics in Computational Linguistics: History of Computational Linguistics. 3-4 Units.

Intellectual history of computational linguistics and natural language processing, together with related aspects of dialogue and speech processing, using primary sources. Reading of seminal early papers, interviews with historical figures, with the goal of understanding the origins and intellectual development of the field. Prerequisites: at least one of LING 180, 281, 283, 284, 286, or 288.

LINGUIST 291. Linguistics and the Teaching of English as a Second/ Foreign Language. 4-5 Units.

Methodology and techniques for teaching languages, using concepts from linguistics and second language acquisition theory and research. Focus is on teaching English, but most principles and techniques applicable to any language. Optional 1-unit seminar in computer-assisted language learning. Same as: LINGUIST 191

LINGUIST 294. Linguistic Research Discussion Group. 1 Unit.

Restricted to first-year Linguistics Ph.D. students.

LINGUIST 390. M.A. Project. 1-6 Unit.**LINGUIST 391A. Curricular Practical Training. 1 Unit.**

Educational opportunities in research and development labs in industry. Qualified linguistics students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 391 A may be taken only once.

LINGUIST 393. Summer Research Activity. 1-8 Unit.

Restricted to Linguistics Ph.D. students. May be repeated for credit.

LINGUIST 393A. Research Activity in Sociolinguistics. 1-2 Unit.

For Linguistics Graduate Students involved in the Voices of CA Project.

LINGUIST 394. TA Training Workshop. 1 Unit.

For second-year graduate students in Linguistics.

LINGUIST 395. Research Workshop. 1-2 Unit.

Restricted to students in the doctoral program. Student presentations of research toward qualifying papers. May be repeated for credit.

LINGUIST 395C. Research Workshop III. 1-2 Unit.

Restricted to students in the doctoral program. Student presentations of ongoing research plus professional development sessions.

LINGUIST 395D. Linguistics Writing Group. 1 Unit.

meets weekly to support student writing projects.

LINGUIST 396. Research Projects in Linguistics. 2-3 Units.

Mentored research project for first-year graduate students in linguistics.

LINGUIST 397. Directed Reading. 1-15 Unit.**LINGUIST 398. Directed Research. 1-15 Unit.****LINGUIST 399. Dissertation Research. 1-15 Unit.**

Management Science Engineering Courses

MSE 20. Discrete Probability Concepts And Models. 4 Units.

Concepts and tools for the analysis of problems under uncertainty, focusing on structuring, model building, and analysis. Examples from legal, social, medical, and physical problems. Topics include axioms of probability, probability trees, belief networks, random variables, conditioning, and expectation.

MSE 22Q. The Flaw of Averages. 3 Units.

Uncertain assumptions in business and public policy are often replaced with single iquest;best guessquest; or average numbers. This leads to a fallacy as fundamental as the belief that the earth is flat, which I call the Flaw of Averages. It states, in effect, that: plans based on average assumptions are wrong on average. This class will discuss mitigations of the flaw of averages using simulation and other methods from probability management.

MSE 41. Financial Literacy. 1 Unit.

Practical knowledge about personal finance and money management including budgeting, pay checks, credit cards, banking, insurance, taxes, and saving. Class especially appropriate for those soon to be self-supporting. Limited enrollment. Admission by order of enrollment in Axxess.

MSE 52. Introduction to Decision Making. 3 Units.

How to sustain focus, discipline, and passion across the Decision Making Spectrum. Comprehensive examples illustrate decision analysis theories and concepts. Consulting case studies highlight practical solutions for real decisions. Student teams present insights from their decision analyses for current organizations. Topics: decision quality, context, processes, framing, structuring, modeling, assessment, judgment under uncertainty, bias reduction, probabilistic inference, robust analysis, sensitivity diagrams, information appraisal, portfolio analysis, risk management, creativity, decision psychology, communication strategies, gaining commitment, decision culture, and decision leadership and management. Not intended for MS&E majors.

MSE 92Q. International Environmental Policy. 3 Units.

Preference to sophomores. Science, economics, and politics of international environmental policy. Current negotiations on global climate change, including actors and potential solutions. Sources include briefing materials used in international negotiations and the U.S. Congress.

MSE 93Q. Nuclear Weapons, Energy, Proliferation, and Terrorism. 3 Units.

Preference to sophomores. At least 20 countries have built or considered building nuclear weapons. However, the paths these countries took in realizing their nuclear ambitions vary immensely. Why is this the case? How do the histories, cultures, national identities, and leadership of these countries affect the trajectory and success of their nuclear programs? This seminar will address these and other questions about nuclear weapons and their proliferation. Students will learn the fundamentals of nuclear technology, including nuclear weapons and nuclear energy, and be expected to use this knowledge in individual research projects on the nuclear weapons programs of individual countries. Case studies will include France, UK, China, India, Israel, Pakistan, North Korea, South Africa, Libya, Iraq, and Iran, among others. Please note any language skills in your application. Recommended: 193 or 193W or 293.

MSE 101. Undergraduate Directed Study. 1-15 Unit.

Subject of mutual interest to student and faculty member. Prerequisite: faculty sponsor.

MSE 107. Interactive Management Science. 3 Units.

Analytical techniques such as linear and integer programming, Monte Carlo simulation, forecasting, decision analysis, and Markov chains in the environment of the spreadsheet. Probability management. Materials include spreadsheet add-ins for implementing these and other techniques. Emphasis is on building intuition through interactive modeling, and extending the applicability of this type of analysis through integration with existing business data structures.

Same as: MSE 207

MSE 108. Senior Project. 5 Units.

Restricted to MS&E majors in their senior year. Students carry out a major project in groups of four, applying techniques and concepts learned in the major. Project work includes problem identification and definition, data collection and synthesis, modeling, development of feasible solutions, and presentation of results. Service Learning Course (certified by Haas Center).

MSE 111. Introduction to Optimization. 4 Units.

Formulation and analysis of linear optimization problems. Solution using Excel solver. Polyhedral geometry and duality theory. Applications to contingent claims analysis, production scheduling, pattern recognition, two-player zero-sum games, and network flows. Prerequisite: CME 100 or MATH 51.

Same as: ENGR 62

MSE 120. Probabilistic Analysis. 5 Units.

Concepts and tools for the analysis of problems under uncertainty, focusing on focusing on structuring, model building, and analysis. Examples from legal, social, medical, and physical problems. Topics include axioms of probability, probability trees, random variables, distributions, conditioning, expectation, change of variables, and limit theorems. Prerequisite: CME 100 or MATH 51.

MSE 121. Introduction to Stochastic Modeling. 4 Units.

Stochastic processes and models in operations research. Discrete and continuous time parameter Markov chains. Queuing theory, inventory theory, simulation. Prerequisite: 120 or Statistics 116.

MSE 125. Introduction to Applied Statistics. 4 Units.

An increasing amount of data is now generated in a variety of disciplines, ranging from finance and economics, to the natural and social sciences. Making use of this information, however, requires both statistical tools and an understanding of how the substantive scientific questions should drive the analysis. In this hands-on course, we learn to explore and analyze real-world datasets. We cover techniques for summarizing and describing data, methods for statistical inference, and principles for effectively communicating results. Prerequisite: 120 or equivalent, CS 106A.

MSE 130. Information Networks and Services. 3 Units.

Architecture of the Internet and performance engineering of computer systems and networks. Switching, routing and shortest path algorithms. Congestion management and queuing networks. Peer-to-peer networking. Wireless and mobile networking. Information service engineering and management. Search engines and recommendation systems. Reputation systems and social networking technologies. Security and trust. Information markets. Select special topics and case studies. Prerequisites: 111, 120, and CS 106A.

MSE 140. Accounting for Managers and Entrepreneurs. 3-4 Units.

Non-majors and minors who have taken or are taking elementary accounting should not enroll. Introduction to accounting concepts and the operating characteristics of accounting systems. The principles of financial and cost accounting, design of accounting systems, techniques of analysis, and cost control. Interpretation and use of accounting information for decision making. Designed for the user of accounting information and not as an introduction to a professional accounting career. Enrollment limited. Admission by order of enrollment.

Same as: MSE 240

MSE 140X. Financial Accounting Concepts and Analysis. 2 Units.

Introductory course in financial accounting. Accounting is referred to as the language of business. Developing students' ability to read, understand, and use business financial statements. Understanding the mapping between the underlying economic events and financial statements, and how this mapping can affect inferences about future firm profitability. Introduction to measuring and reporting of the operating cycle; the process of preparing and presenting primary financial statements; the judgment involved and discretion allowed in making accounting choices; the effects of accounting discretion on the quality of the (reported) financial information; and the fundamentals of financial statement analysis. Class time will be allocated to a combination of lectures, cases and discussions of cases. Capstone project analyzing a company's financials at the end of the quarter.

MSE 145. Introductory Financial Analysis. 3 Units.

Formerly MS&E 142. Evaluation and management of money, complicated by temporary distributions and uncertainty. The "time-value of money" and its impact on economic decisions (both personal and corporate) with the introduction of interest rate (constant or varying over time); several approaches critically examined and made consistent as suitable metrics of comparison. The concept of investment diversification in the presence of uncertainty; portfolio selection and efficient frontier analysis leading to the formulation of the Capital Asset Pricing Model; practical implementation of the concepts, including comparison of loan (e.g., house and auto) terms, credit card financial terms, interest rate term structure and its relationship to rate-of-return analysis, and graphical presentation of uncertain investment alternatives; and current economic news of interest. Critical thinking, discussion, and interaction, using group and computer labs assignments. Prerequisites: differential calculus and probability. Recommended: optimization.

MSE 146. Corporate Financial Management. 4 Units.

Key functions of finance in both large and small companies, and the core concepts and key analytic tools that provide their foundation. Making financing decisions, evaluating investments, and managing cashflow, profitability and risk. Designing performance metrics to effectively measure and align the activities of functional groups and individuals within the firm. Structuring relationships with key customers, partners and suppliers. Prerequisite: 142 or 245G or equivalent.

MSE 152. Introduction to Decision Analysis. 3-4 Units.

How to make good decisions in a complex, dynamic, and uncertain world. People often make decisions that on close examination they regard as wrong. Decision analysis uses a structured conversation based on actional thought to obtain clarity of action in a wide variety of domains. Topics: distinctions, possibilities and probabilities, relevance, value of information and experimentation, relevance and decision diagrams, risk attitude. Students seeking to fulfill the Writing in the Major requirement should register for MS&E 152W.

Same as: MSE 152W

MSE 152W. Introduction to Decision Analysis. 3-4 Units.

How to make good decisions in a complex, dynamic, and uncertain world. People often make decisions that on close examination they regard as wrong. Decision analysis uses a structured conversation based on actional thought to obtain clarity of action in a wide variety of domains. Topics: distinctions, possibilities and probabilities, relevance, value of information and experimentation, relevance and decision diagrams, risk attitude. Students seeking to fulfill the Writing in the Major requirement should register for MS&E 152W.

Same as: MSE 152

MSE 174. Social Entrepreneurship Collaboratory. 4 Units.

Interdisciplinary student teams create and develop U.S. and international social entrepreneurship initiatives. Proposed initiatives may be new entities, or innovative projects, partnerships, and/or strategies impacting existing organizations and social issues in the U.S. and internationally. Focus is on each team's research and on planning documents to further project development. Project development varies with the quarter and the skill set of each team, but should include: issue and needs identification; market research; design and development of an innovative and feasible solution; and drafting of planning documents. In advanced cases, solicitation of funding and implementation of a pilot project. Enrollment limited to 20. May be repeated for credit. Prerequisites: 131 and 132, or consent of instructor.

Same as: URBANST 133

MSE 175. Innovation, Creativity, and Change. 3-4 Units.

Problem solving in organizations; creativity and innovation skills; thinking tools; creative organizations, teams, individuals, and communities. Limited enrollment. (Katila).

MSE 177. Engineering Innovation. 4 Units.

This experiential course explores a wide array of tools that are used to enhance innovation and how those tools are applied across engineering disciplines. Using workshops, demonstrations, and field trips, students will learn how creative problem solving is deployed across engineering fields and, in partnership with the Stanford Virtual Human Interaction Lab, expand their own creative problem solving skills with virtual reality experiences that stretch their imagination. Limited enrollment. Admission by application.

MSE 178. The Spirit of Entrepreneurship. 3 Units.

Is there more to entrepreneurship than inventing the better mouse trap? This course uses the speakers from the Entrepreneurial Thought Leader seminar (MS&E472) to drive research and discussion about what makes an entrepreneur successful. Topics include venture financing, business models, and interpersonal dynamics in the startup environment. Students meet before and after MS&E 472 to prepare for and debrief after the sessions. Enrollment limited to 50 students. Admission by application.

MSE 180. Organizations: Theory and Management. 4 Units.

For undergraduates only; preference to MS&E majors. Classical and contemporary organization theory; the behavior of individuals, groups, and organizations. Limited enrollment. Admission by application. Students must attend first session.

MSE 181. Issues in Technology and Work for a Postindustrial Economy. 3 Units.

How changes in technology and organization are altering work and lives. Approaches to studying and designing work. How understanding work and work practices can assist engineers in designing better technologies and organizations. Topics include job design, distributed and virtual organizations, the blurring of boundaries between work and family life, computer supported cooperative work, trends in skill requirements and occupational structures, monitoring and surveillance in the workplace, downsizing and its effects on work systems, project work and project-based lifestyles, the growth of contingent employment, telecommuting, electronic commerce, and the changing nature of labor relations. Enrollment limited to 50 students. Preference to MS&E, STS, and CEE seniors, followed by MS&E, STS, and CEE juniors.

MSE 185. Global Work. 4 Units.

Issues, challenges, and opportunities facing workers, teams, and organizations working across national boundaries. Topics include geographic distance, time zones, language and cultural differences, technologies to support distant collaboration, team dynamics, and corporate strategy. Limited enrollment. Admission by application. Recommended: 180.

MSE 189. Social Networks - Theory, Methods, and Applications. 3 Units.

Introduces students to the theoretical, substantive, and methodological foundations of social networks. The social network paradigm seeks to explain how social relations facilitate and constrain an actor's opportunities, behaviors, and cognitions. Topics include: network concepts and principles; network data collection, measurement, and analysis; and applications in management, engineering, and related disciplines.

MSE 190. Methods and Models for Policy and Strategy Analysis. 3 Units.

Guest lectures by departmental practitioners. Emphasis is on links among theory, application, and observation. Environmental, national security, and health policy; marketing, new technology, and new business strategy analyses. Comparisons between domains and methods.

MSE 193. Technology and National Security. 3 Units.

The interaction of technology and national security policy from the perspective of history to implications for the new security imperative, homeland defense. Key technologies in nuclear and biological weapons, military platforms, and intelligence gathering. Policy issues from the point of view of U.S. and other nations. The impact of terrorist threat. Guest lecturers include key participants in the development of technology and/or policy.

Same as: MSE 293

MSE 197. Ethics, Technology, and Public Policy. 5 Units.

Ethical issues in science- and technology-related public policy conflicts. Focus is on complex, value-laden policy disputes. Topics: the nature of ethics and morality; rationales for liberty, justice, and human rights; and the use and abuse of these concepts in policy disputes. Case studies from biomedicine, environmental affairs, technical professions, communications, and international relations.

MSE 201. Dynamic Systems. 3-4 Units.

Goal is to think dynamically in decision making, and recognize and analyze dynamic phenomena in diverse situations. Concepts: formulation and analysis; state-space formulation; solutions of linear dynamic systems, equilibria, dynamic diagrams; eigenvalues and eigenvectors of linear systems, the concept of feedback; nonlinear dynamics, phase plane analysis, linearized analysis, Liapunov functions, catastrophe theory. Examples: grabber-holder dynamics, technology innovation dynamics, creation of new game dynamics in business competition, ecosystem dynamics, social dynamics, and stochastic exchange dynamics. Prerequisite: CME 100 or MATH 51 or equivalent.

MSE 207. Interactive Management Science. 3 Units.

Analytical techniques such as linear and integer programming, Monte Carlo simulation, forecasting, decision analysis, and Markov chains in the environment of the spreadsheet. Probability management. Materials include spreadsheet add-ins for implementing these and other techniques. Emphasis is on building intuition through interactive modeling, and extending the applicability of this type of analysis through integration with existing business data structures.

Same as: MSE 107

MSE 208A. Practical Training. 1 Unit.

MS&E students obtain employment in a relevant industrial or research activity to enhance professional experience, consistent with the degree program they are pursuing. Students submit a one-page statement showing relevance to degree program along with offer letter before the start of the quarter, and a 2-3 page final report documenting the work done and relevance to degree program at the conclusion of the quarter. Students may take each of A, B, and C once.

MSE 208B. Practical Training. 1 Unit.

MS&E students obtain employment in a relevant industrial or research activity to enhance professional experience, consistent with the degree program they are pursuing. Students submit a one-page statement showing relevance to degree program along with offer letter before the start of the quarter, and a 2-3 page final report documenting the work done and relevance to degree program at the conclusion of the quarter. Students may take each of A, B, and C once.

MSE 208C. Practical Training. 1 Unit.

MS&E students obtain employment in a relevant industrial or research activity to enhance professional experience, consistent with the degree program they are pursuing. Students submit a one-page statement showing relevance to degree program along with offer letter before the start of the quarter, and a 2-3 page final report documenting the work done and relevance to degree program at the conclusion of the quarter. Students may take each of A, B, and C once.

MSE 211. Linear and Nonlinear Optimization. 3-4 Units.

Optimization theory and modeling. The role of prices, duality, optimality conditions, and algorithms in finding and recognizing solutions. Perspectives: problem formulation, analytical theory, computational methods, and recent applications in engineering, finance, and economics. Theories: finite dimensional derivatives, convexity, optimality, duality, and sensitivity. Methods: simplex and interior-point, gradient, Newton, and barrier. Prerequisite: CME 100 or MATH 51.

MSE 220. Probabilistic Analysis. 3-4 Units.

Concepts and tools for the analysis of problems under uncertainty, focusing on model building and communication: the structuring, processing, and presentation of probabilistic information. Examples from legal, social, medical, and physical problems. Spreadsheets illustrate and solve problems as a complement to analytical closed-form solutions. Topics: axioms of probability, probability trees, random variables, distributions, conditioning, expectation, change of variables, and limit theorems. Prerequisite: CME 100 or MATH 51. Recommended: knowledge of spreadsheets.

MSE 221. Stochastic Modeling. 3 Units.

Focus is on time-dependent random phenomena. Topics: discrete and continuous time Markov chains, renewal processes, queueing theory, and applications. Emphasis is on building a framework to formulate and analyze probabilistic systems. Prerequisite: 220 or consent of instructor.

MSE 223. Simulation. 3 Units.

Discrete-event systems, generation of uniform and non-uniform random numbers, Monte Carlo methods, programming techniques for simulation, statistical analysis of simulation output, efficiency-improvement techniques, decision making using simulation, applications to systems in computer science, engineering, finance, and operations research. Prerequisites: working knowledge of a programming language such as C, C++, Java, Python, or FORTRAN; calculus-base probability; and basic statistical methods.

MSE 226. "Small" Data. 3 Units.

This course is about understanding "small data": these are datasets that allow interaction, visualization, exploration, and analysis on a local machine. The material provides an introduction to applied data analysis, with an emphasis on providing a conceptual framework for thinking about data from both statistical and machine learning perspectives. Topics will be drawn from the following list, depending on time constraints and class interest: approaches to data analysis: statistics (frequentist, Bayesian) and machine learning; binary classification; regression; bootstrapping; causal inference and experimental design; time series modeling. Class lectures will be supplemented by data-driven problem sets and a project. Prerequisites: CME 100 or MATH 51; 120, 220 or STATS 116; experience with R at the level of CME/STATS 195 or equivalent.

MSE 233. Networked Markets. 3 Units.

An introduction to economic analysis for modern online services and systems. Topics include: Examples of networked markets. Online advertising. Recommendation and reputation systems. Pricing digital media. Network effects and network externalities. Social learning and herd behavior. Markets and information. Prerequisites: CME 100 or Math 51, and probability at the level of MS&E 220 or equivalent. No prior economics background will be assumed; requisite concepts will be introduced as needed.

MSE 238. Leading Trends in Information Technology. 3 Units.

Focuses on new trends and disruptive technologies in IT. Emphasis on the way technologies create a competitive edge and generate business value. Broad range of views presented by guest speakers, including top level executives of technology companies, and IT executives (e.g. CIOs) of Fortune 1000 companies. Special emphasis in technologies such as Virtualization, Cloud Computing, Security, Mobility and Unified Communications.

MSE 238A. Leading Trends in Information Technology. 1 Unit.

Focuses on new trends and disruptive technologies in IT. Emphasis on the way technologies create a competitive edge and generate business value. Broad range of views presented by guest speakers, including top level executives of technology companies, and IT executives (e.g. CIOs) of Fortune 1000 companies. Special emphasis in technologies such as Virtualization, Cloud Computing, Security, Mobility and Unified Communications.

MSE 240. Accounting for Managers and Entrepreneurs. 3-4 Units.

Non-majors and minors who have taken or are taking elementary accounting should not enroll. Introduction to accounting concepts and the operating characteristics of accounting systems. The principles of financial and cost accounting, design of accounting systems, techniques of analysis, and cost control. Interpretation and use of accounting information for decision making. Designed for the user of accounting information and not as an introduction to a professional accounting career. Enrollment limited. Admission by order of enrollment. Same as: MSE 140

MSE 241. Economic Analysis. 3-4 Units.

Principal methods of economic analysis of the production activities of firms, including production technologies, cost and profit, and perfect and imperfect competition; individual choice, including preferences and demand; and the market-based system, including price formation, efficiency, and welfare. Practical applications of the methods presented. See 341 for continuation of 241. Recommended: 211, ECON 50.

MSE 243. Energy and Environmental Policy Analysis. 3 Units.

Concepts, methods, and applications. Energy/environmental policy issues such as automobile fuel economy regulation, global climate change, research and development policy, and environmental benefit assessment. Group project. Prerequisite: MS&E 241 or ECON 50, 51.

MSE 244. Economic Growth and Development. 3 Units.

Formerly 249. What generates economic growth. Emphasis is on theory accompanied by intuition, illustrated with country cases. Topics: the equation of motion of an economy; optimal growth theory; calculus of variations and optimal control approaches; deriving the Euler and Pontraguine equations from economic reasoning. Applications: former planned economies in Russia and E. Europe; the present global crisis: causes and consequences; a comparative study of India and China. The links between economic growth and civilization; the causes of the rise and decline of civilizations; lessons for the future. Intended for graduate students. Prerequisite: multivariate calculus and permission of instructor. To receive permission, submit an application at <http://web.stanford.edu/~lcottle/forms/244app.fb>.

MSE 245A. Investment Science. 3 Units.

Formerly MS&E 242. Introduction to the basic concepts of modern quantitative finance and investments. Focus is on basic principles and how they are applied in practice. Topics: basic interest rates; evaluating investments: present value and internal rate of return; fixed-income markets: bonds, yield, duration, portfolio immunization; term structure of interest rates; measuring risk: volatility and value at risk; designing optimal security portfolios; the capital asset pricing model. Group projects involving financial market data. No prior knowledge of finance required. Appropriate for engineering or science students wishing to apply their quantitative skills to develop a basic understanding of financial modeling and markets. Prerequisite: basic preparation in probability, statistics, and optimization.

MSE 245B. Advanced Investment Science. 3 Units.

Formerly MS&E 342. Topics: forwards and futures contracts, continuous and discrete time models of stock price behavior, geometric Brownian motion, Ito's lemma, basic options theory, Black-Scholes equation, advanced options techniques, models and applications of stochastic interest rate processes, and optimal portfolio growth. Computational issues and general theory. Teams work on independent projects. Prerequisite: 242.

MSE 245G. Finance for Non-MBAs. 3 Units.

For graduate students and advanced undergraduates. The foundations of finance; applications in corporate finance and investment management. Financial decisions made by corporate managers and investors with focus on process valuation. Topics include criteria for investment decisions, valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the valuation of derivative securities. Corporate financial instruments including debt, equity, and convertible securities. Equivalent to core MBA finance course, FINANCE 220. Prerequisites: ECON 51, or ENGR 60, or equivalent; ability to use spreadsheets, and basic probability and statistics concepts including random variables, expected value, variance, covariance, and simple estimation and regression.

Same as: ECON 135

MSE 246. Financial Risk Management. 3 Units.

This course provides an introduction to the measurement and management of financial risk. Topics include risk classification, regulatory framework, risk measures, estimation, capital allocation, derivatives hedging, credit portfolio risk, factor models, risk analysis of mortgages and mortgage backed securities, peer-to-peer lending risk. Data-driven group projects. Prerequisite: 245A or similar.

MSE 250A. Engineering Risk Analysis. 3 Units.

The techniques of analysis of engineering systems for risk management decisions involving trade-offs (technical, human, environmental aspects). Elements of decision analysis; probabilistic risk analysis (fault trees, event trees, systems dynamics); economic analysis of failure consequences (human safety and long-term economic discounting); and case studies such as space systems, nuclear power plants, and medical systems. Public and private sectors. Prerequisites: probability, decision analysis, stochastic processes, and convex optimization.

MSE 250B. Project Course in Engineering Risk Analysis. 3 Units.

Students, individually or in groups, choose, define, formulate, and resolve a real risk management problem, preferably from a local firm or institution. Oral presentation and report required. Scope of the project is adapted to the number of students involved. Three phases: risk assessment, communication, and management. Emphasis is on the use of probability for the treatment of uncertainties and sensitivity to problem boundaries. Limited enrollment. Prerequisites: MS&E 250A and consent of instructor.

MSE 251. Stochastic Control. 3 Units.

Introduction to stochastic control, with applications taken from a variety of areas including supply-chain optimization, advertising, finance, dynamic resource allocation, caching, and traditional automatic control. Markov decision processes, optimal policy with full state information for finite-horizon case, infinite-horizon discounted, and average stage cost problems. Bellman value function, value iteration, and policy iteration. Approximate dynamic programming. Linear quadratic stochastic control. Formerly EE365. Prerequisites: EE 263, EE 178 or equivalent. Same as: EE 266

MSE 252. Decision Analysis I: Foundations of Decision Analysis. 3-4 Units.

Coherent approach to decision making, using the metaphor of developing a structured conversation having desirable properties, and producing actional thought that leads to clarity of action. Socratic instruction; computational problem sessions. Emphasis is on creation of distinctions, representation of uncertainty by probability, development of alternatives, specification of preference, and the role of these elements in creating a normative approach to decisions. Information gathering opportunities in terms of a value measure. Relevance and decision diagrams to represent inference and decision. Principles are applied to decisions in business, technology, law, and medicine. See 352 for continuation.

MSE 254. The Ethical Analyst. 1-3 Unit.

The ethical responsibility for consequences of professional analysts who use technical knowledge in support of any individual, organization, or government. The means to form ethical judgments; questioning the desirability of physical coercion and deception as a means to reach any end. Human action and relations in society in the light of previous thought, and research on the desired form of social interactions. Attitudes toward ethical dilemmas through an explicit personal code.

MSE 256. Technology Assessment and Regulation of Medical Devices. 3 Units.

(Formerly 475.) Regulatory approval and reimbursement for new medical technologies as a key component of product commercialization. The regulatory and payer environment in the U.S. and abroad, and common methods of health technology assessment. Framework to identify factors relevant to adoption of new medical devices, and the management of those factors in the design and development phases. Case studies; guest speakers from government (FDA) and industry.

MSE 256A. Technology Assessment and Regulation of Medical Devices. 1 Unit.

Regulatory approval and reimbursement for new medical technologies as a key component of product commercialization. The regulatory and payer environment in the U.S. and abroad, and common methods of health technology assessment. Framework to identify factors relevant to adoption of new medical devices, and the management of those factors in the design and development phases. Case studies; guest speakers from government (FDA) and industry.

MSE 257. Healthcare Reforms and Value-Based Biomedical Technology Innovation. 3 Units.

A fundamental transformation of the healthcare system is underway in which policymakers, payers and administrators are intensely focused on new policy mechanisms designed to constrain healthcare costs while promoting quality, outcomes and value. This class evaluates healthcare reforms in the U.S. and abroad with specific focus on examining their impact on the biomedical technology innovation process. Lectures and case studies, guest speakers from health plans, providers, and the medical technology industry perspectives. Students investigate real-world technology innovations in projects.

MSE 257A. Healthcare Reforms and Value-Based Biomedical Technology Innovation. 1 Unit.

A fundamental transformation of the healthcare system is underway in which policymakers, payers and administrators are intensely focused on new policy mechanisms designed to constrain healthcare costs while promoting quality, outcomes and value. This class evaluates healthcare reforms in the U.S. and abroad with specific focus on examining their impact on the biomedical technology innovation process. Lectures and case studies, guest speakers from health plans, providers, and the medical technology industry perspectives. Students investigate real-world technology innovations in projects.

MSE 260. Introduction to Operations Management. 3 Units.

Operations management focuses on the effective planning, scheduling, and control of manufacturing and service entities. This course introduces students to a broad range of key issues in operations management. Topics include determination of optimal facility location, production planning, optimal timing and sizing of capacity expansion, and inventory control. Prerequisites: basic knowledge of Excel spreadsheets, probability, and optimization.

MSE 261. Inventory Control and Production Systems. 3 Units.

Topics in the planning and control of manufacturing systems. The functions of inventory, determination of order quantities and safety stocks, alternative inventory replenishment systems, item forecasting, production-inventory systems, materials requirements planning (MRP), just-in-time systems, master and operations scheduling, supply chain management, and service operations. Limited enrollment. Prerequisite: 120, or STATS 116, or equivalent.

MSE 262. Supply Chain Management. 3 Units.

Definition of a supply chain; coordination difficulties; pitfalls and opportunities in supply chain management; inventory/service tradeoffs; performance measurement and incentives. Global supply chain management; mass customization; supplier management. Design and redesign of products and processes for supply chain management; tools for analysis; industrial applications; current industry initiatives. Enrollment limited to 50. Admission determined in the first class meeting. Prerequisite: 260 or 261.

MSE 263. Healthcare Operations Management. 3 Units.

With healthcare spending in the US exceeding 17% of GDP and growing, improvements in the quality and efficiency of healthcare services are urgently needed. This class focuses on the use of analytical tools to support efficient and effective delivery of health care. Topics include quality control and management, capacity planning, resource allocation, management of patient flows, and scheduling. Prerequisites: basic knowledge of Excel spreadsheets, probability, and optimization.

MSE 264. Sustainable Product Development and Manufacturing. 3-4 Units.

For SCPD students only in 2014; not offered on-campus. Strategies and techniques for development of sustainable products and manufacturing processes. Topics: strategic decisions in new product development when environmental and resource externalities are accounted for; effect of regulatory requirements on ability of a firm to achieve its business objectives; contributions of sustainable products/processes to the firm's competitive advantage and operational efficiency and to enabling entrepreneurial opportunities; industrial ecology and life cycle analysis techniques in integrating traditional product development requirements with those of the environment and society. May be repeatable for credit once.

MSE 268. Operations Strategy. 3 Units.

The development and implementation of the operations functional strategy. The integration of operations strategy with business and corporate strategies of a manufacturing-based firm. Topics: types and characteristics of manufacturing technologies, quality management, capacity planning and facilities choice, organization and control of operations, and operations' role in corporate strategy. Prerequisites: 260 or 261, or equivalent experience.

MSE 270. Strategy in Technology-Based Companies. 3-4 Units.

For graduate students only. Introduction to the basic concepts of strategy, with emphasis on high technology firms. Topics: competitive positioning, resource-based perspectives, co-opetition and standards setting, and complexity/evolutionary perspectives. Limited enrollment.

MSE 271. Global Entrepreneurial Marketing. 3-4 Units.

Skills needed to market new technology-based products to customers around the world. Case method discussions. Cases include startups and global high tech firms. Course themes: marketing toolkit, targeting markets and customers, product marketing and management, partners and distribution, sales and negotiation, and outbound marketing. Team-based take-home final exam. Limited enrollment. Admission by application.

MSE 272. Startup Boards. 3 Units.

Accelerate your startup through hands-on guidance from your own "board of directors" comprised of venture capitalists and experienced entrepreneurs. Like real startup boards, your board will help your team identify critical milestones, assist in achieving them, and hold your team accountable through regular board meetings. Learn how to avoid common mistakes that lead to ineffective board meetings, fired CEOs, and startup failures. Experience the other side of the table as a board member for another startup and learn the principles of effective board services. Topics include building boards, managing board meetings, making strategic decisions, executing board responsibilities, and replacing CEOs. Limited enrollment. Admission by application. Preference given to teams with demonstrated commitment to a viable startup business.

MSE 273. Technology Venture Formation. 3-4 Units.

Open to graduate students interested in technology driven start-ups. Provides the experience of an early-stage entrepreneur seeking initial investment, including: team building, opportunity assessment, customer development, go-to-market strategy, and IP. Teaching team includes serial entrepreneurs and venture capitalists. Student teams validate the business model using R&D plans and financial projections, and define milestones for raising and using venture capital. Final exam is an investment pitch delivered to a panel of top tier VC partners. In addition to lectures, teams interact with mentors and teaching team weekly. Enrollment by application: <http://www.stanford.edu/class/msande273>. Recommended: 270, 271, or equivalent.

MSE 274. Dynamic Entrepreneurial Strategy. 3 Units.

Primarily for graduate students. How entrepreneurial strategy focuses on creating structural change or responding to change induced externally. Grabber-holder dynamics as an analytical framework for developing entrepreneurial strategy to increase success in creating and shaping the diffusion of new technology or product innovation dynamics. Topics: First mover versus follower advantage in an emerging market; latecomer advantage and strategy in a mature market; strategy to break through stagnation; and strategy to turn danger into opportunity. Modeling, case studies, and term project.

MSE 276. Entrepreneurial Management and Finance. 3 Units.

For graduate students only, with a preference for engineering and science majors. Emphasis on managing high-growth, early-stage enterprises, especially those with innovation-based products and services. Students work in teams to develop skills and approaches necessary to becoming effective entrepreneurial leaders and managers. Topics include assessing risk, understanding business models, analyzing key operational metrics, modeling cash flow and capital requirements, evaluating sources of financing, structuring and negotiating investments, managing organizational culture and incentives, managing the interplay between ownership and growth, and handling adversity and failure. Limited enrollment. Admission by application. Recommended: basic accounting.

MSE 277. Creativity and Innovation. 3-4 Units.

Experiential course explores factors that promote and inhibit creativity and innovation in individuals, teams, and organizations. Teaches creativity tools using workshops, case studies, field trips, expert guests, and team design challenges. Enrollment limited to 40. Admission by application. See <http://dschool.stanford.edu/classes>.

MSE 278. Patent Law and Strategy for Innovators and Entrepreneurs. 2-3 Units.

Inventors and entrepreneurs have four concerns related to patent law: protecting their inventions in the very early stages of product development, determining the patentability of their invention, avoiding infringement of a competitor's patent, and leveraging their patent as a business asset. This course will address each of these concerns through the application of law cases and business cases to an invention of the Student's choice. Although listed as a ME/MSE course, the course is not specific to any discipline or technology.

Same as: ME 208

MSE 279A. Entrepreneurial Leadership. 1 Unit.

This seminar explores a wide range of topics related to entrepreneurial leadership through class discussions, case studies, field trips, and guest speakers. It is part of the DFJ Entrepreneurial Leaders Fellowship, which requires an application during Fall quarter. Details can be found at: <http://stvp.stanford.edu/dfj/>.

MSE 279B. Entrepreneurial Leadership. 1 Unit.

This seminar explores a wide range of topics related to entrepreneurial leadership through class discussions, case studies, field trips, and guest speakers. It is part of the DFJ Entrepreneurial Leaders Fellowship, which requires an application during Fall quarter. Details can be found at: <http://stvp.stanford.edu/dfj/>.

MSE 280. Organizational Behavior: Evidence in Action. 3-4 Units.

Organization theory; concepts and functions of management; behavior of the individual, work group, and organization. Emphasis is on cases and related discussion. Enrollment limited; priority to MS&E students. Autumn Quarter section is restricted to SCPD students; the class will not be available to on-campus students in the Autumn Quarter.

MSE 282. Transformational Leadership. 3 Units.

The personal, team-based and organizational skills needed to become a transformative leader. Case method discussions and lectures. Themes include: personal transformation; the inside-out effect, group transformation; cross-functional teams; re-engineering; rapid - non-profit and for profit - organizational transformation; and social transformation. Course includes a group project that is defined and approved during the first two weeks of class. Limited enrollment. Graduate students only. Admission by application. Prerequisite: 180 or 280.

MSE 283. Scaling up Excellence in Organizations. 4 Units.

A problem for every manager is to make 'good' behaviors spread quickly and to shrink 'undesirable' behaviors quickly. This course provides you practical frameworks to accomplish these managerial goals. We will examine issues such as scaling Idea generation, scaling knowledge sharing, scaling the adoption of ideas across firms, scaling change in global firms. We will be using a newly written series of cases for this course and also draw on guest speakers.

MSE 284. Designing Modern Work Organizations. 3 Units.

This practice-based experiential lab course is geared toward MS&E masters students. Students will master the concepts of organizational design, with an emphasis on applying them to modern challenges (technology, growth, globalization, and the modern workforce). Students will also gain mastery of skills necessary for success in today's workplace (working in teams, communicating verbally, presenting project work). Guest speakers from industry will present real-world challenges related to class concepts. Students will complete a quarter-long project designing and managing an actual online organization. Limited to 25. Admission by application.

MSE 292. Health Policy Modeling. 3 Units.

Primarily for master's students; also open to undergraduates and doctoral students. The application of mathematical, statistical, economic, and systems models to problems in health policy. Areas include: disease screening, prevention, and treatment; assessment of new technologies; bioterrorism response; and drug control policies.

MSE 293. Technology and National Security. 3 Units.

The interaction of technology and national security policy from the perspective of history to implications for the new security imperative, homeland defense. Key technologies in nuclear and biological weapons, military platforms, and intelligence gathering. Policy issues from the point of view of U.S. and other nations. The impact of terrorist threat. Guest lecturers include key participants in the development of technology and/or policy.

Same as: MSE 193

MSE 294. Climate Policy Analysis. 3 Units.

Design and application of formal analytical methods in climate policy development. Issues include instrument design, technology development, resource management, multiparty negotiation, and dealing with complexity and uncertainty. Links among art, theory, and practice. Emphasis is on integrated use of modeling tools from diverse methodologies and requirements for policy making application. Prerequisites: ECON 50, MS&E 211, MS&E 252, or equivalents, or permission of instructor.

MSE 295. Energy Policy Analysis. 3 Units.

Design and application of formal analytical methods for policy and technology assessments of energy efficiency and renewable energy options. Emphasis is on integrated use of modeling tools from diverse methodologies and requirements for policy and corporate strategy development. Prerequisites: ECON 50, MS&E 211, MS&E 252, or equivalents, or permission of instructor.

MSE 299. Voluntary Social Systems. 1-3 Unit.

Ethical theory, feasibility, and desirability of a social order in which coercion by individuals and government is minimized and people pursue ends on a voluntary basis. Topics: efficacy and ethics; use rights for property; contracts and torts; spontaneous order and free markets; crime and punishment based on restitution; guardian-ward theory for dealing with incompetents; the effects of state action-hypothesis of reverse results; applications to help the needy, armed intervention, victimless crimes, and environmental protection; transition strategies to a voluntary society.

MSE 300. Ph.D. Qualifying Tutorial or Paper. 1-3 Unit.

Restricted to Ph.D. students assigned tutorials as part of the MS&E Ph.D. qualifying process. Enrollment optional.

MSE 301. Dissertation Research. 1-15 Unit.

Prerequisite: doctoral candidacy.

MSE 310. Linear Programming. 3 Units.

Formulation of standard linear programming models. Theory of polyhedral convex sets, linear inequalities, alternative theorems, and duality. Variants of the simplex method and the state of art interior-point algorithms. Sensitivity analyses, economic interpretations, and primal-dual methods. Relaxations of harder optimization problems and recent convex conic linear programs. Applications include game equilibrium facility location. Prerequisite: MATH 113 or consent of instructor.

MSE 311. Optimization. 3 Units.

Applications, theories, and algorithms for finite-dimensional linear and nonlinear optimization problems with continuous variables. Elements of convex analysis, first- and second-order optimality conditions, sensitivity and duality. Algorithms for unconstrained optimization, and linearly and nonlinearly constrained problems. Modern applications in communication, game theory, auction, and economics. Prerequisites: MATH 113, 115, or equivalent.

MSE 312. Advanced Methods in Numerical Optimization. 3 Units.

Topics include interior-point methods, relaxation methods for nonlinear discrete optimization, sequential quadratic programming methods, optimal control and decomposition methods. Topic chosen in first class; different topics for individuals or groups possible. Individual or team projects. May be repeated for credit.

Same as: CME 334

MSE 314. Linear and Conic Optimization with Applications. 3 Units.

Linear, semidefinite, conic, and convex nonlinear optimization problems as generalizations of classical linear programming. Algorithms include the interior-point, barrier function, and cutting plane methods. Related convex analysis, including the separating hyperplane theorem, Farkas lemma, dual cones, optimality conditions, and conic inequalities. Complexity and/or computation efficiency analysis. Applications to combinatorial optimization, sensor network localization, support vector machine, and graph realization. Prerequisite: MS&E 211 or equivalent.

Same as: CME 336

MSE 315. Numerical Optimization. 3 Units.

Solution of nonlinear equations; unconstrained optimization; linear programming; quadratic programming; global optimization; general linearly and nonlinearly constrained optimization. Theory and algorithms to solve these problems. Prerequisite: background in analysis and numerical linear algebra.

Same as: CME 304

MSE 316. Discrete Mathematics and Algorithms. 3 Units.

Topics: Basic Algebraic Graph Theory, Matroids and Minimum Spanning Trees, Submodularity and Maximum Flow, NP-Hardness, Approximation Algorithms, Randomized Algorithms, The Probabilistic Method, and Spectral Sparsification using Effective Resistances. Topics will be illustrated with applications from Distributed Computing, Machine Learning, and large-scale Optimization. Prerequisites: CS 261 is highly recommended, although not required.

Same as: CME 305

MSE 317. Algorithms for Modern Data Models. 3 Units.

We traditionally think of algorithms as running on data available in a single location, typically main memory. In many modern applications including web analytics, search and data mining, computational biology, finance, and scientific computing, the data is often too large to reside in a single location, is arriving incrementally over time, is noisy/uncertain, or all of the above. Paradigms such as map-reduce, streaming, sketching, Distributed Hash Tables, Bulk Synchronous Processing, and random walks have proved useful for these applications. This course will provide an introduction to the design and analysis of algorithms for these modern data models.

Prerequisite: Algorithms at the level of CS 261.

Same as: CS 263

MSE 318. Large-Scale Numerical Optimization. 3 Units.

The main algorithms and software for constrained optimization emphasizing the sparse-matrix methods needed for their implementation. Iterative methods for linear equations and least squares. The simplex method. Basis factorization and updates. Interior methods. The reduced-gradient method, augmented Lagrangian methods, and SQP methods.

Prerequisites: Basic numerical linear algebra, including LU, QR, and SVD factorizations, and an interest in MATLAB, sparse-matrix methods, and gradient-based algorithms for constrained optimization. Recommended: MS&E 310, 311, 312, 314, or 315; CME 108, 200, 302, 304, 334, or 335.

Same as: CME 338

MSE 319. Approximation Algorithms. 3 Units.

Combinatorial and mathematical programming techniques to derive approximation algorithms for NP-hard optimization problems. Possible topics include: greedy algorithms for vertex/set cover; rounding LP relaxations of integer programs; primal-dual algorithms; semidefinite relaxations. May be repeated for credit. Prerequisites: 112 or CS 161.

MSE 321. Stochastic Systems. 3 Units.

Topics in stochastic processes, emphasizing applications. Markov chains in discrete and continuous time; Markov processes in general state space; Lyapunov functions; regenerative process theory; renewal theory; martingales, Brownian motion, and diffusion processes. Application to queueing theory, storage theory, reliability, and finance. Prerequisites: 221 or STATS 217; MATH 113, 115. (Glynn).

MSE 322. Stochastic Calculus and Control. 3 Units.

Integral, existence and uniqueness of solutions of stochastic differential equations (SDEs), diffusion approximations, numerical solutions of SDEs, controlled diffusions and the Hamilton-Jacobi-Bellman equation, and statistical inference of SDEs. Applications to finance and queueing theory. Prerequisites: 221 or STATS 217; MATH 113, 115.

MSE 331. Introduction to Computational Social Science. 3 Units.

With a vast amount of data now collected on our online and offline actions -- from what we buy, to where we travel, to who we interact with -- we have an unprecedented opportunity to study complex social systems. This opportunity, however, comes with scientific, engineering, and ethical challenges. In this hands-on course, we develop ideas from computer science and statistics to address problems in sociology, economics, political science, and beyond. We cover techniques for collecting and parsing data, methods for large-scale machine learning, and principles for effectively communicating results. To see how these techniques are applied in practice, we discuss recent research findings in a variety of areas.

MSE 333. Social Algorithms. 1 Unit.

This seminar will introduce students to research in the field of social algorithms, including networked markets, collective decision making, recommendation and reputation systems, prediction markets, social choice theory, and models of influence and contagion.

MSE 335. Queueing and Scheduling in Processing Networks. 3 Units.

Advanced stochastic modeling and control of systems involving queueing and scheduling operations. Stability analysis of queueing systems. Key results on single queues and queueing networks. Controlled queueing systems. Dynamic routing and scheduling in processing networks. Applications to modeling, analysis and performance engineering of computing systems, communication networks, flexible manufacturing, and service systems. Prerequisite: 221 or equivalent.

MSE 336. Platform and Marketplace Design. 3 Units.

The last decade has witnessed a meteoric rise in the number of online markets and platforms competing with traditional mechanisms of trade. Examples of such markets include online marketplaces for goods, such as eBay; online dating markets; markets for shared resources, such as Lyft, Uber, and Airbnb; and online labor markets. We will review recent research that aims to both understand and design such markets. Emphasis on mathematical modeling and methodology, with a view towards preparing Ph.D. students for research in this area. Prerequisites: Mathematical maturity; 300-level background in optimization and probability; prior exposure to game theory.

MSE 337. Spectral Graph Theory and Algorithmic Applications. 3 Units.

Brings students to the forefront of a very active area of research. Reviews classic results relating graph expansion and spectra, random walks, random spanning trees, and their electrical network representation. Covers recent progress on graph sparsification, Kadison-Singer problem and approximation algorithms for traveling salesman problems.

Same as: CME 337

MSE 338. Advanced Topics in Information Science and Technology. 3 Units.

Advanced material in this area is sometimes taught for the first time as a topics course. Prerequisite: consent of instructor.

MSE 347. Credit Risk: Modeling and Management. 3 Units.

Credit risk modeling, valuation, and hedging emphasizing underlying economic, probabilistic, and statistical concepts. Point processes and their compensators. Structural, incomplete information and reduced form approaches. Single name products: corporate bonds, equity, equity options, credit and equity default swaps, forwards and swaptions. Multiname modeling: index and tranche swaps and options, collateralized debt obligations. Implementation, calibration and testing of models. Industry and market practice. Data and implementation driven group projects that focus on problems in the financial industry.

MSE 348. Optimization of Uncertainty and Applications in Finance. 3 Units.

How to make optimal decisions in the presence of uncertainty, solution techniques for large-scale systems resulting from decision problems under uncertainty, and applications in finance. Decision trees, utility, two-stage and multi-stage decision problems, approaches to stochastic programming, model formulation; large-scale systems, Benders and Dantzig-Wolfe decomposition, Monte Carlo sampling and variance reduction techniques, risk management, portfolio optimization, asset-liability management, mortgage finance. Projects involving the practical application of optimization under uncertainty to financial planning.

MSE 351. Dynamic Programming and Stochastic Control. 3 Units.

Markov population decision chains in discrete and continuous time. Risk posture. Present value and Cesaro overtaking optimality. Optimal stopping. Successive approximation, policy improvement, and linear programming methods. Team decisions and stochastic programs; quadratic costs and certainty equivalents. Maximum principle. Controlled diffusions. Examples from inventory, overbooking, options, investment, queues, reliability, quality, capacity, transportation. MATLAB. Prerequisites: MATH 113, 115; Markov chains; linear programming.

MSE 352. Decision Analysis II: Professional Decision Analysis. 3-4 Units.

How to organize the decision conversation, the role of the decision analysis cycle and the model sequence, assessing the quality of decisions, framing decisions, the decision hierarchy, strategy tables for alternative development, creating spare and effective decision diagrams, biases in assessment, knowledge maps, uncertainty about probability. Sensitivity analysis, approximations, value of revelation, joint information, options, flexibility, bidding, assessing and using corporate risk attitude, risk sharing and scaling, and decisions involving health and safety. See 353 for continuation. Prerequisite: 252.

MSE 353. Decision Analysis III: Frontiers of Decision Analysis. 3 Units.

The concept of decision composite; probabilistic insurance and other challenges to the normative approach; the relationship of decision analysis to classical inference and data analysis procedures; the likelihood and exchangeability principles; inference, decision, and experimentation using conjugate distributions; developing a risk attitude based on general properties; alternative decision aiding practices such as analytic hierarchy and fuzzy approaches. Student presentations on current research. Goal is to prepare doctoral students for research. Prerequisite: 352.

MSE 355. Influence Diagrams and Probabilistic Networks. 3 Units.

Network representations for reasoning under uncertainty: influence diagrams, belief networks, and Markov networks. Structuring and assessment of decision problems under uncertainty. Learning from evidence. Conditional independence and requisite information. Node reductions. Belief propagation and revision. Simulation. Linear-quadratic-Gaussian decision models and Kalman filters. Dynamic processes. Bayesian meta-analysis. Prerequisites: 220, 252, or equivalents, or consent of instructor.

MSE 365. Advanced Models in Operations Management. 3 Units.

Primarily for doctoral students. Focus on quantitative models dealing with sustainability and related to operations management. Prerequisite: consent of instructor. May be repeated for credit.

MSE 371. Innovation and Strategic Change. 2-3 Units.

Doctoral research seminar, limited to Ph.D. students. Current research on innovation strategy. Topics: scientific discovery, innovation search, organizational learning, evolutionary approaches, and incremental and radical change. Topics change yearly. Recommended: course in statistics or research methods.

MSE 372. Entrepreneurship Doctoral Research Seminar. 1-3 Unit.

Classic and current research on entrepreneurship. Limited enrollment, restricted to PhD students. Prerequisites: SOC 363 or equivalent, and permission of instructor.

MSE 374. Dynamic Corporate Strategy. 3 Units.

Restricted to Ph.D. students. Research on the creation and shaping of disruptive industry dynamics and how companies can formulate and implement strategies to excel in such changing environments. Dynamic system model approach; case studies. Prerequisites: 201 or equivalent, 274.

MSE 375. Research on Entrepreneurship. 3 Units.

Restricted to Ph.D. students. Organization theory, economics, and strategy perspectives. Limited enrollment. Prerequisites: SOC 360 or equivalent, and consent of instructor.

MSE 376. Strategy Doctoral Research Seminar. 3 Units.

Classic and current research on business and corporate strategy. Limited enrollment, restricted to PhD students. Prerequisites: SOC 363 or equivalent, and permission of instructor. Course may be repeated for credit.

MSE 380. Doctoral Research Seminar in Organizations. 3 Units.

Limited to Ph.D. students. Topics from current published literature and working papers. Content varies. Prerequisite: consent of instructor.

MSE 381. Doctoral Research Seminar in Work, Technology, and Organization. 2-3 Units.

Enrollment limited to Ph.D. students. Topics from current published literature and working papers. Content varies. Prerequisite: consent of instructor.

MSE 383. Doctoral Seminar on Ethnographic Research. 3 Units.

For graduate students; upper-level undergraduates with consent of instructor. Ethnosemantic interviewing and participant observation. Techniques for taking, managing, and analyzing field notes and other qualitative data. 15 hours per week outside class collecting and analyzing own data. Methods texts and ethnographies offer examples of how to analyze and communicate ethnographic data. Prerequisite: consent of instructor. (Barley).

MSE 384. Groups and Teams. 3 Units.

Research on groups and teams in organizations from the perspective of organizational behavior and social psychology. Topics include group effectiveness, norms, group composition, diversity, conflict, group dynamics, temporal issues in groups, geographically distributed teams, and intergroup relations.

MSE 388. Themes in Contemporary Meso-level Field Research. 3 Units.

Doctoral research seminar, limited to Ph.D. students. Current meso-level field research on organizational behavior, especially work and coordination. Topics: work design, job design, roles, teams, organizational change and learning, knowledge management, performance. Focus on understanding theory development and research design in contemporary field research. Topics change yearly. Recommended: course in statistics or research methods.

MSE 389. Seminar on Organizational Theory. 5 Units.

The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

Same as: EDUC 375A, SOC 363A

MSE 390. Doctoral Research Seminar in Health Systems Modeling. 1-3 Unit.

Restricted to PhD students, or by consent of instructor. Doctoral research seminar covering current topics in health policy, health systems modeling, and health innovation. May be repeated for credit.

MSE 391. Doctoral Research Seminar in Energy-Environmental Systems Modeling and Analysis. 1-3 Unit.

Restricted to PhD students, or by consent of instructor. Doctoral research seminar covering current topics in energy and environmental modeling and analysis. Current emphasis on approaches to incorporation of uncertainty and technology dynamics into complex systems models. May be repeated for credit.

MSE 401. Data Science Consulting Workshop. 1 Unit.

Students participate as consultants in the Data Science Drop-in, the department's free consulting service for members of the Stanford community. Participants learn to work with clients, help analyze data, and prepare formal written reports. May be repeated for credit. Prerequisites: course work in applied statistics or data analysis, and consent of instructor.

MSE 403. Integrative Modeling. 3 Units.

Modeling approaches for examining real life problems: how to get started. Critical thinking in framing and problem formulation leading to actionable solutions and communication of results to decision makers. Models to identify and evaluate multiple objectives/metrics. Models examined include both deterministic and probabilistic components. Overview of optimization and probability, decomposition principles to model large scale problems, appropriate integration of uncertainties into model formulations. Primarily team-project based assignments, with three to four group projects. Project topics drawn from applications with real data. Sample project topics include: optimizing group phone plans for large corporations, life insurance business models, making sense of the health care debate, logistic decision problems. Project teams will critically grade other teams' projects; project reports using provided guidelines. Project presentations throughout the quarter. Prerequisites: 211, 220.

MSE 408. Directed Reading and Research. 1-15 Unit.

Directed study and research on a subject of mutual interest to student and faculty member. Prerequisite: faculty sponsor.nn (Staff).

MSE 441. Policy and Economics Research Roundtable. 1 Unit.

Research in progress or contemplated in policy and economics areas. Emphasis depends on research interests of participants, but is likely to include energy, environment, transportation, or technology policy and analysis. May be repeated for credit.
Same as: PERR

MSE 445. Projects in Wealth Management. 3-4 Units.

Recent theory and standard practice in portfolio design for institutions, individuals, and funds. Student projects and case studies derived from the financial industry.

MSE 447. Systemic and Market Risk : Notes on Recent History, Practice, and Policy. 3 Units.

The global financial crisis of 2007-8 threw into sharp relief the ongoing challenges of understanding risk, the financial system, links with the global economy, and interactions with policy. We will explore elements of the crisis, a few other key events, and ongoing debates about systemic risk. Group projects will explore in more detail past events and current topics in systemic risk. Supplements a rigorous technical curriculum in modern finance with select aspects relevant to understanding the practice and broader context of modern financial activities such as derivatives, financial engineering, and risk management.

MSE 448. Big Financial Data and Algorithmic Trading. 3 Units.

Project course emphasizing the connection between data, models, and reality. Vast amounts of high volume, high frequency observations of financial quotes, orders and transactions are now available, and poses a unique set of challenges. This type of data will be used as the empirical basis for modeling and testing various ideas within the umbrella of algorithmic trading and quantitative modeling related to the dynamics and micro-structure of financial markets. Due to the fact that it is near impossible to perform experiments in finance, there is a need for empirical inference and intuition, any model should also be justified in terms of plausibility that goes beyond pure econometric and data mining approaches. Introductory lectures, followed by real-world type projects to get a hands-on experience with realistic challenges and hone skills needed in the work place. Work in groups on selected projects that will entail obtaining and cleaning the raw data and becoming familiar with techniques and challenges in handling big data sets. Develop a framework for modeling and testing (in computer languages such as Python, C++ , Matlab and R) and prepare presentations to present to the class. Example projects include optimal order execution, developing a market making algorithm, design of an intra-day trading strategy, and modeling the dynamics of the bid and ask. Prerequisites: MS&E 211, 242, 342, or equivalents, some exposure to statistics and programming. Enrollment limited. Admission by application; details at first class.

MSE 450. Lessons in Decision Making. 1 Unit.

Entrepreneurs, senior management consultants, and executives from Fortune 500 companies share real-world stories and insights from their experience in decision making.

MSE 452. Decision Analysis Projects: Helping Real Leaders Make Real Decisions. 3 Units.

A virtual consulting firm directed by professional decision analysts who offer advice and guidance as student teams help local organizations make a current business strategy or public policy decision. Projects for businesses, governments, or other institutions typically include start-up venture funding, R&D portfolio planning, new product or market entry, acquisition or partnering, cost reduction, program design, or regulatory policy decisions. Emphasis is on developing clarity of action and delivering insights to clients. Satisfies MS&E project course requirement. Prerequisite: 252. Recommended: 352.

MSE 453. Decision Analysis Applications: Business Strategy and Public Policy. 2-3 Units.

What are the most essential, efficient, and effective ways that important decisions are being made in the real world? Experienced practitioners provide insights from technically challenging and organizationally complex decisions that they helped analyze for decision makers in businesses, nonprofits, and governments. Both the process and content of such decisions are discussed. Process includes disciplined qualitative and quantitative approaches for framing, structuring, modeling, assessing, evaluating, appraising, and communicating decisions. Content broadly covers business and corporate strategy, venture capital investing, financial derivatives and hedging, R&D portfolio management, new product design, technology manufacturing alternatives, business renewal, real estate investment and development, intellectual property litigation risk, interplanetary contamination risk, energy economics and policies, electric power production, nuclear waste disposal, environmental cleanup of mines, marine fisheries and resource protection, medical diagnosis and treatment options, health insurance plans, hospital risk management, pharmaceutical drug trials and backups, behavioral economics lessons, effective interaction techniques, and implications of social psychology for improved organizational decision making. Prerequisite: 252.

MSE 454. Decision Analysis Seminar. 1 Unit.

Current research and related topics presented by doctoral students and invited speakers. May be repeated for credit. Prerequisite: 252.

MSE 464. Global Project Coordination. 3-4 Units.

Students engage in projects that are global in nature and related to the planning, design, and operations of supply chains, marketing, manufacturing, and product development processes. Stanford students work with students from an overseas university in teams of 6-8, using email, teleconferencing, and videoconferencing to meet on a regular basis. As part of the course, students travel to Hong Kong during Stanford's spring break. Applications due by November 15. Information session on October 29. Please see https://stanford.qualtrics.com/SE/?SID=SV_3a8ZBx2NWB8p73T for more information.

MSE 467. Strategic Operations Consulting. 3 Units.

Restricted to MS&E masters students. Guided by industry practitioners, students work in teams to conduct an in-depth consulting project for a sponsoring company, assessing operational challenges and developing effective solutions. Projects range from the planning, design, and operation of supply chains to manufacturing to new product introduction. Emphasis is on developing diagnostic skills and designing effective and actionable solutions that provide new insights to clients. Students will be taught and coached on business writing and presentation skills. Projects culminate with a comprehensive presentation of findings and recommended actions to the sponsor. Satisfies MS&E project course requirement. Prerequisites: 260 or 261. Admission by application, limited enrollment.

MSE 472. Entrepreneurial Thought Leaders' Seminar. 1 Unit.

Entrepreneurial leaders share lessons from real-world experiences across entrepreneurial settings. ETL speakers include entrepreneurs, leaders from global technology companies, venture capitalists, and best-selling authors. Half-hour talks followed by half hour of class interaction. Required web discussion. May be repeated for credit.

MSE 476. Entrepreneurship Through the Lens of Venture Capital: Venture Capital From Past to Present. 2 Units.

Explores changes in the venture capital industry: rise of Silicon Valley and Sand Hill Road, investing in the dot-com bubble, incubators and accelerators, equity crowd funding platform, and different models of venture capital. Explores how companies are funded, grown, and scale by meeting with individuals who have been at the forefront of this change. See www.lensofvc.com.

MSE 478. The Spirit of Entrepreneurship. 2 Units.

This course uses the speakers from the Entrepreneurial Thought Leader seminar (MS&E472) to drive research and discussion about what makes an entrepreneur successful. Students meet before and after MS&E 472 to prepare for and debrief after the sessions. It is part of the DFJ Entrepreneurial Leaders Fellowship, which requires an application during Fall quarter. Details can be found at: <http://stvp.stanford.edu/dfj/>.

MSE 487. D.ORG: PROTOTYPING ORGANIZATIONAL CHANGE. 2-4 Units.

d.org will send outstanding, proven design thinkers into organizations to jump-start organizational R&D; experiments. Students will work directly with senior leaders to prototype ways to reinforce culture through policies, rituals, and behavioral norms.

MSE 488. Prototyping and Rapid Experiment Lab. 4 Units.

Gain a deeper understanding of the prototyping and user feedback parts of the design thinking process with a focus on rapid experimentation. Explore prototyping and user feedback that happens in later stages of iteration when design ideas are somewhat gelled, but designers are still uncertain about whether the design will meet the need and evoke the response intended. Introduce and generate creative ways to discover what users will do in the real world with the designs we envision. For seasoned students who thoroughly understand the design thinking process or, more broadly, human-centered design and now want to focus on one later stage aspect of it in more depth. An application process will happen in Fall Quarter. Please contact the d.school for more details.

MSE 489. d.Leadership: Design Leadership in Context. 1-3 Unit.

d.Leadership is a course that teaches the coaching and leadership skills needed to drive good design process in groups. d.Leaders will work on real projects driving design projects within organizations, and gain real world skills as they experiment with their leadership style while coaching innovation projects. Take this course if you are inspired by past design classes and want skills to lead design projects beyond Stanford. Preference given to students who have taken other Design Group or d.school classes. Admission by application. See dschool.stanford.edu/classes for more information.

Same as: ME 368

MSE 490. Health Operations and Policy: Thought Leaders Seminar. 1 Unit.

Thought leaders in healthcare policy and healthcare design and delivery share ideas about how to improve our healthcare system. Speakers include individuals from government, industry, and academia with a broad range of experience and perspective.

MSE 802. TGR Dissertation. 0 Units.

Marketing Courses

MKTG 240. Marketing Management. 3 Units.

The objectives of this course are to introduce students to the substantive and procedural aspects of marketing management and to sharpen skills for critical analytical thinking and effective communication. Specifically, the goals are to introduce students to marketing strategy and to the elements of marketing analysis: customer analysis, competitor analysis, and company analysis; to familiarize students with the elements of the marketing mix (product strategy, pricing, advertising and promotion, and distribution), and to enhance problem solving and decision-making abilities in these operational areas of marketing; and to provide students with a forum (both written and verbal) for presenting and defending their own recommendations, and for critically examining and discussing the recommendations of others.

MKTG 249. MSx: Marketing. 3 Units.

Every business has two kinds of problems: 1) Not having customers and 2) everything else. Marketing addresses the first problem. With increased access to information and fast-changing technology the role of marketing has broadened significantly. To attract and retain profitable customers, managers must identify and measure consumers' needs and wants, assess the competitive environment, select the most appropriate customer targets, and then develop multi-faceted marketing programs that satisfy consumers' needs better than the competition. The objective of this class is to provide you with perspectives on classical and modern day marketing, and to teach you how to take a high level strategic approach towards contemporary marketing challenges.

MKTG 335. Product Launch. 3 Units.

Our focus is on the question, "When launching a product, what are the framing issues that will help determine success?" In particular, we will provide you with tools to analyze market situations and determine whether it makes sense to launch a product or engage in a marketing-related investment. The course is not designed to cover issues such as execution of a strategy (although we will touch on this a bit), but on whether to enter a market to begin with. Thus, the course is decision oriented; we want you to think about market entry decisions and how you would make them. The tools that you will be provided won't consist of equations; instead, we'll arm you with a set of questions to ask, whose answers will help you make better decisions. This course is an advanced applications marketing course. Unlike the base core course that is designed to cover every basic topic in marketing, here we focus on a number of basic questions and explore them in depth. Although we will have some lectures for background, the bulk of this endeavor will be accomplished through case discussions. In other words, we can't and won't cover everything, as this course is not designed to be comprehensive. We are going to rely on your academic background in marketing to cover the basics; here and there, it is possible that some material will be a review of what you've done before (there's nothing wrong with a little *de ja vu*). Unfortunately, due to the tight schedule we will not be able to cover any of the basics that are not already included in the course material. The course includes, cases, lectures, and guest lectures.

MKTG 344. Marketing Research. 3 Units.

Market intelligence is of value to firms. To understand their markets, firms need to answer questions such as: How large is the market for a product, what is important for the target segment? How does change in the product design affect profits? This course aims to help students ask relevant questions and find data-driven answers to them. The main objectives are to equip students with: 1) an understanding of the value of data - what intelligence it can and cannot provide, 2) exposure to state-of-the-art quantitative tools such as conjoint analysis and cluster analysis to analyze the data, and 3) sufficient hands-on experience with these tools for answering students' own marketing research questions from the perspective of an entrepreneur, marketer or a consultant. The course is designed to address substantive marketing problems such as: market segmentation, targeting, forecasting demand, pricing, and developing new products. We will use a mix of lectures, exercises, cases and a project to learn the material.

MKTG 353. Social Brands. 4 Units.

As savvy consumers are increasingly participating in brands rather than merely receiving their messages, how do leading organizations stoke conversations, co-create experiences and stories, and build engaging relationships with consumers? Moreover, how do they harness social media to build a brand, and empower employees and consumers to share these brand stories with others? Social Brands is a hands-on, project-based course that will draw brain power from the GSB, School of Engineering, and other Stanford graduate programs to collaboratively and creatively explore these questions. While we examine various inspiring examples of social brands, we will find that the rules are yet to be written. This emerging genre of social commerce and marketing is the "Wild West" and students working in mixed teams will be challenged to design and launch their own social experiments to form their own hypotheses. Assignments will push student teams to audit a brand, focus on a strategic goal, and design a social interaction that invites people on campus to participate in an extraordinary personal experience with that brand. Teams will then capture this experience in short videos and compile them into a story -- one that highlights the brand experience they orchestrated, its impact, and their key learnings. This course will integrate approaches from the d.school and marketing curriculum - including brand strategy, storytelling fundamentals, human-centered methods, rapid prototyping, and a bias toward action. This is a class for those that want to learn by doing and creating. MKTG 353 - Social Brands class website: <http://www.stanford.edu/class/mktg353/>.

MKTG 355. Designing for Happiness. 4 Units.

We assume happiness is stable, an endpoint to achieve or goal to chase. It's not. What we think drives our happiness often doesn't. So what does? And how can knowing this help us create strong companies and brands? Understanding happiness is crucial to building successful relationships, products, and organizations. Yet recent research suggests that our definition of happiness is often confused and misguided. In this class, we explore new data on happiness, focusing on: re-thinking happiness (a happy you) designing happiness (a happy company) spreading happiness (a happy brand) Students will work together to use an iterative design-thinking approach to understand our own definitions of happiness, uncover what really makes us happy (vs. what we think makes us happy), prototype solutions/products to increase our happiness, and design happy companies and brands. The class will be data-driven, drawing on multiple methodologies both quantitative and ethnographic. Throughout the quarter, students will build a class-wide database to investigate real-world happiness data via an *Designing Happiness* app, and test hypotheses about what truly makes them, their teams and their customers happy. This class is recommended for students who plan to be a future entrepreneur building a strong brand, an employee who finds meaning in their work, or someone who wants to understand happiness.

MKTG 365. Marketing Analytics. 4 Units.

Firms operate in an increasingly challenging business environment, with greater competition, more informed customers and rapidly changing market trends. Simultaneously, they also have access to more information about their customers, the marketplace and their competitors than ever before. In this environment, knowing how to use this information to make optimal business decisions is a crucial competitive advantage. Firms often have access to data that they do not know how to use. The objectives of this course are to introduce students to state-of-the-art marketing analytics and to teach them how to practically apply these analytics to real-world business decisions. The following are examples of the types of questions that the course will address: How should a firm determine the prices for its products and services? What is the effect of television advertising on a brand's sales and how should advertising be optimized? What can a firm learn about its customers from online browsing behavior and how can this knowledge be used for targeted advertising and promotions? How should a firm allocate its sales force? How should a firm manage the allocation of its promotional budget in order to maximize its returns? How should the mailing of catalogs or direct mail be targeted to increase response rates? The course will use a mix of lectures, cases, homework assignments and a course project to learn the material. Students do not need to have an advanced statistical background to take this course. Familiarity with the material in an introductory marketing course and an introductory statistics course will be assumed, but necessary material will be reviewed during the course of the quarter as necessary.

MKTG 373. Monetization - Choosing a Business Model. 4 Units.

This course examines the fundamental issues of creating a strategy for monetization and revenue growth within an organization. Students learn about setting an organization's business model design, aligning various functional areas within the company to implement a monetization strategy, and the tradeoffs that occur when choosing amongst profitable monetization policies for the firm. They master concepts, frameworks, and tools to assess an industry and a firm's pricing strategy and business models, and to craft alternatives. They also study the interplay between marketing, salesforces, HR incentives and human capital management, advertising and data and analytics in shaping a winning monetization policy. Topics we will cover include monetizing online content and strategies in ad-driven industries, understanding freemium models and installed-base competition, monetization of consumer data, privacy considerations and the privacy economy, business models from the perspective of investors and venture capitalists, regulatory considerations, and linking monetization to the ability to measure and capture value. We will use a mix of cases and lectures along with extensive participation from industry leaders to bring to light the various issues in class.

MKTG 375. Consumer Behavior. 4 Units.

Contemporary approaches to marketing emphasize the importance of adopting a consumer focus, from determining consumers' wants and needs to shaping their attitudes and ensuring their loyalty. This course provides insight into consumer psychology and the means by which consumer behavior can be influenced or altered. The course has both theoretical and practical objectives in that it will: (1) explore theory and research that is relevant to understanding consumer psychology and behavior, and (2) apply these theories and findings to generate ideas for developing effective marketing techniques and tactics. By shedding light on the psychological underpinnings of consumers' thoughts, attitudes, preferences, needs, and decision-making styles, this course will help students make more insightful and effective marketing decisions. Moreover, because this course takes a broad psychological perspective, it highlights novel ideas for grabbing attention, shaping behavior, and changing people's minds both within and outside of traditional marketing contexts.

MKTG 526. Customer Acquisition for New Ventures. 2 Units.

The focus of this course is on the strategies and methods used by early-stage companies to acquire customers (through outbound or inbound marketing) and to activate them (i.e., to encourage repeat behavior and/or increase the frequency of interaction). Throughout the course, we will examine topics such as search engine marketing (SEM), content marketing, affiliate marketing, social media campaigns, mobile applications, freemium strategies, and the use of web analytics for tracking customer acquisition and conversion. The focus will be mainly on digital marketing channels, and the emphasis will be more B2C than B2B. Instruction will consist of case discussion and guest lectures, with students working in groups to apply their learning to improve the process of customer acquisition.

MKTG 532. Persuasion. 2 Units.

The aim of this course is to provide insight into the psychology of persuasion. We will explore research and theory in this domain and discuss and develop potentially powerful techniques for changing people's attitudes and behaviors. We will apply our insights broadly to examine the features that make for an effective persuasive appeal in a wide range of settings (e.g., an ad, a pitch to investors, etc.), and students will practice designing and implementing persuasive appeals.

MKTG 534. The Travel and Airline Industry. 2 Units.

This class will provide an overview of the travel and hospitality industry focusing on strategy, business models, institutions and innovations. Issues we will cover include pricing and yield management, service quality assessment and loyalty and reward program management within verticals such as airlines, hotels and cruise lines. We will also discuss new innovations such as shared consumption models and the role of online reviews and user generated content in facilitating travel. The class will involve a mix of cases and lectures; a site visit to a Bay Area hotel for a tour of operations and discussion of strategy; and interactions with several industry leaders in the travel space.

MKTG 536. Entrepreneurial Ventures in Luxury Markets. 2 Units.

The broad goal of this Bass Seminar is to apply the key concepts covered in *The Frinky Science of the Human Mind (GSBGEN 520)** for identifying and proposing new ventures in the "luxury" space. For this course, "luxury" will be viewed in a broader than usual fashion, namely creating distinctive differences to fundamentally change an otherwise mundane product category. An example of such a view will be the venture, Mr., an upscale barbershop in San Francisco, started by two GSB alums, Kumi Walker and Sean Heywood. Another example will be Voss, an upscale brand in the bottled water category. Students in this course will work in groups to identify promising opportunities in the "luxury" space early in the quarter. The groups will then hone their new venture ideas through meetings with entrepreneurs, experts in private equity, product design, etc., who will serve as guest speakers in this course. In this regard, each session will be structured to begin with a guest speaker followed by a brainstorming/ discussion session. The final deliverable will be a business plan that is put together by each group for a new venture in the "luxury" space. nnn*Students who could not take GSBGEN 520 are strongly encouraged to attend preparatory sessions that will be scheduled in the first week of December. Such students may also contact the instructor (shiv_baba@gsb.stanford.edu) to see if they can sit in on some of the GSBGEN 520 sessions that will be relevant for this Bass Seminar.

MKTG 541. Social Brands. 2 Units.

A hands-on two-week survey of Marketing's cutting edge, where bold brands are becoming ever more open, participatory, experiential & experimental. nnnInspired by a smattering of provocative real-world examples and mind-blowing guests, diverse student teams will employ design methods to conceive of and visualize their own creative proposals for how the Stanford GSB itself might engage with the world in radical new ways. Teams will ultimately pitch their final concepts to the GSB's Chief Marketing Officer for consideration, feedback and potential real-world implementation. nnn.

MKTG 542. Designing Story in a Digital World. 1 Unit.

Our world is changing at an incredible pace. We're in the middle of a commerce revolution that is consumer-driven and technology-enabled. Consumer expectations have risen. They want to be inspired by engaging, meaningful experiences, and they want to engage with people and brands that have compelling, data-driven, and authentic stories to share. But how do you develop that story? n nStorytelling has always been a significant part of history, but the means through which the stories have been told has evolved with each civilization. From the oral histories, to the works of scribes, to newspapers, television, and now the Internet, personal narrative has been used to communicate the events of the past. Digital media now combines tradition with technology and allows us to tell stories through voice, text, images, audio, and video. The immersive workshop is structured around three key principles: (1) know your goal, (2) craft your story, and (3) prototype to learn. You will be a part of an ultra-paced design sprint to come up with a compelling story about a brand or person of your choosing, and design the story to be leveraged across digital media.

MKTG 547. Strategic Marketing Communication - Compressed. 2 Units.

The course is designed to sharpen students' grasp of the strategic and tactical aspects of Marketing Communications that lead to competitive advantages in the marketplace. The course will begin a focus on strategy and introduce students to frameworks that address two broad goals of any firm: (1) Establish a competitive advantage by offering a superior customer value proposition and (2) Generate sustainable organic growth. The course will then segue into marketing communication tactics that will enable the firm effectively accomplish its strategic objectives. Here, the concepts and frameworks will only be applicable to traditional approaches (such as the use of television, print, and point-of-purchase promotions) but also to emergent approaches (such as the use of the internet, mobile media, etc.). Designed from the perspective of executives who are often involved in making strategic as well as tactical marketing decisions to solve contemporary business problems, this course is intended for students whose career plans include consulting and entrepreneurial ventures, apart from those thinking of careers in marketing.

MKTG 552. Building Innovative Brands. 2 Units.

Building Innovative Brands is a hands-on two-week dive into how leading brands may leverage a Design Thinking approach to become ever more participatory, experiential and experimental. Together, we will explore how leading organizations stoke conversations, co-create experiences, spark stories and build engaging relationships with consumers. Inspired by provocative real-world examples and industry guests, diverse student teams will employ human-centered design methods to conceive of and visualize their own creative proposals for how a brand could engage in innovative, brand-enhancing new ways. Teams will ultimately pitch their experience design concepts to the program leadership for feedback, consideration and potential real-world implementation.

MKTG 555. Designing Happiness. 2 Units.

We assume happiness is stable, an endpoint to achieve or a goal to "chase." It's not. Recent research suggests that the meaning of happiness changes every 3-4 years. Understanding happiness is crucial to building successful products, organizations and relationships. In this MBA seminar, we explore the data-driven research on happiness, revealing insights about (a) anticipating, (b) understanding, (c) visualizing, (d) spreading, (e) remembering, and (f) creating happiness. Students will work together to use an iterative design-thinking approach to understand our own current definition of happiness, uncover what really makes us happy (vs. what we think makes us happy), prototype solutions/products to increase our present happiness, and develop tools to continually understand and foster happiness as our lives change. The seminar will be data-driven, drawing on multiple methodologies including blogs (<http://www.wefeelfine.org/>), experiments and surveys.

MKTG 575. Consumer Behavior. 2 Units.

Contemporary approaches to marketing emphasize the importance of adopting a consumer focus, from determining consumers' wants and needs, understanding their motivation, to shaping their attitudes and ensuring their loyalty. This course provides insight into consumer psychology and the means by which consumer behavior can be influenced or altered. The course has both theoretical and practical objectives in that we will: (1) explore theory and research that is relevant to understanding consumer psychology, (2) apply these theories and findings to generate novel ideas for effective marketing techniques. By shedding light on the psychological underpinnings of consumers' motivation, attitudes, preferences, and decision-making styles, this course will help students make more insightful and effective marketing decisions, as well as developing novel ideas for grabbing attention, shaping behavior, and changing consumers' minds.

MKTG 622. Behavioral Research in Marketing III: Consumer Behavior Classics. 3 Units.

The purpose of this seminar is to provide PhD level coverage of the major research work carried out in consumer behavior. For each topic considered, a selection of articles with a specific focus on "early classics" will be distributed and discussed. For each topic, our goals will be to determine the main ideas and research questions driving work in each topic area, how these authors positioned their work and tested their ideas, what made these papers "classics," where the gaps are, and what ideas for new research those gaps imply.

MKTG 641. Behavioral Research in Marketing I. 3 Units.

This course prepares the student to do empirical behavioral research. It will cover all aspects of the research process, from hypothesis generation to experimental design to data analysis to writing up your results.

MKTG 642. Behavioral Research in Marketing II: Consumer Behavior. 3 Units.

This PhD seminar provides coverage of the major research carried out in consumer research both in marketing and psychology. A vast set of topics will be covered including conscious and non-conscious consumer goals, motivations, emotions, attention and perception, and consumer decision processes. The course will help students hone their ability to conceptualize, operationalize, and develop research ideas and will provide a grasp of what it takes to be a successful academic in the field of consumer behavior.

MKTG 644. Quantitative Research in Marketing. 4 Units.

The goal of this seminar is to familiarize students with the quantitative marketing literature and develop the process of generating research ideas and topics. Sessions will involve a mix of: (i) a discussion of papers in a particular area in quantitative marketing; and/or (ii) a discussion of students' research ideas with respect to topics. The format will mix student presentations of papers with lectures by the instructor(s). When discussing papers in the literature, the focus will be on the topic and research question and not the methodological approach. When discussing research ideas, students should be able to articulate why their question is interesting, where it fits in the literature and how they would address their question.

MKTG 645. Empirical Analysis of Dynamic Decision Contexts. 3 Units.

This course will focus on empirical tools for analyzing dynamic decision contexts, wherein current actions of firms or consumers have effects on future payoffs, profits and/or competitive conduct. The course will build the relevant material generally, but our applications will be mostly focused on empirical marketing, operations and industrial organization problems. We will have an applied focus overall, emphasizing the practical aspects of implementation, especially programming. The overall aim of the class is to help students obtain the skills to implement these methods in their research. By the end of the class, students are expected to be able to formulate a dynamic decision problem, program it in a language such as Matlab or C, and to estimate the model from data. The course starts with an overview of consumer theory and static models of consumer choice. We build on this material and introduce discrete choice markovian decision problems, and continuous markovian decision problems, and focus on building the computational toolkit for the numerical analysis of these problems. We then move on to specific applications, and discuss multi-agent dynamic equilibrium models. Finally, we discuss recently proposed advanced methods for alleviating computational burden in dynamic models.

MKTG 646. Bayesian Inference: Methods and Applications. 3 Units.

The course aims to develop a thorough understanding of Bayesian inference, with a special focus on empirical applications in marketing. The course will start with a brief theoretical foundation to Bayesian inference and will subsequently focus on empirical methods. Initial topics would include Bayesian linear regression, multivariate regression, importance sampling and its applications. Subsequently, the course will focus on Markov Chain Monte Carlo (MCMC) methods including the Gibbs Sampler and the Metropolis-Hastings algorithm and their applications. The overall focus of the course will be on applying these methods for empirical research using a programming language such as R.

MKTG 661. Attitudes and Persuasion. 3 Units.

This course will provide an overview of recent research on attitudes and persuasion. Content will include broad coverage of the issues of major importance to attitude theory, but will focus on more recent issues and controversies that have captured the interest of researchers in the field. The class will cover research areas such as attitude change, persuasion, and resistance processes; implicit versus explicit attitudes; attitude certainty; cognitive versus affective influences; dissonance and attitudinal ambivalence; selective exposure and biased processing; metacognition; and others. Students who take this course will become familiar with research methods and major issues in attitudes research and will have a better understanding of how individuals form, maintain, and change their evaluations. Throughout the course, students will be encouraged to critique existing research and formulate new research ideas.

MKTG 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

MKTG 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

MKTG 695. Directed Research. 0 Units.

This course is designed to prepare new marketing PhD students for conducting rigorous, independent research. In this course, the student will work closely with a faculty member in collaborative research activities and will become familiar with various aspects of the research process, including developing hypotheses, designing and conducting experiments and/or analyses, and reporting results.

MKTG 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

Materials Science Engineer Courses

MATSCI 10SC. Diamonds from Peanut Butter: Material Technologies and Human History. 2 Units.

Technological importance of materials in history is captured in names: the Stone Age, Bronze Age, Iron Age, and now the Information Age or the Silicon Age. How materials have played, and continue to play, pivotal roles in the development of new technologies.

MATSCI 11SC. Energy Technologies for a Sustainable Future. 2 Units.

Wondering what the buzz is about sustainability, renewable energy, and clean fuels? Meeting the world's growing energy needs in a sustainable fashion is one of the most pressing problems of our time. This class will introduce the scope of the energy problem and define some of the options for sustainable energy. We will look into the scientific basis of sustainable energy technologies, such as solar cells, which convert the energy of the sun directly into electricity, and fuel cells, which convert chemical energy directly into electricity. Other topics will include biofuels, i.e., fuel derived from plant matter, and clean fuels such as hydrogen. The course will emphasize the fundamental science behind the devices and highlight some of the cutting-edge technological issues that are currently being explored. Assigned reading will include books on global energy issues as well as technical reading on the science and engineering of sustainable energy technologies. We will visit several local energy-technology companies, and students will have hands-on lab experience with solar cells, fuel cells, and generators. Students are expected to participate in classroom discussions, attend field trips, carry out laboratory experiments, and complete homework assignments, including a term paper.

MATSCI 81N. Bioengineering Materials to Heal the Body. 3 Units.

Preference to freshmen. How scientists and engineers are designing new materials for surgeon to use in replacing body parts such as heart tissue or the spinal cord. How cells, in the body and transplanted stem cells, communicate with implanted materials. Real-world examples of materials developed for tissue engineering and regenerative medicine therapies. Students identify a clinically important disease or injury that requires a better material, research approaches to the problem, and debate possible engineering solutions.

MATSCI 82N. Science of the Impossible. 3 Units.

Imagine a world where cancer is cured with light, objects can be made invisible, and teleportation is allowed through space and time. The future once envisioned by science fiction writers is now becoming a reality, thanks to advances in materials science and engineering. This seminar will explore 'impossible' technologies - those that have shaped our past and those that promise to revolutionize the future. Attention will be given to both the science and the societal impact of these technologies. We will begin by investigating breakthroughs from the 20th century that seemed impossible in the early 1900s, such as the invention of integrated circuits and the discovery of chemotherapy. We will then discuss the scientific breakthroughs that enabled modern 'impossible' science, such as photodynamic cancer therapeutics, invisibility, and psychokinesis through advanced mind-machine interfaces. Lastly, we will explore technologies currently perceived as completely impossible and brainstorm the breakthroughs needed to make such science fiction a reality. The course will include introductory lectures and in-depth conversations based on readings. Students will also be given the opportunity to lead class discussions on a relevant 'impossible science' topic of their choosing.

MATSCI 100. Undergraduate Independent Study. 1-3 Unit.

Independent study in materials science under supervision of a faculty member.

MATSCI 150. Undergraduate Research. 3-6 Units.

Participation in a research project.

MATSCI 151. Microstructure and Mechanical Properties. 3-4 Units.

Primarily for students without a materials background. Mechanical properties and their dependence on microstructure in a range of engineering materials. Elementary deformation and fracture concepts, strengthening and toughening strategies in metals and ceramics. Topics: dislocation theory, mechanisms of hardening and toughening, fracture, fatigue, and high-temperature creep. Prerequisite: MATSCI 163. Undergraduates register in 151 for 4 units; graduates register for 251 in 3 units.

Same as: MATSCI 251

MATSCI 152. Electronic Materials Engineering. 4 Units.

Materials science and engineering for electronic device applications. Kinetic molecular theory and thermally activated processes; band structure; electrical conductivity of metals and semiconductors; intrinsic and extrinsic semiconductors; elementary p-n junction theory; operating principles of light emitting diodes, solar cells, thermoelectric coolers, and transistors. Semiconductor processing including crystal growth, ion implantation, thin film deposition, etching, lithography, and nanomaterials synthesis.

MATSCI 153. Nanostructure and Characterization. 4 Units.

The structure of materials at the nanoscale is in most cases the same crystalline form as the natural phase. Structures of materials such as semiconductors, ceramics, metals, and nanotubes; classification of these materials according to the principles of crystallography. Primary methods of structural characterization, X-ray diffraction, and electron microscopy; their applications to study such nanostructures.

MATSCI 154. Thermodynamic Evaluation of Green Energy Technologies. 4 Units.

Understand the thermodynamics and efficiency limits of modern green technologies such as carbon dioxide capture from air, fuel cells, batteries, and solar-thermal power.

MATSCI 155. Nanomaterials Synthesis. 4 Units.

The science of synthesis of nanometer scale materials. Examples including solution phase synthesis of nanoparticles, the vapor-liquid-solid approach to growing nanowires, formation of mesoporous materials from block-copolymer solutions, and formation of photonic crystals. Relationship of the synthesis phenomena to the materials science driving forces and kinetic mechanisms. Materials science concepts including capillarity, Gibbs free energy, phase diagrams, and driving forces.

MATSCI 156. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units. Same as: EE 293A, ENERGY 293A, MATSCI 256

MATSCI 157. Quantum Mechanics of Nanoscale Materials. 4 Units.

Introduction to quantum mechanics and its application to the properties of materials. No prior background beyond a working knowledge of calculus and high school physics is presumed. Topics include: The Schrodinger equation and applications to understanding of the properties of quantum dots, semiconductor heterostructures, nanowires, and bulk solids. Tunneling processes and applications to nanoscale devices; the scanning tunneling microscope, and quantum cascade lasers. Simple models for the electronic properties and band structure of materials including semiconductors, insulators and metals and applications to semiconductor devices. Time-dependent perturbation theory and interaction of light with materials with applications to laser technology.

MATSCI 159Q. Japanese Companies and Japanese Society. 3 Units.

Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. Same as: ENGR 159Q

MATSCI 160. Nanomaterials Laboratory. 4 Units.

Preference to sophomores and juniors. Hands-on approach to synthesis and characterization of nanoscale materials. How to make, pattern, and analyze the latest nanotech materials, including nanoparticles, nanowires, and self-assembled monolayers. Techniques such as soft lithography, self-assembly, and surface functionalization. The VLS mechanism of nanowire growth, nanoparticle size control, self-assembly mechanisms, and surface energy considerations. Laboratory projects. Enrollment limited to 24.

MATSCI 161. Nanocharacterization Laboratory. 3-4 Units.

Students use optical microscopy, x-ray diffraction, scanning electron microscopy, x-ray photoelectron spectroscopy, atomic force microscopy and other techniques to characterize recently discovered perovskite semiconductors that can be used to make highly efficient solar cells. This course fulfills the Writing in the Major Requirement for MSE undergrads. Instruction on writing, statistics, generating effective plots with curve fits, using databases to find information and giving oral scientific presentations is given. Instruction on characterization techniques is provided, but it is expected that the students will have already taken a course like MATSCI 153 that covers the fundamentals of the techniques. The emphasis on this course is on doing nanocharacterization experiments and writing up the results. Undergraduates register for 161 for 4 units; graduates register for 171 for 3 units.

Same as: MATSCI 171

MATSCI 162. X-Ray Diffraction Laboratory. 3-4 Units.

Experimental x-ray diffraction techniques for microstructural analysis of materials, emphasizing powder and single-crystal techniques. Diffraction from epitaxial and polycrystalline thin films, multilayers, and amorphous materials using medium and high resolution configurations. Determination of phase purity, crystallinity, relaxation, stress, and texture in the materials. Advanced experimental x-ray diffraction techniques: reciprocal lattice mapping, reflectivity, and grazing incidence diffraction. Enrollment limited to 20. Undergraduates register for 162 for 4 units; graduates register for 172 for 3 units.

Same as: MATSCI 172, PHOTON 172

MATSCI 163. Mechanical Behavior Laboratory. 3-4 Units.

Experimental techniques for the study of the mechanical behavior of engineering materials in bulk and thin film form, including tension testing, nanoindentation, and wafer curvature stress analysis. Metallic and polymeric systems. Prerequisite: ENGR 50. Undergraduates register for 163 in 4 units; graduates register in 173 for 3 units.

Same as: MATSCI 173

MATSCI 164. Electronic and Photonic Materials and Devices Laboratory. 3-4 Units.

Lab course. Current electronic and photonic materials and devices. Device physics and micro-fabrication techniques. Students design, fabricate, and perform physical characterization on the devices they have fabricated. Established techniques and materials such as photolithography, metal evaporation, and Si technology; and novel ones such as soft lithography and organic semiconductors. Prerequisite: 152 or 199 or consent of instructor. Undergraduates register in 164 for 4 units; graduates register in 174 for 3 units.

Same as: MATSCI 174

MATSCI 165. Nanoscale Materials Physics Computation Laboratory. 3-4 Units.

Computational exploration of fundamental topics in materials science using Java-based computation and visualization tools. Emphasis is on the atomic-scale origins of macroscopic materials phenomena. Simulation methods include molecular dynamics and Monte Carlo with applications in thermodynamics, kinetics, and topics in statistical mechanics. Required prerequisites: Freshman-level physics, undergraduate thermodynamics. Undergraduates register for 165 for 4 units; graduates register for 175 for 3 units.

Same as: MATSCI 175

MATSCI 171. Nanocharacterization Laboratory. 3-4 Units.

Students use optical microscopy, x-ray diffraction, scanning electron microscopy, x-ray photoelectron spectroscopy, atomic force microscopy and other techniques to characterize recently discovered perovskite semiconductors that can be used to make highly efficient solar cells. This course fulfills the Writing in the Major Requirement for MSE undergrads. Instruction on writing, statistics, generating effective plots with curve fits, using databases to find information and giving oral scientific presentations is given. Instruction on characterization techniques is provided, but it is expected that the students will have already taken a course like MATSCI 153 that covers the fundamentals of the techniques. The emphasis on this course is on doing nanocharacterization experiments and writing up the results. Undergraduates register for 161 for 4 units; graduates register for 171 for 3 units.

Same as: MATSCI 161

MATSCI 172. X-Ray Diffraction Laboratory. 3-4 Units.

Experimental x-ray diffraction techniques for microstructural analysis of materials, emphasizing powder and single-crystal techniques. Diffraction from epitaxial and polycrystalline thin films, multilayers, and amorphous materials using medium and high resolution configurations. Determination of phase purity, crystallinity, relaxation, stress, and texture in the materials. Advanced experimental x-ray diffraction techniques: reciprocal lattice mapping, reflectivity, and grazing incidence diffraction. Enrollment limited to 20. Undergraduates register for 162 for 4 units; graduates register for 172 for 3 units.

Same as: MATSCI 162, PHOTON 172

MATSCI 173. Mechanical Behavior Laboratory. 3-4 Units.

Experimental techniques for the study of the mechanical behavior of engineering materials in bulk and thin film form, including tension testing, nanoindentation, and wafer curvature stress analysis. Metallic and polymeric systems. Prerequisite: ENGR 50. Undergraduates register for 163 in 4 units; graduates register in 173 for 3 units.

Same as: MATSCI 163

MATSCI 174. Electronic and Photonic Materials and Devices Laboratory. 3-4 Units.

Lab course. Current electronic and photonic materials and devices. Device physics and micro-fabrication techniques. Students design, fabricate, and perform physical characterization on the devices they have fabricated. Established techniques and materials such as photolithography, metal evaporation, and Si technology; and novel ones such as soft lithography and organic semiconductors. Prerequisite: 152 or 199 or consent of instructor. Undergraduates register in 164 for 4 units; graduates register in 174 for 3 units.

Same as: MATSCI 164

MATSCI 175. Nanoscale Materials Physics Computation Laboratory. 3-4 Units.

Computational exploration of fundamental topics in materials science using Java-based computation and visualization tools. Emphasis is on the atomic-scale origins of macroscopic materials phenomena. Simulation methods include molecular dynamics and Monte Carlo with applications in thermodynamics, kinetics, and topics in statistical mechanics. Required prerequisites: Freshman-level physics, undergraduate thermodynamics. Undergraduates register for 165 for 4 units; graduates register for 175 for 3 units.

Same as: MATSCI 165

MATSCI 190. Organic and Biological Materials. 3-4 Units.

Unique physical and chemical properties of organic materials and their uses. The relationship between structure and physical properties, and techniques to determine chemical structure and molecular ordering. Examples include liquid crystals, dendrimers, carbon nanotubes, hydrogels, and biopolymers such as lipids, protein, and DNA. Prerequisite: Thermodynamics and ENGR 50 or equivalent. Undergraduates register for 190 for 4 units; graduates register for 210 for 3 units.

Same as: MATSCI 210

MATSCI 192. Materials Chemistry. 3-4 Units.

An introduction to the fundamental physical chemical principles underlying materials properties. Beginning from basic quantum chemistry, students will learn how the electronic configuration of molecules and solids impacts their structure, stability/reactivity, and spectra. Topics for the course include molecular symmetry, molecular orbital theory, solid-state chemistry, coordination compounds, and nanomaterials chemistry. Using both classroom lectures and journal discussions, students will gain an understanding of and be well-positioned to contribute to the frontiers of materials chemistry, ranging from solar-fuel generation to next-generation cancer treatments. Undergraduates register in 192 for 4 units; graduates register in 202 for 3 units.

Same as: MATSCI 202

MATSCI 193. Atomic Arrangements in Solids. 3-4 Units.

Atomic arrangements in perfect and imperfect solids, especially important metals, ceramics, and semiconductors. Elements of formal crystallography, including development of point groups and space groups. Undergraduates register in 193 for 4 units; graduates register in 203 for 3 units.

Same as: MATSCI 203

MATSCI 194. Thermodynamics and Phase Equilibria. 3-4 Units.

The principles of heterogeneous equilibria and their application to phase diagrams. Thermodynamics of solutions; chemical reactions; non-stoichiometry in compounds; first order phase transitions and metastability; thermodynamics of surfaces, elastic solids, dielectrics, and magnetic solids. Undergraduates register for 194 for 4 units; graduates register for 204 for 3 units.

Same as: MATSCI 204

MATSCI 195. Waves and Diffraction in Solids. 3-4 Units.

The elementary principals of x-ray, vibrational, and electron waves in solids. Basic wave behavior including Fourier analysis, interference, diffraction, and polarization. Examples of wave systems, including electromagnetic waves from Maxwell's equations. Diffracted intensity in reciprocal space and experimental techniques such as electron and x-ray diffraction. Lattice vibrations in solids, including vibrational modes, dispersion relationship, density of states, and thermal properties. Free electron model. Basic quantum mechanics and statistical mechanics including Fermi-Dirac and Bose-Einstein statistics. Prerequisite: 193/203 or consent of instructor. Undergraduates register for 195 for 4 units; graduates register for 205 for 3 units.

Same as: MATSCI 205, PHOTON 205

MATSCI 196. Defects in Crystalline Solids. 3-4 Units.

Thermodynamic and kinetic behaviors of 0-D (point), 1-D (line), and 2-D (interface and surface) defects in crystalline solids. Influences of these defects on the macroscopic ionic, electronic, and catalytic properties of materials, such as batteries, fuel cells, catalysts, and memory-storage devices. Prerequisite: 193/203. Undergraduates register for 196 for 4 units; graduates register for 206 for 3 units.

Same as: MATSCI 206

MATSCI 197. Rate Processes in Materials. 3-4 Units.

Diffusion and phase transformations in solids. Diffusion topics: Fick's laws, atomic theory of diffusion, and diffusion in alloys. Phase transformation topics: nucleation, growth, diffusional transformations, spinodal decomposition, and interface phenomena. Material builds on the mathematical, thermodynamic, and statistical mechanical foundations in the prerequisites. Prerequisites: 194/204. Undergraduates register for 197 for 4 units; graduates register for 207 for 3 units.

Same as: MATSCI 207

MATSCI 198. Mechanical Properties of Materials. 3-4 Units.

Introduction to the mechanical behavior of solids, emphasizing the relationships between microstructure and mechanical properties. Elastic, anelastic, and plastic properties of materials. The relations between stress, strain, strain rate, and temperature for plastically deformable solids. Application of dislocation theory to strengthening mechanisms in crystalline solids. The phenomena of creep, fracture, and fatigue and their controlling mechanisms. Prerequisites: 193/203. Undergraduates register for 198 for 4 units; graduates register for 208 for 3 units.

Same as: MATSCI 208

MATSCI 199. Electronic and Optical Properties of Solids. 3-4 Units.

The concepts of electronic energy bands and transports applied to metals, semiconductors, and insulators. The behavior of electronic and optical devices including p-n junctions, MOS-capacitors, MOSFETs, optical waveguides, quantum-well lasers, light amplifiers, and metallo-dielectric light guides. Emphasis is on relationships between structure and physical properties. Elementary quantum and statistical mechanics concepts are used. Prerequisite: 195/205 or equivalent. Undergraduates register for 199 for 4 units; graduates register for 209 for 3 units.

Same as: MATSCI 209

MATSCI 200. Master's Research. 1-15 Unit.

Participation in a research project.

MATSCI 202. Materials Chemistry. 3-4 Units.

An introduction to the fundamental physical chemical principles underlying materials properties. Beginning from basic quantum chemistry, students will learn how the electronic configuration of molecules and solids impacts their structure, stability/reactivity, and spectra. Topics for the course include molecular symmetry, molecular orbital theory, solid-state chemistry, coordination compounds, and nanomaterials chemistry. Using both classroom lectures and journal discussions, students will gain an understanding of and be well-positioned to contribute to the frontiers of materials chemistry, ranging from solar-fuel generation to next-generation cancer treatments. Undergraduates register in 192 for 4 units; graduates register in 202 for 3 units.

Same as: MATSCI 192

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Same as: MATSCI 199

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Unique physical and chemical properties of organic materials and their uses. The relationship between structure and physical properties, and techniques to determine chemical structure and molecular ordering. Examples include liquid crystals, dendrimers, carbon nanotubes, hydrogels, and biopolymers such as lipids, protein, and DNA. Prerequisite: Thermodynamics and ENGR 50 or equivalent. Undergraduates register for 190 for 4 units; graduates register for 210 for 3 units.

Same as: MATSCI 190

MATSCI 230. Materials Science Colloquium. 1 Unit.

May be repeated for credit.

MATSCI 251. Microstructure and Mechanical Properties. 3-4 Units.

Primarily for students without a materials background. Mechanical properties and their dependence on microstructure in a range of engineering materials. Elementary deformation and fracture concepts, strengthening and toughening strategies in metals and ceramics. Topics: dislocation theory, mechanisms of hardening and toughening, fracture, fatigue, and high-temperature creep. Prerequisite: MATSCI 163. Undergraduates register in 151 for 4 units; graduates register for 251 in 3 units.

Same as: MATSCI 151

MATSCI 256. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units.

Same as: EE 293A, ENERGY 293A, MATSCI 156

MATSCI 299. Practical Training. 1 Unit.

Educational opportunities in high-technology research and development labs in industry. Qualified graduate students engage in internship work and integrate that work into their academic program. Following the internship, students complete a research report outlining their work activity, problems investigated, key results, and any follow-on projects they expect to perform. Student is responsible for arranging own employment. See department student services manager before enrolling.

MATSCI 300. Ph.D. Research. 1-15 Unit.

Participation in a research project.

MATSCI 302. Solar Cells. 3 Units.

This course takes a comprehensive view of solar cells and what will need to be done to enable them to substantially change how the world obtains its electricity. After covering the fundamentals (light trapping, current flow in pn junctions, recombination) that are important for almost all photovoltaic technologies, the course will address technologies based on highly crystalline forms of silicon and gallium arsenide. The device simulator PC1D will be used to model solar cells. The course will then go through multijunctions cells with concentrators, low-cost thin-film solar cells, organic semiconductors, hybrid perovskites and nanowires. There will be discussions of module design and the economics of the solar industry. There will be a tour of a company that makes solar cells and guest lectures.

MATSCI 303. Principles, Materials and Devices of Batteries. 3 Units.

Thermodynamics and electrochemistry for batteries. Emphasis on lithium ion batteries, but also different types including lead acid, nickel metal hydride, metal air, sodium sulfur and redox flow. Battery electrode materials, electrolytes, separators, additives and electrode-electrolyte interface. Electrochemical techniques; advanced battery materials with nanotechnology; battery device structure. Prerequisites: undergraduate chemistry.

MATSCI 311. Lasers in Materials Processing. 3 Units.

Principles of laser operation. Optically and electrically pumped lasers. Materials for solid-state lasers. Fundamentals of laser/materials interactions. Applications in thin film technology and microfabrication; laser annealing of defects and crystallization of amorphous films. Laser-induced shock waves. Extreme non-equilibrium laser processing; ultra-fast (femtosecond) lasers and their novel uses; micro- and nanofabrication of fluidic and photonic devices; intracellular nano-surgery.

MATSCI 312. New Methods in Thin Film Synthesis. 3 Units.

Materials base for engineering new classes of coatings and devices. Techniques to grow thin films at atomic scale and to fabricate multilayers/superlattices at nanoscale. Vacuum growth techniques including evaporation, molecular beam epitaxy (MBE), sputtering, ion beam assisted deposition, laser ablation, chemical vapor deposition (CVD), and electroplating. Future direction of material synthesis such as nanocluster deposition and nanoparticles self-assembly. Relationships between deposition parameters and film properties. Applications of thin film synthesis in microelectronics, nanotechnology, and biology. SCPD offering.

MATSCI 316. Nanoscale Science, Engineering, and Technology. 3 Units.

This course covers important aspects of nanotechnology in nanomaterials synthesis and fabrication, novel property at the nanoscale, tools and applications: a variety of nanostructures including nanocrystal, nanowire, carbon nanotube, graphene, nanoporous material, block copolymer, and self-assembled monolayer; nanofabrication techniques developed over the past 20 years; thermodynamic, electronic and optical property; applications in solar cells, batteries, biosensors and electronics. Other nanotechnology topics may be explored through a group project. SCPD offering.

MATSCI 320. Nanocharacterization of Materials. 3 Units.

Current methods of directly examining the microstructure of materials. Topics: optical microscopy, scanning electron and focused ion beam microscopy, field ion microscopy, transmission electron microscopy, scanning probe microscopy, and microanalytical surface science methods. Emphasis is on the electron-optical techniques. Recommended: 193/203.

MATSCI 321. Transmission Electron Microscopy. 3 Units.

Image formation and interpretation. The contrast phenomena associated with perfect and imperfect crystals from a physical point of view and from a formal treatment of electron diffraction theory. The importance of electron diffraction to systematic analysis and recent imaging developments. Recommended: 193/203, 195/205, or equivalent.

MATSCI 322. Transmission Electron Microscopy Laboratory. 3 Units.

Practical techniques in transmission electron microscopy (TEM): topics include microscope operation and alignment, diffraction modes and analysis, bright-field/dark-field imaging, high resolution and aberration corrected imaging, scanning TEM (STEM) imaging, x-ray energy dispersive spectrometry (EDS) and electron energy loss spectrometry (EELS) for compositional analysis and mapping. Prerequisite: 321, consent of instructor. Enrollment limited to 12.

MATSCI 323. Thin Film and Interface Microanalysis. 3 Units.

The science and technology of microanalytical techniques, including Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), ion scattering spectroscopy (ISS), and x-ray photoelectron spectroscopy (XPS or ESCA). Generic processes such as sputtering and high-vacuum generation. Prerequisite: some prior exposure to atomic and electronic structure of solids. SCPD offering.

MATSCI 326. X-Ray Science and Techniques. 3 Units.

X-ray interaction with matter; diffraction from ordered and disordered materials; x-ray absorption, photoemission, and coherent scattering; x-ray microscopy. Sources including synchrotrons, high harmonic generation, x-ray lasers. Time-resolved techniques and detector technology. Same as: PHOTON 326

MATSCI 331. Atom-based computational methods for materials. 3 Units.

Introduction to atom-based computational methods for materials with emphasis on quantum methods. Topics include density functional theory, tight-binding and empirical approaches. Computation of optical, electronic, phonon properties. Bulk materials, interfaces, nanostructures. Molecular dynamics. Prerequisites - undergraduate quantum mechanics.

MATSCI 343. Organic Semiconductors for Electronics and Photonics. 3 Units.

The science of organic semiconductors and their use in electronic and photonic devices. Topics: methods for fabricating thin films and devices; relationship between chemical structure and molecular packing on properties such as band gap, charge carrier mobility and luminescence efficiency; doping; field-effect transistors; light-emitting diodes; lasers; biosensors; photodetectors and photovoltaic cells.

MATSCI 346. Nanophotonics. 3 Units.

Recent developments in micro- and nanophotonic materials and devices. Basic concepts of photonic crystals. Integrated photonic circuits. Photonic crystal fibers. Superprism effects. Optical properties of metallic nanostructures. Sub-wavelength phenomena and plasmonic excitations. Meta-materials. Prerequisite: Electromagnetic theory at the level of 242. Same as: EE 336

MATSCI 347. Introduction to Magnetism and Magnetic Nanostructures. 3 Units.

Atomic origins of magnetic moments, magnetic exchange and ferromagnetism, types of magnetic order, magnetic anisotropy, domains, domain walls, hysteresis loops, hard and soft magnetic materials, demagnetization factors, and applications of magnetic materials, especially magnetic nanostructures and nanotechnology. Tools include finite-element and micromagnetic modeling. Design topics include electromagnet and permanent magnet, electronic article surveillance, magnetic inductors, bio-magnetic sensors, and magnetic drug delivery. Design projects, team work, and computer-aided design. Prerequisites: PHYSICS 29 and 43, or college-level electricity and magnetism.

MATSCI 353. Mechanical Properties of Thin Films. 3 Units.

The mechanical properties of thin films on substrates. The mechanics of thin films and of the atomic processes which cause stresses to develop during thin film growth. Experimental techniques for studying stresses in and mechanical properties of thin films. Elastic, plastic, and diffusional deformation of thin films on substrates as a function of temperature and microstructure. Effects of deformation and fracture on the processing of thin film materials. Prerequisite: 198/208.

MATSCI 358. Fracture and Fatigue of Materials and Thin Film Structures. 3 Units.

Linear-elastic and elastic-plastic fracture mechanics from a materials science perspective, emphasizing microstructure and the micromechanisms of fracture. Plane strain fracture toughness and resistance curve behavior. Mechanisms of failure associated with cohesion and adhesion in bulk materials, composites, and thin film structures. Fracture mechanics approaches to toughening and subcritical crack-growth processes, with examples and applications involving cyclic fatigue and environmentally assisted subcritical crack growth. Prerequisite: 151/251, 198/208, or equivalent. SCPD offering.

MATSCI 359. Crystalline Anisotropy. 3 Units.

Matrix and tensor analysis with applications to the effects of crystal symmetry on elastic deformation, thermal expansion, diffusion, piezoelectricity, magnetism, thermodynamics, and optical properties of solids, on the level of J. F. Nye's *Physical Properties of Crystals*. Homework sets use *Mathematica*.

MATSCI 380. Nano-Biotechnology. 3 Units.

Literature based. Principles that make nanoscale materials unique, applications to biology, and how biological systems can create nanomaterials. Molecular sensing, drug delivery, bio-inspired synthesis, self-assembling systems, and nanomaterial based therapies. Interactions at the nanoscale. Applications and opportunities for new technology.

MATSCI 381. Biomaterials in Regenerative Medicine. 3 Units.

Materials design and engineering for regenerative medicine. How materials interact with cells through their micro- and nanostructure, mechanical properties, degradation characteristics, surface chemistry, and biochemistry. Examples include novel materials for drug and gene delivery, materials for stem cell proliferation and differentiation, and tissue engineering scaffolds. Prerequisites: undergraduate chemistry, and cell/molecular biology or biochemistry. Same as: BIOE 361

MATSCI 382. Biochips and Medical Imaging. 3 Units.

The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies.

Same as: EE 225, SBIO 225

MATSCI 399. Graduate Independent Study. 1-10 Unit.

Under supervision of a faculty member.

MATSCI 400. Participation in Materials Science Teaching. 1-3 Unit.

May be repeated for credit.

MATSCI 801. TGR Project for MS Students. 0 Units.

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MATSCI 802. TGR Dissertation for Ph.D Students. 0 Units.

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Mathematical Computational Science Courses

MCS 100. Mathematics of Sports. 3 Units.

The use of mathematics, statistics, and probability in the analysis of sports performance, sports records, and strategy. Topics include mathematical analysis of the physics of sports and the determinations of optimal strategies. New diagnostic statistics and strategies for each sport. Corequisite: STATS 60, 110 or 116.

Same as: STATS 50

Mathematics Courses

MATH 16. Mathematics in the Real World. 3 Units.

Introduction to non-calculus applications of mathematical ideas and principles in real-world problems. Topics include probability and counting, basic statistical concepts, geometric series. Applications include insurance, gambler's ruin, false positives in disease testing, present value of money, and mortgages. No knowledge of calculus required. Enrollment limited to students who do not have Stanford credit for a high school or college course in calculus or statistics.

Same as: STATS 90

MATH 19. Calculus. 3 Units.

Introduction to differential calculus of functions of one variable. Topics: review of elementary functions including exponentials and logarithms, limits, rates of change, the derivative, and applications. Math 19, 20, and 21 cover the same material as Math 41 and 42, but in three quarters rather than two. Prerequisites: precalculus, including trigonometry, advanced algebra, and analysis of elementary functions.

MATH 20. Calculus. 3 Units.

Continuation of 19. Applications of differential calculus; introduction to integral calculus of functions of one variable, including: the definite integral, methods of symbolic and numerical integration, applications of the definite integral. Prerequisites: 19 or equivalent.

MATH 21. Calculus. 4 Units.

Continuation of 20. Applications of integral calculus, introduction to differential equations, infinite series. Prerequisite: 20 or equivalent.

MATH 41. Calculus. 5 Units.

Introduction to differential and integral calculus of functions of one variable. Topics: limits, rates of change, the derivative and applications, introduction to the definite integral and integration. Math 41 and 42 cover the same material as Math 19-20-21, but in two quarters rather than three. Prerequisites: trigonometry, advanced algebra, and analysis of elementary functions, including exponentials and logarithms.
Same as: accelerated

MATH 41A. Calculus ACE. 6 Units.

Students attend MATH 41 lectures with different recitation sessions, four hours instead of two, emphasizing engineering applications. Prerequisite: application; see <http://soe.stanford.edu/edp/programs/ace.html>.

MATH 42. Calculus. 5 Units.

Continuation of 41. Methods of symbolic and numerical integration, applications of the definite integral, introduction to differential equations, infinite series. Prerequisite: 41 or equivalent.
Same as: Accelerated

MATH 42A. Calculus ACE. 6 Units.

Students attend MATH 42 lectures with different recitation sessions, four hours instead of two, emphasizing engineering applications. Prerequisite: application; see <http://soe.stanford.edu/edp/programs/ace.html>.

MATH 51. Linear Algebra and Differential Calculus of Several Variables. 5 Units.

Geometry and algebra of vectors, systems of linear equations, matrices and linear transformations, diagonalization and eigenvectors, vector valued functions and functions of several variables, parametric curves, partial derivatives and gradients, the derivative as a matrix, chain rule in several variables, constrained and unconstrained optimization. Prerequisite: 21, or 42, or a score of 4 on the BC Advanced Placement exam or 5 on the AB Advanced Placement exam, or consent of instructor.

MATH 51A. Linear Algebra and Differential Calculus of Several Variables, ACE. 6 Units.

Students attend MATH 51 lectures with different recitation sessions: four hours per week instead of two, emphasizing engineering applications. Prerequisite: application; see <http://soe.stanford.edu/edp/programs/ace.html>.

MATH 51H. Honors Multivariable Mathematics. 5 Units.

For prospective Mathematics majors in the honors program and students from other areas of science or engineering who have a strong mathematics background. Three quarter sequence covers the material of 51, 52, 53, and additional advanced calculus and ordinary and partial differential equations. Unified treatment of multivariable calculus, linear algebra, and differential equations with a different order of topics and emphasis from standard courses. Students should know one-variable calculus and have an interest in a theoretical approach to the subject. Prerequisite: score of 5 on BC Advanced Placement exam, or consent of instructor.

MATH 51M. Introduction to MATLAB for Multivariable Mathematics. 1 Unit.

Corequisite: MATH 51.

MATH 52. Integral Calculus of Several Variables. 5 Units.

Iterated integrals, line and surface integrals, vector analysis with applications to vector potentials and conservative vector fields, physical interpretations. Divergence theorem and the theorems of Green, Gauss, and Stokes. Prerequisite: 51 and 42 or equivalents.

MATH 52H. Honors Multivariable Mathematics. 5 Units.

Continuation of 51H. Prerequisite: 51H.

MATH 53. Ordinary Differential Equations with Linear Algebra. 5 Units.

Ordinary differential equations and initial value problems, systems of linear differential equations with constant coefficients, applications of second-order equations to oscillations, matrix exponentials, Laplace transforms, stability of non-linear systems and phase plane analysis, numerical methods. Prerequisite: 51 and 42 or equivalents.

MATH 53H. Honors Multivariable Mathematics. 5 Units.

Continuation of 52H. Prerequisite: 52H.

MATH 70SI. The Game of Go: Strategy, Theory, and History. 1 Unit.

Strategy and mathematical theories of the game of Go, with guest appearance by a professional Go player.

MATH 78SI. Speedcubing: HHistory, Theory, and Practice. 1 Unit.

History of the Rubik's cube; the current cubing community; basic mathematical theory; concepts to improve speed solving skill. Prior ability to solve cube not required.

MATH 80Q. Capillary Surfaces: Explored and Unexplored Territory. 3 Units.

Preference to sophomores. Capillary surfaces: the interfaces between fluids that are adjacent to each other and do not mix. Recently discovered phenomena, predicted mathematically and subsequently confirmed by experiments, some done in space shuttles. Interested students may participate in ongoing investigations with affinity between mathematics and physics.

MATH 87Q. Mathematics of Knots, Braids, Links, and Tangles. 3 Units.

Preference to sophomores. Types of knots and how knots can be distinguished from one another by means of numerical or polynomial invariants. The geometry and algebra of braids, including their relationships to knots. Topology of surfaces. Brief summary of applications to biology, chemistry, and physics.

MATH 88Q. The Mathematics of the Rubik's Cube. 3 Units.

Preference to sophomores. Group theory through topics that can be illustrated with the Rubik's cube: subgroups, homomorphisms and quotient groups, the symmetric and alternating groups, conjugation, commutators, and Sylow subgroups.

MATH 101. Math Discovery Lab. 3 Units.

MDL is a discovery-based project course in mathematics. Students work independently in small groups to explore open-ended mathematical problems and discover original mathematics. Students formulate conjectures and hypotheses; test predictions by computation, simulation, or pure thought; and present their results to classmates. No lecture component; in-class meetings reserved for student presentations, attendance mandatory. Admission is by application: <http://math101.stanford.edu>. Motivated students with any level of mathematical background are encouraged to apply.

MATH 104. Applied Matrix Theory. 3 Units.

Linear algebra for applications in science and engineering: orthogonality, projections, the four fundamental subspaces of a matrix, spectral theory for symmetric matrices, the singular value decomposition, the QR decomposition, least-squares, the condition number of a matrix, algorithms for solving linear systems. (Math 113 offers a more theoretical treatment.) Prerequisites: MATH 51 and MATH 52 or 53.

MATH 106. Functions of a Complex Variable. 3 Units.

Complex numbers, analytic functions, Cauchy-Riemann equations, complex integration, Cauchy integral formula, residues, elementary conformal mappings. (Math 116 offers a more theoretical treatment.) Prerequisite: 52.

MATH 108. Introduction to Combinatorics and Its Applications. 3 Units.

Topics: graphs, trees (Cayley's Theorem, application to phylogony), eigenvalues, basic enumeration (permutations, Stirling and Bell numbers), recurrences, generating functions, basic asymptotics. Prerequisites: 51 or equivalent.

MATH 109. Applied Group Theory. 3 Units.

Applications of the theory of groups. Topics: elements of group theory, groups of symmetries, matrix groups, group actions, and applications to combinatorics and computing. Applications: rotational symmetry groups, the study of the Platonic solids, crystallographic groups and their applications in chemistry and physics. Honors math majors and students who intend to do graduate work in mathematics should take 120. WIM.

MATH 110. Applied Number Theory and Field Theory. 3 Units.

Number theory and its applications to modern cryptography. Topics: congruences, finite fields, primality testing and factorization, public key cryptography, error correcting codes, and elliptic curves, emphasizing algorithms. WIM.

MATH 111. Computational Commutative Algebra. 3 Units.

Introduction to the theory of commutative rings, ideals, and modules. Systems of polynomial equations in several variables from the algorithmic viewpoint. Groebner bases, Buchberger's algorithm, elimination theory. Applications to algebraic geometry and to geometric problems.

MATH 113. Linear Algebra and Matrix Theory. 3 Units.

Algebraic properties of matrices and their interpretation in geometric terms. The relationship between the algebraic and geometric points of view and matters fundamental to the study and solution of linear equations. Topics: linear equations, vector spaces, linear dependence, bases and coordinate systems; linear transformations and matrices; similarity; eigenvectors and eigenvalues; diagonalization. (Math 104 offers a more application-oriented treatment.)

MATH 114. Introduction to Scientific Computing. 3-4 Units.

Introduction to Scientific Computing Numerical computation for mathematical, computational, physical sciences and engineering: error analysis, floating-point arithmetic, nonlinear equations, numerical solution of systems of algebraic equations, banded matrices, least squares, unconstrained optimization, polynomial interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, truncation error, numerical stability for time dependent problems and stiffness. Implementation of numerical methods in MATLAB programming assignments. Prerequisites: MATH 51, 52, 53; prior programming experience (MATLAB or other language at level of CS 106A or higher). Graduate students should take it for 3 units and undergraduate students should take it for 4 units.

Same as: CME 108

MATH 115. Functions of a Real Variable. 3 Units.

The development of real analysis in Euclidean space: sequences and series, limits, continuous functions, derivatives, integrals. Basic point set topology. Honors math majors and students who intend to do graduate work in mathematics should take 171. Prerequisite: 51.

MATH 116. Complex Analysis. 3 Units.

Analytic functions, Cauchy integral formula, power series and Laurent series, calculus of residues and applications, conformal mapping, analytic continuation, introduction to Riemann surfaces, Fourier series and integrals. (Math 106 offers a less theoretical treatment.) Prerequisites: 52, and 115 or 171.

MATH 118. Mathematics of Computation. 3 Units.

Notions of analysis and algorithms central to modern scientific computing: continuous and discrete Fourier expansions, the fast Fourier transform, orthogonal polynomials, interpolation, quadrature, numerical differentiation, analysis and discretization of initial-value and boundary-value ODE, finite and spectral elements. Prerequisites: MATH 51 and 53.

MATH 120. Groups and Rings. 3 Units.

Recommended for Mathematics majors and required of honors Mathematics majors. Similar to 109 but altered content and more theoretical orientation. Groups acting on sets, examples of finite groups, Sylow theorems, solvable and simple groups. Fields, rings, and ideals; polynomial rings over a field; PID and non-PID. Unique factorization domains. WIM.

MATH 121. Galois Theory. 3 Units.

Field of fractions, splitting fields, separability, finite fields. Galois groups, Galois correspondence, examples and applications. Prerequisite: Math 120 and (also recommended) 113.

MATH 122. Modules and Group Representations. 3 Units.

Modules over PID. Tensor algebra. Group representations and group rings. Maschke's theorem and character theory. Character tables, construction of representations. Prerequisite: Math 120. Also recommended: 113.

MATH 131P. Partial Differential Equations I. 3 Units.

An introduction to PDE; particularly suitable for non-Math majors. Topics include physical examples of PDE's, method of characteristics, D'Alembert's formula, maximum principles, heat kernel, Duhamel's principle, separation of variables, Fourier series, Harmonic functions, Bessel functions, spherical harmonics. Students who have taken MATH 171 should consider taking MATH 173 rather than 131p. Prerequisite: 53.

MATH 132. Partial Differential Equations II. 3 Units.

Laplace's equation and properties of harmonic functions. Green's functions. Distributions and Fourier transforms. Eigenvalue problems and generalized Fourier series. Numerical solutions. Prerequisite: 131P.

MATH 136. Stochastic Processes. 3 Units.

Introduction to measure theory, L_p spaces and Hilbert spaces. Random variables, expectation, conditional expectation, conditional distribution. Uniform integrability, almost sure and L_p convergence. Stochastic processes: definition, stationarity, sample path continuity. Examples: random walk, Markov chains, Gaussian processes, Poisson processes, Martingales. Construction and basic properties of Brownian motion. Prerequisite: STATS 116 or MATH 151 or equivalent. Recommended: MATH 115 or equivalent. Same as: STATS 219

MATH 137. Mathematical Methods of Classical Mechanics. 3 Units.

Newtonian mechanics. Lagrangian formalism. E. Noether's theorem. Oscillations. Rigid bodies. Introduction to symplectic geometry. Hamiltonian formalism. Legendre transform. Variational principles. Geometric optics. Introduction to the theory of integrable systems. Prerequisites: 51, 52, 53, or 51H, 52H, 53H.

MATH 138. Celestial Mechanics. 3 Units.

Mathematically rigorous introduction to the classical N-body problem: the motion of N particles evolving according to Newton's law. Topics include: the Kepler problem and its symmetries; other central force problems; conservation theorems; variational methods; Hamilton-Jacobi theory; the role of equilibrium points and stability; and symplectic methods. Prerequisites: 53, and 115 or 171.

MATH 143. Differential Geometry. 3 Units.

Geometry of curves and surfaces in three-space and higher dimensional manifolds. Parallel transport, curvature, and geodesics. Surfaces with constant curvature. Minimal surfaces.

MATH 144. Riemannian Geometry. 3 Units.

Smooth manifolds, tensor fields, geometry of Riemannian and Lorentz metrics, the Levi-Civita connection and curvature tensor, Ricci curvature, scalar curvature, and Einstein manifolds, spaces of constant curvature. Prerequisites: Math 51, 52, and 53.

MATH 145. Algebraic Geometry. 3 Units.

Hilbert's nullstellensatz, complex affine and projective curves, Bezout's theorem, the degree/genus formula, blow-up, Riemann-Roch theorem. Prerequisites: 120, and 121 or knowledge of fraction fields. Recommended: familiarity with surfaces equivalent to 143, 146, 147, or 148.

MATH 146. Analysis on Manifolds. 3 Units.

Differentiable manifolds, tangent space, submanifolds, implicit function theorem, differential forms, vector and tensor fields. Frobenius' theorem, DeRham theory. Prerequisite: 52 or 52H.

MATH 147. Differential Topology. 3 Units.

Smooth manifolds, transversality, Sard's theorem, embeddings, degree of a map, Borsuk-Ulam theorem, Hopf degree theorem, Jordan curve theorem. Prerequisite: 115 or 171.

MATH 148. Algebraic Topology. 3 Units.

Fundamental group, covering spaces, Euler characteristic, homology, classification of surfaces, knots. Prerequisite: 109 or 120.

MATH 149. Applied Algebraic Topology. 3 Units.

Introduction to algebraic topology and its applications, in particular persistent homology as a tool for shape and pattern recognition from high dimensional data sets, with examples analyzed using state-of-the-art software. Prerequisite: linear algebra.

MATH 151. Introduction to Probability Theory. 3 Units.

Counting; axioms of probability; conditioning and independence; expectation and variance; discrete and continuous random variables and distributions; joint distributions and dependence; central limit theorem and laws of large numbers. Prerequisite: 52 or consent of instructor.

MATH 152. Elementary Theory of Numbers. 3 Units.

Euclid's algorithm, fundamental theorems on divisibility; prime numbers; congruence of numbers; theorems of Fermat, Euler, Wilson; congruences of first and higher degrees; quadratic residues; introduction to the theory of binary quadratic forms; quadratic reciprocity; partitions.

MATH 154. Algebraic Number Theory. 3 Units.

Properties of number fields and Dedekind domains, quadratic and cyclotomic fields, applications to some classical Diophantine equations; introduction to elliptic curves. Prerequisites: 120 and 121, especially modules over principal ideal domains and Galois theory of finite fields.

MATH 155. Analytic Number Theory. 3 Units.

Topics in analytic number theory such as the distribution of prime numbers, the prime number theorem, twin primes and Goldbach's conjecture, the theory of quadratic forms, Dirichlet's class number formula, Dirichlet's theorem on primes in arithmetic progressions, and the fifteen theorem. Prerequisite: 152, or familiarity with the Euclidean algorithm, congruences, residue classes and reduced residue classes, primitive roots, and quadratic reciprocity.

MATH 159. Discrete Probabilistic Methods. 3 Units.

Modern discrete probabilistic methods suitable for analyzing discrete structures of the type arising in number theory, graph theory, combinatorics, computer science, information theory and molecular sequence analysis. Prerequisite: STATS 116/MATH 151 or equivalent.

MATH 161. Set Theory. 3 Units.

Informal and axiomatic set theory: sets, relations, functions, and set-theoretical operations. The Zermelo-Fraenkel axiom system and the special role of the axiom of choice and its various equivalents. Well-orderings and ordinal numbers; transfinite induction and transfinite recursion. Equinumerosity and cardinal numbers; Cantor's Alephs and cardinal arithmetic. Open problems in set theory. Prerequisite: students should be comfortable doing proofs.

MATH 162. Philosophy of Mathematics. 4 Units.

(Graduate students register for PHIL 262.) General survey of the philosophy of mathematics, focusing on epistemological issues. Includes survey of some basic concepts (proof, axiom, definition, number, set); mind-bending theorems about the limits of our current mathematical knowledge, such as Gödel's Incompleteness Theorems, and the independence of the continuum hypothesis from the current axioms of set theory; major philosophical accounts of mathematics: Logicism, Intuitionism, Hilbert's program, Quine's empiricism, Field's program, Structuralism; concluding with a discussion of Eugene Wigner's 'The Unreasonable Effectiveness of Mathematics in the Natural Sciences'. Students won't be expected to prove theorems or complete mathematical exercises. However, includes some material of a technical nature. Prerequisite: PHIL 150 or consent of instructor.

Same as: PHIL 162, PHIL 262

MATH 163. The Greek Invention of Mathematics. 3-5 Units.

(Formerly CLASSGEN 103.) How was mathematics invented? A survey of the main creative ideas of ancient Greek mathematics. Among the issues explored are the axiomatic system of Euclid's Elements, the origins of the calculus in Greek measurements of solids and surfaces, and Archimedes' creation of mathematical physics. We will provide proofs of ancient theorems, and also learn how such theorems are even known today thanks to the recovery of ancient manuscripts.

Same as: CLASSICS 136

MATH 171. Fundamental Concepts of Analysis. 3 Units.

Recommended for Mathematics majors and required of honors Mathematics majors. Similar to 115 but altered content and more theoretical orientation. Properties of Riemann integrals, continuous functions and convergence in metric spaces; compact metric spaces, basic point set topology. Prerequisite: 51H or 115 or consent of the instructor. WIM.

MATH 172. Lebesgue Integration and Fourier Analysis. 3 Units.

Similar to 205A, but for undergraduate Math majors and graduate students in other disciplines. Topics include Lebesgue measure on Euclidean space, Lebesgue integration, L^p spaces, the Fourier transform, the Hardy-Littlewood maximal function and Lebesgue differentiation. Prerequisite: 171 or consent of instructor.

MATH 173. Theory of Partial Differential Equations. 3 Units.

A rigorous introduction to PDE accessible to advanced undergraduates. Elliptic, parabolic, and hyperbolic equations in many space dimensions including basic properties of solutions such as maximum principles, causality, and conservation laws. Methods include the Fourier transform as well as more classical methods. The Lebesgue integral will be used throughout, but a summary of its properties will be provided to make the course accessible to students who have not had 172 or 205A. Prerequisite: 171 or equivalent.

MATH 174. Calculus of Variations. 3 Units.

An introductory course emphasizing the historical development of the theory, its connections to physics and mechanics, its independent mathematical interest, and its contacts with daily life experience. Applications to minimal surfaces and to capillary surface interfaces. Prerequisites: Math 171 or equivalent.

MATH 175. Elementary Functional Analysis. 3 Units.

Linear operators on Hilbert space. Spectral theory of compact operators; applications to integral equations. Elements of Banach space theory. Prerequisite: 115 or 171.

MATH 177. Geometric Methods in the Theory of Ordinary Differential Equations. 3 Units.

Hamiltonian systems and their geometry. First order PDE and Hamilton-Jacobi equation. Structural stability and hyperbolic dynamical systems. Completely integrable systems. Perturbation theory.

MATH 180. Introduction to Financial Mathematics. 3 Units.

Financial derivatives: contracts and options. Hedging and risk management. Arbitrage, interest rate, and discounted value. Geometric random walk and Brownian motion as models of risky assets. Initial boundary value problems for the heat and related partial differential equations. Self-financing replicating portfolio. Black-Scholes pricing of European options. Dividends. Implied volatility. Optimal stopping and American options. Prerequisite: 53. Corequisites: 131, 151 or STATS 116.

MATH 191. Research Project. 1-10 Unit.

Undergraduates pursue an individual or group research project under Math department faculty supervision. Math Department approval is required prior to enrolling. A maximum of 5 units of credit can be used towards the Math course requirement for the Math major. May be repeated for credit for up to 10 units per academic year.

MATH 193. Polya Problem Solving Seminar. 1 Unit.

Topics in mathematics and problem solving strategies with an eye towards the Putnam Competition. Topics may include parity, the pigeonhole principle, number theory, recurrence, generating functions, and probability. Students present solutions to the class. Open to anyone with an interest in mathematics.

MATH 196. Undergraduate Colloquium. 1 Unit.

Weekly lectures by different experts on topics in pure and applied mathematics that go beyond the standard curriculum. May be repeated for credit for up to 3 units. Does not count toward the math major or minor.

MATH 197. Senior Honors Thesis. 1-6 Unit.

Honors math major working on senior honors thesis under an approved advisor carries out research and reading. Satisfactory written account of progress achieved during term must be submitted to advisor before term ends. May be repeated 3 times for a max of 9 units. Contact department student services specialist to enroll.

MATH 198. Practical Training. 1 Unit.

Only for students majoring in mathematics. Students obtain employment in a relevant industrial or research activity to enhance their professional experience. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit up to 3 units. Prerequisite: qualified offer of employment and consent of department. Prior approval by Math Department is required; you must contact the Math Department's Student Services staff for instructions before being granted permission to enroll.

MATH 199. Independent Work. 1-3 Unit.

For math majors only. Undergraduates pursue a reading program; topics limited to those not in regular department course offerings. Credit can fulfill the elective requirement for math majors. Approval of Undergraduate Affairs Committee is required to use credit for honors majors area requirement. Contact department student services specialist to enroll.

MATH 205A. Real Analysis. 3 Units.

Basic measure theory and the theory of Lebesgue integration. Prerequisite: 171 or equivalent.

MATH 205B. Real Analysis. 3 Units.

Point set topology, basic functional analysis, Fourier series, and Fourier transform. Prerequisites: 171 and 205A or equivalent.

MATH 210A. Modern Algebra I. 3 Units.

Basic commutative ring and module theory, tensor algebra, homological constructions, linear and multilinear algebra, introduction to representation theory. Prerequisite: 122 or equivalent.

MATH 210B. Modern Algebra II. 3 Units.

Continuation of 210A. Topics in Galois theory, commutative algebra, and algebraic geometry. Prerequisites: 210A, and 121 or equivalent.

MATH 210C. Lie Theory. 3 Units.

Topics in Lie groups, Lie algebras, and/or representation theory. Prerequisite: math 210B. May be repeated for credit.

MATH 215A. Complex Analysis, Geometry, and Topology. 3 Units.

Analytic functions, complex integration, Cauchy's theorem, residue theorem, argument principle, conformal mappings, Riemann mapping theorem, Picard's theorem, elliptic functions, analytic continuation and Riemann surfaces.

MATH 215B. Complex Analysis, Geometry, and Topology. 3 Units.

Topics: fundamental group and covering spaces, homology, cohomology, products, basic homotopy theory, and applications. Prerequisites: 113, 120, and 171, or equivalent; 215A is not a prerequisite for 215B.

MATH 215C. Complex Analysis, Geometry, and Topology. 3 Units.

Differentiable manifolds, transversality, degree of a mapping, vector fields, intersection theory, and Poincare duality. Differential forms and the DeRham theorem. Prerequisite: 215B or equivalent.

MATH 216A. Introduction to Algebraic Geometry. 3 Units.

Algebraic curves, algebraic varieties, sheaves, cohomology, Riemann-Roch theorem. Classification of algebraic surfaces, moduli spaces, deformation theory and obstruction theory, the notion of schemes. May be repeated for credit. Prerequisites: 210ABC or equivalent.

MATH 216B. Introduction to Algebraic Geometry. 3 Units.

Continuation of 216A. May be repeated for credit.

MATH 216C. Introduction to Algebraic Geometry. 3 Units.

Continuation of 216B. May be repeated for credit.

MATH 217A. Differential Geometry. 3 Units.

Smooth manifolds and submanifolds, tensors and forms, Lie and exterior derivative, DeRham cohomology, distributions and the Frobenius theorem, vector bundles, connection theory, parallel transport and curvature, affine connections, geodesics and the exponential map, connections on the principal frame bundle. Prerequisite: 215C or equivalent.

MATH 217C. Complex Differential Geometry. 3 Units.

Complex structures, almost complex manifolds and integrability, Hermitian and Kahler metrics, connections on complex vector bundles, Chern classes and Chern-Weil theory, Hodge and Dolbeault theory, vanishing theorems, Calabi-Yau manifolds, deformation theory.

MATH 220. Partial Differential Equations of Applied Mathematics. 3 Units.

First-order partial differential equations; method of characteristics; weak solutions; elliptic, parabolic, and hyperbolic equations; Fourier transform; Fourier series; and eigenvalue problems. Prerequisite: foundation in multivariable calculus and ordinary differential equations. Same as: CME 303

MATH 221A. Mathematical Methods of Imaging. 3 Units.

Image denoising and deblurring with optimization and partial differential equations methods. Imaging functionals based on total variation and l-1 minimization. Fast algorithms and their implementation. Same as: CME 321A

MATH 221B. Mathematical Methods of Imaging. 3 Units.

Array imaging using Kirchhoff migration and beamforming, resolution theory for broad and narrow band array imaging in homogeneous media, topics in high-frequency, variable background imaging with velocity estimation, interferometric imaging methods, the role of noise and inhomogeneities, and variational problems that arise in optimizing the performance of array imaging algorithms. Same as: CME 321B

MATH 222. Computational Methods for Fronts, Interfaces, and Waves. 3 Units.

High-order methods for multidimensional systems of conservation laws and Hamilton-Jacobi equations (central schemes, discontinuous Galerkin methods, relaxation methods). Level set methods and fast marching methods. Computation of multi-valued solutions. Multi-scale analysis, including wavelet-based methods. Boundary schemes (perfectly matched layers). Examples from (but not limited to) geometrical optics, transport equations, reaction-diffusion equations, imaging, and signal processing.

MATH 224. Topics in Mathematical Biology. 3 Units.

Mathematical models for biological processes based on ordinary and partial differential equations. Topics: population and infectious diseases dynamics, biological oscillators, reaction diffusion models, biological waves, and pattern formation. Prerequisites: 53 and 131, or equivalents.

MATH 226. Numerical Solution of Partial Differential Equations. 3 Units.

Hyperbolic partial differential equations: stability, convergence and qualitative properties; nonlinear hyperbolic equations and systems; combined solution methods from elliptic, parabolic, and hyperbolic problems. Examples include: Burger's equation, Euler equations for compressible flow, Navier-Stokes equations for incompressible flow. Prerequisites: MATH 220A or CME 302. Same as: CME 306

MATH 227. Partial Differential Equations and Diffusion Processes. 3 Units.

Parabolic and elliptic partial differential equations and their relation to diffusion processes. First order equations and optimal control. Emphasis is on applications to mathematical finance. Prerequisites: MATH 131 and MATH 136/STATS 219, or equivalents.

MATH 228. Stochastic Methods in Engineering. 3 Units.

Review of basic probability; Monte Carlo simulation; state space models and time series; parameter estimation, prediction, and filtering; Markov chains and processes; stochastic control; and stochastic differential equations. Examples from various engineering disciplines. Prerequisites: exposure to probability; background in real variables and analysis. Same as: CME 308

MATH 230A. Theory of Probability. 2-4 Units.

Mathematical tools: sigma algebras, measure theory, connections between coin tossing and Lebesgue measure, basic convergence theorems. Probability: independence, Borel-Cantelli lemmas, almost sure and L_p convergence, weak and strong laws of large numbers. Large deviations. Weak convergence; central limit theorems; Poisson convergence; Stein's method. Prerequisites: 116, MATH 171. Same as: STATS 310A

MATH 230B. Theory of Probability. 2-3 Units.

Conditional expectations, discrete time martingales, stopping times, uniform integrability, applications to 0-1 laws, Radon-Nikodym Theorem, ruin problems, etc. Other topics as time allows selected from (i) local limit theorems, (ii) renewal theory, (iii) discrete time Markov chains, (iv) random walk theory, (v) ergodic theory. Prerequisite: 310A or MATH 230A. Same as: STATS 310B

MATH 230C. Theory of Probability. 2-4 Units.

Continuous time stochastic processes: martingales, Brownian motion, stationary independent increments, Markov jump processes and Gaussian processes. Invariance principle, random walks, LIL and functional CLT. Markov and strong Markov property. Infinitely divisible laws. Some ergodic theory. Prerequisite: 310B or MATH 230B. Same as: STATS 310C

MATH 231. Orthogonal Polynomials and the Moment Problem. 3 Units.

Orthogonal polynomials in one variable (three term recurrence, Favard's theorem, distribution of zeros Verblunsky coefficients). Classical examples (Hermite, Chebychev, Jacobi, Meixner, Askey-Wilson). Applications in probability (Markov chains), Statistics (multivariate distributions with given margins), Numerical analysis (Gaussian Quadrature), Combinatorics (combinatorial interpretation of the classical orthogonal polynomials). The moment problem on \mathbb{R} (when is a measure determined by its moments, what happens if not?). Multivariate orthogonal polynomials (with an introduction to symmetric function theory). Connections to group representations.

MATH 231A. An Introduction to Random Matrix Theory. 3 Units.

Patterns in the eigenvalue distribution of typical large matrices, which also show up in physics (energy distribution in scattering experiments), combinatorics (length of longest increasing subsequence), first passage percolation and number theory (zeros of the zeta function). Classical compact ensembles (random orthogonal matrices). The tools of determinantal point processes. Same as: STATS 351A

MATH 231C. Free Probability. 3 Units.

Background from operator theory, addition and multiplication theorems for operators, spectral properties of infinite-dimensional operators, the free additive and multiplicative convolutions of probability measures and their classical counterparts, asymptotic freeness of large random matrices, and free entropy and free dimension. Prerequisite: STATS 310B or equivalent.

MATH 232. Topics in Probability: Percolation Theory. 3 Units.

An introduction to some of the most important theorems and open problems in percolation theory. Topics include some of the difficult early breakthroughs of Kesten, Menshikov, Aizenman and others, and recent fields-medal winning works of Schramm, Lawler, Werner and Smirnov. Prerequisites: graduate-level probability. Offered every 1-2 years.

MATH 234. Large Deviations Theory. 3 Units.

Combinatorial estimates and the method of types. Large deviation probabilities for partial sums and for empirical distributions, Cramer's and Sanov's theorems and their Markov extensions. Applications in statistics, information theory, and statistical mechanics. Prerequisite: MATH 230A or STATS 310. Offered every 2-3 years. Same as: STATS 374

MATH 236. Introduction to Stochastic Differential Equations. 3 Units.

Brownian motion, stochastic integrals, and diffusions as solutions of stochastic differential equations. Functionals of diffusions and their connection with partial differential equations. Random walk approximation of diffusions. Prerequisite: 136 or equivalent and differential equations.

MATH 237. Default and Systemic Risk. 3 Units.

Introduction to mathematical models of complex static and dynamic stochastic systems that undergo sudden regime change in response to small changes in parameters. Examples from materials science (phase transitions), power grid models, financial and banking systems. Special emphasis on mean field models and their large deviations, including computational issues. Dynamic network models of financial systems and their stability.

MATH 238. Mathematical Finance. 3 Units.

Stochastic models of financial markets. Forward and futures contracts. European options and equivalent martingale measures. Hedging strategies and management of risk. Term structure models and interest rate derivatives. Optimal stopping and American options. Corequisites: MATH 236 and 227 or equivalent. Same as: STATS 250

MATH 239. Computation and Simulation in Finance. 3 Units.

Monte Carlo, finite difference, tree, and transform methods for the numerical solution of partial differential equations in finance. Emphasis is on derivative security pricing. Prerequisite: 238 or equivalent.

MATH 243. Functions of Several Complex Variables. 3 Units.**MATH 244. Riemann Surfaces. 3 Units.**

Compact Riemann surfaces and algebraic curves; cohomology of sheaves; Serre duality; Riemann-Roch theorem and application; Jacobians; Abel's theorem. May be repeated for credit.

MATH 245A. Topics in Algebraic Geometry: Moduli Theory. 3 Units.

Topics in the study of moduli spaces: Basic of algebraic surfaces, Hodge structure of surfaces, moduli of K3 surfaces, cycles and rational curves in K3 surfaces, Torelli for K3 surfaces.

MATH 245B. Topics in Algebraic Geometry. 3 Units.

May be repeated for credit.

MATH 245C. Topics in Algebraic Geometry. 3 Units.**MATH 247. Topics in Group Theory. 3 Units.**

Topics include the Burnside basis theorem, classification of p -groups, regular and powerful groups, Sylow theorems, the Frattini argument, nilpotent groups, solvable groups, theorems of P. Hall, group cohomology, and the Schur-Zassenhaus theorem. The classical groups and introduction to the classification of finite simple groups and its applications. May be repeated for credit.

MATH 248. Introduction to Ergodic Theory. 3 Units.

Topics may include 1) subadditive and multiplicative ergodic theorems, 2) notions of mixing, weak mixing, spectral theory, 3) metric and topological entropy of dynamical systems, 4) measures of maximal entropy. Prerequisites: Solid background in "Measure and Integration" (Math 205A) and some functional analysis, including Riesz representation theorem and Hahn-Banach theorem (Math 205B).

MATH 248A. Algebraic Number Theory. 3 Units.

Structure theory and Galois theory of local and global fields, finiteness theorems for class numbers and units, adelic techniques. Prerequisites: MATH 210A,B.

MATH 249A. Topics in number theory. 3 Units.

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MATH 249B. Topics in Number Theory. 3 Units.

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MATH 249C. Topics in Number Theory. 3 Units.

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MATH 256A. Partial Differential Equations. 3 Units.

The theory of linear and nonlinear partial differential equations, beginning with linear theory involving use of Fourier transform and Sobolev spaces. Topics: Schauder and L2 estimates for elliptic and parabolic equations; De Giorgi-Nash-Moser theory for elliptic equations; nonlinear equations such as the minimal surface equation, geometric flow problems, and nonlinear hyperbolic equations.

MATH 256B. Partial Differential Equations. 3 Units.

Continuation of 256A.

MATH 257A. Symplectic Geometry and Topology. 3 Units.

Linear symplectic geometry and linear Hamiltonian systems. Symplectic manifolds and their Lagrangian submanifolds, local properties. Symplectic geometry and mechanics. Contact geometry and contact manifolds. Relations between symplectic and contact manifolds. Hamiltonian systems with symmetries. Momentum map and its properties. May be repeated for credit.

MATH 257B. Symplectic Geometry and Topology. 3 Units.

Continuation of 257A. May be repeated for credit.

MATH 257C. Symplectic Geometry and Topology. 3 Units.

Continuation of 257B. May be repeated for credit.

MATH 258. Topics in Geometric Analysis. 3 Units.

May be repeated for credit.

MATH 259. mirror symmetry. 3 Units.

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MATH 261A. Functional Analysis. 3 Units.

Geometry of linear topological spaces. Linear operators and functionals. Spectral theory. Calculus for vector-valued functions. Operational calculus. Banach algebras. Special topics in functional analysis. May be repeated for credit.

MATH 262. Applied Fourier Analysis and Elements of Modern Signal Processing. 3 Units.

Introduction to the mathematics of the Fourier transform and how it arises in a number of imaging problems. Mathematical topics include the Fourier transform, the Plancherel theorem, Fourier series, the Shannon sampling theorem, the discrete Fourier transform, and the spectral representation of stationary stochastic processes. Computational topics include fast Fourier transforms (FFT) and nonuniform FFTs. Applications include Fourier imaging (the theory of diffraction, computed tomography, and magnetic resonance imaging) and the theory of compressive sensing. Same as: CME 372

MATH 263A. Infinite-dimensional Lie Algebras. 3 Units.

Basics of Kac-Moody Lie algebras, which include both finite dimensional semisimple Lie algebras and their infinite-dimensional analogs, up to the Kac-Weyl character formula and Macdonald identities, and the Boson-Fermion correspondence. May be repeated for credit. Prerequisite: 210 or equivalent.

MATH 263B. Modular Representation Theory. 3 Units.

Modular representation theory, a field largely created by Brauer, is the representation theory of finite groups over a field of characteristic p . It was a key tool in the classification of finite simple groups. Key features are the important roles played by projective modules, and the subtle relationship with the characteristic zero theory. Modular representation theory has strong similarities to the theory of groups of Lie type, with normalizers of p -subgroups playing the role of parabolics. Brauer and Green found deep relationships between the modular representation theory of the group and the simpler representation theory of such subgroups. In addition to such classical topics, we will look at some more recent developments.

MATH 263C. Topics in Representation Theory. 3 Units.

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MATH 264. Infinite Dimensional Lie Algebra. 3 Units.

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MATH 266. Computational Signal Processing and Wavelets. 3 Units.

Theoretical and computational aspects of signal processing. Topics: time-frequency transforms; wavelet bases and wavelet packets; linear and nonlinear multiresolution approximations; estimation and restoration of signals; signal compression. May be repeated for credit.

MATH 269. Topics in symplectic geometry. 3 Units.

May be repeated for credit.

MATH 270. Geometry and Topology of Complex Manifolds. 3 Units.

Complex manifolds, Kahler manifolds, curvature, Hodge theory, Lefschetz theorem, Kahler-Einstein equation, Hermitian-Einstein equations, deformation of complex structures. May be repeated for credit.

MATH 271. The H-Principle. 3 Units.

The language of jets. Thom transversality theorem. Holonomic approximation theorem. Applications: immersion theory and its generalizations. Differential relations and Gromov's h-principle for open manifolds. Applications to symplectic geometry. Microflexibility. Mappings with simple singularities and their applications. Method of convex integration. Nash-Kuiper C^1 -isometric embedding theorem.

MATH 272. Topics in Partial Differential Equations. 3 Units.

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MATH 273A. Quantum Mechanics I. 3 Units.

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MATH 273B. QUANTUM MECHANICS II. 3 Units.

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MATH 280. Evolution Equations in Differential Geometry. 3 Units.

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MATH 282A. Low Dimensional Topology. 3 Units.

The theory of surfaces and 3-manifolds. Curves on surfaces, the classification of diffeomorphisms of surfaces, and Teichmüller space. The mapping class group and the braid group. Knot theory, including knot invariants. Decomposition of 3-manifolds: triangulations, Heegaard splittings, Dehn surgery. Loop theorem, sphere theorem, incompressible surfaces. Geometric structures, particularly hyperbolic structures on surfaces and 3-manifolds. May be repeated for credit up to 6 total units.

MATH 282B. Homotopy Theory. 3 Units.

Homotopy groups, fibrations, spectral sequences, simplicial methods, Dold-Thom theorem, models for loop spaces, homotopy limits and colimits, stable homotopy theory. May be repeated for credit up to 6 total units.

MATH 282C. Fiber Bundles and Cobordism. 3 Units.

Possible topics: principal bundles, vector bundles, classifying spaces. Connections on bundles, curvature. Topology of gauge groups and gauge equivalence classes of connections. Characteristic classes and K-theory, including Bott periodicity, algebraic K-theory, and indices of elliptic operators. Spectral sequences of Atiyah-Hirzebruch, Serre, and Adams. Cobordism theory, Pontryagin-Thom theorem, calculation of unoriented and complex cobordism. May be repeated for credit up to 6 total units.

MATH 283. Topics in Algebraic and Geometric Topology. 3 Units.

May be repeated for credit.

MATH 283A. Topics in Topology. 3 Units.**MATH 284. Topics in Geometric Topology. 3 Units.**

Incompressible surfaces, irreducible manifolds, prime decomposition, Morse theory, Heegaard diagrams, Heegaard splittings, the Thurston norm, sutured manifold theory, Heegaard Floer homology, sutured Floer homology.

MATH 284A. Geometry and Topology in Dimension 3. 3 Units.

The Poincaré conjecture and the uniformization of 3-manifolds. May be repeated for credit.

MATH 284B. Geometry and Topology in Dimension 3. 3 Units.

The Poincaré conjecture and the uniformization of 3-manifolds. May be repeated for credit.

MATH 285. Geometric Measure Theory. 3 Units.

Hausdorff measures and dimensions, area and co-area formulas for Lipschitz maps, integral currents and flat chains, minimal surfaces and their singular sets.

MATH 286. Topics in Differential Geometry. 3 Units.

May be repeated for credit.

MATH 287. Introduction to optimal transportation. 3 Units.

This will be an introductory course on Optimal Transportation theory. We will study Monge's problem, Kantorovich's problem, c -concave functions (also in the Riemannian setting), Wasserstein distance and geodesics (including a PDE formulation), applications to inequalities in convex analysis, as well as other topics, time permitting.

MATH 290B. Model Theory B. 1-3 Unit.

Decidable theories. Model-theoretic background. Dense linear orders, arithmetic of addition, real closed and algebraically closed fields, ω -minimal theories.

Same as: PHIL 350B

MATH 292A. Set Theory. 3 Units.

The basics of axiomatic set theory; the systems of Zermelo-Fraenkel and Bernays-Gödel. Topics: cardinal and ordinal numbers, the cumulative hierarchy and the role of the axiom of choice. Models of set theory, including the constructible sets and models constructed by the method of forcing. Consistency and independence results for the axiom of choice, the continuum hypothesis, and other unsettled mathematical and set-theoretical problems. Prerequisites: PHIL151 and MATH 161, or equivalents.

Same as: PHIL 352A

MATH 293A. Proof Theory. 3 Units.

Gentzen's natural deduction and sequential calculi for first-order propositional and predicate logics. Normalization and cut-elimination procedures. Relationships with computational lambda calculi and automated deduction. Prerequisites: 151, 152, and 161, or equivalents.

Same as: PHIL 353A

MATH 295. Computation and Algorithms in Mathematics. 3 Units.

Use of computer and algorithmic techniques in various areas of mathematics. Computational experiments. Topics may include polynomial manipulation, Groebner bases, computational geometry, and randomness. May be repeated for credit.

MATH 301. Advanced Topics in Convex Optimization. 3 Units.

Modern developments in convex optimization: semidefinite programming; novel and efficient first-order algorithms for smooth and nonsmooth convex optimization. Emphasis on numerical methods suitable for large scale problems arising in science and engineering. Prerequisites: convex optimization (EE 364), linear algebra (Math 104), numerical linear algebra (CME 302); background in probability, statistics, real analysis and numerical optimization.

Same as: CME 375

MATH 310. Top Ten Algorithms of the 20th Century. 3 Units.

A high-level survey course covering one algorithm per week: metropolis, simplex method, conjugate gradient, QR, quicksort, fast fourier transform, maxcut, fast multipole method, integer relation detection, and convex/semi-definite programming.

Same as: CME 329

MATH 355. Graduate Teaching Seminar. 1 Unit.

Required of and limited to first-year Mathematics graduate students.

MATH 360. Advanced Reading and Research. 1-10 Unit.**MATH 361. Research Seminar Participation. 1-3 Unit.**

Participation in a faculty-led seminar which has no specific course number.

MATH 381. Seminar in Analysis. 1-3 Unit.**MATH 382. Qualifying Examination Seminar. 1-3 Unit.****MATH 384. Seminar in Geometry. 1 Unit.****MATH 385. Seminar in Topology. 1-3 Unit.****MATH 388. Seminar in Probability and Stochastic Processes. 1-3 Unit.****MATH 389. Seminar in Mathematical Biology. 1-3 Unit.****MATH 391. Research Seminar in Logic and the Foundations of Mathematics. 1-3 Unit.**

Contemporary work. May be repeated a total of three times for credit. Math 391 students attend the logic colloquium in 380-381T.

Same as: PHIL 391

MATH 394. Classics in Analysis. 3 Units.

Original papers in analysis.

MATH 395. Classics in Geometry and Topology. 3 Units.

Original papers in geometry and in algebraic and geometric topology. May be repeated for credit.

MATH 396. Graduate Progress. 1 Unit.

Results and current research of graduate and postdoctoral students. May be repeated for credit.

MATH 802. TGR Dissertation. 0 Units.

Mechanical Engineering Courses

ME 10AX. Design Thinking and the Art of Innovation. 2 Units.

Design Thinking and the Art of Innovation is a hands-on seminar that introduces students to the multi-disciplinary practice of product, service, and experience design through the lenses of both art and engineering. A project-based, studio-driven class promises a deep dive into Design Thinking, Stanford's unique approach to problem finding and problem solving. Along with a survey of tools such as need finding and ethnography, structured brainstorming, rapid prototyping, visual communication, and story-telling, the class will include thought provoking and inspirational field trips to San Francisco's MOMA and other Bay Area museums, The San Francisco Ferry Building, and IDEO, the internationally renowned design and innovation firm headquartered in Palo Alto. This course is designed to introduce students to cutting edge techniques and processes used in the field of design. Through emphasis on design problems where aesthetics, technology, human behavior, and business needs overlap, students will both increase visual literacy and develop creative competence. The course provides an overview of contemporary professional design practice and exposes students to the world of design and the "wicked problems" that are the grist for the mill of design work.

ME 10N. Form and Function of Animal Skeletons. 3 Units.

Preference to freshmen. The biomechanics and mechanobiology of the musculoskeletal system in human beings and other vertebrates on the level of the whole organism, organ systems, tissues, and cell biology. Field trips to labs.

Same as: BIOE 10N

ME 11AX. The Art of Product Branding. 2 Units.

This onsite course will present a comprehensive approach to Corporate Product Branding. Students will experience firsthand the development of a product brand from naming and developing positioning to the creation of a logo, website, and collateral. As a final project, students will present their overall brands to corporate executives. This project will include field trips to the client site and workshops with naming, positioning, and design professionals each day.

ME 11SC. The Art and Science of Measuring Fluid Flows. 2 Units.

The roles of fluid flows in natural systems such as swimming protozoa and planet-forming nebulae, and technologies such as biomolecular assay devices and jet engines. The analytical background for fluid sciences. Phenomena such as shock waves and vortex formation that create flow patterns while challenging engineers. Visualization and measurement techniques to obtain full-field flow pattern information. The physics behind these technologies. Field trips; lab work. (Eaton).

ME 12N. The Jet Engine. 3 Units.

Preference to freshmen. How a jet engine works; the technologies and analytical techniques required to understand them. Dynamics, thermodynamics, turbomachinery, combustion, advanced materials, cooling technologies, and control systems. Visits to research laboratories, examination of a partially disassembled engine, and probable operation of a small jet engine. Prerequisites: high school physics.

ME 12SC. Hands-on Jet Engines. 2 Units.

How jet engines transformed the world through intercontinental travel causing internationalization in daily life. Competition driving improvements in fuel economy, engine lifetime, noise, and emissions.

ME 13N. The Great Principle of Similitude. 3 Units.

The rules of dimensional analysis were formulated by Isaac Newton, who called it The Great Principle of Similitude. On its surface, it is a look at the relationships between physical quantities by exploring their basic units. In fact, it is a powerful and formalized method to analyze complex physical phenomena, including those for which we cannot pose, much less solve, governing equations. Valuable to engineers and scientists as it helps perform back-of-the-envelope estimates and derive scaling laws for the design of machines and processes, the principle has been applied to the study of complex phenomena in biology, aerodynamics, chemistry, social science, astrophysics, and economics. Focus is on tools to perform such analyses. Examples include estimating the running speed of a hungry velociraptor, the probability of serious injury in a car accident, the cost of submarines, and the energy released by an atomic weapon. Students identify problems in everyday life and/or current world events to analyze with this tool.

ME 14N. How Stuff Is Made. 3 Units.

The design and engineering of products and processes, such as machining, fabric, food, and electrical goods. Tradeoffs in choice of materials, features, and process selection. Final project: students research and redesign the engineering and manufacturing aspects of a product and its processes with an eye toward sustainability. Includes several field trips to manufacturing facilities.

ME 15. Pre-field Course for Alternative Spring Break: Design for a Sustainable World. 1 Unit.

Preparation for Alternative Spring Break trip Design for a Sustainable World: Using the design method to create human-centered solutions to address the challenges of global poverty and sustainability. Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more information.

ME 16. Alternative Spring Break - From Classroom to Community: Science Education and Environmental Literacy. 1 Unit.

This Alternative Spring Break course and trip will examine K-12 science education in California. Though centered in the San Francisco Bay Area, we will be exploring different institutions throughout the state - schools, science museums, non-profit organizations - and their current contributions to the education of California's youth in STEM (Science, Technology, Engineering, Mathematics) fields. These institutions will help us explore the interaction between in-school and out-of-school learning, and the benefits of each. We will particularly focus on disparities (socioeconomic, regional, etc.) present in Californian science education, discussing their effects and how they can be remedied. The trip will involve conversations with teachers, students, and other professional educators centered around improvement to the current science education system in California. All told, we hope to explore the best methods for developing lasting interest and aptitude for science in California students to promote a brighter future.

ME 16N. Energy & The Industrial Revolution - Past, Present & Future. 3 Units.

When you flip a light switch, or drive to your neighborhood grocery store or do a Google search, it is easy to forget that we receive the benefit of 250 years of industrial revolution, which has been arguably the most remarkable period of human history. This revolution has resulted in exponential growth in the world's economy as well as unprecedented prosperity and improvements in our quality of life. The industrial revolution has been largely about how we sourced, distributed and used energy. It was and continues to be predominantly based on fossil energy. But the impact of our traditional energy sources on climate change is one of the most daunting issues of the 21st century because it will affect the world as a whole - the 7-10 billion people, businesses, nations, ecosystems. The choice that our society is asked to make is often posed as follows: Should we continue our exponential economic growth based on fossil fuels and ignore the environment, or should we reduce our greenhouse gas emissions at the cost of our economic growth? This is a false choice because it is based on extrapolating the past. It does not account for the capacity for innovations in technology, finance and business to create sustainable energy future, one that allows the economy and our environment to be mutually inclusive. In short, we need a new industrial revolution. This seminar course will: (a) provide a view of the current energy landscape and the magnitude of the challenge; (b) discuss some techno-economic trends that we are currently witnessing; and (c) identify opportunities to innovate in technology, finance and business that could create the foundations for a new industrial revolution.

ME 17N. Robotics Imitating Nature. 3 Units.

Preference to freshmen. The dream of constructing robots that duplicate the functional abilities of humans and/or other animals has been promulgated primarily by science fiction writers. But biological systems provide models for the designers of robots. Building electromechanical devices that perform locomotory and sensing functions similar to those of an animal as a way of learning about how biological systems function. Walking and running machines, and the problem of giving a robot the capability to respond to its environment.

ME 18Q. Teamology: Creative Teams and Individual Development. 3 Units.

Preference to sophomores. Roles on a problem solving team that best suit individual creative characteristics. Two teams are formed for teaching experientially how to develop less conscious abilities from teammates creative in those roles. Reinforcement teams have members with similar personalities; problem solving teams are composed of people with maximally different personalities.

ME 19. Pre-field Course for Alternative Spring Break: Design for Social Change. 1 Unit.

Focus is on applying design, technology and innovation to catalyze social change. Topics include identifying social needs, learning different brainstorming methods, developing an applicable service model or product, prototyping, implementation, and reiteration. Reading and service components, followed by week-long Alternative Spring Break trip. See <http://d4sc.blogspot.com>. Enrollment limited to 12. May be repeated for credit.

ME 20N. Haptics: Engineering Touch. 3 Units.

Students in this class will learn how to build, program, and control haptic devices, which are mechatronic devices that allow users to feel virtual or remote environments. In the process, students will gain an appreciation for the capabilities and limitations of human touch, develop an intuitive connection between equations that describe physical interactions and how they feel, and gain practical interdisciplinary engineering skills related to robotics, mechanical engineering, electrical engineering, bioengineering, and computer science. In-class laboratories will give students hands-on experience in assembling mechanical systems, making circuits, programming Arduino microcontrollers, testing their haptic creations, and using Stanford's student prototyping facilities. The final project for this class will involve creating a novel haptic device that could be used to enhance human interaction with computers, mobile devices, or remote-controlled robots.

ME 21N. Renaissance Machine Design. 3 Units.

Preference to freshmen. Technological innovations of the 1400s that accompanied the proliferation of monumental art and architecture by Brunelleschi, da Vinci, and others who designed machines and invented novel construction, fresco, and bronze-casting techniques. The social and political climate, from the perspective of a machine designer, that made possible and demanded engineering expertise from prominent artists. Hands-on projects to provide a physical understanding of Renaissance-era engineering challenges and introduce the pleasure of creative engineering design. Technical background not required.

ME 23Q. The Worldly Engineer. 3 Units.

Preference given to sophomores. Engineering, its practice and products placed in multi-disciplinary context. Topics include the history of the engineering profession and engineering education; cultural influences on design; the role of national and international public policy and economics; dependence on natural resources; environmental impact; contemporary workforce development. Emphasis is on cultivating an appreciation of these issues to enrich the educational and professional pursuit of engineering.

ME 24N. Designing the Car of the Future. 3 Units.

Preference to freshmen. Automotive design drawing from all areas of mechanical engineering. The state of the art in automotive design and the engineering principles to understand vehicle performance. Future technologies for vehicles. Topics include vehicle emissions and fuel consumption, possibilities of hydrogen, drive-by-wire systems, active safety and collision avoidance, and human-machine interface issues.

ME 25N. Energy Sustainability and Climate Change. 3 Units.

One of the primary global challenges of the 21st century is providing the energy required to meet increasing demands due to population growth and economic development. A related challenge is mitigation of the effect of this energy growth on climate. This seminar will examine various scenarios for the energy resources required to meet future demand and the potential consequences on climate. The scientific issues underlying climate change and the coupling of energy use with changes in the global atmosphere that impact climate will be discussed.

ME 26N. Think Like a Designer. 3 Units.

Introduces students to techniques designers use to create highly innovative solutions across domains. The project-based class will emphasize approaches to problem identification and problem solving. Topics include need-finding, structured brainstorming, synthesis, rapid prototyping, and visual communication; field trips to a local design firm, a robotics lab, and a machining lab. A secondary goal of the seminar is to introduce students to the pleasures of creative design and hands-on development of tangible solutions.

ME 27SI. Needfinding for Underserved Populations. 2 Units.

The heart of any design process resides in empathy with users and their needs. Working in the realm of public service may engage a population to which the designer might not have been exposed. How different needfinding techniques can help designers to understand users from underserved populations and inspire them to create products and services that serve user needs.

ME 28SI. Professional Design Practices. 1 Unit.

Lab. Professional skills are developed through web-based portfolio and resume building. Additionally, visits to local design consulting firms and in house design groups will help solidify students understanding of the designer in the professional workplace. May be repeated for credit.

ME 29D. Design for Diversity: Collaboration by difference in digital age. 2 Units.

The focus of this course is on applying design, technology, and social innovation to create an environment that fosters collaboration by difference. Students will learn how in a digital age their identities amplify and create unique opportunities for them to bring about social change. They will learn resocializing skills through somatic literacy to understand the other's point of view. By the end of the quarter they will demonstrate literacy in collaboration by difference and use design thinking tools to prototype a collaboratorium, a portable structure and process to create an appreciation of voice and value to be effective global leaders.

ME 29SI. Cars: A Crash Course. 1 Unit.

Focus is on the basic mechanics and significance of cars. Topics include a basic, real-world understanding of automobile workings, histories, industries, cultural impact, and related media. Field trips to Tesla Motors and Go-Kart Racer will be organized, and there will be guest appearances by local automotive historians and enthusiasts. Students will get hands on experience with maintaining real cars, see high performance engines run, and have the opportunity to learn how to drive a manual transmission.

ME 52SI. Scan, Model, Print! Designing with 3D Technology. 2 Units.

Think 3D scanning, modeling, and printing technology is just about plastic widgets? Think again! Immerse yourself in a world of custom prosthetics, manufacturing in space, autonomous cars, and much more. This hands-on engineering design course teaches advanced 3D imaging and computational modeling skills in order to leverage the unique benefits of additive manufacturing to solve complex problems. Students will connect the theory behind these tools to direct experience with the equipment and software. Short assignments at the start of the quarter will build students' core competencies and prepare them for a team-based, open-ended project. Class time will be a mixture of lecture, lab, guest speakers, and field trips. Recommended: basic CAD, fabrication, and programming experience (e.g. ME103D, 203, CS106A or equivalents).

ME 70. Introductory Fluids Engineering. 4 Units.

Elements of fluid mechanics as applied to engineering problems. Equations of motion for incompressible ideal flow. Hydrostatics. Control volume laws for mass, momentum, and energy. Bernoulli equation. Dimensional analysis and similarity. Flow in ducts. Boundary layer flows. Lift and drag. Lab experiment demonstrations. Prerequisites: ENGR 14 and 30.

ME 80. Mechanics of Materials. 4 Units.

Mechanics of materials and deformation of structural members. Topics include stress and deformation analysis under axial loading, torsion and bending, column buckling and pressure vessels. Introduction to stress transformation and multiaxial loading. Prerequisite: ENGR 14.

ME 101. Visual Thinking. 4 Units.

Lecture/lab. Visual thinking and language skills are developed and exercised in the context of solving design problems. Exercises for the mind's eye. Rapid visualization and prototyping with emphasis on fluent and flexible idea production. The relationship between visual thinking and the creative process. Freshmen and Sophomores are recommended to take this section of ME101. Limited enrollment. Attend the first day of class.

ME 103D. Engineering Drawing and Design. 1 Unit.

Designed to accompany 203. The fundamentals of engineering drawing including orthographic projection, dimensioning, sectioning, exploded and auxiliary views, assembly drawings, and SolidWorks. Homework drawings are of parts fabricated by the student in the lab. Assignments in 203 supported by material in 103D and sequenced on the assumption that the student is enrolled in both courses simultaneously.

ME 103Q. Product Realization: Making is Thinking. 3 Units.

Product Realization encompasses those processes required to transform a concept into the creation of a functional, useful, and beautiful product. In this project-based seminar, students develop product realization confidence and intuition using the rich array of tools available in the Product Realization Lab as well as industry-standard design engineering software programs and course readings in design/realization philosophy. Interactions with the Stanford design engineering community as well as field trips to iconic Bay area design engineering firms round out students' experience. Learning Goals: Build confidence in transforming concepts into products through foundational texts and rigorous exercises, master integrated design/realization software and tools through hands-on learning and practice, and engage with the Stanford design engineering community on campus and well beyond.

ME 104. The Designer's Voice. 1 Unit.

Course helps students develop a point of view about their design career that will enable them to articulate their design vision, inspire a design studio, or infect a business with a culture of design-thinking. Focus on the integration of work and worldview, professional values, design language, and the development of the designer's voice. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching. Participants will be required to keep a journal.

ME 104B. Designing Your Life. 2 Units.

The course employs a design thinking approach to help students develop a point of view about their career. The course focuses on an introduction to design thinking, the integration of work and worldview, and practices that support vocation formation. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching. Open to juniors and seniors of all majors. Admission to be confirmed by email to Axxess registered students prior to first class session. More information at <http://www.designingyourlife.org>. Effective Autumn 2012, course is no longer repeatable for credit.

ME 104S. Designing Your Stanford. 2 Units.

DYS uses a Design Thinking approach to help Freshmen and Sophomores learn practical tools and ideas to make the most of their Stanford experience. Topics include the purpose of college, major selection, educational wayfinding, and innovating college outcomes - all applied through an introduction to Design Thinking. This seminar class incorporates small group discussion, in-class activities, field exercises, personal reflection, and individual coaching. Admission to be confirmed by email to Axxess registered students prior to first class session. More information at www.designingyourstanford.org. Same as: EDUC 118S

ME 110. Design Sketching. 2 Units.

Freehand sketching, rendering, and design development. Students develop a design sketching portfolio for review by program faculty. May be repeated for credit.

ME 112. Mechanical Systems Design. 4 Units.

Lecture/lab. Characteristics of machine elements including gears, bearings, and shafts. Design for fatigue life. Electric motor fundamentals. Transmission design for maximizing output power or efficiency. Mechanism types, linkage analysis and kinematic synthesis. Team-based design projects emphasizing the balance of physical with virtual prototyping based on engineering analysis. Lab for dissection of mechanical systems and project design reviews. Prerequisites: 80, 101. Recommended: 203, ENGR 15.

ME 113. Mechanical Engineering Design. 4 Units.

Capstone course. Mechanical engineering design is experienced by students as they work on team projects. Prerequisites: 80, 101, 112, 131 a,b, 203. Enrollment limited to ME majors.

ME 114. Consumer Analytical Product Design. 4 Units.

Holistic design experience for consumer product. Integration of models of engineering function, environmental impact, manufacturing costs, and market conditions. Introduction to life-cycle-analysis to capture environmental impact. Introduction to modeling micro economics, market models, and consumer surveying as applied in product design. Introduction to consumer product cost modeling. Draw from past coursework to build engineering function model. Student teams build and link these models in an optimization framework to maximize profitability and minimize environmental impact. Build prototypes for engineering function and form expression. ME Design Capstone Experience option. Same as: CAPD

ME 115A. Introduction to Human Values in Design. 3 Units.

Lecture/lab. Introduces the central philosophy of the product design program, emphasizing the relation between technical and human values, the innovation process, and design methodology. Lab exercises include development of simple product concepts visualized in rapidly executed three-dimensional mockups. Prerequisite: 101.

ME 115B. Product Design Methods. 3 Units.

Problem-finding, problem-solving, intermediate creativity methods and effective techniques for researching and presenting product concepts. Individual- and team-based design projects emphasizing advanced visual thinking and prototyping skills. Prerequisite: ME115A.

ME 115C. Design and Business Factors. 3 Units.

Design and Business Factors: Introduces business concepts critical to determining the success of new products and services. Students will learn to estimate the cost of R&D for new product development. Using financial analysis, ROI, and tollgates to reduce development risk will be explored using case studies and simulations. Students will develop a bill of materials and a profit and loss statement for a sample product concept, prototype a design consultancy, and create a business proposal for a proposed new product company.

ME 120. History and Philosophy of Design. 3 Units.

Major schools of 19th- and 20th-century design (Arts and Crafts movement, Bauhaus, Industrial Design, and postmodernism) are analyzed in terms of their continuing cultural relevance. The relation of design to art, technology, and politics; readings from principal theorists, practitioners, and critics; recent controversies in industrial and graphic design, architecture, and urbanism. Enrollment limited to 65.

ME 131A. Heat Transfer. 3-5 Units.

The principles of heat transfer by conduction, convection, and radiation with examples from the engineering of practical devices and systems. Topics include transient and steady conduction, conduction by extended surfaces, boundary layer theory for forced and natural convection, boiling, heat exchangers, and graybody radiative exchange. Prerequisites: 70, ENGR 30. Recommended: intermediate calculus, ordinary differential equations.

ME 131B. Fluid Mechanics: Compressible Flow and Turbomachinery. 4 Units.

Engineering applications involving compressible flow: aircraft and rocket propulsion, power generation; application of mass, momentum, energy and entropy balance to compressible flows; variable area isentropic flow, normal shock waves, adiabatic flow with friction, flow with heat addition. Operation of flow systems: the propulsion system. Turbomachinery: pumps, compressors, turbines. Angular momentum analysis of turbomachine performance, centrifugal and axial flow machines, effect of blade geometry, dimensionless performance of turbomachines; hydraulic turbines; steam turbines; wind turbines. Compressible flow turbomachinery: the aircraft engine. Prerequisites: 70, ENGR 30.

ME 139. Educating Young STEM Thinkers. 3-5 Units.

The course will introduce students to the design thinking process, the national conversations about the future of STEM careers, and provide opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course will be both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 139X, EDUC 239X, ME 231

ME 140. Advanced Thermal Systems. 5 Units.

Capstone course. Thermal analysis and engineering emphasizing integrating heat transfer, fluid mechanics, and thermodynamics into a unified approach to treating complex systems. Mixtures, humidity, chemical and phase equilibrium, and availability. Labs apply principles through hands-on experience with a turbojet engine, PEM fuel cell, and hybrid solid/oxygen rocket motor. Use of MATLAB as a computational tool. Prerequisites: ENGR 30, ME 70, and 131A,B.

ME 161. Dynamic Systems, Vibrations and Control. 3-4 Units.

(Graduate students only enroll in 261.) Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, amplification and attenuation, and control system design. Demonstrations and laboratory experiments. Prerequisite: Calculus (differentiation and integration), ordinary differential equations (e.g., CME 102 or MATH53), basic linear algebra (determinants and solving linear equations), and familiarity with basic dynamics ($F=m*a$) and electronics ($v=i*R$). ME undergraduates must enroll for 4 units with lab. All others should enroll for 3 units without lab.

Same as: ME 261

ME 166. Introduction to Physiology and Biomechanics of Hearing. 3 Units.

Hearing is fundamental to our ability to communicate, yet in the US alone over 30 million people suffer some form of hearing impairment. As engineers and scientists, it is important for us to understand the underlying principles of the auditory system if we are to devise better ways of helping those with hearing loss. The goal of this course is to introduce undergraduate and graduate students to the anatomy, physiology, and biomechanics of hearing. Principles from acoustics, mechanics, and hydrodynamics will be used to build a foundational understanding of one of the most complex, interdisciplinary, and fascinating areas of biology. Topics include the evolution of hearing, computational modeling approaches, fluid-structure interactions, ion-channel transduction, psychoacoustics, diagnostic tools, and micrometer to millimeter scale imaging methods. We will also study current technologies for mitigating hearing loss via passive and active prostheses, as well as future regenerative therapies.

Same as: BIOE 287, ME 266

ME 177. Global Engineers' Education. 3 Units.

A project based course for those who would like to use their engineering backgrounds to address real world challenges faced by underserved communities globally. In direct collaboration with an underserved community from a rural village in India, students will develop engineering solutions to the challenge of sanitation and hygiene. Focus will be on working with the community rather than for them. Concepts covered will include designing with what designers care about at the center, articulating and realizing individual and community aspirations, ethics of engaging with underserved communities, and methodology of working sustainably with an underserved community.

ME 181. Deliverables: A Mechanical Engineering Design Practicum. 3 Units.

The goal of this course is to enable students to solve industry design challenges using modern mechanical design methods. Each week a new practical skill is introduced. These skills have been identified by recently graduated Stanford engineers as being critical to their work. Students then build their command of each skill by completing a simplified yet representative project and submitting deliverables similar to those required in industry. For example, students will learn about how to properly design parts with O-rings and then will be required to design a water-tight enclosure and submit CAD, mechanical drawings, and a bill of materials. Several of the classes feature recent Stanford graduates as guest lecturers. In addition to teaching applicable skills from their job and providing examples from industry, these engineers will also expose students to the range of responsibilities and daily activities that makeup professional mechanical design work. Prerequisites: ME203, ME103d and ME112 OR consent of instructor. Enrollment limited, students complete application on first day of class.

ME 185. Electric Vehicle Design. 3 Units.

This project based class focuses on the design and prototyping of electric vehicles. Students learn the fundamentals of vehicle design in class and apply the knowledge as they form teams and work on projects involving concept, specifications, structure, systems, integration, assembly, testing, etc. The class meets once a week to learn about the fundamentals, exchange their experiences, and coordinate between projects. The teams of 3-5 will work on their projects independently.

ME 190. Ethical Issues in Mechanical Engineering. 4 Units.

Moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; whistle blowing; engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations, and engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Case studies and field research. Enrollment limited to 25 Mechanical Engineering majors.

ME 191. Engineering Problems and Experimental Investigation. 1-5 Unit.

Directed study and research for undergraduates on a subject of mutual interest to student and staff member. Student must find faculty sponsor and have approval of adviser.

ME 191H. Honors Research. 1-5 Unit.

Student must find faculty honors adviser and apply for admission to the honors program.nn (Staff).

ME 196. Design and Manufacturing Forum. 1 Unit.

Invited speakers address issues of interest to design and manufacturing engineering and business students. Sponsored by the Product Realization Laboratory at Stanford.

Same as: ME 396

ME 199A. Practical Training. 1 Unit.

For undergraduate students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the Student Services Office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

ME 200. Judging Historical Significance Through the Automobile. 1 Unit.

This seminar is for students to learn how to assess the impact of historical importance through the lens of the automobile. Students will participate in discussions about measuring and judging historical importance from a number of perspectives - engineering, aesthetic, historical, etc. They will then decide on criteria and use these to be a part of a judging team at the Pebble Beach Concours d'Elegance. The Pebble Beach event is the leading concours for automobiles in the United States. Using the criteria established by the students, the judging team, including the students, will decide the recipient of the Stanford/Revs Automotive History Trophy for 2015 and have the opportunity to present it on the lawn at Pebble Beach Lodge on August 16th. Must apply using this application: <http://revs.stanford.edu/course/703>. Must attend first class to be considered for acceptance, no exceptions.

ME 201. Dim Sum of Mechanical Engineering. 1 Unit.

Introduction to research in mechanical engineering for M.S. students and upper-division undergraduates. Weekly presentations by current ME Ph.D. and second-year fellowship students to show research opportunities across the department. Strategies for getting involved in a research project.

ME 202. Mechaphonics: Smart Phone-Enabled Mechatronic Systems. 3 Units.

Explore the use of smartphones and tablets as enabling components within modern mechatronic systems. Emphasis on leveraging Android resources (user interface, communications, sensors) in combination with the Arduino microcontroller platform to design and build complex mechatronic devices. Topics include: basic Android application development, Android communications, sensors, Arduino, Arduino peripherals. Large, open-ended team project. Android device and programming hardware required. Limited enrollment. Prerequisites: ME210, ME218, or permission of instructor.

ME 203. Design and Manufacturing. 4 Units.

Integrated experience involving need finding, product definition, conceptual design, detail design, prototype manufacture, public presentation of outcomes, archiving and interpreting the product realization process and its results. Presents an overview of manufacturing processes crucial to the practice of design. Corequisite: 103D or CAD experience. Recommended: 101.

ME 203X. Prototyping and Process Capture. 1 Unit.

Concepts and methods for low resolution prototyping as an integral activity in engineering design process. Class meetings include presentations by faculty and design oriented exercises by students. Assignments will be Blog Posts. ME203X is designed to work in phase with ME203 and offers greater depth in prototyping strategy, technique, and resultant insights. Concurrent enrollment in ME203 is required. Enrollment is optional and capped at 6 students.

ME 204A. Bicycle Design and Frame-Building. 1 Unit.

Lecture/lab. The engineering and artistic execution of designing and building a bicycle frame. Fundamentals of bicycle dynamics, handling, and sizing. Manufacturing processes. Films, guest lecturers, field trips. Each student designs and fabricates a custom bicycle frame. This course is now a two part course series ME204A&B. Limited enrollment. Prerequisite: 203 or equivalent.

ME 204B. Bicycle Design and Frame-Building. 3 Units.

The engineering and artistic execution of designing and building a bicycle frame. The fundamentals of bicycle dynamics, handling, and sizing. Manufacturing processes. Films, guest lecturers, field trips. Each student designs a custom bicycle frame that they continue from ME204A in winter quarter. Limited enrollment, admission by consent of instructors. Attendance at first lecture is required. Both ME204A and ME204B must be taken. Prerequisite: 203 or equivalent.

ME 205. Flexible Part Design. 3 Units.

Project based course. Students design and fabricate tooling to create and refine elastomeric parts using RTV silicone rubber. Focus is on the development of elastomeric part design intuition through iteration. Fabrication techniques include manual/CNC machining and additive manufacturing, and molding liquid silicone. Prerequisites: ME203 or instructor consent. Recommended: ME318. Admission is by consent of the instructor. Class size limited to 10, must attend first lecture.

ME 206A. Entrepreneurial Design for Extreme Affordability. 4 Units.

Project course jointly offered by School of Engineering and Graduate School of Business. Students apply engineering and business skills to design product prototypes, distribution systems, and business plans for entrepreneurial ventures in developing countries for a specified challenge faced by the world's poor. Topics include user empathy, appropriate technology design, rapid prototype engineering and testing, social technology entrepreneurship, business modeling, and project management. Weekly design reviews; final course presentation. Industry and adviser interaction. Limited enrollment via application; see extreme.stanford.edu.

ME 206B. Entrepreneurial Design for Extreme Affordability. 4 Units.

Part two of two-quarter project course jointly offered by School of Engineering and Graduate School of Business. Second quarter emphasizes prototyping and implementation of specific projects identified in first quarter. Students work in cross-disciplinary project teams. Industry and adviser interaction, weekly design reviews; final course presentation. Prerequisite: 206A.n (Jointly offered as GSB OIT333B) Design Institute class; see <http://dschool.stanford.edu>.

ME 207. Movie Design. 1 Unit.

Apply design techniques to movie-making. Learn the ins and outs of high-speed filmmaking in the digital age, from writing & casting to directing, shooting, & editing. These techniques are useful whether you plan to move to Hollywood or create a video for the web. Project-based: students design, write, shoot, edit, and screen a short film in the span of one week. Students should be prepared to spend significant amount of out of class work-time creating movies: especially during the week of Oct 26 and the weekend of Nov 1-2.

ME 208. Patent Law and Strategy for Innovators and Entrepreneurs. 2-3 Units.

Inventors and entrepreneurs have four concerns related to patent law: protecting their inventions in the very early stages of product development, determining the patentability of their invention, avoiding infringement of a competitor's patent, and leveraging their patent as a business asset. This course will address each of these concerns through the application of law cases and business cases to an invention of the Student's choice. Although listed as a ME/MSE course, the course is not specific to any discipline or technology. Same as: MSE 278

ME 209. Imperfections in Crystalline Solids. 3 Units.

To develop a basic quantitative understanding of the behavior of point, line and planar defects in crystalline solids. Particular attention is focused on those defects that control the thermodynamic, structural and mechanical properties of crystalline materials.

ME 210. Introduction to Mechatronics. 4 Units.

Technologies involved in mechatronics (intelligent electro-mechanical systems), and techniques to apply this technology to mecatronic system design. Topics include: electronics (A/D, D/A converters, op-amps, filters, power devices); software program design, event-driven programming; hardware and DC stepper motors, solenoids, and robust sensing. Large, open-ended team project. Prerequisites: ENGR 40, CS 106, or equivalents. Same as: EE 118

ME 211. ReMake: Design Lessons from Restoration. 1 Unit.

Focus is on the restoration of the 1962 Cadillac DeVille project car as a design investigation. Topics include: What makes a car a classic? How does this car express luxury, and how is that different from contemporary luxury products? What does the car say about the American identity, and how has that changed over the past half-century? Every student can expect to get their hands dirty; prior automotive experience is not required. Goal is to have the car operational again by the end of Autumn Quarter. Preference to early graduate and advanced undergraduate students. Enrollment limited to 15.

ME 212. Calibrating the Instrument. 1 Unit.

For first-year graduate students in the Joint Program in Design. Means for calibrating the designer's mind/body instrument through tools including improvisation, brainstorming, creative imaging, educational kinesiology, and Brain Gym. Current design issues; guest speakers; shared stories; and goal setting.

ME 213. Design for Exploration. 3-4 Units.

A collaboration with the Exploratorium in San Francisco. Students investigate and experiment with all aspects of the creation of interactive museum exhibits. On-site exhibit floor sessions and prototyping workshops. Lectures from museum staff on exhibit design. Students design and construct exhibits for temporary placement on the floor of the Exploratorium. To be considered for admission to the course, student must fill out an application form at <http://stanford.edu/~edmark/application.htm> no later than Nov 30th, 2013. Same as: ARTSTUDI 265

ME 214. Good Products, Bad Products. 3-4 Units.

The characteristics of industrial products that cause them to be successes or failures: the straightforward (performance, economy, reliability), the complicated (human and cultural fit, compatibility with the environment, craftsmanship, positive emotional response of the user), the esoteric (elegance, sophistication, symbolism). Engineers and business people must better understand these factors to produce more successful products. Projects, papers, guest speakers, field trips. Same as: ME 314

ME 215. From Maps to Meaning. 3 Units.

One of the oldest visual tools created by humans to make sense of the complexities of our world, maps are unique in their ability to synthesize data, convey meaning through spatial logic, and deliver information at high resolution. They are also incredible tools for communication, data sorting, and insight finding. This is a hands-on, project-centered course where students will create maps to synthesize complex information and also use maps as a tool for working on design problems. Students will tackle three main projects and several shorter assignments.

ME 216A. Advanced Product Design: Needfinding. 3-4 Units.

Human needs that lead to the conceptualization of future products, environments, systems, and services. Field work in public and private settings; appraisal of personal values; readings on social ethnographic issues; and needfinding for a corporate client. Emphasis is on developing the flexible thinking skills that enable the designer to navigate the future. Prerequisites for undergraduates: ME115A, ME115B and ME203, or consent of the instructor.

ME 216B. Advanced Product Design: Implementation 1. 4 Units.

Summary project using knowledge, methodology, and skills obtained in Product Design major. Students implement an original design concept and present it to a professional jury. Prerequisite: 216A.

ME 216C. Advanced Product Design: Implementation 2. 4 Units.

ME216C: Implementation II is a continuation of ME216B. Students would develop project from ME216B to a further state of completion. Design will be completed, details about manufacturing, cost and production will be developed. Students will validate their projects by making them real in the world. Prerequisites for class are ME216A and ME216B. Prerequisite: 216A and 216B.

ME 217. Design & Construction in Wood. 1-3 Unit.

Explore the design and construction of objects using wood. Taught in the Product Realization Lab. Enrollment by consent of instructor.

ME 218A. Smart Product Design Fundamentals. 4-5 Units.

Lecture/Lab. Team design project series on programmable electromechanical systems design. Topics: transistors as switches, basic digital and analog circuits, operational amplifiers, comparators, software design, state machines, programming in C. Lab fee. Limited enrollment.

ME 218B. Smart Product Design Applications. 4-5 Units.

Lecture/lab. Second in team design project series on programmable electromechanical systems design. Topics: user I/O, timer systems, interrupts, signal conditioning, software design for embedded systems, statecharts, sensors, actuators, noise, and power supplies. Lab fee. Limited enrollment. Prerequisite: 218A or passing the smart product design fundamentals proficiency examination.

ME 218C. Smart Product Design Practice. 4-5 Units.

Lecture/lab. Advanced level in series on programmable electromechanical systems design. Topics: inter-processor communication, system design with multiple microprocessors, architecture and assembly language programming for the PIC microcontroller, controlling the embedded software tool chain, A/D and D/A techniques, electronic manufacturing technology. Team project. Lab fee. Limited enrollment. Prerequisite: 218B.

ME 218D. Smart Product Design: Projects. 3-4 Units.

Lecture/lab. Industrially sponsored project is the culmination of the Smart Product Design sequence. Student teams take on an industrial project requiring application and extension of knowledge gained in the prior three quarters, including prototyping of a final solution with hardware, software, and professional documentation and presentation. Lectures extend the students' knowledge of electronic and software design, and electronic manufacturing techniques. Topics: chip level design of microprocessor systems, real time operating systems, alternate microprocessor architectures, and PCB layout and fabrication. Prerequisite: 218C.

ME 219. The Magic of Materials and Manufacturing. 3 Units.

Intended for design-oriented students who anticipate imagining and then creating new products with a focus on materiality and brand or design and business. Assumes basic knowledge of materials and manufacturing processes which results from taking ENGR 50, ME 203, or equivalent course/life experience. Goal is to acquire professional foundation information about materials and materiality from a product design point-of-view, manufacturing processes and business systems inside a factory, and story-telling by book authorship, essay writing, and multimedia presentation. Goal is for students to exhibit a deep and life-long love of materials and manufacturing in order to make great products and tell a good story about each one.

ME 220. Introduction to Sensors. 3-4 Units.

Sensors are widely used in scientific research and as an integral part of commercial products and automated systems. The basic principles for sensing displacement, force, pressure, acceleration, temperature, optical radiation, nuclear radiation, and other physical parameters. Performance, cost, and operating requirements of available sensors. Elementary electronic circuits which are typically used with sensors. Lecture demonstration of a representative sensor from each category elucidates operating principles and typical performance. Lab experiments with off-the-shelf devices.

ME 221. Green Design Strategies and Metrics. 2 Units.

Foundation in sustainable product design principles, reinforced by conceptual design projects. Discuss what aspects of sustainability matter most for different products. Application of dozens of strategies to improve product sustainability. Frameworks, measurements, and decision-making tools to navigate the complexities of designing greener products. Life-cycle analysis, materials, energy use, biomimicry, product-service systems, persuasive design, design for end-of-life, and systems thinking.

ME 222. Design for Sustainability. 2-3 Units.

Lecture/lab. Role of design in building a sustainable world. How to include sustainability in the design process considering environmental, cultural, and social impacts. Focus is on a proactive design approach, and the tools and techniques needed to translate theory into artifact.

ME 223. Innovating Water Solutions for Developing Countries. 2-3 Units.

Primarily for graduate students and seniors with strong design and mechanical engineering backgrounds. Currently 1.1 billion people lack safe drinking water and 2.6 billion people lack adequate sanitation. The FAO states that by 2025 1.9 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions. The Stanford ChangeLabs has initiated a project called the 100 Liter Water project, designed to form strategies to deliver a minimum of 100 liters of water per day per family to the poorest communities in the world. This is a self-directed project class restricted to 15 students selected through an application process. Students work individually and in teams on water related technologies such as solar based low flow pumping systems, rainwater catchment systems, and storage systems. The studio class entails working on the design of solar powered low flow pumps, rainwater catchment systems, and very low cost storage systems designed for sparsely distributed communities in water stressed regions of the world. Students expected to work with autonomy and self-direction, going through multiple rounds of prototyping to generate breakthrough technologies designed to make deep impact.

ME 225. Mystery of Manufacturing. 3 Units.

Mystery of Manufacturing is intended for design- and engineering-oriented students who anticipate or have an interest in launching products. Where the cousin of this class, ME219, is an overview of fabrication and factory systems, this course will look at manufacturing systems more holistically: what does it take to get a product from your idea into peoples' hands? We'll look at factors that drive location, distribution, and supply chain decisions, and we'll look closely at the inner workings of factories. This course assumes basic knowledge of materials and manufacturing processes resulting from ENGR 50, ME 203, ME 219 or equivalent course/life experience. The goal is to acquire a professional foundation in factory manufacturing systems and the business of manufacturing through storytelling, essay writing, and multimedia presentation. We hope students will exhibit a deep and life-long love of the complexity and flexibility of manufacturing systems in order to launch great products into the world.

ME 226. Designing Sustainable Behavior. 1 Unit.

How do you design a product so people will use it in the most sustainable way? Through practical design exercises you experience how selected design tools can help you affect the behavior of your target group. The course consists of an 8-hour workshop on Saturday April 6th in Studio2 at the d.school, followed by a group project finishing April 24th. Students may request to only audit the workshop by emailing jdaae@stanford.edu. The course builds upon and contributes to an ongoing research project. Prerequisite: training in product design.

ME 227. Vehicle Dynamics and Control. 3 Units.

The application of dynamics, kinematics, and control theory to the analysis and design of ground vehicle behavior. Simplified models of ride, handling, and braking, their role in developing intuition, and limitations in engineering design. Suspension design fundamentals. Performance and safety enhancement through automatic control systems. In-car laboratory assignments for model validation and kinesthetic understanding of dynamics. Limited enrollment. Prerequisites: ENGR 105, consent of instructor.

ME 229. Design Evangelism. 1-2 Unit.

Students work with Ambidextrous staff and magazine professionals to edit and produce Ambidextrous, Stanford University's Journal of Design. Topics include design processes and innovation, storytelling, writing and editing for an audience, magazine production and project leadership. Hands-on projects, in-class exercises, and guest lectures.

ME 231. Educating Young STEM Thinkers. 3-5 Units.

The course will introduce students to the design thinking process, the national conversations about the future of STEM careers, and provide opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course will be both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 139X, EDUC 239X, ME 139

ME 233. Making it Big: Crossing the Entrepreneur's Gap. 3 Units.

Students learn to take novel designs into entrepreneurial production and prepare for market production. Education, resources, and community are provided to help students cross the gap, founding ideas and making them real, in volume. Topics include entrepreneurial production methods and initiation, vendor selection and engagement, cost, design transfer, quality and testing, manufacturing planning and execution. Course prepares students for leadership roles in entrepreneurial as well as large production-oriented companies. Case studies, regular project reviews, final presentation, industry interaction.

ME 235. Understanding Superfans and their Heroes. 2-3 Units.

Harness the power of the hero coefficient through a radical team-based, hands-on, multidisciplinary class. Students will learn and utilize the principles of Empathy-Define-Ideate-Prototype-Test components of the d.thinking process. Why do superfans love their heroes? You'll get to prototype and explore how superfans connect with their heroes, understanding this connective tissue works will give your own ideas a boost. We'll be studying heroes the likes of Dale Earnhardt, Michael Jordan and Stephen Colbert. Expect to leave this class ready to spread the word about heroes and superfans and make everyone at your company or on your team feel like one. You will hear from special guests and take a field trip to a racetrack. Sponsored by the Revs Program. Limited enrollment. FAQ and apply here: <http://revs.stanford.edu/course/693>.

ME 236. Tales to Design Cars By. 1-3 Unit.

Students learn to tell personal narratives and make connections between popular and historic media using the automobile. Explores the meaning and impact of personal and preserved car histories. Storytelling techniques serve to make sense of car experiences; replay memories; examine engagement; understand user interviews. This course celebrates car fascination, and leads the student through finding and telling a car story through the REVS photographic archives, ethnographic research, interviews, and diverse individual and collaborative narrative methods-verbal, non-verbal, and film. Methods draw from socio-cognitive psychology, design thinking, and fine art request; and are applied to car storytelling. Course culminates in a final story presentation and showcase. Restricted to co-term and graduate students. Class Size limited to 18.

ME 238. Patent Prosecution. 2 Units.

The course follows the patent application process through the important stages: inventor interviews, patentability analysis, drafting claims, drafting a specification, filing a patent application, and responding to an office action. The subject matter and practical instruction relevant to each stage are addressed in the context of current rules and case law. The course includes four written assignments: an invention capture, a claim set, a full patent application, and an Office Action response. Pre-requisites: Law 326 (IP:Patents), Law 409 (Intro IP), or ME 208.

ME 239. Mechanics of the Cell. 3 Units.

Kinematical description of basic structural elements used to model parts of the cell: rods, ropes, membranes, and shells. Formulation of constitutive equations: nonlinear elasticity and entropic contributions. Elasticity of polymeric networks. Applications to model basic filaments of the cytoskeleton: actin, microtubules, intermediate filaments, and complete networks. Applications to biological membranes.

ME 240. Introduction to Nanotechnology. 3 Units.

Nanotechnology as multidisciplinary with contributions from physical sciences, engineering, and industry. Current topics in nanotechnology research; developments in nanomaterials, mechanics, electronics, and sensors; and applications. Nanoscale materials building blocks, fabrication and assembly processes, characterization and properties, and novel system architectures. Implications for future development.

ME 242B. Mechanical Vibrations. 3 Units.

For M.S.-level graduate students. Covers the vibrations of discrete systems and continuous structures. Introduction to the computational dynamics of linear engineering systems. Review of analytical dynamics of discrete systems; undamped and damped vibrations of N-degree-of-freedom systems; continuous systems; approximation of continuous systems by displacement methods; solution methods for the Eigenvalue problem; direct time-integration methods. Prerequisites: AA 242A or equivalent (recommended but not required); basic knowledge of linear algebra and ODEs; no prior knowledge of structural dynamics is assumed. Same as: AA 242B

ME 243. Designing Emotion-Reactive Car Interfaces. 3 Units.

How to design in car interfaces that take into account the emotional state of the driver in the moment of driving? Participants will be prototyping and testing interfaces for an industry partner. The challenge is to take real time physiological data to infer the emotional state of a driver and to lever these to improve the driving experience. We will cover topics on design methodology, psychology of emotions, and human machine interaction. The class meets at VAIL, the Stanford automotive innovation facility, for prototyping, discussions and presentations. Participants will have access to tools, prototyping materials, physiological sensors, and a car. Students from all ENG majors but also beyond are encouraged to join, bring your drivers license.

ME 244. Mechanotransduction in Cells and Tissues. 3 Units.

Mechanical cues play a critical role in development, normal functioning of cells and tissues, and various diseases. This course will cover what is known about cellular mechanotransduction, or the processes by which living cells sense and respond to physical cues such as physiological forces or mechanical properties of the tissue microenvironment. Experimental techniques and current areas of active investigation will be highlighted. Same as: BIOE 283

ME 247A. @Stanford Studio. 4 Units.

The d.school is working with the University to re-invent the on-campus experience. Huge shifts are disrupting education in unprecedented ways, questioning what it means to learn and live on campus. It's time to harness those changes and re-invent what it means to be a student right here at Stanford. You will delve into design, dig into the most adventurous educational experiments happening around the country, immerse yourself in mind-blowing experiences both on- and off-campus, and create short films and wild prototypes that demonstrate the future of campus life. Your work may be seen or experienced by faculty, deans, and the Stanford community at-large; the opportunity for impact is very real.

ME 247B. @Stanford Studio. 4 Units.

Re-imagine the Stanford experience for the year 2020. Fall quarter the d.school's @Stanford Project will mount @Stanford Studio, an opportunity for students to design, develop, execute, and iterate immersive prototypes that allow experimentation into many facets of the future student experience. Because of the nature of prototypes and the subject matter, significant time outside of scheduled class meetings will be required. Students will work closely with design mentors, campus stakeholders, and inspiration partners (innovative educators, artists, museums, companies and/or topical experts from beyond Stanford) to create live, testable, learning experiences. Course will involve fast-paced team work and rely on strong, consistent participation and perfect attendance. Admission by application. Please see dschool.stanford.edu for application information.

ME 247C. @Stanford Studio. 4 Units.

Re-imagine the future Stanford experience. @Stanford Studio is an opportunity for students to design, develop, execute, and iterate immersive prototypes that allow experimentation into many facets of the future student experience. Students enrolled in @Stanford Studio in winter quarter will be responsible for running quarter-long independent experiments. This is an advanced studio for continuing students only. Admission by application.

ME 250. Internal Combustion Engines. 1-5 Unit.

Internal combustion engines including conventional and turbocharged spark ignition, and diesel engines. Lectures: basic engine cycles, engine components, methods of analysis of engine performance, pollutant emissions, and methods of engine testing. Lab involves hands-on experience with engines and test hardware. Limited enrollment. Prerequisites: 140.

ME 257. Turbine and Internal Combustion Engines. 3 Units.

Principles of design analysis for aircraft gas turbines and automotive piston engines. Analysis for aircraft engines performed for Airbus A380 type aircraft. Design parameters determined considering aircraft aerodynamics, gas turbine thermodynamics, compressible flow physics, and material limitations. Additional topics include characteristics of main engine components, off-design analysis, and component matching. Performance of automotive piston engines including novel engine concepts in terms of engine thermodynamics, intake and exhaust flows, and in-cylinder flow. Same as: ME 357

ME 260. Fuel Cell Science and Technology. 3 Units.

Emphasis on proton exchange membrane (PEM) and solid oxide fuel cells (SOFC), and principles of electrochemical energy conversion. Topics in materials science, thermodynamics, and fluid mechanics. Prerequisites: MATH 43, PHYSICS 55, and ENGR 30 or ME 140, or equivalents.

ME 261. Dynamic Systems, Vibrations and Control. 3-4 Units.

(Graduate students only enroll in 261.) Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, amplification and attenuation, and control system design. Demonstrations and laboratory experiments. Prerequisite: Calculus (differentiation and integration), ordinary differential equations (e.g., CME 102 or MATH53), basic linear algebra (determinants and solving linear equations), and familiarity with basic dynamics ($F=m*a$) and electronics ($v=i*R$). ME undergraduates must enroll for 4 units with lab. All others should enroll for 3 units without lab.

Same as: ME 161

ME 264. d.science: Design for Science. 3-4 Units.

Where does design fit into scientific research? In this class, we will design for how data are collected, how data are communicated, and how to apply scientific insights to community-based projects. This year's projects are inspired by the Citizen Science movement and The Year of the Bay. We will use human-centered design methods to understand the needs of bay area citizens through hands-on data collection, public data exploration and collaboration with local industry, government and research partners. With guest lectures from the design and science community, research mentors, and skills workshops, you will develop an actionable understanding of the challenges of collecting good data, the complexities of creating engaging stories with quantitative data, and the challenges of balancing insights from both human-centered design research and scientific research. One of the three class projects will involve visualizing and mapping big data. No prior programming or statistics experience required. Enrollment limited to 24. This course is open to graduate students from all schools and departments. Apply the first day of class.

ME 265. Technology Licencing and Commercialization. 3 Units.

How to profit from technology; processes and strategies to commercialize functional or artistic inventions and creations (not limited to mechanical engineering). Business and legal aspects of determining what can be owned and licensed, how to determine commercial value, and what agreements are necessary. Contract and intellectual property law; focus is on provisions of license agreements and their negotiation.

ME 266. Introduction to Physiology and Biomechanics of Hearing. 3 Units.

Hearing is fundamental to our ability to communicate, yet in the US alone over 30 million people suffer some form of hearing impairment. As engineers and scientists, it is important for us to understand the underlying principles of the auditory system if we are to devise better ways of helping those with hearing loss. The goal of this course is to introduce undergraduate and graduate students to the anatomy, physiology, and biomechanics of hearing. Principles from acoustics, mechanics, and hydrodynamics will be used to build a foundational understanding of one of the most complex, interdisciplinary, and fascinating areas of biology. Topics include the evolution of hearing, computational modeling approaches, fluid-structure interactions, ion-channel transduction, psychoacoustics, diagnostic tools, and micrometer to millimeter scale imaging methods. We will also study current technologies for mitigating hearing loss via passive and active prostheses, as well as future regenerative therapies.

Same as: BIOE 287, ME 166

ME 271. Aerodynamic Drone Design. 3 Units.

An introduction to the aerodynamic design of rotor-based drones, for students with a background in robotics, aerospace, or fluids. Focus is on rotor-based drones operating at low Reynolds numbers, but material is applicable to drones, aviation and wind energy in general. Topics include: airfoil simulation, fundamentals of rotor aerodynamics, blade element analysis, rotor simulation and performance (e.g. mission duration, distance, maneuverability, and reliability). Midterm is the design of an airfoil for a drone, final is the aerodynamic design of a rotor for a drone; these projects will be peer-reviewed by students in the class. Prereqs: background in fluid mechanics or aerodynamics; fluency with MATLAB. Recommended: take ME202 or AA241X before or after ME271, for practical applications in drone prototyping and control theory.

ME 277. Graduate Design Research Techniques. 3-4 Units.

Students from different backgrounds work on real-world design challenges. The Design Thinking process with emphasis on: ethnographic techniques, need finding, framing and concept generation. The Design Thinking process as a lens to explore ways to better understand people and their culture. Cultural differences as a source of design inspiration, with the understanding that design itself is a culturally embedded practice.

ME 280. Skeletal Development and Evolution. 3 Units.

The mechanobiology of skeletal growth, adaptation, regeneration, and aging is considered from developmental and evolutionary perspectives. Emphasis is on the interactions between mechanical and chemical factors in the regulation of connective tissue biology. Prerequisites: BIO 42, and ME 80 or BIOE 42.

Same as: BIOE 280

ME 281. Biomechanics of Movement. 3 Units.

Experimental techniques to study human and animal movement including motion capture systems, EMG, force plates, medical imaging, and animation. The mechanical properties of muscle and tendon, and quantitative analysis of musculoskeletal geometry. Projects and demonstrations emphasize applications of mechanics in sports, orthopedics, and rehabilitation.

Same as: BIOE 281

ME 283. Tissue Mechanics and Mechanobiology. 3 Units.

Introduction to the application of mechanical engineering analysis to understand human physiology and disease. Topics include basics of musculoskeletal force analysis, cell mechanics, blood flow, and mechanical behaviors of tissues. Undergraduates should have taken ME 70 and ME 80 or equivalents.

ME 284B. Cardiovascular Bioengineering. 3 Units.

Continuation of ME/BIOE 284A. Integrative cardiovascular physiology, blood fluid mechanics, and transport in the microcirculation. Sensing, feedback, and control of the circulation. Overview of congenital and adult cardiovascular disease, diagnostic methods, and treatment strategies. Engineering principles to evaluate the performance of cardiovascular devices and the efficacy of treatment strategies.

Same as: BIOE 284B

ME 287. Mechanics of Biological Tissues. 3 Units.

Introduction to the mechanical behaviors of biological tissues in health and disease. Overview of experimental approaches to evaluating tissue properties and mathematical constitutive models. Elastic behaviors of hard tissues, nonlinear elastic and viscoelastic models for soft tissues.

ME 287L. Mechanics of Biological Tissues Lab. 1 Unit.

The Mechanics of Biological Tissues Lab is the optional lab component for students taking ME287 Mechanics of Biological Tissues.

ME 288. ReDesigning Theater: Live & Digital Performance. 3 Units.

This quarter's version of ReDesigning Theater looks at Live and Digital Performance. We will examine the use of digital technology in collaboration with live performance. Students will learn and employ the design thinking process as well as improv and theatrical techniques. We aim to create user-centric, interactive experiences where technology enables the audience to become part of and/or influence the outcome of the story or its presentation. Student projects will begin with the concepts enabled by personal technology such as smart phones and expand to animation, video projection, and other media. Students will work in small groups to investigate and experiment with formats that blur the lines between live and digital, performer and audience, and physical and virtual platforms. This project-based course is accessible to students of all backgrounds interested in exploring and transforming the frontiers of technology, art, and live performance.

Same as: TAPS 130

ME 289A. Interactive Art / Performance Design. 2 Units.

This class is for those who want the experience of designing and creating interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. This is a two-quarter long commitment during which students will first learn the design, planning, story boarding, budgeting, engineering, proposal creation and concept pitching of projects for applying for grants and presenting to funders. The second quarter will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part one of a two course series: ME 289A&B.

Same as: TAPS 289A

ME 289B. Interactive Art / Performance Creation. 3-4 Units.

This class is the continuation of ME289A where students experience the designing and creating of interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. During this second quarter students will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part two of a two course series : ME 289A&B.

Same as: TAPS 289B

ME 290. GIVE BIG OR GO HOME. 3-4 Units.

When individuals or organizations attempt to solve social problems by giving money, they often overlook the people at the center of the situation. The bigger the problem, the more removed the donors or funding institutions become from the human experience. You will learn how to use human centered design to shape your giving, while also considering the roles of larger systems. Students will learn design thinking methods, how to conceptualize a system in which you want to make a difference, and creative ways to think about financing change.

ME 292. Humanize My Ride: Investigations in User-Centric Vehicle Design. 3 Units.

Humanize My Ride is vehicle design for the extreme user. We will explore the relationship between specialized vehicles and their user's needs to inform a deep dive into designing and prototyping a unique purpose modified ride for a new type of user. Utilizing the designing thinking approach and emerging technology such as Google GLASS, student teams will interview drivers and users of specific purpose cars and trucks and then choose a new user to design and build for. Teams will work collectively on different elements of one vehicle to test with their user's needs. This project-based course is accessible to students of all backgrounds interested in exploring and transforming the intersection of user-centric design, automotive technology, creative customization and hands-on building.

ME 294. Medical Device Design. 3 Units.

In collaboration with the School of Medicine. Introduction to medical device design for undergraduate and graduate engineering students.

ME 294L. Medical Device Design Lab. 3 Units.

In collaboration with the School of Medicine. This is the lab portion of ME294, which must be taken concurrently. Introduction to medical device design for undergraduate and graduate engineering students. Design, prototyping and labs. Medical device environments may include hands-on device testing; and field trips to operating rooms and local device companies. Prerequisite: 203.

ME 297. Forecasting for Innovators: Technology, Tools & Social Change. 3 Units.

Technologies from the steam engine to the microprocessor have been mixed gifts, at once benefitting humankind and creating many of the problems facing humanity today. This class will explore how innovators can use forecasting methods to identify new challenges, develop responsive innovations and anticipate unintended consequences. Students will produce a long-range forecast project, applying a variety of methodologies including research, expert interviews and graphical exploration.

ME 298. Silversmithing and Design. 3-4 Units.

Skills involved in working with precious metals at a small scale. Investment casting and fabrication techniques such as reticulation, granulations, filigree, and mokume gane.

ME 299A. Practical Training. 1 Unit.

For master's students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the Student Services Office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

ME 299B. Practical Training. 1 Unit.

For Ph.D. students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the student services office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

ME 300A. Linear Algebra with Application to Engineering Computations. 3 Units.

Computer based solution of systems of algebraic equations obtained from engineering problems and eigen-system analysis, Gaussian elimination, effect of round-off error, operation counts, banded matrices arising from discretization of differential equations, ill-conditioned matrices, matrix theory, least square solution of unsolvable systems, solution of non-linear algebraic equations, eigenvalues and eigenvectors, similar matrices, unitary and Hermitian matrices, positive definiteness, Cayley-Hamilton theory and function of a matrix and iterative methods. Prerequisite: familiarity with computer programming, and MATH51.

Same as: CME 200

ME 300B. Partial Differential Equations in Engineering. 3 Units.

Geometric interpretation of partial differential equation (PDE) characteristics; solution of first order PDEs and classification of second-order PDEs; self-similarity; separation of variables as applied to parabolic, hyperbolic, and elliptic PDEs; special functions; eigenfunction expansions; the method of characteristics. If time permits, Fourier integrals and transforms, Laplace transforms. Prerequisite: CME 200/ME 300A, equivalent, or consent of instructor.

Same as: CME 204

ME 300C. Introduction to Numerical Methods for Engineering. 3 Units.

Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B.

Same as: AA 214A, CME 206

ME 301. LaunchPad:Design and Launch your Product or Service. 4 Units.

This is an intense course in product design and development offered to graduate students only (no exceptions). In just ten weeks, we will apply principles of design thinking to the real-life challenge of imagining, prototyping, testing and iterating, building, pricing, marketing, distributing and selling your product or service. You will work hard on both sides of your brain. You will experience the joy of success and the (passing) pain of failure along the way. This course is an excellent chance to practice design thinking in a demanding, fast-paced, results-oriented group with support from faculty and industry leaders. This course may change your life. We will treat each team and idea as a real start-up, so the work will be intense. If you do not have a passionate and overwhelming urge to start a business or launch a product or service, this class will not be a fit.

ME 302. The Future of the Automobile. 1 Unit.

This quarter, the seminar will take a specific focus on "Advanced Driver Assistance Systems", which help drivers to maneuver their vehicles through traffic. Those systems range from navigation systems, adaptive cruise control, night vision, lane departure warning over automated parking, traffic jam assistance, to self-driving cars. With this breadth of applications, advanced driver assistance systems play an important role in making traffic safer, more efficient, and more enjoyable. This course, lectured by an industry expert, will introduce students to technology behind the systems, the benefits, challenges, and future perspectives of this exciting field. At the end of the quarter, students will have developed a technical understanding as well as an understanding for the interactions of the technology, business, and society with a specific automotive focus.

ME 302A. The Future of the Automobile- Trends and Challenges in Personal Mobility. 1 Unit.

The objective of this course is to develop an understanding for the requirements that go into the design of a highly complex yet easy-to-use product, i.e. the automobile. Students will learn about very different interdisciplinary aspects that characterize the automobile and personal mobility. This is the first part of a 3-quarter seminar series, which build on one another but can be taken independently. This quarter, the seminar will discuss general aspects of the automobile and personal mobility. In the first half of the quarter, students will learn about different aspects of the automobile and understand key characteristics and conflicts. Primary trends such as electrification, automation, communication, and commoditization will be discussed. In the second half of the quarter, guest speakers from academia and industry will share their vision regarding the future of the automobile and how design challenges are addressed within their respective organizations. At the end of the quarter, students will have developed a broader understanding of the intertwined technology - environmental - human - business - legal aspects that will shape the future of the automobile.

ME 302B. The Future of the Automobile- Driver Assistance and Automated Driving. 1 Unit.

The objective of this course is to develop an understanding for the requirements that go into the design of a highly complex yet easy-to-use product, i.e. the automobile. Students will learn about very different interdisciplinary aspects that characterize the automobile and personal mobility. This is the second part of a 3-quarter seminar series, which build on one another but can be taken independently. This quarter, the seminar will discuss how various vehicle systems help drivers to maneuver their vehicles through traffic. Advanced driver assistance systems range from navigation, adaptive cruise control, night vision, and lane departure warning to automated parking, traffic jam assistance, and eventually self-driving cars. These systems play an important role in making traffic safer, more efficient, and more enjoyable. This course, lectured by an industry expert, will introduce students to the technology behind the systems, the benefits, challenges, and future perspectives of this exciting field. Students will develop an understanding for the interactions of the technology, business, and society with a specific automotive focus.

ME 302C. The Future of the Automobile- Vehicle Communication Systems. 1 Unit.

ME302C-The Future of the Automobile - Vehicle Communication Systems
The objective of this course is to develop an understanding for the requirements that go into the design of a highly complex yet easy-to-use product, i.e. the automobile. Students will learn about very different interdisciplinary aspects that characterize the automobile and personal mobility. This is the third part of a 3-quarter seminar series, which build on one another but can be taken independently. This quarter, the seminar will discuss how vehicles communicate with one another and beyond. Respective in-vehicle concepts include online media services, connections to a centralized traffic management infrastructure, communication among vehicles to avoid collisions and improve traffic flow. This class consists in the first half of lectures by an industry expert introducing technical and regulatory aspects of connected vehicles. In the second half, students will team up in groups and conceptualize scenarios for vehicle communication systems. Students will develop an understanding for the interactions of the technology, business, and society with a specific automotive focus.

ME 303. Biomechanics of Flight. 3 Units.

Study of biological flight as an inspiration for designing robots. The goal is to give students a broad understanding of the biomechanics of natural flight, and an in-depth understanding of bird flight. This course elucidates how students can pick and choose exciting biological questions, use biological and engineering techniques to answer them, and use the results to identify bio-inspired design applications. Prerequisites: Fluid mechanics OR Aerodynamics AND Fluent Matlab skills. Course website URL: http://lentinklab.stanford.edu/impact/stanford_teaching.

ME 304. The Designer's Voice. 1 Unit.

This course for Masters students in the Stanford Design Program helps students develop a point of view about their design career that will enable them to articulate their design vision, inspire a design studio, or infect a business with a culture of design-thinking. This class focuses on the integration of work and worldview, professional values, design language, and the development of the designer's voice. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching.

ME 305. Statistics for Design Researchers. 1-2 Unit.

Comprehensive yet friendly introduction to the fundamental concepts of inferential statistics, primarily used in survey research. Course content delivered via online video lectures, with group classroom time dedicated to completing the lab assignment. All examples and assignments involve writing code in R, interpreting R output and creating visual output with ggplot2. Two-unit credit requires completion of an analysis project using data collected as part of an NSF-funded engineering education research project. Auditors welcome.

ME 308. Spatial Motion. 3 Units.

The geometry of motion in Euclidean space. Fundamentals of theory of screws with applications to robotic mechanisms, constraint analysis, and vehicle dynamics. Methods for representing the positions of spatial systems of rigid bodies with their inter-relationships; the formulation of Newton-Euler kinetics applied to serial chain systems such as industrial robotics.

ME 309. Finite Element Analysis in Mechanical Design. 3 Units.

Basic concepts of finite elements, with applications to problems confronted by mechanical designers. Linear static, modal, and thermal formulations emphasized; nonlinear and dynamic formulations introduced. Application of a commercial finite element code in analyzing design problems. Issues: solution methods, modeling techniques, features of various commercial codes, basic problem definition. Individual projects focus on the interplay of analysis and testing in product design/development. Prerequisites: Math 51, or equivalent. Recommended: ME80 or CEE101A, or equivalent in structural and/or solid mechanics; some exposure to principles of heat transfer.

ME 310A. Product-Based Engineering Design, Innovation, and Development. 4 Units.

Three quarter sequence; for engineering graduate students intending to lead projects related to sustainability, automotive, biomedical devices, communication, and user interaction. Student teams collaborate with academic partners in Europe, Asia, and Latin America on product innovation challenges presented by global corporations to design requirements and construct functional prototypes for consumer testing and technical evaluation. Design loft format such as found in Silicon Valley consultancies. Typically requires international travel. Prerequisites: undergraduate engineering design project; consent of instructor.

ME 310B. Product-Based Engineering Design, Innovation, and Development. 4 Units.

Three quarter sequence; for engineering graduate students intending to lead projects related to sustainability, automotive, biomedical devices, communication, and user interaction. Student teams collaborate with academic partners in Europe, Asia, and Latin America on product innovation challenges presented by global corporations to design requirements and construct functional prototypes for consumer testing and technical evaluation. Design loft format such as found in Silicon Valley consultancies. Typically requires international travel. Prerequisites: undergraduate engineering design project; consent of instructor.

ME 310C. Project-Based Engineering Design, Innovation, and Development. 4 Units.

Three quarter sequence; for engineering graduate students intending to lead projects related to sustainability, automotive, biomedical devices, communication, and user interaction. Student teams collaborate with academic partners in Europe, Asia, and Latin America on product innovation challenges presented by global corporations to design requirements and construct functional prototypes for consumer testing and technical evaluation. Design loft format such as found in Silicon Valley consultancies. Typically requires international travel. Prerequisites: undergraduate engineering design project; consent of instructor.

ME 310X. New Product Management. 1 Unit.

Restricted to graduate students. Focus is on the role of the product manager in industry. Topics include product management skills, leadership and team management, getting a product management job, corporate and project finance for engineers, sales and marketing for engineers and business strategy. Seminar with in-class exercises and guest speakers from industry. Limited to 50. Prerequisite: Enrolled ME310 students only.

ME 312. Advanced Product Design: Formgiving. 3 Units.

Lecture/lab. Small- and medium- scale design projects carried to a high degree of aesthetic refinement. Emphasis is on form development, design process, and model making.

ME 313. Human Values and Innovation in Design. 3 Units.

Introduction to the philosophy, spirit, and tradition of the product design program. Hands-on design projects used as vehicles for design thinking, visualization, and methodology. The relationships among technical, human, aesthetic, and business concerns. Drawing, prototyping, and design skills. Focus is on tenets of design philosophy: point of view, user-centered design, design methodology, and iterative design.

ME 314. Good Products, Bad Products. 3-4 Units.

The characteristics of industrial products that cause them to be successes or failures: the straightforward (performance, economy, reliability), the complicated (human and cultural fit, compatibility with the environment, craftsmanship, positive emotional response of the user), the esoteric (elegance, sophistication, symbolism). Engineers and business people must better understand these factors to produce more successful products. Projects, papers, guest speakers, field trips. Same as: ME 214

ME 315. The Designer in Society. 3 Units.

For graduate students. Career objectives and psychological orientation compared with existing social values and conditions. Emphasis is on assisting individuals in assessing their roles in society. Readings on political, social, and humanistic thought are related to technology and design. Experiential, in-class exercises, and term project. Enrollment limited to 24. Admission by application. See dschool.stanford.edu/classes for more information and attend the first day of class.

ME 316A. Product Design Master's Project. 2-6 Units.

For graduate Product Design or Design (Art) majors only. Student teams, under the supervision of the design faculty, spend the quarter researching master's project topics. Students are expected to demonstrate mastery of design thinking methods including; needfinding, brainstorming, field interviews and synthesis during this investigation. Masters projects are selected that involve the synthesis of aesthetics and technological concerns in the service of human need. Design Institute class; see <http://dschool.stanford.edu>. Prereq: ME277, ME312, ME313.

ME 316B. Product Design Master's Project. 2-4 Units.

Design Garage is a Winter/Spring class (a two quarter commitment is required). The class is a deep dive in design thinking that uses student-led projects to teach design process and methods. The projects come from investigations conducted during the Fall quarter where the preliminary need finding, customer research, and product or service ideas have been developed to provide the seed projects for the student design teams. Students will learn the methodologies of design thinking by bringing a product, service, or experience to market. Students apply to Design Garage in the Fall, and teams are formed after interviews and applications are reviewed. Prerequisite: graduate student standing.

ME 316C. Product Design Master's Project. 2-4 Units.

This is the second half of the two quarter Design Garage sequence. Students will complete projects begun in ME316B the prior quarter. Prerequisite: ME316B and graduate student standing. Design Institute class; see <http://dschool.stanford.edu>.

ME 317A. Design Methods: Product Definition. 4 Units.

Systematic methodologies to define, develop, and produce world-class products. Student team projects to identify opportunities for improvement and develop a comprehensive product definition. Topics include value engineering, quality function deployment, FMEA and risk analysis, robustness, design for variety, design for life-cycle quality, financial analysis and Monte Carlo simulation. Students must take 317B to complete the project and obtain a letter grade. On-campus enrollment limited to 25; SCPD class size is limited to 75.

ME 317B. Design Methods: Quality By Design. 4 Units.

Building on 317A, focus is on the implementation of competitive product design. Student groups apply structured methods to optimize the design of an improved product, and plan for its manufacture, testing, and service. The project deliverable is a comprehensive product and process specification. Topics: concept generation and selection (Pugh's Method), Poka Yoke, design for robustness, Monte Carlo and Design for Six Sigma, process capability analysis, financial analysis, and prototyping. On-campus class limited to 25. For SCPD students, limit is 75. Prerequisite: 317A.

ME 318. Computer-Aided Product Creation. 4 Units.

Design course focusing on an integrated suite of computer tools: rapid prototyping, solid modeling, computer-aided machining, and computer numerical control manufacturing. Students choose, design, and manufacture individual products, emphasizing individual design process and computer design tools. Field trips demonstrate Stanford Product Realization Lab's relationship to the outside world. Structured lab experiences build a basic CAD/CAM/CNC proficiency. Limited enrollment. Prerequisite: consent of instructor.

ME 319. Fundamentals of Design for Design Thinkers. 2-4 Units.

This course is an introduction to the fundamental principles of Design, geared toward graduate students involved and invested in innovation and design thinking. Core concepts include Contrast, Color, Materiality, Form, Proportion, Transitions, and more. Students will be introduced to the major philosophical concepts of design in readings and in class, and will practice techniques in class and via weekly hands-on projects out of class, culminating in a final personal project. Students will also be introduced to many hands-on prototyping and making skills via access to the Product Realization Lab and Room 36 (webshop.stanford.edu).

ME 320. Introduction to Robotics. 3 Units.

Robotics foundations in modeling, design, planning, and control. Class covers relevant results from geometry, kinematics, statics, dynamics, motion planning, and control, providing the basic methodologies and tools in robotics research and applications. Concepts and models are illustrated through physical robot platforms, interactive robot simulations, and video segments relevant to historical research developments or to emerging application areas in the field. Recommended: matrix algebra. Same as: CS 223A

ME 321. Optofluidics: Interplay of Light and Fluids at the Micro and Nanoscale. 3 Units.

Many optical systems in biology have sophisticated designs with functions that conventional optics cannot achieve: no synthetic materials, for example, can provide the camouflage capability exhibited by some animals. This course overviews recent efforts--some inspired by examples in biology--in using fluids, soft materials and nanostructures to create new functions in optics. Topics include electrowetting lenses, electronic inks, colloidal photonic crystals, bioinspired optical nanostructures, nanophotonic biosensors, lens-less optofluidic microscopes. The use of optics to control fluids is also discussed: optoelectronic tweezers, particle trapping and transport, microrheology, optofluidic sorters, fabrication and self-assembly of novel micro and nanostructures.

ME 322. Kinematic Synthesis of Mechanisms. 3 Units.

The rational design of linkages. Techniques to determine linkage proportions to fulfill design requirements using analytical, graphical, and computer based methods.

ME 323. Modeling and Identification of Mechanical Systems for Control. 3 Units.

Lecture/Lab. The art and science behind developing mathematical models for control system design. Theoretical and practical system modeling and parameter identification. Frequency domain identification, parametric modeling, and black-box identification. Analytical work and laboratory experience with identification, controller implementation, and the implications of unmodeled dynamics and non-linearities. Prerequisites: linear algebra and system simulation with MATLAB/SIMULINK; ENGR 105.

ME 324. Precision Engineering. 4 Units.

Advances in engineering are often enabled by more accurate control of manufacturing and measuring tolerances. Concepts and technology enable precision such that the ratio of overall dimensions to uncertainty of measurement is large relative to normal engineering practice. Typical application areas: non-spherical optics, computer information storage devices, and manufacturing metrology systems. Application experience through design and manufacture of a precision engineering project, emphasizing the principles of precision engineering. Structured labs; field trips. Prerequisite: consent of instructors.

ME 325. Making Multiples: Scaled Manufacturing Tooling. 3 Units.

Design course focusing on the process of injection molding as a prototyping and manufacturing tool. Coursework will include creating and evaluating initial design concepts, detailed part design, mold design, mold manufacturing, molding parts, and testing and evaluating the results. Students will work primarily on individually selected projects, using each project as a tool to continue developing and exercising individual design process. Lectures and field trips will provide students with context for their work in the Stanford Product Realization Lab. Prerequisite: ME318 or consent of instructors.

ME 326. Telerobotics and Human-Robot Interactions. 3 Units.

Focus is on dynamics and controls. Evaluation and implementation of required control systems. Topics include master-slave systems, kinematic and dynamic similarity; control architecture, force feedback, haptics, sensory substitutions; stability, passivity, sensor resolution, servo rates; time delays, prediction, wave variables. Hardware-based projects encouraged, which may complement ongoing research or inspire new developments. Limited enrollment. Prerequisites: ENGR 205, 320 or CS 223A, or consent of instructor. (Niemeier).

ME 327. Design and Control of Haptic Systems. 3 Units.

Study of the design and control of haptic systems, which provide touch feedback to human users interacting with virtual environments and teleoperated robots. Focus is on device modeling (kinematics and dynamics), synthesis and analysis of control systems, design and implementation, and human interaction with haptic systems. Coursework includes homework/laboratory assignments and a research-oriented project. Directed toward graduate students and advanced undergraduates in engineering and computer science. Prerequisites: dynamic systems and MATLAB programming. Suggested experience with C/C++ programming and feedback control design.

ME 328. Medical Robotics. 3 Units.

Study of the design and control of robots for medical applications. Focus is on robotics in surgery and interventional radiology, with introduction to other healthcare robots. Delivery is through instructor lectures and weekly guest speakers. Coursework includes homework and laboratory assignments, an exam, and a research-oriented project. Directed toward graduate students and advanced undergraduates in engineering and computer science; no medical background required. Prerequisites: dynamic systems and MATLAB programming. Suggested experience with C/C++ programming, feedback control design, and linear systems. Cannot be taken concurrently with CS 571.

ME 330. Advanced Kinematics. 3 Units.

Kinematics from mathematical viewpoints. Introduction to algebraic geometry of point, line, and plane elements. Emphasis is on basic theories which have potential application to mechanical linkages, computational geometry, and robotics.

ME 331A. Advanced Dynamics & Computation. 3 Units.

Newton, Euler, momentum, and road-map methods and computational tools for 3-D force and motion analysis of multibody systems. Power, work, and energy. Numerical solutions (e.g., MATLAB, etc.) of nonlinear algebraic and differential equations governing the static and dynamic behavior of multiple degree of freedom systems.

ME 331B. Advanced Dynamics, Simulation & Control. 3 Units.

Advanced methods and computational tools for the efficient formulation of equations of motion for multibody systems. D'Alembert principle. Power, work, and energy. Kane's and Lagrange's method. Computed torque control. Systems with constraints. Quaternions. Numerical solutions (e.g., MATLAB, etc.) of nonlinear algebraic and differential equations governing the behavior of multiple degree of freedom systems. Team-based computational multi-body lab project (inclusion of feed-forward control optional).

ME 332. Introduction to Computational Mechanics. 3 Units.

Provides an introductory overview of modern computational methods for problems arising primarily in mechanics of solids and is intended for students from various engineering disciplines. The course reviews the basic theory of linear solid mechanics and introduces students to the important concept of variational forms, including the principle of minimum potential energy and the principles of virtual work. Specific model problems that will be considered include deformation of bars, beams and membranes, plates, and problems in plane elasticity (plane stress, plane strain, axisymmetric elasticity). The variational forms of these problems are used as the starting point for developing the finite element method (FEM) and boundary element method (BEM) approaches; providing an important connection between mechanics and computational methods.

Same as: CME 232

ME 333. Mechanics. 3 Units.

Goal is a common basis for advanced mechanics courses. Introduction to variational calculus. Formulation of the governing equations from a Lagrangian perspective for finite and infinite dimensional mechanical systems. Examples include systems of particles and linear elastic solids. Introduction to tensors. Definition and interpretation of Cauchy stress tensor.

ME 333A. Mechanics - Fundamentals and Lagrangian Mechanics. 3 Units.

Goal is a common basis for advanced mechanics courses. Introduction to variational calculus. Formulation of the governing equations from a Lagrangian perspective for finite and infinite dimensional mechanical systems. Examples include systems of particles and linear elastic solids. Introduction to tensors. Definition and interpretation of Cauchy stress tensor.

ME 333B. Mechanics - Elasticity and Inelasticity. 3 Units.

Introduction to the theories of elasticity, plasticity and fracture and their applications. Elasticity: Definition of stress, strain, and elastic energy; equilibrium and compatibility conditions; and formulation of boundary value problems. Stress function approach to solve 2D elasticity problems and Greenacirc;##s function approach in 3D. Applications to contact and crack. Plasticity: Yield surface, associative flow rule, strain hardening models, crystal plasticity models. Applications to plastic bending, torsion and pressure vessels. Fracture: Linear elastic fracture mechanics, J-integral, Dugdale-Barrenblatt crack model. Applications to brittle fracture and fatigue crack growth. Computer programming in Matlab is used to aid analytic derivation and numerical solutions.

ME 333C. Mechanics - Continuum Mechanics. 3 Units.

Introduction to linear and nonlinear continuum mechanics of solids. Introduction to tensor algebra and tensor analysis. Kinematics of motion. Balance equations of mass, linear and angular momentum, energy, and entropy. Constitutive equations of isotropic and anisotropic hyperelastic solids. Introduction to numerical solution techniques.

ME 334. MECHANICS OF THE BRAIN. 3 Units.

Understanding the role of mechanics in brain development, physiology, and pathology. Mechanics of brain cells: neurons, mechanobiology, mechanotransduction. Mechanics of brain tissue: experimental testing, constitutive modeling, computational modeling. Mechanics of brain development: gyrification, cortical folding, axon elongation, lissencephaly, polymicrogyria. Mechanics of traumatic brain injury: high impact loading, neural injury. Mechanics of brain tumors, brain cancer, tumor growth, altered cytoskeletal mechanics. Mechanics of neurological disorders: autism, dementia, schizophrenia. Mechanics of brain surgery.

ME 335A. Finite Element Analysis. 3 Units.

Fundamental concepts and techniques of primal finite element methods. Method of weighted residuals, Galerkin's method and variational equations. Linear elliptic boundary value problems in one, two and three space dimensions; applications in structural, solid and fluid mechanics and heat transfer. Properties of standard element families and numerically integrated elements. Implementation of the finite element method using Matlab, assembly of equations, and element routines. Lagrange multiplier and penalty methods for treatment of constraints. The mathematical theory of finite elements.

ME 335B. Finite Element Analysis. 3 Units.

Finite element methods for linear dynamic analysis. Eigenvalue, parabolic, and hyperbolic problems. Mathematical properties of semi-discrete (t-continuous) Galerkin approximations. Modal decomposition and direct spectral truncation techniques. Stability, consistency, convergence, and accuracy of ordinary differential equation solvers. Asymptotic stability, over-shoot, and conservation laws for discrete algorithms. Mass reduction. Applications in heat conduction, structural vibrations, and elastic wave propagation. Computer implementation of finite element methods in linear dynamics. Implicit, explicit, and implicit-explicit algorithms and code architectures.

ME 335C. Finite Element Analysis. 3 Units.

Newton's method for nonlinear problems; convergence, limit points and bifurcation; consistent linearization of nonlinear variational forms by directional derivative; tangent operator and residual vector; variational formulation and finite element discretization of nonlinear boundary value problems (e.g. nonlinear heat equation, nonlinear elasticity); enhancements of Newton's method: line-search techniques, quasi-Newton and arc-length methods.

ME 337. Mechanics of Growth. 3 Units.

Introduction to continuum theory and computational simulation of living matter. Kinematics of finite growth. Balance equations in open system thermodynamics. Constitutive equations for living systems. Custom-designed finite element solution strategies. Analytical solutions for simple model problems. Numerical solutions for clinically relevant problems such as: bone remodeling; wound healing; tumor growth; atherosclerosis; heart failure; tissue expansion; and high performance training.

ME 338. Continuum Mechanics. 3 Units.

Linear and nonlinear continuum mechanics for solids. Introduction to tensor algebra and tensor analysis. Kinematics of motion. Balance equations of mass, linear and angular momentum, energy, and entropy. Constitutive equations of isotropic and anisotropic hyperelasticity. Recommended as prerequisite for Finite Element Methods.

ME 338B. Continuum Mechanics. 3 Units.

Constitutive theory; equilibrium constitutive relations; material frame indifference and material symmetry; finite elasticity; formulation of the boundary value problem; linearization and well-posedness; symmetries and configurational forces; numerical considerations.

ME 339. Introduction to parallel computing using MPI, openMP, and CUDA. 3 Units.

This class will give hands on experience with programming multicore processors, graphics processing units (GPU), and parallel computers. Focus will be on the message passing interface (MPI, parallel clusters) and the compute unified device architecture (CUDA, GPU). Topics will include: network topologies, modeling communication times, collective communication operations, parallel efficiency, MPI, dense linear algebra using MPI. Symmetric multiprocessing (SMP), pthreads, openMP. CUDA, combining MPI and CUDA, dense linear algebra using CUDA, sort, reduce and scan using CUDA. Pre-requisites include: C programming language and numerical algorithms (solution of differential equations, linear algebra, Fourier transforms). Same as: CME 213

ME 340. Theory and Applications of Elasticity. 3 Units.

This course provides an introduction to the elasticity theory and its application to material structures at microscale. The basic theory includes the definition of stress, strain and elastic energy; equilibrium and compatibility conditions; and the formulation of boundary value problems. We will mainly discuss the stress function method to solve 2D problems and will briefly discuss the Green's function approach for 3D problems. The theory and solution methods are then applied to contact problems as well as microscopic defects in solids, such as voids, inclusions, cracks, and dislocations. Computer programming in Matlab is used to aid analytic derivation and numerical solutions of elasticity problems.

ME 342. Theory and Application of Inelasticity. 3 Units.

Theories of plasticity and fracture phenomena from both phenomenological and micromechanical viewpoints. Yield surface, flow rules, strain hardening models, and applications to creep. Plastic zone near crack tip. Linear fracture mechanics and other criteria for crack initiation and growth. Application to fatigue. Classical analytic solutions will be discussed together with numerical solutions of plane elastoplastic problems by Matlab.

ME 342A. Mechanobiology and Biofabrication Methods. 3 Units.

Review of current cell mechanobiology topics and methods for controlling and assessing the biomechanics of living systems. Practice and theory of design and fabrication of devices for cell mechanobiology. Limited enrollment. NOTE: Compressed schedule starts 7/21 with Tu/Th lecture 10-12 in Weeks 1 and 3, and labs 9-5 (with lunch break) in Weeks 2 and 4.

ME 342D. MEMS Fabrication/Projects. 1-3 Unit.

Emphasis is on process planning, in process testing, nanofabrication training, exposure to MEMS industry applications. Prerequisite: ENGR 341.

ME 345. Fatigue Design and Analysis. 3 Units.

The mechanism and occurrences of fatigue in service. Methods for predicting fatigue life and for protecting against premature fatigue failure. Use of elastic stress and inelastic strain analyses to predict crack initiation life. Use of linear elastic fracture mechanics to predict crack propagation life. Effects of stress concentrations, manufacturing processes, load sequence, irregular loading, multi-axial loading. Subject is treated from the viewpoints of the engineer seeking up-to-date methods of life prediction and the researcher interested in improving understanding of fatigue behavior. Prerequisite: undergraduate mechanics of materials.

ME 346A. Introduction to Statistical Mechanics. 3 Units.

The main purpose of this course is to provide students with enough statistical mechanics background to the Molecular Simulations classes (ME 346B,C), including the fundamental concepts such as ensemble, entropy, and free energy, etc. The main theme of this course is how the laws at the macroscale (thermodynamics) can be obtained by analyzing the spontaneous fluctuations at the microscale (dynamics of molecules). Topics include thermodynamics, probability theory, information entropy, statistical ensembles, phase transition and phase equilibrium. Recommended: PHYSICS 110 or equivalent.

ME 346B. Introduction to Molecular Simulations. 3 Units.

Algorithms of molecular simulations and underlying theories. Molecular dynamics, time integrators, modeling thermodynamic ensembles (NPT, NVT), free energy, constraints. Monte Carlo simulations, parallel tempering. Stochastic equations, Langevin and Brownian dynamics. Applications in solids, liquids, and biomolecules (proteins). Programming in Matlab.

ME 346C. Advanced Techniques for Molecular Simulations. 3 Units.

Advanced methods for computer simulations of solids and molecules. Methods for long-range force calculation, including Ewald methods and fast multipole method. Methods for free energy calculation, such as thermodynamic integration. Methods for predicting rates of rare events (e.g. nucleation), including nudged elastic band method and umbrella sampling method. Students will work on projects in teams.

ME 347. Mathematical Theory of Dislocations. 3 Units.

The mathematical theory of straight and curvilinear dislocations in linear elastic solids. Stress fields, energies, and Peach-Koehler forces associated with these line imperfections. Anisotropic effects, Green's function methods, and the geometrical techniques of Brown and Indenbom-Orlov for computing dislocation fields and for studying dislocation interactions. Continuously distributed dislocations and cracks and inclusions.

ME 348. Experimental Stress Analysis. 3 Units.

Theory and applications of photoelasticity, strain gages, and holographic interferometry. Comparison of test results with theoretical predictions of stress and strain. Discussion of other methods of stress and strain determination (optical fiber strain sensors, acoustoelasticity, thermoelasticity, brittle coating, Moire interferometry, residual stress determination). Six labs plus mini-project. Limited enrollment. Lab fee.

ME 349. Variational Methods in Elasticity and Plate Theory. 3 Units.

An introduction to variational calculus methods and their applications to the theories of elasticity and plates.

ME 350A. Design @ the Intersection of Science, Technology, and Entrepreneurship. 1 Unit.

This 1 credit class is for graduate students who are passionate about turning their research into a product or service. This is a chance to explore the potential impact of your work beyond your lab or research group. We are looking for students from the sciences, engineering, or mathematics, or students who have business acumen or start-up experience focused on technology driven companies. If you want to get out of your lab, away from your machine, and start to design your future come join us. The class will begin your journey from research to product conceptualization and user centered design through exercises and group activities. We meet once a week over the quarter in 10 self-contained 2 hour workshops where students will focus on their own work as well as explore the practical applications of fellow students' ideas, experience team formation and collaboration, and begin to explore product and service design. Aside from class time you will need to commit up to one hour per week outside the class on customer and market exploration. Advisors from industry and academia will mentor student teams. The class will be structured for individuals with team formation optional.

ME 351A. Fluid Mechanics. 3 Units.

Exact and approximate analysis of fluid flow covering kinematics, global and differential equations of mass, momentum, and energy conservation. Forces and stresses in fluids. Euler's equations and the Bernoulli theorem applied to inviscid flows. Vorticity dynamics. Topics in irrotational flow: stream function and velocity potential for exact and approximate solutions; superposition of solutions; complex potential function; circulation and lift. Some boundary layer concepts.

ME 351B. Fluid Mechanics. 3 Units.

Laminar viscous fluid flow. Governing equations, boundary conditions, and constitutive laws. Exact solutions for parallel flows. Creeping flow limit, lubrication theory, and boundary layer theory including free-shear layers and approximate methods of solution; boundary layer separation. Introduction to stability theory and transition to turbulence, and turbulent boundary layers. Prerequisite: 351A.

ME 352A. Radiative Heat Transfer. 3 Units.

The fundamentals of thermal radiation heat transfer; blackbody radiation laws; radiative properties of non-black surfaces; analysis of radiative exchange between surfaces and in enclosures; combined radiation, conduction, and convection; radiative transfer in absorbing, emitting, and scattering media. Advanced material for students with interests in heat transfer, as applied in high-temperature energy conversion systems. Take 352B,C for depth in heat transfer. Prerequisites: graduate standing and undergraduate course in heat transfer. Recommended: computer skills.

ME 352B. Fundamentals of Heat Conduction. 3 Units.

Physical description of heat conduction in solids, liquids, and gases. The heat diffusion equation and its solution using analytical and numerical techniques. Data and microscopic models for the thermal conductivity of solids, liquids, and gases, and for the thermal resistance at solid-solid and solid-liquid boundaries. Introduction to the kinetic theory of heat transport, focusing on applications for composite materials, semiconductor devices, micromachined sensors and actuators, and rarefied gases. Prerequisite: consent of instructor.

ME 352C. Convective Heat Transfer. 3 Units.

Prediction of heat and mass transfer rates based on analytical and numerical solutions of the governing partial differential equations. Heat transfer in fully developed pipe and channel flow, pipe entrance flow, laminar boundary layers, and turbulent boundary layers. Superposition methods for handling non-uniform wall boundary conditions. Approximate models for turbulent flows. Comparison of exact and approximate analyses to modern experimental results. General introduction to heat transfer in complex flows. Prerequisite: 351B or equivalent.

ME 354. Experimental Methods in Fluid Mechanics. 4 Units.

Experimental methods associated with the interfacing of laboratory instruments, experimental control, sampling strategies, data analysis, and introductory image processing. Instrumentation including point-wise anemometers and particle image tracking systems. Lab. Prerequisites: previous experience with computer programming and consent of instructor. Limited enrollment.

ME 355. Compressible Flow. 3 Units.

Topics include quasi-one-dimensional isentropic flow in variable area ducts, normal shock waves, oblique shock and expansion waves, flow in ducts with friction and heat transfer, unsteady one-dimensional flow, and steady two-dimensional supersonic flow.

ME 357. Turbine and Internal Combustion Engines. 3 Units.

Principles of design analysis for aircraft gas turbines and automotive piston engines. Analysis for aircraft engines performed for Airbus A380 type aircraft. Design parameters determined considering aircraft aerodynamics, gas turbine thermodynamics, compressible flow physics, and material limitations. Additional topics include characteristics of main engine components, off-design analysis, and component matching. Performance of automotive piston engines including novel engine concepts in terms of engine thermodynamics, intake and exhaust flows, and in-cylinder flow. Same as: ME 257

ME 358. Heat Transfer in Microdevices. 3 Units.

Application-driven introduction to the thermal design of electronic circuits, sensors, and actuators that have dimensions comparable to or smaller than one micrometer. The impact of thin-layer boundaries on thermal conduction and radiation. Convection in microchannels and microscopic heat pipes. Thermal property measurements for microdevices. Emphasis is on Si and GaAs semiconductor devices and layers of unusual, technically-promising materials such as chemical-vapor-deposited (CVD) diamond. Final project based on student research interests. Prerequisite: consent of instructor.

ME 359. ReDesigning the Neonatal ICU. 3 Units.

ReDesigning the Neonatal ICU will inform students about current challenges in the NICU environment through expert speakers, literature, CAPE simulations and field trips. Simultaneously, we will be studying the users: their environment, their behavior, and their emotions. Our goal is to identify needs that will lead to product, system or service innovation that will improve safety and quality of care. Student groups will have structured access to NICU clinicians at Lucile Packard Children's Hospital, as well as parents of preterm infants for conducting ethnography. Opportunities for direct observation in the hospital will be planned as well. Physical prototypes and/or scenarios can be tested and presented at CAPE's simulation lab in order to give students a realistic environment in which to evaluate and present their ideas. For more information, and to see a confirmed list of guest speakers for this class, please visit our class website: <http://www.redesignhealthcare.org/redesigning-the-neonatal-icu/>.

ME 359A. Advanced Design and Engineering of Space Systems I. 4 Units.

The application of advanced theory and concepts to the development of spacecraft and missile subsystems; taught by experts in their fields. Practical aspects of design and integration. Mission analysis, systems design and verification, radiation and space environments, orbital mechanics, space propulsion, electrical power and avionics subsystems, payload communications, and attitude control. Subsystem-oriented design problems focused around a mission to be completed in groups. Tours of Lockheed Martin facilities. Limited enrollment. Prerequisites: undergraduate degree in related engineering field or consent of instructor.

ME 359B. Advanced Design and Engineering of Space Systems II. 4 Units.

Continuation of 359A. Topics include aerospace materials, mechanical environments, structural analysis and design, finite element analysis, mechanisms, thermal control, probability and statistics. Tours of Lockheed Martin facilities. Limited enrollment. Prerequisites: undergraduate degree in related field, or consent of instructor.

ME 361. Turbulence. 3 Units.

The nature of turbulent flows, statistical and spectral description of turbulence, coherent structures, spatial and temporal scales of turbulent flows. Averaging, two-point correlations and governing equations. Reynolds averaged equations and stresses. Free shear flows, turbulent jet, turbulent kinetic energy and kinetic energy dissipation, and kinetic energy budget. Kolmogorov's hypothesis and energy spectrum. Wall bounded flows, viscous scales, and law of the wall. Turbulence closure modeling for Reynolds averaged Navier Stokes equations. Direct and large eddy simulation of turbulent flows. Subgrid scale modeling.

ME 362A. Physical Gas Dynamics. 3 Units.

Concepts and techniques for description of high-temperature and chemically reacting gases from a molecular point of view. Introductory kinetic theory, chemical thermodynamics, and statistical mechanics as applied to properties of gases and gas mixtures. Transport and thermodynamic properties, law of mass action, and equilibrium chemical composition. Maxwellian and Boltzmann distributions of velocity and molecular energy. Examples and applications from areas of current interest such as combustion and materials processing.

ME 362B. Nonequilibrium Processes in High-Temperature Gases. 3 Units.

Chemical kinetics and energy transfer in high-temperature gases. Collision theory, transition state theory, and unimolecular reaction theory. Prerequisite: 362A or consent of instructor.

ME 363. Partially Ionized Plasmas and Gas Discharges. 3 Units.

Introduction to partially ionized gases and the nature of gas discharges. Topics: the fundamentals of plasma physics emphasizing collisional and radiative processes, electron and ion transport, ohmic dissipation, oscillations and waves, interaction of electromagnetic waves with plasmas. Applications: plasma diagnostics, plasma propulsion and materials processing. Prerequisite: 362A or consent of instructor.

ME 364. Optical Diagnostics and Spectroscopy. 3 Units.

The spectroscopy of gases and laser-based diagnostic techniques for measurements of species concentrations, temperature, density, and other flow field properties. Topics: electronic, vibrational, and rotational transitions; spectral lineshapes and broadening mechanisms; absorption, fluorescence, Rayleigh and Raman scattering methods; collisional quenching. Prerequisite: 362A or equivalent.

ME 366. Creative Gym: A Design Thinking Skills Studio. 1 Unit.

Build your creative confidence and sharpen your design thinking skills. Train your intuition and expand the design context from which you operate every day. This experimental studio will introduce d.school students to fast-paced experiential exercises that lay the mental and physical foundation for a potent bias toward action, and a wider knowledge of the personal skills that expert design thinkers utilize in all phases of their process. Recent research based on this course curriculum show that performing these class activities will expand your creative capacity in statistically significant ways.

ME 367. Optical Diagnostics and Spectroscopy Laboratory. 4 Units.

Principles, procedures, and instrumentation associated with optical measurements in gases and plasmas. Absorption, fluorescence and emission, and light-scattering methods. Measurements of temperature, species concentration, and molecular properties. Lab. Enrollment limited to 16. Prerequisite: 362A or 364.

ME 368. d.Leadership: Design Leadership in Context. 1-3 Unit.

d.Leadership is a course that teaches the coaching and leadership skills needed to drive good design process in groups. d.leaders will work on real projects driving design projects within organizations, and gain real world skills as they experiment with their leadership style while coaching innovation projects. Take this course if you are inspired by past design classes and want skills to lead design projects beyond Stanford. Preference given to students who have taken other Design Group or d.school classes. Admission by application. See dschool.stanford.edu/classes for more information. Same as: MSE 489

ME 368A. Biodesign Innovation: Needs Finding and Concept Creation. 4 Units.

This is the first quarter of a two-quarter course series (OIT 384/OIT 385). In this course, students learn how to develop comprehensive solutions (most commonly medical devices) to some of the most significant medical problems. The first quarter includes an introduction to needs finding methods, brainstorming and concept creation. Students learn strategies for understanding and interpreting clinical needs, researching literature and searching patents. Working in small entrepreneurial multidisciplinary teams, students gain exposure to clinical and scientific literature review, techniques of intellectual property analysis and feasibility, basic prototyping and market assessment. Students create, analyze and screen medical technology ideas, and select projects for future development. Final presentations at the end of the winter quarter to a panel of prominent inventors and investors in medical technology provide the impetus for further work in the spring quarter. Course format includes expert guest lecturers (Thu: 4:15 to 6:05 pm), faculty-led practical demonstrations and coaching sessions, and interactive team meetings (Tues: 4:15 to 6:05 pm). Projects from previous years included: prevention of hip fractures in the elderly; methods to accelerate healing after surgery; less invasive techniques for bariatric surgery; point of care diagnostics to improve emergency room efficiency; novel devices to bring specialty-type of care to primary care community doctors. More than 300,000 patients have been treated to date with technologies developed as part of this program and more than thirty venture-backed companies were started by alums of the program. Students must apply and be accepted into the course. The application is available online at <http://biodesign.stanford.edu/bdn/courses/bioe374.jsp>.

Same as: BIOE 374A, MED 272A

ME 368B. Biodesign Innovation: Concept Development and Implementation. 4 Units.

Two-quarter sequence (see OIT384 for complete description of the sequence). The second quarter focuses on how to take a conceptual solution to a medical need forward into development and potential commercialization. Continuing work in teams with engineering and medical colleagues, students will learn the fundamentals of medical device prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing a commercialization route (licensing vs. start-up); marketing, sales and distribution strategies; ethical issues including conflict of interest; fundraising approaches and cash requirements; financial modeling; essentials of developing a business or research plan/canvas; and strategies for assembling a development team. Final project presentations are made to a panel of prominent venture and corporate investors. New students (i.e. students who did not take OIT384 in the winter quarter) may be admitted, depending on team needs. Candidates need to submit an application at <http://biodesign.stanford.edu/bdn/courses/bioe374app.jsp> by March 1.

Same as: BIOE 374B, MED 272B

ME 369. Cracks, Dislocations, and Waves. 3 Units.

The 6-dimensional formalism of A. N. Stroh will be developed to treat two-dimensional problems in elastically anisotropic media. Stress fields of straight dislocations will be developed, from which the elastic fields of line cracks (treated as continuous distributions of straight dislocations) will be obtained along with stress intensity factors and energy release rates. Steady waves including plane waves, Rayleigh waves, and Stoneley waves will be treated along with problems of reflection and refraction of incident plane waves in joined anisotropic half-spaces. Anisotropic boundary element methods will be discussed. Assignments will include both analytical and semi-analytical work as well as simple numerical methods to implement Stroh's formalism. Class notes and readings will be provided.

ME 370A. Energy Systems I: Thermodynamics. 3 Units.

Thermodynamic analysis of energy systems emphasizing systematic methodology for and application of basic principles to generate quantitative understanding. Exergy, mixtures, reacting systems, phase equilibrium, chemical exergy, and modern computational methods for analysis. Prerequisites: undergraduate engineering thermodynamics and computer skills such as Matlab.

ME 370B. Energy Systems II: Modeling and Advanced Concepts. 4 Units.

Development of quantitative device models for complex energy systems, including fuel cells, reformers, combustion engines, and electrolyzers, using thermodynamic and transport analysis. Student groups work on energy systems to develop conceptual understanding, and high-level, quantitative and refined models. Advanced topics in thermodynamics and special topics associated with devices under study. Prerequisite: 370A.

ME 370C. Energy Systems III: Projects. 3-5 Units.

Refinement and calibration of energy system models generated in ME 370B carrying the models to maturity and completion. Integration of device models into a larger model of energy systems. Prerequisites: 370A,B, consent of instructor.

ME 371. Combustion Fundamentals. 3 Units.

Heat of reaction, adiabatic flame temperature, and chemical composition of products of combustion; kinetics of combustion and pollutant formation reactions; conservation equations for multi-component reacting flows; propagation of laminar premixed flames and detonations. Prerequisite: 362A or 370A, or consent of instructor.

ME 372. Combustion Applications. 3 Units.

The role of chemical and physical processes in combustion; ignition, flammability, and quenching of combustible gas mixtures; premixed turbulent flames; laminar and turbulent diffusion flames; combustion of fuel droplets and sprays. Prerequisite: 371.

ME 373. Nanomaterials Synthesis and Applications for Mechanical Engineers. 3 Units.

This course provides an introduction to both combustion synthesis of functional nanomaterials and nanotechnology. The first part of the course will introduce basic principles, synthesis/fabrication techniques and application of nanoscience and nanotechnology. The second part of the course will discuss combustion synthesis of nanostructures in zero-, one- two- and three- dimensions, their characterization methods, physical and chemical properties, and applications in energy conversion systems.

ME 374. Dynamics and Kinetics of Nanoparticles. 3 Units.

Part 1: Thermodynamics, transport theories and properties, aerosol dynamics and reaction kinetics of nanoparticles in fluids. Nucleation, gas kinetic theory of nanoparticles, the Smoluchowski equation, gas-surface reactions, diffusion, thermophoresis, conservation equations and useful solutions. Part 2: Introduction to soot formation, nanoparticles in reacting flows, particle transport and kinetics in flames, atmospheric heterogeneous reactions, and nanocatalysis.

ME 375A. StoryViz: COMMUNICATION REDESIGNED. 2-3 Units.

StoryViz is about creating authentic & compelling communication in many media: this year's topics include sketching, video, visual design & performance. Fantastic guests and a bevy of assignments will prepare students to communicate their work and ideas genuinely, concisely, and with a keen sense of wit. Limited enrollment; application required; see <http://dschool.stanford.edu/classes>. Please see notes.

ME 375B. Institute of Design Project 2. 1-6 Unit.

Hands-on, project-based series for d.school students emphasizing innovation and design thinking. Resolving constraints among technical, business, and human concerns to create solutions that benefit society. Real-world design projects in areas such as K-12 education, social entrepreneurship, business prototyping, sustainability, and health and wellness. Design reviews and final course presentations. Industry and adviser interaction. Limited enrollment; application required; see <http://dschool.stanford.edu/classes>.

ME 375C. Institute of Design Project 3. 1-6 Unit.

Hands-on, project-based series for d.school students emphasizing innovation and design thinking. Resolving constraints among technical, business, and human concerns to create solutions that benefit society. Real-world design projects in areas such as K-12 education, social entrepreneurship, business prototyping, sustainability, and health and wellness. Design reviews and final course presentations. Industry and adviser interaction. Limited enrollment; application required; see <http://dschool.stanford.edu/classes>.

ME 376A. Imagining the Future of Learning: SparkTruck - Designing Mobile Interventions for Education. 4 Units.

Created at the d.school last year, SparkTruck has traveled over 15,000 miles across the USA, teaching thousands of kids how to build stuff and unleash their creativity. In this class, students will explore the potential of a mobile platform for affecting change in the educational ecosystem. Topics will include introductions to the design process, modern prototyping tools, and the complex education ecosystem. Students will work in teams in this project-based class, and an emphasis will be placed on real-world prototyping through hands-on field work in local schools. Interested and qualified students will have the opportunity to embark on a cross-country road trip in the SparkTruck this summer. Open to all graduate students and well-qualified undergrads of any major. Enrollment is limited. Apply at www.sparktruck.org/apply. Same as: EDUC 333B

ME 376C. Institute of Design Project 2. 1-6 Unit.

Hands-on, project-based series for d.school students. Design thinking, design processes, innovation methodologies, need finding, human factors, rapid prototyping, team dynamics, negotiation, and project management. Focus is on resolving constraints among technical, business, and human concerns to create solutions that benefit society. Real-world design projects. Weekly design reviews, final course presentations. Industry and adviser interaction. Limited enrollment; application required; see <http://dschool.stanford.edu/classes>.

ME 377. Design Thinking Studio: Experiences in Innovation and Design. 3-4 Units.

Design Thinking Studio is an immersive introduction to design thinking. You will engage in the real world, with your eyes, with your mind, with your hands, and with classmates to learn, practice, and use the tools and attitudes of design. The fundamental goal of the class is to cultivate the creative, synthetic, and divergent thinking of students. This is a project-based class, asking students to take on new behaviors of work: collaboration, experimentation, empathizing, visualization, craft and inference. Field work and collaboration with teammates are required and critical for student success. Admission by application. See dschool.stanford.edu/classes for more information.

ME 378. Tell, Make, Engage: Action Stories for Entrepreneurship. 1-3 Unit.

Individual storytelling action and reflective observations gives the course an evolving framework of evaluative methods, formed and reformed by collaborative development within the class. Stories attached to an idea or a discovery, are considered through iterative narrative work and small group research projects. This course will use qualitative and quantitative methods for story engagement, assessment, and class determined research projects with practice exercises, artifacts, short papers and presentations.

ME 379. Fail Faster. 1 Unit.

Fail Faster will dive deeply into one of design thinking's key tenets: Fail early, fail often. Students will explore ways to: [1] become comfortable with uncertainty, [2] develop tools to navigate situations of failure, and [3] learn to turn failures into opportunities. This exercised-based workshop will examine the physiological impact of failure and practice the psychological traits and the power of resilience through hands-on activities. Participants will acquire techniques to help them navigate, bounce back, grow and even flourish in the face of their failures.

ME 381. Orthopaedic Bioengineering. 3 Units.

Engineering approaches applied to the musculoskeletal system in the context of surgical and medical care. Fundamental anatomy and physiology. Material and structural characteristics of hard and soft connective tissues and organ systems, and the role of mechanics in normal development and pathogenesis. Engineering methods used in the evaluation and planning of orthopaedic procedures, surgery, and devices.

Same as: BIOE 381

ME 385. Tissue Engineering Lab. 1-2 Unit.

Hands-on experience in the fabrication of living engineered tissues. Techniques include sterile technique, culture of mammalian cells, creation of cell-seeded scaffolds, and the effects of mechanical loading on the metabolism of living engineered tissues. Theory, background, and practical demonstration for each technique. Lab.

ME 386. Neuromuscular Biomechanics. 3 Units.

The interplay between mechanics and neural control of movement. State of the art assessment through a review of classic and recent journal articles. Emphasis is on the application of dynamics and control to the design of assistive technology for persons with movement disorders.

Same as: BIOE 386

ME 387. Soft Tissue Mechanics. 3 Units.

Structure/function relationships and mechanical properties of soft tissues, including nonlinear elasticity, viscoelasticity, and poroelasticity.

ME 388. Transport Modeling for Biological Systems. 3 Units.

Introduction to electric fields, fluid flows, transport phenomena and their application to biological systems. Maxwell's equations, electrostatics, electro-chemical-mechanical driving forces in physiological systems. Ionic diffusion in electrolytes and membrane transport. Fluid and solid continua theory for porous, hydrated biological tissues. Applications include ionic and molecular transport in tissues and cells, electrophoresis, electromechanical and physicochemical interactions in cells and the extracellular matrix of connective tissue.

ME 389. Biomechanical Research Symposium. 1 Unit.

Guest speakers present contemporary research on experimental and theoretical aspects of biomechanical engineering and bioengineering. May be repeated for credit.

ME 390. Thermosciences Research Project Seminar. 1 Unit.

Review of work in a particular research program and presentations of other related work.

ME 390A. High Temperature Gasdynamics Laboratory Research Project Seminar. 1 Unit.

Review of work in a particular research program and presentations of other related work.

ME 391. Engineering Problems. 1-10 Unit.

Directed study for graduate engineering students on subjects of mutual interest to student and staff member. May be used to prepare for experimental research during a later quarter under 392. Faculty sponsor required.

ME 392. Experimental Investigation of Engineering Problems. 1-10 Unit.

Graduate engineering students undertake experimental investigation under guidance of staff member. Previous work under 391 may be required to provide background for experimental program. Faculty sponsor required.

ME 393. Topics in Biologically Inspired or Human Interactive Robotics. 1 Unit.

Application of observations from human and animal physiology to robotic systems. Force control of motion including manipulation, haptics, and locomotion. Weekly literature review forum led by student. May be repeated for credit. (Cutkosky, Waldron, Niemeyer).

ME 395. Seminar in Solid Mechanics. 1 Unit.

Required of Ph.D. candidates in solid mechanics. Guest speakers present research topics related to mechanics theory, computational methods, and applications in science and engineering. May be repeated for credit. See <http://mc.stanford.edu>.

ME 396. Design and Manufacturing Forum. 1 Unit.

Invited speakers address issues of interest to design and manufacturing engineering and business students. Sponsored by the Product Realization Laboratory at Stanford.

Same as: ME 196

ME 397. Design Theory and Methodology Seminar. 1-3 Unit.

What do designers do when they do design? How can their performance be improved? Topics change each quarter. May be repeated for credit.

ME 399. Fuel Cell Seminar. 1 Unit.

Interdisciplinary research in engineering, chemistry, and physics. Talks on fundamentals of fuel cells by speakers from Stanford, other academic and research institutions, and industry. The potential to provide high efficiency and zero emissions energy conversion for transportation and electrical power generation.

ME 400. Thesis. 2-15 Units.

Investigation of some engineering problems. Required of Engineer degree candidates.

Same as: Engineer Degree

ME 405. Asymptotic Methods in Computational Engineering. 3 Units.
This course is not a standard teaching of asymptotic methods as thought in the applied math programs. Nor does it involve such elaborate algebra and analytical derivations. Instead, the class relies on students' numerical programming skills and introduces improvements on numerical methods using standard asymptotic and scaling ideas. The main objective of the course is to bring physical insight into numerical programming. Majority of the problems to be explored involve one- and two-dimensional transient partial differential equations. Topics include: 1-Review of numerical discretization and numerical stability, 2-Implicit versus explicit methods, 3-Introduction to regular and singular perturbation problems, 4-Method of matched asymptotic expansions, 5-Stationary thin interfaces: boundary layers, Debye layers, 6-Moving thin interfaces: shocks, phase interfaces, 7-Reaction-diffusion problems, 8-Directional equilibrium and lubrication theory.

ME 406. Turbulence Physics and Modeling Using Numerical Simulation Data. 2 Units.
Prerequisite: consent of instructor.

ME 408. Spectral Methods in Computational Physics. 3 Units.
Data analysis, spectra and correlations, sampling theorem, nonperiodic data, and windowing; spectral methods for numerical solution of partial differential equations; accuracy and computational cost; fast Fourier transform, Galerkin, collocation, and Tau methods; spectral and pseudospectral methods based on Fourier series and eigenfunctions of singular Sturm-Liouville problems; Chebyshev, Legendre, and Laguerre representations; convergence of eigenfunction expansions; discontinuities and Gibbs phenomenon; aliasing errors and control; efficient implementation of spectral methods; spectral methods for complicated domains; time differencing and numerical stability.
Same as: CME 322

ME 409. Advanced Design Studies in Product Realization. 3-5 Units.
Advanced Design Studies in Product Realization provides advanced engineering design graduate students with the technical and intellectual resources necessary to produce an unambiguously professional-quality project in an area of individual specialization. Emphasis is on integrated design and manufacture of a project in a diverse range of processes and materials. Students will meet bi-weekly to receive collegial support and critique from the instructor, interdisciplinary faculty mentor team, practitioners in the field, and students enrolled in the course. Prerequisites: Students will be accepted into the program on the basis of a portfolio review and a brief essay describing the proposed project. Students will be asked to name a faculty member who can provide a reference upon request. Instructor consent required.

ME 410A. Introduction Foresight and Innovation. 3 Units.
Learn how to develop inventions built on emerging cognitive technologies, with a long-range vision (10+ years). This course provides an intensive and hands-on approach to multiple engineering foresight strategies and tools that show you how to plan and develop radical innovations. Students build a cognitive technology prototype and business case. Three quarter sequence. Prerequisite: consent of instructor.

ME 410B. Advanced Foresight and Innovation. 3 Units.
Continuation of ME410A. Students will continue developing their invention, integrate additional engineering foresight tools and theories, and develop an intrinsic innovation mindset. Ongoing discussion of industry examples and contemporary events demonstrate foresight principals and engineering leadership in action. Prerequisite: consent of instructor.

ME 410C. Advanced Foresight and Innovation. 1 Unit.
Continuation of ME410B. Students will continue developing their invention, integrate additional engineering foresight tools and theories, and develop an intrinsic innovation mindset. Ongoing discussion of industry examples and contemporary events that demonstrate foresight principles and engineering leadership in action. Prerequisite: consent of instructor.

ME 410X. Advanced Engineering Foresight- Projects. 1 Unit.
Participate in foresight engineering research project focused on the development of "cognitive" products. Offered through Stanford's Foresight Thinking approach. Hands-on engineering foresight and technology leadership become part of the student's portfolio. May be repeated for credit. Limited enrollment. Prerequisite: consent of instructor.

ME 411. Advanced Topics in Computational Solid Mechanics. 3 Units.
Discussion of the use of computational simulation methods for analyzing and optimizing production processes and for developing new products, based on real industrial applications in the metal forming industry. Brief review of linear and nonlinear continuum mechanics and the use of finite element methods to model solid mechanics problems, constitutive relations for metals, coupled thermo-elasto-plastic (viscoplastic) problems, modeling metal production processes: bulk metal forming processes using rigid/viscoplastic material models, application examples: hot rolling of plates and the Mannesmann piercing processes and modeling the service behavior of steel pipes. Prerequisites: ME 338A, ME 335A,B,C, or consent of instructor.

ME 412. Engineering Functional Analysis and Finite Elements. 3 Units.
Concepts in functional analysis to understand models and methods used in simulation and design. Topology, measure, and integration theory to introduce Sobolev spaces. Convergence analysis of finite elements for the generalized Poisson problem. Extensions to convection-diffusion-reaction equations and elasticity. Upwinding. Mixed methods and LBB conditions. Analysis of nonlinear and evolution problems. Prerequisites: 335A,B, CME 200, CME 204, or consent of instructor. Recommended: 333, MATH 171. Same as: CME 356

ME 413. Quantum Confinement Structures: Physics and Fabrication. 3 Units.
Quantum mechanics principles and the thermodynamics of confinement structures. Focus is on potential applications such as solar cells and catalysis. Student presentations. Lab demonstrations. Prerequisite: background in quantum mechanics and statistical thermodynamics.

ME 414. Solid State Physics for Mechanical Engineering Experiments. 3 Units.
Introductory overview of principles of statistical mechanics, quantum mechanics and solid-state physics. Provides graduate Mechanical Engineering students with the understanding needed to work on devices or technologies which rely on solid-state physics. (Alternate years, not offered summer 2012).

ME 417. Total Product Integration Engineering. 4 Units.
For students aspiring to be product development executives and leaders in research and education. Advanced methods and tools beyond the material covered in ME 317: quality design across global supply chain, design for robustness, product development risk management, Monte Carlo simulation and product financial analysis, and decision analysis. Small teams or individuals conduct a practical project that produces a case study or enhancement to existing development methods and tools. Enrollment limited to 12. Prerequisites: 317A, B.

ME 420. Applied Electrochemistry at Micro- and Nanoscale. 3 Units.
This class is built around applied electrochemistry with focus on energy conversion and storage. Basic concepts of thermodynamics, electrochemistry, and first principal calculations are presented. Conventional as well as advanced Li battery concepts/systems and their applications will be a main subject area this year. Here intercalation and conversion cathode and anode material families will be introduced. Further conventional electrolyte materials such as carbonate based liquid electrolyte system and advanced solid-state material will be a topic in class. First principle calculations using Vienna Ab-initio Simulation Package (VASP) of some example will be done in class in order to gain fundamental understanding of these materials.

ME 421. European Entrepreneurship and Innovation Thought Leaders Seminar. 1 Unit.

Lessons from real-world experiences and challenges in European startups, corporations, universities, non-profit research institutes and venture finance organizations. Speakers include entrepreneurs, leaders from global technology companies, university researchers, venture capitalists, legal experts, senior policy makers and other guests from selected European countries and regions. Geographic scope encompasses Ireland to Russia, and Scandinavia to the Mediterranean region. Enrollment open to undergraduates and graduates in any school or department at Stanford.

ME 423. D.HEALTH: Design Thinking for Better Health. 3 Units.

In the U.S., 75% of medical expenditures are for illnesses that are predominantly lifestyle related such as type 2 diabetes, arthritis and heart disease. It has been shown as people modify their lifestyles with healthier habits, medical problems can be reduced or avoided and a healthier and happier life achieved. The class employs design thinking in teams while working directly with volunteers in the community to help them achieve their health goals. There is an individual project and a team project each with multiple milestones. Admission by application. See dschool.stanford.edu/classes for more information.

ME 429. COMMERCIAL MEMS DESIGN. 3 Units.

This course, taught by Dr. Gary O'Brien of the Bosch RTC, will provide insight into the issues and challenges in designing MEMS device for commercial and automotive applications. Topics to be covered in the class will include device simulation and design, design of experiments, compensation for cross-wafer and wafer-to-wafer fabrication variations, design for extreme environments, analysis and management of reliability issues including package stress, shock, drift, cost analysis of manufacturing processes, and some discussion of the unique challenges for consumer and automotive customers and markets. Student teams will develop a device design, fabrication process, and manufacturing analysis in response to a specification.

ME 440. Electronic States and Transitions In Quantum Confined Structures. 3 Units.

Summary of selected quantum mechanical concepts with focus on phenomena related to charge separation and transfer. The physics and thermodynamics of excitons described and related to experimental observations. The energy state of electrons as function of confinement size and strength. Presentations include on electron tunneling, measuring the density of electronic states, dielectric behavior of materials, Bose Einstein condensation of quasi particles, and excitons in quantum wells and dots.

ME 450. Advances in Biotechnology. 3 Units.

Guest academic and industrial speakers. Latest developments in fields such as bioenergy, green process technology, production of industrial chemicals from renewable resources, protein pharmaceutical production, industrial enzyme production, stem cell applications, medical diagnostics, and medical imaging. Biotechnology ethics, business and patenting issues, and entrepreneurship in biotechnology.

ME 451A. Advanced Fluid Mechanics Multiphase Flows. 3 Units.

Single particle and multi-particle fluid flow phenomena, mass, momentum and heat transfer, characteristic time and length scales, non-dimensional groups; collection of dispersed-phase elements: instantaneous and averaged descriptions for multiphase flow, Eulerian-Eulerian and Lagrangian-Eulerian statistical representations, mixture theories; models for drag, heat and mass transfer; dilute to dense two-phase flow, granular flows; computer simulation approaches for multiphase flows, emerging research topics. Prerequisites: graduate level fluid mechanics and engineering mathematics, and undergraduate engineering mechanics and thermodynamics.

ME 451B. Advanced Fluid Mechanics Flow Instability. 3 Units.

Waves in fluids: surface waves, internal waves, inertial and acoustic waves, dispersion and group velocity, wave trains, transport due to waves, propagation in slowly varying medium, wave steepening, solitons and solitary waves, shock waves. Instability of fluid motion: dynamical systems, bifurcations, Kelvin-Helmholtz instability, Rayleigh-Benard convection, energy method, global stability, linear stability of parallel flows, necessary and sufficient conditions for stability, viscosity as a destabilizing factor, convective and absolute instability. Focus is on flow instabilities. Prerequisites: graduate courses in compressible and viscous flow.

ME 451C. Advanced Fluid Mechanics. 3 Units.

Compressible flow: governing equations, Crocco-Vazsonyi equation; equations, creation and destruction of vorticity by compressibility effects, shock waves. Modal decomposition of compressible flow, linear and nonlinear modal interactions, interaction of turbulence with shock waves. Energetics of compressible turbulence, effects of compressibility on free-shear flows, turbulent boundary layers, Van Driest transformation, recovery temperature, and shock/boundary layer interaction. Strong Reynolds analogy, modeling compressible turbulent flows. Prerequisites: 355, 361A, or equivalents.

ME 451D. Microhydrodynamics. 3 Units.

Transport phenomena on small-length scales appropriate to applications in microfluidics, complex fluids, and biology. The basic equations of mass, momentum, and energy, derived for incompressible fluids and simplified to the slow-flow limit. Topics: solution techniques utilizing expansions of harmonic and Green's functions; singularity solutions; flows involving rigid particles and fluid droplets; applications to suspensions; lubrication theory for flows in confined geometries; slender body theory; and capillarity and wetting. Prerequisites: 120A,B, 300, or equivalents.

Same as: CHEMENG 310

ME 453A. Finite Element-Based Modeling and Simulation of Linear Fluid/Structure Interaction Problems. 3 Units.

Basic physics behind many fluid/structure interaction phenomena. Finite element-based computational approaches for linear modeling and simulation in the frequency domain. Vibrations of elastic structures. Linearized equations of small movements of inviscid fluids. Sloshing modes. Hydroelastic vibrations. Acoustic cavity modes. Structural-acoustic vibrations. Applications to liquid containers and underwater signatures. Prerequisite: graduate course in the finite element method or consent of instructor.

ME 453B. Computational Fluid Dynamics Based Modeling of Nonlinear Fluid/Structure Interaction Problems. 3 Units.

Basic physics behind many high-speed flow/structure interaction phenomena. Modern computational approaches for nonlinear modeling and simulation in the time domain. Dynamic equilibrium of restrained and unrestrained elastic structures. Corotational formulation for large structural displacements and rotations. Arbitrary Lagrangian-Eulerian description of inviscid and viscous flows. Time-accurate CFD on moving and deforming grids. Discrete geometric conservation laws. Discretization of transmission conditions on non-matching discrete fluid/structure interfaces. Coupled fluid/mesh-motion/structure time integration schemes. Application to divergence, flutter, and buffeting. Prerequisites: graduate course in the finite element method, and in computational fluid dynamics.

ME 455. Complex Fluids and Non-Newtonian Flows. 3 Units.

Definition of a complex liquid and microrheology. Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal. Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor. Same as: CHEMENG 462

ME 457. Fluid Flow in Microdevices. 3 Units.

Physico-chemical hydrodynamics. Creeping flow, electric double layers, and electrochemical transport such as Nernst-Planck equation; hydrodynamics of solutions of charged and uncharged particles. Device applications include microsystems that perform capillary electrophoresis, drug dispensation, and hybridization assays. Emphasis is on bioanalytical applications where electrophoresis, electro-osmosis, and diffusion are important. Prerequisite: consent of instructor.

ME 458. Advanced Topics in Electrokinetics. 3-5 Units.

Electrokinetic theory and electrokinetic separation assays. Electroneutrality approximation and weak electrolyte electrophoresis theory. Capillary zone electrophoresis, field amplified sample stacking, isoelectric focusing, and isotachopheresis. Introduction to general electrohydrodynamics (EHD) theory including the leaky dielectric concept, the Ohmic model formulation, and electrokinetic flow instabilities. Prerequisite: ME 457.

ME 461. Advanced Topics in Turbulence. 3 Units.

Turbulence phenomenology; statistical description and the equations governing the mean flow; fluctuations and their energetics; turbulence closure problem, two-equation turbulence models, and second moment closures; non-local effect of pressure; rapid distortion analysis and effect of shear and compression on turbulence; effect of body forces on turbulent flows; buoyancy-generated turbulence; suppression of turbulence by stratification; turbulent flows of variable density; effect of rotation on homogeneous turbulence; turbulent flows with strong vortices. Prerequisites: 351B and 361A, or consent of instructor.

ME 463. Advanced Topics in Plasma Science and Engineering. 3 Units.

Research areas such as plasma diagnostics, plasma transport, waves and instabilities, and engineering applications.

ME 468. Experimental Research in Advanced User Interfaces. 1-5 Unit.

Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

Same as: COMM 168, COMM 268, COMM 368

ME 469. Computational Methods in Fluid Mechanics. 3 Units.

The last two decades have seen the widespread use of Computational Fluid Dynamics (CFD) for analysis and design of thermal-fluids systems in a wide variety of engineering fields. Numerical methods used in CFD have reached a high degree of sophistication and accuracy. The objective of this course is to introduce the most classical approaches and algorithms used for the numerical simulations of incompressible flows. In addition, some of the more recent developments are described, in particular as they pertain to unstructured meshes and parallel computers. An in-depth analysis of the procedures required to certify numerical codes and results will conclude the course.

ME 469B. Computational Methods in Fluid Mechanics. 3 Units.

Advanced CFD codes. Geometry modeling, CAD-CFD conversion. Structured and unstructured mesh generation. Solution methods for steady and unsteady incompressible Navier-Stokes equations. Turbulence modeling. Conjugate (solid/fluid) heat transfer problems. Development of customized physical models. Batch execution for parametric studies. Final project involving solution of a problem of student's choosing. Prerequisite: ME 300C/CME 206.

ME 470. Uncertainty Quantification. 3 Units.

Uncertainty analysis in computational science. Probabilistic data representation, propagation techniques and validation under uncertainty. Mathematical and statistical foundations of random variables and processes for uncertainty modeling. Focus is on state-of-the-art propagation schemes, sampling techniques, and stochastic Galerkin methods. The concept of model validation under uncertainty and the determination of confidence bounds estimates. Prerequisite: basic probability and statistics at the level of CME 106 or equivalent.

ME 471. Turbulent Combustion. 3 Units.

Basis of turbulent combustion models. Assumption of scale separation between turbulence and combustion, resulting in Reynolds number independence of combustion models. Level-set approach for premixed combustion. Different regimes of premixed turbulent combustion with either kinematic or diffusive flow/chemistry interaction leading to different scaling laws and unified expression for turbulent velocity in both regimes. Models for non-premixed turbulent combustion based on mixture fraction concept. Analytical predictions for flame length of turbulent jets and NO_x formation. Partially premixed combustion. Analytical scaling for lift-off heights of lifted diffusion.

ME 484. Computational Methods in Cardiovascular Bioengineering. 3 Units.

Lumped parameter, one-dimensional nonlinear and linear wave propagation, and three-dimensional modeling techniques applied to simulate blood flow in the cardiovascular system and evaluate the performance of cardiovascular devices. Construction of anatomic models and extraction of physiologic quantities from medical imaging data. Problems in blood flow within the context of disease research, device design, and surgical planning. Same as: BIOE 484

ME 485. Modeling and Simulation of Human Movement. 3 Units.

Direct experience with the computational tools used to create simulations of human movement. Lecture/labs on animation of movement; kinematic models of joints; forward dynamic simulation; computational models of muscles, tendons, and ligaments; creation of models from medical images; control of dynamic simulations; collision detection and contact models. Prerequisite: 281, 331A,B, or equivalent. Same as: BIOE 485

ME 491. Ph.D. Teaching Experience. 3 Units.

Required of Ph.D. students. May be repeated for credit.

ME 492. Mechanical Engineering Teaching Assistance Training. 1 Unit.

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ME 495A. ME Seminar Series: Product Design. 1 Unit.

Seminars will feature accomplished product designers and product design researchers. Guest speakers will come from the U.S. and internationally, and will present on topics of current interest to the Product Design Community.

ME 495B. ME Seminar Series: At the Interface between Mechanical Engineering and Biology. 1 Unit.

Seminars will feature early career mechanical engineers working on leading edge problems in biomechanical engineering. Topics include mechanobiology, cell mechanics, transport phenomena in biological systems, bio-inspired design, design and analysis of biodevices or bioinstrumentation, biomaterials, and modeling of physiological systems. Guest speakers will come from top universities within the U.S. and internationally, and will discuss both their past research and plans for building a research program in the future.

ME 500. Thesis. 1-15 Unit.

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Same as: Ph.D.

ME 571. Surgical Robotics Seminar. 1 Unit.

Surgical robots developed and implemented clinically on varying scales. Seminar goal is to expose students from engineering, medicine, and business to guest lecturers from academia and industry. engineering and clinical aspects connected to design and use of surgical robots, varying in degree of complexity and procedural role. May be repeated for credit. Same as: CS 571

ME 801. TGR Project. 0 Units.

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ME 802. TGR Dissertation. 0 Units.

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Medicine Courses

MED 1A. Leadership in Multicultural Health. 2 Units.

Designed for undergraduates serving as staff for the Stanford Medical Youth Science Summer Residential Program (SRP). Structured opportunities to learn, observe, participate in, and evaluate leadership development, multicultural health theories and practices, and social advocacy. Utilizes service learning as a pedagogical approach to developing an understanding of the intersections between identity, power and privilege and disparities (health, education, environment), fostering knowledge and skills to become social advocates to address forms of inequities. Students explore approaches for identifying and tackling issues of equity (health and education) as well as learn fundamental skills necessary to implement activities for the Summer Residential Program.

MED 1B. Identity, Power and Privilege in Multicultural Health. 1 Unit.

An independent study service learning course designed to develop students' understanding of the intersection between identity, power, privilege, and disparities (health, education, environment). Students submit a written reflective term paper based on their experience as staff for the Summer Residential Program as well as their understanding of how constructs of identity, power and privilege impact low-income and underrepresented students in their pursuit of higher education. Prerequisite MED 1A.

MED 10SC. Responses to the AIDS Epidemic. 2 Units.

This course focuses on the HIV epidemic, contrasting the origin and spread of HIV and AIDS in Africa and the emergence of HIV in the U.S., in particular the history of HIV in San Francisco and the Bay Area. We will meet the people and visit the institutions which played key roles in the Public Health prevention, care, and treatment of HIV in San Francisco and consider the impact of HIV globally in our thinking about epidemic disease and the international responses to HIV. This will include key locations in the City, including the AIDS Grove, San Francisco General Hospital, the San Francisco Department of Public Health, the Castro, and local AIDS service organizations. Students will also hear from patients, physicians, and activists who are living with AIDS. We will also meet with scientists at UCSF, Stanford, and local pharmaceutical companies who are at the forefront of new prevention, therapeutic, and diagnostic research. By examining the relationship between the emergence of Gay activism and AIDS in California and New York and the pandemic in Southern Africa, the course will emphasize the multi-disciplinary and multi-sector approach to epidemic infectious disease. How do physicians, patients, epidemiologists, pharmaceutical companies, and policymakers develop effective responses to the AIDS epidemic? What are we learning from Africa and what can Africa learn from us about how communities react to deadly threats from infectious disease. AIDS experts from the Stanford community and Africa are invited to share their perspectives with us. In preparation for the seminar, you will be required to read *And the Band Played On* and *Barnett and Whiteside's AIDS in the Twenty-First Century* and selected scientific articles. As part of a group, you will also develop an AIDS-related project of your choice which you will present on the last day of class.

MED 27SI. Alternative Spring Break: Healthcare of Underserved Communities in Central California. 1 Unit.

Pre-field group directed reading for Alternative Spring Break: Healthcare of Underserved Communities in Central California.

MED 28SI. Alternative Spring Break: Health Accessibility. 1 Unit.

Alternative Spring Break class. Pre-field course for students participating in the Health Accessibility Alternative Spring Break trip. Focuses on the Bay Area and the current state of the U.S. healthcare system, how it has developed, and how it can be transformed to ensure greater accessibility for all.

MED 50Q. Respiration. 3 Units.

Preference to sophomores. Topics include: the biological basis for use of oxygen for aerobic metabolism in animals, human lung physiology and pathophysiology, comparative physiology of respiration in fish, birds and mammals, new insights into mammalian lung development, current challenges in human respiratory health including air pollution and lung cancer. Student presentations on specific topics based on literature research developed in consultation with the instructor. Application required.

MED 51Q. Palliative Medicine, Hospice and End of Life Care for Diverse Americans. 3 Units.

Introduces students to changing demographics of the aging and dying population in the United States. Topics include current issues in palliative medicine, hospice and end-of-life care for an increasingly diverse population. Includes simulated video case studies, real patient case discussions and collaborative field project. Application required.

MED 70Q. Cancer and the Immune System. 2 Units.

Preference to sophomores. Myths and facts surrounding the idea that the immune system is capable of recognizing malignant cells. The biological basis and function of effector arms of the immune system; how these mechanisms may be used to investigate the biological basis and potential therapy of cancer. How the immune system functions.

MED 71N. Hormones in a Performance-Enhanced Society. 3 Units.

(Formerly 117Q) Preference to freshmen. Explores how the availability of hormone therapy has affected various aspects of daily lives. Topics include the controversies concerning menopause and its treatment; use of hormones in athletics; cosmetic use of hormones to enhance growth, strength, and libido; use of hormones as anti-aging drugs; and how the hormone system has influenced our notions of gender. Includes the biochemistry and physiology of the human endocrine system; how hormones influence behavior, and how to read a scientific paper.

MED 86Q. Seeing the Heart. 2 Units.

Introduction to biomedical technology, science, clinical medicine, and public policy through cardiovascular imaging. Invasive and noninvasive techniques to detect early stage heart disease and to see inside the heart and blood vessels. Topics include: common forms of heart disease, how they develop, and why they affect so many people; imaging technologies such as ultrasound, CT, MRI, PET, and optical; a cost-effective public screening program. Field trips to Stanford Medical Center imaging centers.

MED 87Q. Women and Aging. 5 Units.

Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. Service Learning Course (certified by Haas Center).

Same as: HUMBIO 87Q

MED 88Q. Dilemmas in Current Medical Practice. 3 Units.

Preference to sophomores. Social, political, scientific, and economic forces influencing medical practice. Spiraling costs, impaired access to health care, and disillusionment toward the health care system. Attempts by government and medical insurers to control costs through managed care and health maintenance organizations. Medical education and how it has affected the practice of medicine. Alternative health care, preventive medicine, and the doctor-patient relationship. The paradox of health in America: why do so many people who are healthy feel unhealthy? Mandatory observation of instructors in their medical practices.

MED 94Q. Hormones, Health, and Disease. 2 Units.

Preference to sophomores. The role of hormones in maintaining health; how abnormalities in hormones cause disease. Topics include: the pituitary, the master gland; thyroid hormones and metabolism; insulin and diabetes; adrenal steroids and hypertension; vitamin D, parathyroid hormone, and osteoporosis; sex hormones, birth control, pregnancy, and menopause; androgens, erectile dysfunction, and athletic performance; cholesterol, obesity, and cardiovascular risk. Recommended: background in human biology and physiology.

MED 108Q. Human Rights and Health. 3 Units.

Preference to sophomores. History of human-rights law. International conventions and treaties on human rights as background for social and political changes that could improve the health of groups and individuals. Topics such as: regional conflict and health, the health status of refugees and internally displaced persons; child labor; trafficking in women and children; HIV/AIDS; torture; poverty, the environment and health; access to clean water; domestic violence and sexual assault; and international availability of drugs. Possible optional opportunities to observe at community sites where human rights and health are issues. Guest speakers from national and international NGOs including Doctors Without Borders; McMaster University Institute for Peace Studies; UC Berkeley Human Rights Center; Kiva. PowerPoint presentation on topic of choice required.

MED 120N. Pathophysiology of Diseases of the Heart. 3 Units.

Preference to freshmen. Introduces students to the anatomy, physiology, pathology and clinical aspects that comprise the discipline of cardiovascular medicine. Topics will include explanations of such pathologic states as heart attack, stroke, congestive heart failure, cardiac rhythm disturbances, and sudden cardiac death. Introduction to the underlying principles of diagnosis and treatment of heart disease are included in the syllabus.

MED 130. The Practice of Happiness. 1 Unit.

The Practice of Happiness is a 1-unit credit course that provides students with tools and strategies to develop a sustainable approach to their happiness and well-being. Students will learn breathwork- and meditation-based processes to decrease stress and increase happiness and peace. In addition, students will also engage in community-building group discussions, interactive processes, and study happiness-based research to discover for themselves what happiness is, and how it can be sustained as a personal practice. In addition to weekly sessions, there are 3 mandatory back-to-back sessions over a weekend in the quarter- hours will be Friday: 6:30pm - 10pm; Saturday/Sunday: 1pm - 5pm (exact dates TBD). See yesplus.stanford.edu for further insight into the program. Enrollment limited; priority to residents of Castano Hall; others selected by application.

MED 135. Community Leadership. 2 Units.

Offered through Residential Education to residents of Castano House, Manzanita Park. Topics include: emotional intelligence, leadership styles, listening, facilitating meetings, group dynamics and motivation, finding purpose, fostering resilience. Students will lead discussions on personal development, relationships, risky behaviors, race, ethnicity, spirituality, integrity.

MED 143A. Patient Health Education in Community Clinics. 2 Units.

Open to undergraduate, graduate, and medical students. Principles of health education, theories of behavior change, methods for risk reduction. Presentations of health education modules, focusing on topics prevalent among underserved populations. Students apply theoretical frameworks to health education activities in the Cardinal Free Clinics. Application required. Contact jdelluna@stanford.edu.

Same as: MED 243A

MED 143B. Patient Health Education in Community Clinics - Practicum. 2 Units.

Open to undergraduate, graduate, and medical students. For students who have completed MED 143A/243A and currently volunteer in one of the course-affiliated clinic sites. Objective is to expand health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Includes readings and online reflections. Prerequisite: successful completion of MED 143A/243A.

Same as: MED 243B

MED 143C. Patient Health Education in Community Clinics - Practicum. 2 Units.

Open to undergraduate, graduate, and medical students. For students currently volunteering in one of the course-affiliated clinic sites. Objective is to expand health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Includes readings and online reflections. Pre-requisites: MED 143A/243A, Med 143B/243B.

Same as: MED 243C

MED 145. Alternative Spring Break: Confronting HIV/AIDS in San Francisco. 2 Units.

Preparation for the Alternative Spring Break trip. Current issues regarding HIV/AIDS worldwide and in the United States, with a specific focus on San Francisco. Topics include biology, transmission, prevention, pharmaceutical development, discrimination, stigma, access to health care, and perspectives of affected communities. See asb.stanford.edu for more information.

MED 147. Methods in Community Assessment, Evaluation, and Research. 3 Units.

Development of pragmatic skills for design, implementation, and analysis of structured interviews, focus groups, survey questionnaires, and field observations. Topics include: principles of community-based participatory research, including importance of dissemination; strengths and limitations of different study designs; validity and reliability; construction of interview and focus group questions; techniques for moderating focus groups; content analysis of qualitative data; survey questionnaire design; and interpretation of commonly-used statistical analyses.

Same as: MED 247

MED 149. Medical Interpreting at the Cardinal Free Clinics: The Qualified Bilingual Student Program. 2 Units.

The quality of health care often depends as much on the interpreter as the provider. This foundation courses prepares bilingual students to work as medical interpreters in hospital and clinic settings. Students learn basic interpreting skills; ethics; communication techniques; medical vocabulary; key healthcare information; communication skills for advocacy; how to draft practical, working solutions, and professional development. By application only; must be an accepted Cardinal Free Clinic (CFC) interpreter volunteer. Applications accepted in Fall for Winter quarter and in Winter for Spring quarter. Students registering for this 2-unit course are required to interpret at the clinic a minimum of 2 weekend sessions; upon completion of this course, students can continue to volunteer at CFC for academic credit.

MED 150SI. Clinical Foundations for Patient Navigators at Arbor Free Clinic. 1 Unit.

Addresses key areas of learning for patient navigator volunteers at Arbor Free Clinic. Prepares patient navigators for their clinical role. Enrollment limited to current, active patient navigator volunteers.

MED 157. Foundations for Community Health Engagement. 3 Units.

Open to undergraduate, graduate, and MD students. Examination and exploration of community health principles and their application at the local level. Designed to prepare students to make substantive contributions in a variety of community health settings (e.g. clinics, government agencies, non-profit organization, advocacy groups). Topics include community health assessment; health disparities; health promotion and disease prevention; strategies for working with diverse, low-income, and underserved populations; and principles of ethical and effective community engagement.

MED 158A. From Foodies to Freegans: Food Popular Topics in the Silicon Valley. 1 Unit.

This is a discussion-based survey course to introduce the complexities of many "pop topics" in food, such as obesity, sustainability, and local vs. organic food. Course offered over two quarters; second part is MED 158B. The course focuses on Silicon Valley and is taught through a food justice lens. The goal is to provide knowledge and new frameworks for conceptualizing food that transform the way students think about, eat, and purchase food. Furthermore, course content is aligned with Community Engaged Learning (CEL) so that students have the opportunity to collaborate with local partners to complete community-based projects relevant to course topics. Coursework involves class participation, critical reflection, and three papers written for different audiences in the food space.

MED 158B. From Foodies to Freegans Practicum. 2 Units.

Students work toward making change in the food system. This course matches students with a community partner in the local area who is working to address food issues, broadly defined. There are many ways to make meaningful impact, including working at Second Harvest Food Bank as a Health Ambassador, or to assist with the Healthy Cornerstore initiatives or Garden to Table with the Hispanic Chamber of Commerce. Provides students with the opportunity to apply their academic area of concentration within a community-based context that fits their interests. Med 158A highly recommended but not required as a prerequisite.

MED 159A. Service-Learning in Migrant Health. 2 Units.

Examines the intersection of migration, poverty and health; provides opportunities for engagement directly with community partners working with Bay Area Mexican migrant populations. Weekly knowledge and skills-building sessions covering the process of migration; the demographic characteristics of the local migrant population; the health and socioeconomic status of local migrant populations; current initiatives to improve their quality of life and well-being. Service opportunities include participation in community organizing; health education seminars; and health screening activities. Prerequisite: intermediate/advanced level of Spanish language proficiency.

MED 159B. Service-Learning in Migrant Health. 2 Units.

Second quarter of two-quarter series. Examines the intersection of migration, poverty and health; provides opportunities for engagement directly with community partners working with Bay Area Mexican migrant populations. Weekly knowledge and skills-building sessions covering the process of migration; the demographic characteristics of the local migrant population; the health and socioeconomic status of local migrant populations; current initiatives to improve their quality of life and well-being. Service opportunities include participation in community organizing; health education seminars; and health screening activities. Prerequisites: intermediate/advanced level of Spanish language proficiency, MED 159A.

MED 160. Physician Shadowing: Stanford Immersion in Medicine Series. 1 Unit.

Undergraduates are paired with a physician mentor at Stanford Hospital and Clinics, Lucile Packard Children's Hospital, or the Veteran's Administration Hospital. May be repeated for credit. Prerequisite: Application and acceptance to the SIMS program.

Same as: SIMS

MED 176. Impact of Infectious Diseases on Human History. 3 Units.

Impact of infectious diseases on human society. Some topics include: Plague of Justinian and 14th century; impact on exploration, trade and conquest; how slavery, malaria and yellow fever conspired to alter the New World; Microbes and war; diseases of poverty, tuberculosis and others; Cholera and public health; pandemic influenza; diseases of human progress. Students give a 30 minute presentation on a topic of their choosing that exemplifies an aspect of the impact of politics, societal influences, religion or other forces on infectious diseases.

Same as: HUMBIO 176

MED 182. Early Clinical Experience at the Cardinal Free Clinics. 1-2 Unit.

Students provide health care in a student-run clinic for the homeless and uninsured. Student volunteers are guided in the practice of medical interviews, history-taking and physical examinations as appropriate. Clinical students and attending physicians provide support and guidance as the team arrives at a diagnosis and management plan. One unit of credit for students who volunteer a minimum of twice per month. Two units of credit for students whose volunteer commitment is greater than twice per quarter. By application only. Visit <http://cfc.stanford.edu> for more information. Same as: MED 282

MED 184. Team Leadership in the Cardinal Free Clinics. 1 Unit.

Open to Steering Committee and Managers of Cardinal Free Clinics. Introduction to skills for effective leadership, including: conflict resolution, team dynamics, leadership styles, personality types, giving and receiving feedback, and group decision-making. Utilizes hands-on-activities and real-life clinic scenarios. Applied learning through shifts at the Cardinal Free Clinics and related project work. Same as: MED 284

MED 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

MED 200. The Medical Device Entrepreneur's Course Primer. 1 Unit.

This course provides students and entrepreneurs a solid understanding of the complex US regulatory framework governing medical devices, in vitro diagnostics and drug-device combination products. Through class lectures, research and team assignments, class participants learn the key regulatory, clinical and ethical issues in biomedical product innovation. Focuses specifically on US investigational and marketing submission types and preparation of submission outlines, key steps to develop a product that will meet US regulatory requirements and development of regulatory strategy for a novel product. While there are no technical prerequisites, the course projects are challenging, and thus are more suitable for graduate and advanced undergraduate students.

MED 200A. Practical Applications for Qualitative Data Analysis. 2 Units.

(Same as PEDS 202A) First quarter of a two-quarter course. Gain experience analyzing qualitative data using qualitative analysis software (i.e. Nvivo, Dedoose). Conduct analysis using your own or existing data sources. Explore multiple qualitative data analysis topics through class lectures, foundational readings and hands-on learning. Core topics include: grounded theory, qualitative data analysis approaches, software-based analysis, cleaning and coding of data, and interpreting data. Note: Preference will be given to medical students and undergraduate students that have successfully completed an introductory qualitative methods course. Enrollment in subsequent MED 202B required.

MED 200B. Practical Applications for Qualitative Data Analysis. 2 Units.

(Same as PEDS 202B) Second quarter of a two-quarter course provides hands-on experience summarizing qualitative data and describing findings for dissemination. Final course product will be a draft manuscript for submission with students listed as co-authors. Core topics include: identifying themes and representative quotes, community-engaged dissemination, abstract submission, posters, oral presentations, manuscript writing, and journal selection. Prerequisite: Successful completion of MED 202A.

MED 200SI. Primary Care Presentations. 1 Unit.

This course is a lecture series offered during the winter quarter. The aim of this seminar is to allow medical students to experience the mindset of primary care physicians in real time. Classes feature presentations of patient cases submitted by Stanford faculty. Faculty presenters are provided with the diagnostic information for the cases in a sequential manner during and not in advance of each class, allowing students to learn from the thought process of physicians in real time as they put together the differential diagnosis, interpret diagnostic information, deliberate treatment and management options, and discuss other thoughts about the cases.

MED 201. Internal Medicine: Body as Text. 1 Unit.

Body as Text refers to the idea that every patient's body tells a story. The narrative includes the past and present of a person's social and medical condition; it is a demonstration of the phenotype. The art of reading the body as text was at its peak in the first half of the 20th century, but as technology has become ascendant, bedside skills and the ability to read the text have faded. Beyond scientific knowledge and medical facts, it is this often forgotten craft which is at the heart of the excitement of being an internist. This course introduces students to the art of the clinical exam, to developing a clinical eye, and learning to see the body in a completely different way.

MED 202. Alternative Spring Break: Rural and American Indian Health Disparities. 3 Units.

Open to MD, graduate, and undergraduate students. Classroom preparation followed by a one week spring break service learning experience on a reservation in South Dakota. Introduces students to the challenges and promise of Native American and rural health care, and the role of communities as leaders and problem solvers. Includes lectures, discussion and readings pertaining to Native American culture, current research in Native American health, and the methods and practice of community based participatory research. Culminates in formulation of a plan for communicating with and engaging community partners in South Dakota: Indian Health Services, Habitat for Humanity, Porcupine Clinic, Teach for America, and Sinte Gleska University.

MED 203SI. Patient Partner Skills: in Care Transitions. 1 Unit.

Teaches medical students to support patients as their care transitions out of the hospital and into the home. Students participate in hands-on sessions developing skills in patient education, motivational interviewing, and home safety evaluation. Students meet patients individually in the wards before patients are discharged, and follow-up by home visit to continue support of patients' long-term health. Patient Partners aims to help medical students better understand and respond to the challenges that chronically ill patients face while also better supporting patients discharged from Stanford Hospital.

MED 204. Access and Delivery of Essential Medicines to Poor and Underserved Communities. 1 Unit.

Student initiated lecture series. Guest speakers. Topics include: neglected diseases, underserved and impoverished markets, disease profiles of lower and middle income countries, pricing and distribution of biomedical end products, intellectual property in medicine and its effect on delivery of healthcare.

MED 205. Health and Human Rights Speaker Series. 1 Unit.

Focuses on the relationship between global health and human rights. The course will feature leading human rights scholars and practitioners from around the world. Examines conceptual linkages between global health and human rights and explores both the promise of the field and challenges inherent in implementing its norms on the ground. Topics include: the interrelation of health and human rights; how health policies can enhance or hinder human rights; the relationship between health outcomes and fulfilling the full range of human rights.

MED 206. Meta-research: Appraising Research Findings, Bias, and Meta-analysis. 3 Units.

Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics.

Same as: HRP 206, STATS 211

MED 207. History of Medicine. 1 Unit.

Begins with studying Shamanistic medicine, practiced by humans throughout the globe, for millennia. Covers magico-religious medicine developed in ancient Egypt, Mesopotamia and Greece; the 4th Century BC with Hippocrates beginning to separate medicine from religion and magic; the slow progress in ancient Rome, the medieval period, and during the Renaissance; and the acceleration in the pace of discoveries in the last few centuries, as medicine became more scientific, complex, and specialized as Pasteur developed the germ theory of disease, Darwin and Mendel publications begin the development of Evolution and of Genetics, Watson and Crick solved the mystery of DNA structure, organ transplants began, and imaging procedures such as CT and MRI came into being. Lectures are profusely illustrated, and, for the sake of comparison, two equally ancient systems of medicine, the traditional Chinese and the Vedic, are briefly reviewed.

MED 208. The Future of Primary Care. 1 Unit.

Introduces the latest thinking and innovations in Primary Care, both at Stanford and nationally. Topics include the role of primary care in patient-centered care, team-based care, care coordination, patient tracking and monitoring, preventive care, and payment reform. Speakers include leading local and national figures in primary care innovation representing the private sector, academia, safety net systems, think tanks, and individuals working on the ground to implement change. Preference to medical students. May be repeated for credit.

MED 209. Health Law: Quality and Safety of Care. 3 Units.

(Same as LAW 727) Concerns about the quality of health care, along with concerns about its cost and accessibility, are the focal points of American health policy. Considers how legislators, courts, and professional groups attempt to safeguard the quality and safety of the health care patients receive. The course approaches "regulation" in a broad sense. Focuses on regimes for determining who may deliver health care services (e.g. licensing and accreditation agencies), legal and ethical obligations providers owe to patients (e.g. confidentiality, informed consent), individual and institutional liability for substandard care, and various proposals for reforming the medical malpractice system. Includes discussion of the Patient Protection and Affordable Care Act (aka, "Obamacare"), which is launching many new initiatives aimed at assuring or improving health care quality.

MED 213. Compassion Cultivation for the Physician-in-Training. 1 Unit.

Provides mentored practice and growth in students' knowledge, skills and attitudes in compassion cultivation for one's self and others. Integrates traditional contemplative practices with contemporary psychology and scientific research on compassion.

MED 220. Literature and Human Experimentation. 3-5 Units.

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann* and Vivien Spitz's *Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care.

Same as: AFRICAAM 223, COMPLIT 223, CSRE 123B, HUMBIO 175H

MED 222. The Medical Malpractice System. 2 Units.

Focus is on policy and law pertaining to the medical malpractice system in the U.S. Readings include a mix of articles from the medical, law and health policy literatures, as well as some legal cases. Includes problem-based learning and small group work.

MED 223. Cardiovascular and Pulmonary Sciences Seminar. 2 Units.

Weekly modified journal club primarily for CVP Scholarly Application students, Cardiovascular Institute graduate students, clinical and research fellows, and faculty. Open to other graduate students and medical students (Advanced undergraduate students with permission of instructor). Each meeting begins with an overview of a particular area by a faculty member, followed by presentation of a seminal paper in that area by a postdoctoral fellow or a graduate student. Discussion follows the presentation, after which the faculty moderator meets separately with the students for further questions and discussion.

MED 225. U.S. Human Rights NGOs and International Human Rights. 1 Unit.

(Same as LAW 782) Many US human rights non-government organizations, including the US philanthropic sector, work on international human rights. The US government also engages with the private sector in "partnerships" that twins US foreign aid human rights action with corporate expertise. This weekly series will feature speakers who lead these human rights NGOs, philanthropic enterprises, and corporate partnerships, and also policy experts and scholars, to explore the pro's and con's of this scenario. Same as: ETHICSOC 15R, IPS 271A, POLISCI 203

MED 226. Practical Approaches to Global Health Research. 3 Units.

Enrollment limited to graduate students; undergraduates in their junior or senior year may enroll with consent of instructor only. Introduces research methods for conducting studies involving health in low-income context. Focuses on developing a concept note to support a funding proposal. addressing research question of student's interest. Skills developed include developing a compelling research question; synthesizing a focused literature review; selecting and adapting appropriate study design, target population, sampling methods, data collection and analysis; addressing human subject issues; developing productive cross-collaboration.

Same as: HRP 237, IPS 290

MED 227. Bedside Ultrasound. 1-2 Unit.

For preclinical or clinical medical students, and others with permission. Introduces students to diagnostic ultrasound at the bedside. The normal anatomy of the heart, abdomen, and pelvis pertinent to ultrasound is taught. Some pathology involving these areas is also introduced. As the students' proficiency increases, those electing to can visit the Pacific Free Clinic to be introduced to scanning patients. 1 unit for class attendance only 2 units for class attendance and participation in the Pacific Free Clinic.

MED 228. Physicians and Social Responsibility. 1 Unit.

Social and political context of the roles of physicians and health professionals in social change; policy, advocacy, and shaping public attitudes. How physicians have influenced governmental policy on nuclear arms proliferation; environmental health concerns; physicians in government; activism through research; the effects of poverty on health; homelessness; and gun violence. Guest speakers from national and international NGOs.

MED 229. Introduction to Global Health. 1 Unit.

Provides an overview of global health and how it is similar to and different from public health and tropical medicine. Topics include the evolution, economics, politics of global health, major players in global health, and issues of geography, politics, humanitarianism, human rights, science, research, culture and disease.

MED 231. Measuring Global Health. 4 Units.

Open to MD, graduate, and undergraduate students. Assessing the global burden of disease, its distribution among and within countries, its causes, and appropriate interventions requires rigorous quantitative approaches. This course develops skills in these areas by critically examining questions like: How do we know who is sick and where? How are risk factors incorporated into our projections of future disease trends? How do we combine mortality and morbidity in a meaningful way? What works for improving health efficiently? Workshops build familiarity with relevant data and their analysis. Prerequisite: coursework in statistics, biostatistics, quantitative epidemiology, econometrics, or equivalent. Same as: HRP 241, HUMBIO 129M

MED 232. Discussions in Global Health. 2 Units.

The goal of this interactive series is to encourage students to think broadly about the variety of activities encompassed within global health and the roles of various entities, including NGOs, governments, and healthcare providers, in responding to large-scale health crises, building health systems, and caring for patients in developing countries. Examines challenges in global health such as organizing medical responses to natural disasters, providing healthcare to societies in conflict, and integrating traditional and modern approaches to healing. Case studies are used to critique strategies employed by organizations that work to improve medical care in poor settings.

MED 233. Global Health: Beyond Diseases and International Organizations. 3 Units.

Enrollment limited to clinical MD students. Provides multidisciplinary trainees insight into over-arching themes of global health. Topics include systemic issues affecting healthcare progress globally, ethical and thoughtful approaches to solving these issues, as well as economics, public health, organizations in global health, human rights, involvement in NGOs, ethics of overseas work, and other non-medical aspects of this subject. Includes significant clinical, laboratory and diagnostic components.

MED 234. Literature and Global Health. 3-5 Units.

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with an introduction to global health ethics as a field rooted in philosophy and policy that address questions raised by practice in resource-constrained communities abroad. We will then spend the quarter understanding the way literature may deepen and even alter those questions. For instance: how have writers used scenes of practice in Africa, the Caribbean or South Asia to think through ideas of mercy, charity, beneficence and justice? How differently do they imagine such scenes when examining issues of autonomy, paternalism and language? To what extent, then, do novels and memoirs serve as sites of ethical inquiry? And how has literary study revealed the complexities of narrating care for underserved communities, and therefore presented close reading as a mode of ethics for global health? Readings will include prose fiction by Albert Camus, Joseph Conrad, Amitav Ghosh and Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese and Paul Farmer.

Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, CSRE 129B, FRENCH 229, HUMBIO 175L

MED 235. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 135X, EDUC 335X, HUMBIO 26

MED 236. Economics of Infectious Disease and Global Health. 3 Units.

Introduction to global health topics such as childhood health, hygiene, drug resistance, and pharmaceutical industries from an economic development perspective. Introduces economic concepts including decision-making over time, externalities, and incentives as they relate to health.

Same as: HUMBIO 124E

MED 237. Health Law: Improving Public Health. 3 Units.

(Same as Law 762) Examines how the law can be used to improve the public's health. Major themes explored include: what authority does the government have to regulate in the interest of public health? How are individual rights balanced against this authority? What are the benefits and pitfalls of using laws and litigation to achieve public health goals? Investigates these issues in several contexts, including the control and prevention of infectious disease, laws aimed at preventing obesity and associated noncommunicable diseases, tobacco regulation, ensuring access to medical care, reproductive health, lawsuits against tobacco, food and gun companies, and public health emergencies.

MED 240. Sex and Gender in Human Physiology and Disease. 2-3 Units.

Chromosomal, hormonal and environmental influences that lead to male and female reproductive systems and neuroendocrine regulation and intersex variants. Masculinizing and feminizing effects of endogenous and exogenous sex hormones and other factors, in particular gender, on the musculoskeletal, neurological, cardiovascular, immunological and other systems and tissues, e.g. adipose, skin, etc. over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women, and with aging in both sexes). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor. Undergraduate students must enroll for 3 units.

Same as: FEMGEN 241, HUMBIO 140

MED 241. Clinical Skills for Patient Care in Free Clinics. 1 Unit.

Enrollment in this course is by application only for advanced volunteers at the Cardinal Free Clinics. Focus is on preparing students to gain early clinical experience by teaching basic skills such as taking patient histories, working with interpreters, providing motivational interviewing, and presenting cases to medical students or physicians. Students learn through classroom lectures and practice sessions. Upon successful completion of a competency assessment, students are able to serve in a clinic role in the Cardinal Free Clinics. Prerequisite: Advanced standing as a volunteer at the Cardinal Free Clinics.

MED 242. Physicians and Human Rights. 1 Unit.

Weekly lectures on how human rights violations affect health. Topics include: regional conflict and health, the health status of refugees and internally displaced persons; child labor; trafficking in women and children; HIV/AIDS; torture; poverty, the environment and health; access to clean water; domestic violence and sexual assault; and international availability of drugs. Guest speakers from national and international NGOs including Doctors Without Borders; McMaster University Institute for Peace Studies; UC Berkeley Human Rights Center; Kiva.

MED 243A. Patient Health Education in Community Clinics. 2 Units.

Open to undergraduate, graduate, and medical students. Principles of health education, theories of behavior change, methods for risk reduction. Presentations of health education modules, focusing on topics prevalent among underserved populations. Students apply theoretical frameworks to health education activities in the Cardinal Free Clinics. Application required. Contact jdelluna@stanford.edu.

Same as: MED 143A

MED 243B. Patient Health Education in Community Clinics - Practicum. 2 Units.

Open to undergraduate, graduate, and medical students. For students who have completed MED 143A/243A and currently volunteer in one of the course-affiliated clinic sites. Objective is to expand health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Includes readings and online reflections. Prerequisite: successful completion of MED 143A/243A.

Same as: MED 143B

MED 243C. Patient Health Education in Community Clinics - Practicum. 2 Units.

Open to undergraduate, graduate, and medical students. For students currently volunteering in one of the course-affiliated clinic sites. Objective is to expand health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Includes readings and online reflections. Pre-requisites: MED 143A/243A, Med 143B/243B.

Same as: MED 143C

MED 246. The Medical Interview for Spanish Speakers. 1 Unit.

Student led forum for practicing and learning medical Spanish related specifically to the medical interview. Prepares clinical students to interact more effectively with Spanish speaking patients in clinics. Classes are topical; each class includes a demonstration, medical vocabulary practice, and conversational practice on the topic of the day.

MED 247. Methods in Community Assessment, Evaluation, and Research. 3 Units.

Development of pragmatic skills for design, implementation, and analysis of structured interviews, focus groups, survey questionnaires, and field observations. Topics include: principles of community-based participatory research, including importance of dissemination; strengths and limitations of different study designs; validity and reliability; construction of interview and focus group questions; techniques for moderating focus groups; content analysis of qualitative data; survey questionnaire design; and interpretation of commonly-used statistical analyses.

Same as: MED 147

MED 248. Student Rounds. 1 Unit.

Teams of preclinical students meet weekly with a clinical student to hear the history and physical of a recent case the clinical student encountered on the wards. Following the presentation, the preclinical students work together under the guidance of the clinical student to develop a problem list and plan, which are then compared with the problem list, plan, and orders made by the actual admitting team. In the course of presenting the cases, the clinical student describes personal experiences and practical components of ward work and daily clinical routine.

MED 252. Outcomes Analysis. 4 Units.

Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics.

Same as: BIOMEDIN 251, HRP 252

MED 253. Applied Grant-Writing Skills for Community and Clinical Research. 2 Units.

Skill-building in writing scientific research proposals. Topics include: grant proposal preparation; scientific literature review; developing research aims; decision-making on study design & methodology; planning statistical analyses; determining research compliances, timelines and resources. Students develop drafts of potential projects, peer-review and critique writing samples, and receive detailed feedback from instructor on all aspects of research projects.

MED 255. The Responsible Conduct of Research. 1 Unit.

Forum. How to identify and approach ethical dilemmas that commonly arise in biomedical research. Issues in the practice of research such as in publication and interpretation of data, and issues raised by academic/industry ties. Contemporary debates at the interface of biomedical science and society regarding research on stem cells, bioweapons, genetic testing, human subjects, and vertebrate animals. Completion fulfills NIH/ADAMHA requirement for instruction in the ethical conduct of research. Prerequisite: research experience recommended.

MED 255C. The Responsible Conduct of Research for Clinical Researchers. 1 Unit.

Engages clinical researchers in discussions about ethical issues commonly encountered during their clinical research careers and addresses contemporary debates at the interface of biomedical science and society. Graduate students required to take RCR who are or will be conducting clinical research are encouraged to enroll in this version of the course. Prerequisite: research experience recommended.

MED 257A. Community Health Advocacy. 2 Units.

First of a three-quarter course series providing students with knowledge and concrete skills for working with and advocating for underserved populations. Through coursework and placements in community health clinics and social service organizations, students broaden and deepen their understanding of the social and economic determinants of health, how they impact underserved populations, and the various levels at which these challenges can be addressed. Fellows engage in structured activities centered around supporting the mission of placement organizations. Students must apply and be accepted into the program the winter preceding enrollment; application information at och.stanford.edu. Additional prerequisites: Med 157 or equivalent coursework. Spanish language proficiency required for most placements.

MED 257B. Community Health Advocacy. 2 Units.

Second of a three-quarter course series that provides students with knowledge and concrete skills for working with and advocating for underserved populations. Through coursework and placements in community health clinics and social service organizations, student will broaden and deepen their understanding of the social and economic determinants of health, how they impact underserved populations, and the various levels at which these challenges can be addressed. Student will engage in structured activities that center around supporting the mission of their placement organization: direct service with clients and design and implementation of a capacity-building project. Weekly Monday evening classroom meetings serve as a forum for teaching and training, discussion of class readings and placement experiences, project development, and troubleshooting and support. Prerequisites: MED 257A.

MED 257C. Community Health Advocacy. 2 Units.

Third of a three-quarter course series that provides students with knowledge and concrete skills for working with and advocating for underserved populations. Through coursework and placements in community health clinics and social service organizations, students broaden and deepen their understanding of the social and economic determinants of health, how they impact underserved populations, and the various levels at which these challenges can be addressed. Student engage in structured activities that center around supporting the mission of their placement organization: direct service with clients and design and implementation of a capacity-building project. Weekly evening classroom meetings serve as a forum for teaching and training, discussion of class readings and placement experiences, project development, and troubleshooting and support. Prerequisites: MED 257A/B.

MED 258A. Policy Advocacy in Community Health. 2 Units.

In order to affect broad-based change in the health of populations, advocates must look upstream to the social and economic factors that impact health. Most powerful among these factors are the policies that shape our lives and the context in which we make individual and collective decisions. This course gives students the skills and tools to influence the policy process through various avenues, including legislative and media advocacy. Students select a current community health issue of interest and track relevant policy initiatives and media coverage of the issue to serve as the foundation for the application of real-time advocacy strategies. Prerequisites: MED 257A or consent of instructor.

MED 259. Oaxacan Health on Both Sides of the Border. 2 Units.

Required for students participating in the Community Health in Oaxaca summer program. Introduction to the health literacy and health-seeking behaviors of Oaxacan and other Mexican migrants; the health challenges these groups face. Through discussion and reflection, students prepare for clinical work and community engagement in Oaxaca, while also gaining knowledge and insight to make connections between their experiences in Mexico and their health-related work with Mexican immigrants in the Bay Area. Service Learning Course (certified by Haas Center). Prerequisite: application and acceptance into the Community Health in Oaxaca Summer Program (<http://och.stanford.edu/oaxaca.html>).

MED 260. HIV: The Virus, the Disease, the Research. 3-4 Units.

Open to medical students, graduate students in biological sciences, undergraduates with strong biological background. Topics: immunopathogenesis immune deficits, opportunistic infections including TB, and malignancies; genomics viral genetic analyses that have traced the origin of HIV-1 and HIV-2 to primates, dated the spread of infection in humans, and characterized the evolution of the virus within infected individuals; antiretroviral drug development identification of drug targets, structure-based drug design, overcoming drug resistance, pivotal clinical trials, and role of community activism; clinical management solutions in high- and low-income countries; vaccine development learning from past failures and the future of engineering the human immune response. 4 units includes a final project assigned in consultation with the instructor to fit the individual student's background and area of HIV interest. Same as: IMMUNOL 260

MED 262. Economics of Health Improvement in Developing Countries. 5 Units.

Application of economic paradigms and empirical methods to health improvement in developing countries. Emphasis is on unifying analytic frameworks and evaluation of empirical evidence. How economic views differ from public health, medicine, and epidemiology; analytic paradigms for health and population change; the demand for health; the role of health in international development. Prerequisites: ECON 50 and ECON 102B. Same as: ECON 127

MED 263. Advanced Decision Science Methods and Modeling in Health. 3 Units.

Advanced methods currently used in published model-based cost-effectiveness analyses in medicine and public health, both theory and technical applications. Topics include: Markov and microsimulation models, model calibration and evaluation, and probabilistic sensitivity analyses. Prerequisites: a course in probability, a course in statistics or biostatistics, a course on cost-effectiveness such as HRP 392, a course in economics, and familiarity with decision modeling software such as TreeAge.

Same as: HRP 263

MED 271. Global Biodesign: Medical Technology in an International Context. 1-3 Unit.

(Same as OIT 587) This course examines the development and commercialization of innovative medical technologies in different global settings. Faculty and guest speakers from the medtech field will discuss the status of the industry, as well as opportunities in and challenges to medical technology innovation unique to seven primary geographic regions: Africa, China, Europe, India, Japan, United States and Latin America. Students will be exposed to the biodesign innovation process, which provides a proven approach for identifying important unmet medical needs and inventing meaningful solutions to address them. They will also explore key differences between the covered geographies, which range from emerging markets with vast bottom-of-the-pyramid and growing middle class populations, to well-established markets with sophisticated demands and shifting demographics. The class will utilize real-world case studies and class projects (for 3-unit students) to promote engagement and provide a hands-on learning experience. There is no 2 unit option for this course.

Same as: BIOE 371

MED 272A. Biodesign Innovation: Needs Finding and Concept Creation. 4 Units.

This is the first quarter of a two-quarter course series (OIT 384/OIT 385). In this course, students learn how to develop comprehensive solutions (most commonly medical devices) to some of the most significant medical problems. The first quarter includes an introduction to needs finding methods, brainstorming and concept creation. Students learn strategies for understanding and interpreting clinical needs, researching literature and searching patents. Working in small entrepreneurial multidisciplinary teams, students gain exposure to clinical and scientific literature review, techniques of intellectual property analysis and feasibility, basic prototyping and market assessment. Students create, analyze and screen medical technology ideas, and select projects for future development. Final presentations at the end of the winter quarter to a panel of prominent inventors and investors in medical technology provide the impetus for further work in the spring quarter. Course format includes expert guest lecturers (Thu: 4:15 to 6:05 pm), faculty-led practical demonstrations and coaching sessions, and interactive team meetings (Tues: 4:15 to 6:05 pm). Projects from previous years included: prevention of hip fractures in the elderly; methods to accelerate healing after surgery; less invasive techniques for bariatric surgery; point of care diagnostics to improve emergency room efficiency; novel devices to bring specialty-type of care to primary care community doctors. More than 300,000 patients have been treated to date with technologies developed as part of this program and more than thirty venture-backed companies were started by alums of the program. Students must apply and be accepted into the course. The application is available online at <http://biodesign.stanford.edu/bdn/courses/bioe374.jsp>.

Same as: BIOE 374A, ME 368A

MED 272B. Biodesign Innovation: Concept Development and Implementation. 4 Units.

Two-quarter sequence (see OIT384 for complete description of the sequence). The second quarter focuses on how to take a conceptual solution to a medical need forward into development and potential commercialization. Continuing work in teams with engineering and medical colleagues, students will learn the fundamentals of medical device prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing a commercialization route (licensing vs. start-up); marketing, sales and distribution strategies; ethical issues including conflict of interest; fundraising approaches and cash requirements; financial modeling; essentials of developing a business or research plan/canvas; and strategies for assembling a development team. Final project presentations are made to a panel of prominent venture and corporate investors. New students (i.e. students who did not take OIT384 in the winter quarter) may be admitted, depending on team needs. Candidates need to submit an application at <http://biodesign.stanford.edu/bdn/courses/bioe374app.jsp> by March 1.

Same as: BIOE 374B, ME 368B

MED 273. BIODESIGN FOR MOBILE HEALTH. 1-2 Unit.

This seminar examines the emerging Mobile Health industry. Mobile Health is the provision of health services and information via mobile technologies such as mobile phones and wearable sensors. Faculty from Stanford University and other Academic Institutions and guest lecturers from the Mobile Health industry discuss the driving needs, opportunities and challenges that characterize the emerging Mobile Health innovation landscape, and present an overview of the technologies, initiatives and companies that are transforming the way we access health care today.

Same as: BIOE 273

MED 274. Design for Service Innovation. 4 Units.

(Same as OIT 343/01) Open to graduate students from all schools and departments. An experiential project course in which students work in multidisciplinary teams to design new services to address the needs of medically patients. Project teams partner with "safety net" hospitals and clinics to find better ways to deliver care to the low income and uninsured patients these institutions serve. Students learn proven innovation processes from experienced GSB, d. school, and SoM faculty, interface with students from across the university, and have the opportunity to see their ideas translated into improvements in the quality and efficiency of healthcare in the real world. Prerequisite: admission to the course is by application only. Applications available at <http://DesignForService.stanford.edu>. Applications must be submitted by November 16, 2011. Same as: BIOE 372, HRP 274

MED 275B. Biomedical Innovation Incubator. 2-5 Units.

Introduction to medical device design and prototyping. Regulatory aspects, marketing, venture capital. 2 unit option: weekly seminar series and assignments; open to all. 5 unit option: weekly seminar series, hands-on medical device prototyping project in conjunction with Stanford Medical Faculty. 5 unit option by application only. Graduate students may take project option for 3 units. Project application and more information at bit.ly/ssbincubator.

MED 276. Careers in Medical Technology. 2-3 Units.

Career tracks in biomedical technology for medical, life science, engineering, business, and law students of all levels. Industry professionals describe career tracks, current roles, and industry perspectives. 2-unit option, lectures and weekly assignments, MED or S/NC grading only. 3-unit option, including a group project and final presentation, may be taken for a letter grade. May be repeated for credit.

MED 282. Early Clinical Experience at the Cardinal Free Clinics. 1-2 Unit.

Students provide health care in a student-run clinic for the homeless and uninsured. Student volunteers are guided in the practice of medical interviews, history-taking and physical examinations as appropriate. Clinical students and attending physicians provide support and guidance as the team arrives at a diagnosis and management plan. One unit of credit for students who volunteer a minimum of twice per month. Two units of credit for students whose volunteer commitment is greater than twice per quarter. By application only. Visit <http://cfc.stanford.edu> for more information. Same as: MED 182

MED 284. Team Leadership in the Cardinal Free Clinics. 1 Unit.

Open to Steering Committee and Managers of Cardinal Free Clinics. Introduction to skills for effective leadership, including: conflict resolution, team dynamics, leadership styles, personality types, giving and receiving feedback, and group decision-making. Utilizes hands-on-activities and real-life clinic scenarios. Applied learning through shifts at the Cardinal Free Clinics and related project work. Same as: MED 184

MED 289. Introduction to Bioengineering Research. 1-2 Unit.

Preference to medical and bioengineering graduate students with first preference given to Bioengineering Scholarly Concentration medical students. Bioengineering is an interdisciplinary field that leverages the disciplines of biology, medicine, and engineering to understand living systems, and engineer biological systems and improve engineering designs and human and environmental health. Students and faculty make presentations during the course. Students expected to make presentations, complete a short paper, read selected articles, and take quizzes on the material. Same as: BIOE 390

MED 295. Advanced Cardiac Life Support. 2 Units.

(For clinical MD students only) Prepares students to manage the victim of a cardiac arrest. Knowledge and skills necessary for resuscitation of critically ill patients. Clinical scenarios and small group discussions address cardiovascular pharmacology, arrhythmia recognition and therapy, acute coronary syndrome including myocardial infarction, ventricular dysrhythmias and defibrillation, and acute ischemic stroke. Requires pre-course preparation and an intensive two-day session on a Friday and Saturday. Students should get the approval of their Clerkship Coordinator before registering for the course. Recommended prerequisites: Medicine 300A, Pediatrics 300A, or Surgery 300A.

MED 297A. MD Capstone Experience: Preparation for Residency. 1 Unit.

For senior medical students. Review of wide variety of skills essential to working effectively as interns. Curricular topics fall into three larger themes: communication, clinical skills and knowledge. Includes significant amount of time in Immersive Learning Center with simulation exercises as a key component.

MED 299. Directed Reading in Medicine. 1-18 Unit.

Prerequisite: consent of instructor.

MED 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

MED 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Medicine Interdisciplinary Courses

INDE 200. The Future of Academic Medicine. 1 Unit.

Required for and limited to first-year MSTP students. Presentations of research directions and opportunities by chairs of basic science, clinical departments, and PhD programs. Prerequisite: instructor consent.

INDE 201. Practice of Medicine I. 11 Units.

Six quarter series extending throughout the first two years of the MD program, interweaving core skills training in medical interviewing and the physical examination with other major threads addressing the context of medical practice: information literacy, nutrition principles, clinical epidemiology and biostatistics, evidence-based practice, psychiatry, biomedical ethics, health policy, population health. Core clinical skills are acquired through hands-on practice, and evaluated through an extensive program of simulated medical encounters, in which students interview, examine, and manage patients in a mock clinic. The information literacy thread introduces students to informatics and knowledge management, biomedical informatics, and evidence-based medicine searching. Nutrition principles are acquired through interactive, web-based instruction, and reinforced through problem-based learning cases, which run in parallel to the basic science components over the first year. In epidemiology students learn the taxonomy of epidemiological studies, how to critically read a journal article, and how to recognize and understand the concepts behind different clinical study designs. Topics include bias, confounding, diagnostic testing and screening, and "how statistics can lie." Psychiatry introduces students to the unique role of medical students in talking with patients, the difference between process and content in patient communication, how to respond to breaks in the patient-physician relationship, and the relationship between the quality of the patient-physician interaction and health outcomes. Health care policy covers such topics as health insurance, physician payment, health care costs, access, measurement and improvement of quality, regulation and health care reform. Biomedical ethics includes important ethical issues in medical practice, such as confidentiality, privacy, and ethical issues relating to medical students. The population health curriculum exposes students to concepts of public health, community action, and advocacy, and includes a year-long, community-based project. At the end of this quarter students participate in a performance-based assessment of the medical interview skills.

INDE 202. Practice of Medicine II. 8 Units.

Medical interview and physical examination skills, information literacy, nutrition principles, evidence-based practice, health policy, and population health are covered. At the end of this quarter, students participate in a performance-based assessment of their medical interview and physical examination skills. See INDE 201 for a complete description of the Practice of Medicine course series.

INDE 203. Practice of Medicine III. 8 Units.

Medical interview and physical examination skills, biomedical literature retrieval and appraisal, nutrition principles, evidence-based practice, biomedical ethics, and population health are covered. Students begin clinical problem-solving sessions to learn the approach to common and important clinical problems. Cases integrate other course themes of population health, evidence-based practice, clinical ethics, nutrition, health policy, and behavioral medicine. Students begin transition from comprehensive to problem-focused patient encounters. Students also gain exposure to geriatrics, pediatrics, and interprofessional healthcare teams, and practice mental health interview skills. At the end of this quarter, students participate in a performance-based assessment of their medical interview and physical examination skills. See INDE 201 for a complete description of the Practice of Medicine course series.

INDE 204. Practice of Medicine IV. 10 Units.

The second year of the Practice of Medicine series (INDE 204 and 205) emphasizes clinical reasoning, clinical practicum, and clinical procedures. Students continue clinical problem-solving sessions to learn the approach to common and important clinical problems. Cases integrate other course themes of population health, evidence-based practice, clinical ethics, nutrition, health policy, and behavioral medicine. Students spend one-half day per week in a clinical setting, practicing medical interview, physical examination skills, oral presentations, and clinical note-writing under the mentorship of a clinical tutor. In the practicum, students also gain experience with other practical aspects of patient care. The Clinical Procedures segment introduces common and important procedures in clinical practice, including phlebotomy, intravenous line insertion, and electrocardiography.

INDE 205. Practice of Medicine V. 8 Units.

Continued emphasis on clinical reasoning, clinical practicum, and clinical procedures. Students continue clinical problem-solving sessions to learn the approach to common and important clinical problems. Cases integrate other course themes of population health, evidence-based practice, clinical ethics, nutrition, health policy, and behavioral medicine. Students spend one-half day per week in a clinical setting, practicing medical interview, physical examination skills, oral presentations, and clinical note-writing under the mentorship of a clinical tutor. In the practicum, students also gain experience with other practical aspects of patient care. For the Clinical Procedures segment, students will have an opportunity in the Emergency Department to practice performing procedures learned in the previous quarter. At the end of this quarter, students participate in a comprehensive four-station objective structured clinical examination (OSCE) performance-based assessment of their medical interview, physical examination, and clinical problem-solving skills.

INDE 206. Practice of Medicine VI. 9 Units.

This last segment of the Practice of Medicine series is an intensive, four-week learning experience to consolidate clinical skills from prior quarters, and a final preparation for transition to clerkships. An extensive series of workshops covers topics such as dermatology, ophthalmology, advanced clinical reasoning, advanced presentations, bedside skills, ethics, palliative medicine, advanced sexual history, electronic medical record, ekg interpretation, intravenous fluid and electrolyte management. Students practice clinical procedures with task trainers and on a cadaver. This quarter also includes a professionalism series to prepare students for entry into clinical practice. Special clinical practice sessions are held as a capstone to clinical skills preparation.

INDE 207A. Medical Mandarin I: Beginning. 2-3 Units.

Develops conversational communication skills and essential medical vocabularies. Teaches in pinyin pronunciation system, which provides an accessible method of learning basic phrases. The foundations of taking a comprehensive patient history in Mandarin and doing medical interviews at individual hospital divisions, including making introductions, soliciting symptoms, explaining health concepts (e.g. diseases and prescriptions) as well as daily survival conversations. Main goals are to improve rapport with Chinese patients through Mandarin fluency in the medical setting and to promote understanding of Chinese culture in the context of health care as well as daily life. Students registering for 3 units participate in clinic visits and field activities.

INDE 207B. Medical Mandarin II: Intermediate. 2-3 Units.

For students who already have a basic command of spoken Chinese. Conversational communication skills practiced in a more advanced setting, including more sophisticated assessment of patient history and different tasks such as giving medical instructions and doing labs and tests. Builds working vocabulary for organ system, disease assessment to conduct a full physical exam, and to describe treatment modalities for Chinese-speaking patients (diagnostic and therapeutic). Students registering for 3 units participate in clinic visits and field activities. Prerequisite: one year of college-level Chinese or instructor assessment of fluency.

INDE 207C. Medical Mandarin III: Advanced. 2-3 Units.

Access advanced professional medical vocabulary, conduct medical research, and engage in discussions in Chinese. Aims at a proficiency level of medical interpreting or doing other independent work in Chinese. Students are also assisted in doing a project or projects related to a specific field of medicine. Students registering for 3 units participate in clinic visits, field activities or projects. Prerequisite: completion of Medical Mandarin II, or advanced Chinese proficiency.

INDE 207D. Professional Mandarin I. 2-3 Units.

Designed for students who seek professional development via Mandarin. Coursework includes lectures, online classes, language partnerships, selected topics, projects and field activities. Goal is to enhance students' language abilities as professionals and facilitate a career. Students choose to enroll for 2 units or 3 units depending upon an agreed- upon workload approved by the instructor. Prerequisite: sound preparation in Mandarin as assessed by the instructor.

INDE 208A. Medical Mandarin I: Beginning. 2-3 Units.

Continuation of 207A. See description for 207A. Students participating in classroom and online instruction only register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

INDE 208B. Medical Mandarin II: Intermediate. 2-3 Units.

Continuation of 207B. See description for 207B. Students participating in classroom and online instruction only register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

INDE 208C. Medical Mandarin III: Advanced. 2-3 Units.

Access advanced professional medical vocabulary, conduct medical research, and engage in discussions in Chinese. Aims at a proficiency level of medical interpreting or doing other independent work in Chinese. Students are also assisted in doing a project or projects related to a specific field of medicine. 3 units Includes clinic visits and field activities. Prerequisite: completion of 207C, or advanced Chinese proficiency.

INDE 208D. Professional Mandarin II. 2-3 Units.

Continuation of INDE 207D. Designed for students who seek professional development via Mandarin. Coursework includes lectures, online classes, language partnerships, selected topics, projects and field activities. Goal is to enhance students' language abilities as professionals and facilitate a career. Students choose to enroll for 2 units or 3 units depending upon an agreed- upon workload approved by the instructor. Prerequisite: INDE 207D.

INDE 209A. Medical Mandarin III: Beginning. 2-3 Units.

Continuation of 207A/208A. See description for 207A. Students participating only in classroom and online instruction register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

INDE 209B. Medical Mandarin III: Intermediate. 2-3 Units.

Continuation of 207B/208B. See description for 207B. Students participating only in classroom and online instruction register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

INDE 209C. Medical Mandarin III: Advanced. 2-3 Units.

Access advanced professional medical vocabulary, conduct medical research, and engage in discussions in Chinese. Aims at a proficiency level of medical interpreting or doing other independent work in Chinese. Students are also assisted in doing a project or projects related to a specific field of medicine. 3 units Includes clinic visits and field activities. Prerequisite: completion of 208C or advanced Chinese proficiency.

INDE 209D. Professional Mandarin III. 2-3 Units.

Continuation of INDE 208D. Designed for students who seek professional development via Mandarin. Coursework includes lectures, online classes, language partnerships, selected topics, projects and field activities. Goal is to enhance students' language abilities as professionals and facilitate a career. Students choose to enroll for 2 units or 3 units depending upon an agreed- upon workload approved by the instructor. Prerequisite: INDE 208D.

INDE 211. Creative Writing. 1 Unit.

For medical students - all levels of writing skill. Examines uses of creative writing, including understanding the experience of medical training. May be repeated for credit.

INDE 212. Medical Humanities and the Arts. 2 Units.

The interdisciplinary field of medical humanities: the use of the arts and humanities to examine medicine in personal, social, and cultural contexts. Topics include the doctor/patient relationship, the patient perspective, the meaning of doctoring, and the meaning of illness. Sources include visual and performing arts, film, and literary genres such as poetry, fiction, and scholarly writing. Designed for medical students in the Biomedical Ethics and Medical Humanities Scholarly Concentration, but all students are welcome.

INDE 214. Stanford Medical Student Journal. 1 Unit.

Provides an opportunity for editors of all levels to cultivate their skills and assist in preparing pieces submitted by colleagues for publication in the Stanford Medical Student Journal. Students enrolled in the course work closely with student authors as well as other editors. Editors examine multiple categories of writing, including opinion pieces, poetry, memoirs, book reviews, case reports and investigative reports. The Journal is published two to three times per year and highlights the diverse talents of Stanford medical students in both scientific writing and the humanities.

INDE 215. Queer Health and Medicine. 1 Unit.

Explores specific, pertinent, and timely issues impacting the health of the lesbian, gay, bisexual, and transgender community; examines the role of the primary care physician in addressing the health care needs of this community. Guest lecturers provide a gender-sensitive approach to the medical care of the LGBT patient, breaking down homophobic barriers and reaffirming patient diversity. May be repeated for credit.

INDE 216. Cells to Tissues. 3 Units.

Focuses on the cell biology and structural organization of human tissues as self-renewing systems. Topics include identification and differentiation of stem cells, regulation of the cell cycle and apoptosis in normal and cancerous cells, cell adhesion and polarity in epithelial tissues, intracellular transport, and cell migration. Histology laboratory sessions examine normal and abnormal samples of blood, epithelia, connective tissue, muscle, bone and cartilage. Patient presentations and small group discussions of current medical literature illustrate how cell biology influences medical practice.

INDE 217. Physician Scientist Hour. 1 Unit.

Enrollment is limited to MD, PhD, or MD-PhD students interested in careers as physician scientists. Focus is on aspects of developing careers in biomedical research through a mix of research lectures, clinical case presentations, and physician-scientist guest speakers.

INDE 220. Human Health and Disease I. 3 Units.

Establishes the foundation for the Human Health and Disease block which spans Q3 (Spring quarter Year One) through Q5 (Winter quarter Year Two). The Human Health and Disease block presents organ system-based histology, pathology, physiology, pharmacology, and infectious disease in a sequence of interdisciplinary courses. Each organ-specific integrated course includes a review of the anatomy and related histology, normal function of that organ system, how the organ system is affected by and responds to disease including infection, and how diseases of that organ system are treated (therapeutics).

INDE 221. Human Health and Disease II. 12 Units.

Structure, function, disease, and therapeutics of the respiratory system and the cardiovascular system. See INDE 220 for a description of the Human Health and Disease block .

INDE 222. Human Health and Disease III. 15 Units.

Structure, function, disease, and therapeutics of the renal/genito-urinary system, the gastrointestinal system, the endocrine system, male and female reproductive systems, and women's health. See INDE 220 for a description of the Human Health and Disease block .

INDE 223. Human Health and Disease IV. 11 Units.

Structure, function, disease, and therapeutics of the central nervous system, hematologic system and multi-systemic diseases. See INDE 220 for a description of the Human Health and Disease block .

INDE 225. Popular and Clinical Nutrition: Food Facts, Fads, and Pharmacology. 1 Unit.

Designed for medical students and other health care professionals. Lunchtime lectures review the epidemiological and clinical research related to eating patterns and misconceptions of the public, the mechanisms of pharmacological effects of food, and related topics common to patient nutritional concerns. Topics include fad diets, the impact of dietary addiction, longevity associated with caloric restriction, toxins in foods and the action of phytonutrients. Epidemiological, clinical, and biochemical studies are reviewed in the discussion of these and other topics.

INDE 226. History of Medicine Online. 1 Unit.

Via Internet. Topics include: ancient medicine, Egypt and Babylonia, ancient Greece and Rome, Europe in the Middle Ages and the Renaissance, 18th-century schools of thought, and technological medicine. Sources include Kleinman's core clinical functions, and text, pictures, hypertext links, and sound clips. For assistance accessing the course, email: cwpsupport@lists.stanford.edu. Enroll in Axxess, then ask cwpsupport to be added to the course site as a student.

INDE 227. Careers in Medicine: Pathways in the Medical Sciences. 1 Unit.

Open to medical students, graduate and undergraduate students. Interactive, seminar-style sessions expose students to diverse career opportunities and the challenges of developing work-life balance in medicine. Recognized experts in clinical medicine and biomedical research who have been innovators in their careers discuss their work, decision-points in their career pathways, and lifestyle aspects of their choices.

INDE 228. Career Transition Planning: Taking Action Today for a Successful Tomorrow. 1 Unit.

Open to School of Medicine MD and graduate students; post-docs and clinical fellows may audit by consent of instructor. How to prioritize career goals and develop an effective job search campaign. Topics: translating scientific and clinical training into a variety of workplace environments, professional network development, professional interest assessment, recruiters' perspectives, credentials development, and creating a marketing plan. Guest speakers from myriad career fields. May be repeated for credit.

INDE 229. Managing Difficult Conversations. 2 Units.

(Same as GSBGEN 568) Dealing effectively with difficult interpersonal situations in medical contexts. Focus is on improving students' judgment as to how to prepare for and confront difficult discussions in medical situations. Relevant principles of professionalism, leadership, and psychology underlie the course pedagogy. Case-based; student-to-student and student-to-instructor role-playing in actual medical situations. Patient and physician-expert participation as class guests. Enrollment limited to 20 medical students (2nd year and beyond) and 15 2nd year MBA students.

INDE 230. Topics in Scientific Management. 1 Unit.

Designed for postdocs and advanced graduate students. Reviews management skills necessary for successfully assuming leadership roles in scientific research. Addresses some of the most difficult aspects of developing, directing, and managing people and projects and running a research group, especially issues that new faculty have traditionally learned by trial and error over a number of years. Topics include: the faculty job search process and strategies, key elements in starting a lab, basic principles regarding legal dimensions of scientific activity (intellectual property, royalties, links with industry), team science, research ethics, communication and negotiation skills, and writing and securing grants.

INDE 231A. Career Transitions: Academia. 1 Unit.

Preference to PhD students in their fourth year or beyond and postdocs/fellows in their intended final year. Restricted to students in Biosciences and the School of Medicine. Focus is on practical, hands-on preparation of application materials (including interview and job talk) for academic positions. Topics include an overview of the academic hiring process, critiques of CVs, cover letters, teaching and research statements, interviews and job talks. Includes panel discussion of academic hiring processes by experienced committee members and job talk critiques by communication coaches. Class information available at web.stanford.edu/class/inde231a.

INDE 231B. Career Prep and Practice: Academia. 1 Unit.

Open to all Biosciences PhD students, postdocs/fellows and medical students/residents/fellows planning to pursue academic careers. Focus is on gaining a deeper understanding of faculty roles and responsibilities. Topics include how to balance teaching, research, service, lab set-up, grantwriting and publishing at different types of institutions. Features panels of experienced faculty members from different academic environments. More information available on course website: web.stanford.edu/class/inde231b.

INDE 232. Introduction to Academic Medicine for Physician-Scientists. 3 Units.

Open only to accepted MSTP students. Presentations by Stanford faculty on professional development topics, including: choosing a dissertation advisor, giving oral presentations, writing a grant proposal, attending scientific meetings, developing a research career. Substantial writing component.

INDE 233. Medical Education Seminar Series. 1 Unit.

For pre-clinical and clinical medical students. A series of sessions rotating among the following formats: Medical Education journal club; education works-in-progress; topics in medical education design, implementation, and evaluation; teaching M&M; hot topics and controversies in medical education. May be repeated for credit.

INDE 234. Introduction to Writing Research Proposals. 3 Units.

Practical instruction in research proposal writing. Suitable for advanced graduate students. Substantial writing component. Enrollment by instructor approval only.

INDE 235. Wilderness Leadership and Mentorship Skills for Medical Students. 2 Units.

For MD/Master of Medicine wilderness pre-orientation trip (SWEAT) leaders. Training to engage with and prepare incoming first-year medical students for the rigors of medical school. Topics include: fundamentals of wilderness survival, wilderness equipment use, wilderness first aid, camping, outdoor leadership, mentorship, team building, improvisation, risk management, cultural competency, professionalism as a physician, reflection and resiliency, first-year curriculum, stress management and coping. Guest lectures from Stanford faculty, emergency medicine physicians, National Outdoor Leadership School wilderness instructors, learning strategy specialists, and mentorship development specialists.

INDE 236. Introduction to Teaching and Mentoring. 1 Unit.

Enrollment limited to medical students. An introduction to medical education teaching principles and skills. Topics include assessment of current teaching skills, reviews of performance, giving appropriate learner feedback, and best practices for interactive teaching. Also introduces the literature around the value of peer mentoring in the medical setting and how to apply this information. Recommended for medical students interested in or currently serving as teaching assistants or interested in future academic positions.

INDE 239. Preparation and Practice for Biotechnology Business and Finance. 2 Units.

Open to School of Medicine graduate students, medical students, residents and fellows. Focus on the process of new company development and skills for success in biotechnology business, entrepreneurship and finance, including management/leadership skill development, awareness of business terminology and theory. Topics include: financial analysis, feasibility, IP, case practice.

INDE 255A. Health Policy, Finance and Economics I. 1 Unit.

Open to medical students and resident physicians. Introduction to basic concepts and current issues in health policy, health finance, and health economics. Goals are to promote understanding of the forces that shape healthcare; to integrate medical students with graduate medical education (residents); to motivate participants to pursue further scholarly activity in these subjects through coursework, graduate programs or research. Team taught by world-renowned experts in their respective fields. Prerequisite: instructor consent.

INDE 255B. Health Policy, Finance and Economics II. 1 Unit.

Continuation of INDE 255A. Open to medical students and resident physicians. Introduction to basic concepts and current issues in health policy, health finance, and health economics. Goals are to promote understanding of the forces that shape healthcare; to integrate medical students with graduate medical education (residents); to motivate participants to pursue further scholarly activity in these subjects through coursework, graduate programs or research. Team taught by world-renowned experts in their respective fields. For medical students 255A is not prerequisite to 255B. Prerequisite: instructor consent.

INDE 260. Journeys in Women's Health and Sex and Gender in Medicine. 1 Unit.

Sponsored by the Stanford WSDM Center. Course focuses on health research on women and sex differences in medicine, acknowledges the "wisdom" of research and education on sex (e.g. chromosomes, gonads, gonadal hormones) and gender (sociocultural) factors influencing health. Brings alumni to share their professional journeys in the world of Women and Sex Differences in Medicine. Meets Women's Health Scholarly Concentration Requirement. Same as: FEMGEN 260X

INDE 295. Bioethics and Anthropology Interdisciplinary Directed Individual Study. 3-5 Units.

Supervised individualized study in bioethics and anthropology for a qualifying paper, research proposal, or project with an individual faculty member. May be repeated for credit.

INDE 297. Reflections, Research, and Advances in Patient Care. 4 Units.

Required for all MD students enrolled in clerkships at Stanford affiliated sites. Two-year curriculum designed to provide structured time for students to step back from clerkships, in order to promote reflection on and reinforcement for their learning in the clinical environment. Goals are: to discuss and reflect upon critical experiences in clerkships; to provide continuity of instruction in translational science topics across the curriculum; to reinforce and extend the study of behavioral, cultural, ethical, social and socioeconomic topics introduced in the Practice of Medicine course sequence; to expose students to recent advances in medical discoveries, emphasizing their application to clinical practice (translational medicine); and to develop research and critical thinking skills, acquiring new information in areas related to the Scholarly Concentrations. Components of this curriculum include Doctoring with CARE small groups, the Advances and Reflections in Medicine lecture/seminar series, and Scholarly Concentration breakout groups. The Friday afternoon lecture/seminars explore advances in biomedical sciences with applications to medical practice (translational medicine) as well as faculty career pathways, reflections on doctoring, and the context of medicine in society. All students in clinical clerkships must participate in all aspects of RRAP Days. Prerequisite: Concurrent enrollment in clinical clerkships.

INDE 298. Women's Health Independent Project. 1 Unit.

Required for Women's Health Scholarly Concentration. Students pursue individual projects under the supervision of a faculty member. Prerequisite: consent of instructor.

Medieval Studies Courses

Microbiology Immunology Courses

MI 18SC. The Coming Influenza Pandemic. 2 Units.

Examines the H1N1 influenza virus from molecular, clinical, societal, historical, demographic, economic, and political perspectives. Examines the unique genetic, epidemiological, virologic, and pathogenic features of the influenza virus that allow it to continue to reinvent itself and re-emerge on an annual basis. Discusses past successes and failures, the current status of influenza, and the critical factors to consider to avert the coming influenza pandemic. Explores whether or not the lessons learned from influenza can be applied to other diseases. Includes guest lectures, field trips, student presentations.

MI 19SC. Measles and Sneezles and Things That Go Mumps in the Night. 2 Units.

A study of measles (until recently one of the leading causes of death in the world and the most contagious disease agent ever studied) and its relatives in the paramyxovirus family, including mumps, respiratory syncytial virus, hendra, and nipah, as well as a number of important animal pathogens. Investigates the nature of viruses using the paramyxoviruses as a paradigm. Topics include: the history of this devastating group of pathogens; basic aspects of paramyxovirus taxonomy and molecular virology; viral epidemiology, emergence, and eradication, including the pioneering studies of Peter Panum; the use, misuse, and abuse of science; the interactions between pathogen and host and how this interplay leads to disease, including the appearance of a bizarre brain complication with 100% mortality; the politics and economics of infection; how a putative link between the measles vaccine and autism entered the public eye, and how it refuses to disappear despite overwhelming evidence to the contrary. Field trips, guest speakers, student presentations. No science background necessary.

MI 70Q. Photographing Nature. 3 Units.

Utilizes the idiom of photography to learn about nature, enhance observation, and explore scientific concepts. Builds upon the pioneering photographic work of Eadweard J. Muybridge on human and animal locomotion. A secondary goal is to learn the grammar, syntax, composition, and style of nature photography to enhance the use of this medium as a form of scientific communication and also to explore the themes of change across time and space. Scientific themes to be explored include: taxonomy, habitat preservation, climate change; species diversity; survival and reproductive strategies; ecological niches and coevolution, carrying capacity and sustainability, population densities, predation, and predator-prey relationships, open-space management, the physics of photography. Extensive use of field trips and class critique.

MI 104. Innate Immunology. 3 Units.

Innate immune mechanisms as the only defenses used by the majority of multicellular organisms. Topics include Toll signaling, NK cells, complement, antimicrobial peptides, phagocytes, neuroimmunity, community responses to infection, and the role of native flora in immunity. How microbes induce and defeat innate immune reactions, including examples from vertebrates, invertebrates, and plants.

Same as: IMMUNOL 204, MI 204

MI 115B. The Vaccine Revolution. 6 Units.

Advanced seminar. Human aspects of viral disease, focusing on recent discoveries in vaccine development and emerging infections. Journal club format: students choose articles from primary scientific literature, write formal summaries, and synthesize them into a literature review. Emphasis is on analysis, experimental design, and interpretation of data. Oral presentations. Enrollment limited to 8. Prerequisite: prior enrollment in HumBio 155H Humans and Viruses or MI 116, The Human Virosphere. Same as: HUMBIO 155B

MI 115C. Human Virology Inquiry Project I. 1-3 Unit.

Advanced topics in human virology focuses on current issues in the field. Topics will include: clinical features of infection, epidemiology, molecular virology, drug development and policy, vaccinology, pathogenesis, host modulation, and media representations of viral infection. Student presentations and discussion in a small group setting.

MI 116. The Human Virosphere. 5 Units.

Focus on interaction of humans and viruses from a number of perspectives: historical, cultural, political, and demographic. Organismal, molecular biological, biochemical, human and viral interactions; clinical aspects of viral disease, epidemiology and risk factors, public and international health, aspects of virology including emerging viruses and biological weapons. Case studies involving particular viruses: human herpes viruses, retroviruses, oncogenic viruses; vaccination and disease eradication, evolution of viruses as tools for research and therapy. Emphasis on general principles of biology and matters of decision making policy. Prerequisite: Biology core, Human Biology core, or consent of instructor.

Same as: MI 216

MI 120. Bacteria in Health and Disease. 3 Units.

Enrollment limited to junior and senior undergraduates, graduate students and medical students. Introduces students to the bacteria that live in and on humans and, in some cases, can cause disease and sometimes death. Topics include the biology of the interaction of the simple microbe with complex human biology and the factors that determine whether or not we coexist relatively peacefully, suffer from overt disease, or succumb to the bacterial onslaught.

Same as: BIO 120

MI 155H. Humans and Viruses I. 6 Units.

Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis is on host pathogen interactions and policy issues. Topics: polio and vaccination, smallpox and eradication, yellow fever and history, influenza and genomic diversity, rubella and childhood infections, adenovirus and viral morphology, ebola and emerging infection, lassa fever and immune response.

Same as: HUMBIO 155H

MI 155V. Humans and Viruses II. 6 Units.

Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Topics: measles and viral epidemiology, rotavirus and world health, rabies and infections of the brain, HPV and cancer-causing viruses, herpes simplex and viral latency, CMV and viral teratogenesis, retrovirology and endogenous viral sequences, HIV and viral treatment, viral hepatitis and chronic infections, prions and diseases of life style. Prerequisite: MI155H.

MI 185. Topics in Microbiology. 3 Units.

For advanced undergraduates and graduate students. 1/3rd of the course consists of lectures by the instructor/colleagues. These cover, at an advanced level, with emphasis on bacteria, topics not covered elsewhere, e.g., phylogeny, molecular regulation, and bioenergetics. The remainder of the course involves interactive discussion of a topic of current interest in microbiology, chosen with student participation, and includes student presentations. (The topic last year was: Gene therapy.) Satisfies Central Menu Area 3 for BIO majors. Prerequisites: CHEM 31X, Biology core. Same as: MI 285

MI 198. Directed Reading in Microbiology and Immunology. 1-15 Unit.

Fields of study are decided in consultation with sponsoring professor. Prerequisite: consent of instructor.

MI 199. Undergraduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Possible fields: microbial molecular biology and physiology, microbial pathogenicity, immunology, virology, and molecular parasitology. Prerequisite: consent of instructor.

MI 204. Innate Immunology. 3 Units.

Innate immune mechanisms as the only defenses used by the majority of multicellular organisms. Topics include Toll signaling, NK cells, complement, antimicrobial peptides, phagocytes, neuroimmunity, community responses to infection, and the role of native flora in immunity. How microbes induce and defeat innate immune reactions, including examples from vertebrates, invertebrates, and plants.

Same as: IMMUNOL 204, MI 104

MI 209. Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites: Part I. 4 Units.

For graduate students and advanced undergraduates; required of first-year graduate students in Microbiology and Immunology. Emphasis is on mechanisms to establish infection in the host and responses of the host to infection. Current literature. Prerequisite: background in biochemistry and molecular biology.

MI 210. Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites. 4 Units.

For graduate and medical students, and advanced undergraduates; required of first-year graduate students in Microbiology and Immunology. The molecular mechanisms by which microorganisms invade animal and human hosts, express their genomes, interact with macromolecular pathways in the infected host, and induce disease. Current literature. Undergraduate students interested in taking this class must meet with the instructor to obtain approval before enrolling.

MI 211. Advanced Immunology I. 3 Units.

For graduate students, medical students and advanced undergraduates. Topics include the innate and adaptive immune systems; genetics, structure, and function of immune molecules; lymphocyte activation and regulation of immune responses. Prerequisites: undergraduate course in Immunology and familiarity with experimental approaches in biochemistry, molecular biology, and cell biology. Same as: IMMUNOL 201

MI 215. Principles of Biological Technologies. 3 Units.

The principles underlying novel as well as commonly utilized techniques to answer biological questions. Lectures and primary literature critiques on topics such as fluorescence microscopy, including applications such as FRET and single-cell analysis; human and murine genetic analysis; FACS; proteomics and analysis of noncoding RNAs. Class participation is emphasized. Prerequisite: biochemistry. Required of first-year graduate students in Microbiology and Immunology and the Immunology program. Same as: IMMUNOL 215

MI 216. The Human Virophere. 5 Units.

Focus on interaction of humans and viruses from a number of perspectives: historical, cultural, political, and demographic. Organismal, molecular biological, biochemical, human and viral interactions; clinical aspects of viral disease, epidemiology and risk factors, public and international health, aspects of virology including emerging viruses and biological weapons. Case studies involving particular viruses: human herpes viruses, retroviruses, oncogenic viruses; vaccination and disease eradication, evolution of viruses as tools for research and therapy. Emphasis on general principles of biology and matters of decision making policy. Prerequisite: Biology core, Human Biology core, or consent of instructor. Same as: MI 116

MI 218. Computational Analysis of Biological Information: Introduction to Python for Biologists. 2 Units.

Computational tools for processing, interpretation, communication, and archiving of biological information. Emphasis is on sequence and digital microscopy/image analysis. Intended for biological and clinical trainees without substantial programming experience. Same as: GENE 218, PATH 218

MI 233. The Biology of Small Modulatory RNAs. 2 Units.

Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal. Same as: GENE 233, PATH 233

MI 234. Fundamentals of RNA Biology. 2 Units.

For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students. Same as: GENE 234, PATH 234

MI 245. Computational Modeling of Microbial Communities. 4 Units.

Provides biologists with basic computational tools and knowledge to confront large datasets in a quantitative manner. Students learn basic programming skills focused on Matlab, but also are introduced to Perl and Python. Topics include: image analysis, bioinformatics algorithms, reaction diffusion modeling, Monte Carlo algorithms, and population dynamics. Students apply computational skills to a miniature research project studying the human gut microbiota. Same as: BIOE 115

MI 250. Frontiers in Microbiology and Immunology. 1 Unit.

Required of first- and second-year students in Microbiology and Immunology. How to evaluate biological research. Held in conjunction with the Microbiology and Immunology Friday noon seminar series. Before the seminar, students and faculty discuss one or more papers from the speaker's primary research literature on a related topic. After the seminar, students meet informally with the speaker to discuss their research.

MI 285. Topics in Microbiology. 3 Units.

For advanced undergraduates and graduate students. 1/3rd of the course consists of lectures by the instructor/colleagues. These cover, at an advanced level, with emphasis on bacteria, topics not covered elsewhere, e.g., phylogeny, molecular regulation, and bioenergetics. The remainder of the course involves interactive discussion of a topic of current interest in microbiology, chosen with student participation, and includes student presentations. (The topic last year was: Gene therapy.) Satisfies Central Menu Area 3 for BIO majors. Prerequisites: CHEM 31X, Biology core. Same as: MI 185

MI 299. Directed Reading in Microbiology and Immunology. 1-18 Unit.

Prerequisite: consent of instructor.

MI 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

MI 399. Graduate Research. 1-18 Unit.

Students who have completed the necessary foundation courses undertake investigations in general bacteriology, bacterial physiology and ecology, bacterial genetics, microbial pathogenicity, immunology, parasitology, or virology sponsored by individual faculty members. Prerequisite: consent of instructor.

MI 801. TGR Master's Project. 0 Units.

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MI 802. TGR PhD Dissertation. 0 Units.

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Modern Thought Literature Courses

MTL 299. Edgework: New Directions in the Study of Culture. 1-3 Unit.

Workshop. Required of first-year students in the doctoral program. Methodologies of different disciplines, the possibility and difficulty of interdisciplinary work within these disciplines, and their connection with the individual projects of students in Modern Thought and Literature. May be repeated for credit.

MTL 334A. Concepts of Modernity I: Philosophical Foundations. 5 Units.

In the late eighteenth century Immanuel Kant proclaimed his age to be "the genuine age of criticism." He went on to develop the critique of reason, which set the stage for many of the themes and problems that have preoccupied Western thinkers for the last two centuries. This fall quarter course is intended as an introduction to these themes and problems. We begin this course with an examination of Kant's philosophy before approaching a number of texts that extend and further interrogate the critique of reason. In addition to Kant, we will read texts by Hegel, Marx, Nietzsche, Weber, Freud, Lukacs, and Heidegger. This course is the first of a two-course sequence. Priority to graduate students in MTL and English. The course will be capped at 12 students. Same as: ENGLISH 334A, GERMAN 300

MTL 334B. Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization. 5 Units.

Emphasis on world-system theory, theories of coloniality and power, and aesthetic modernity/postmodernity in their relation to culture broadly understood. Same as: COMPLIT 334B, ENGLISH 334B

MTL 390. Qualifying Paper. 1-5 Unit.

Preparation and writing of the qualifying paper for the Ph.D. in Modern Thought and Literature. nn (Staff).

MTL 398. Graduate Independent Study. 1-15 Unit.

Students pursue a special subject of investigation under supervision of a member of the committee or another faculty member. May be repeated for credit.

MTL 399. Reading for Orals. 1-15 Unit.

Reading in preparation for the University Oral Examination. May be repeated for credit.

MTL 802. TGR Dissertation. 0 Units.

Molecular Cellular Physiology Courses

MCP 126. Neurons and Disease. 4 Units.

Diseases of the nervous system. First lecture of each week focuses on the clinical, epidemiological and behavioral aspects of a selected disease or syndrome. Second lecture exposes the cell biological, electrophysiological, biochemical and/or molecular biological processes that underlie each disease presented. Instructors maintain some flexibility in the diseases chosen for elucidation, but students can expect those covered to range from the relatively straightforward, for example Multiple Sclerosis (MS) or Amyotrophic Lateral Sclerosis (ALS), to the more complex, for example, Schizophrenia or Obsessive Compulsive Disorder (OCD). Prerequisite: Biology or Human Biology core.

MCP 156. How Cells Work: Energetics, Compartments, and Coupling in Cell Biology. 4 Units.

Open to graduate and medical students, and advanced undergraduates. Dynamic aspects of cell behavior and function, including cellular energetics, homeostasis, heterogeneity of membranes, structure and function of organelles, solute and water transport, signaling and motility. Emphasis is on the principles of how coupling of molecular processes gives rise to essential functions at the cellular level. Mathematical models of cell function. Student presentations. Same as: MCP 256

MCP 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

MCP 202. Advanced Immunology II. 3 Units.

Readings of immunological literature. Classic problems and emerging areas based on primary literature. Student and faculty presentations. Prerequisite: IMMUNOL 201/MI 211. Same as: IMMUNOL 202

MCP 216. Genetic Analysis of Behavior. 3 Units.

Advanced seminar. Findings and implications of behavioral genetics as applied to invertebrate and vertebrate model systems. Topics include biological clocks, and sensation and central pattern generators. Relevant genetic techniques and historical perspective. Student presentation. Same as: NBIO 216

MCP 221. Advanced Cell Biology. 4 Units.

For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, and differentiation. Weekly reading of current papers from the primary literature. Preparation of an original research proposal. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor. Same as: BIO 214, BIOC 224

MCP 222. Imaging: Biological Light Microscopy. 3 Units.

Survey of instruments which use light and other radiation for analysis of cells in biological and medical research. Topics: basic light microscopy through confocal fluorescence and video/digital image processing. Lectures on physical principles; involves partial assembly and extensive use of lab instruments. Lab. Prerequisites: some college physics, Biology core. Same as: BIO 152

MCP 256. How Cells Work: Energetics, Compartments, and Coupling in Cell Biology. 4 Units.

Open to graduate and medical students, and advanced undergraduates. Dynamic aspects of cell behavior and function, including cellular energetics, homeostasis, heterogeneity of membranes, structure and function of organelles, solute and water transport, signaling and motility. Emphasis is on the principles of how coupling of molecular processes gives rise to essential functions at the cellular level. Mathematical models of cell function. Student presentations. Same as: MCP 156

MCP 287. Connectomes. 1-3 Unit.

(Same as PSYCH 287) Neural circuitry can be measured over a huge range of spatial scales, from sub-synaptic to whole brain connectomes. The methods used to measure these scales differ enormously, and scientists working at one scale should be able to understand and communicate with those measuring at other scales. Reviews methods, principal results, and ideas for integrating findings across scales by large-scale computation modeling.

MCP 299. Directed Reading in Molecular and Cellular Physiology. 1-18 Unit.

Prerequisite: consent of instructor.

MCP 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

MCP 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Research fields include endocrinology, neuroendocrinology, and topics in molecular and cellular physiology. Prerequisite: consent of instructor. (Staff).

MCP 801. TGR Project. 0 Units.

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MCP 802. TGR Dissertation. 0 Units.

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Music Courses

MUSIC 1A. Music, Mind, and Human Behavior. 3 Units.

An introductory exploration of the question of why music is a pervasive and fundamental aspect of human existence. The class will introduce aspects of music perception and cognition as well as anthropological and cultural considerations.

MUSIC 1SL. Introduction to Indian Classical Music. 1 Unit.

This is an introductory course in the classical music of India, with emphasis on learning to listen to and appreciate Indian classical music concerts. It will cover a broad overview of the two main genres of Indian classical music - Carnatic and Hindustani. We will have several in-class demonstrations of instruments unique to the Indian classical music tradition. Class meetings will include discussions of landmark performances and artists as well as fundamentals of this music style, such as Raaga (melody), Taala (rhythm), song structure, and improvisation.

MUSIC 2C. An Introduction to Opera. 3 Units.

The lasting appeal of opera as a lavishly hybrid genre from the 1600s to the present. How and why does opera set its stories to music? What is operatic singing? Who is the audience? How do words, music, voices, movement, and staging collaborate in different operatic eras and cultures? Principal works by Monteverdi, Handel, Mozart, Verdi, Wagner, Strauss, Britten, and Adams. Class studies and attends two works performed by the San Francisco Opera.

MUSIC 4SI. Interactive Introduction to North American Taiko. 1 Unit.

Taught by Stanford Taiko members. Techniques and history. No experience necessary. May be repeated for credit. This course was initiated by Mitchell Fukumoto and Stanford Taiko.

MUSIC 5G. Introduction to Gu-Zheng. 1 Unit.

Introduction to Chinese music through learning how to play Gu-Zheng, a 21-stringed traditional Chinese instrument. The cultural, social, and historical significance of Gu-Zheng. 15 Gu-Zheng techniques, how to read Chinese music and Gu-Zheng notation, and two simple classic Gu-Zheng pieces. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee information. All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 5GZ. Introduction to Gu-Zheng. 0 Units.

Introduction to Chinese music through learning how to play Gu-Zheng, a 21-stringed traditional Chinese instrument. The cultural, social, and historical significance of Gu-Zheng. 15 Gu-Zheng techniques, how to read Chinese music and Gu-Zheng notation, and two simple classic Gu-Zheng pieces. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee information. All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 6F. Art is My Occupation: Professional Development in Music. 1-2 Unit.

Open to majors and non-majors. This course is designed to empower music students to explore their personal and artistic identity. One-unit option (recommended for freshmen and sophomore) is for students who wish to explore various music related occupations through research, discussion and interview with invited speakers. Two-unit option (recommended for junior and seniors) has an additional part that students prepare resumes and biography or cover letter, and create other materials that will assist in the process of job or graduate school applications through on-line resources.

MUSIC 7B. Musical Cultures of the World. 3 Units.

An overview of selected musical cultures from Africa, Asia, Europe, and the Americas. Course objectives: cultivate an appreciation for the diversity of human musical expression; discover how music is used to shape social interactions and systems of meaning; develop active listening skills that can be used when encountering any music; gain a preliminary understanding of ethnomusicological concepts and vocabulary. No musical experience is necessary. Class format: Lecture, discussion, listening, guest performances, musical participation, and a concert analysis.

MUSIC 8A. Rock, Sex, and Rebellion. 3 Units.

Development of critical listening skills and musical parameters through genres in the history of rock music. Focus is on competing aesthetic tendencies and subcultural forces that shaped the music. Rock's significance in American culture, and the minority communities that have enriched rock's legacy as an expressively diverse form. Lectures, readings, listening, and video screenings. Attendance at all lectures is required.

MUSIC 10AX. Science of Sound. 2 Units.

Science of Sound will explore sound and sound-related technology from the perspectives of mathematics, physics, and acoustics. Scientists and engineers will have a chance to apply their technical knowledge to the field of music while musicians will learn how sound behaves physically and how it can be recorded, processed, and reproduced. Using the newly opened Bing Concert Hall as a focal point, we will study the science of sound recording, room acoustics, and multi-channel mixing and playback. Students will use what they learn to create short multi-channel compositions using special techniques to place sounds spatially. These pieces will be performed during the annual outdoor Summer CCRMA Transitions concert and again during the Fall 2014 CCRMA concert at Bing Concert Hall. We will use the textbook by Jay Kadis entitled *Science of Sound Recording* as our primary text and incorporate plenty of hands-on experience with sound equipment and electronics.

MUSIC 11A. Orchestral Repertoire and Technique for Violin. 1 Unit.

Open to major and non-majors who would like to learn orchestral pieces and performance technique, including the works from the Stanford Symphony Orchestra's concert program. Priority is given to students who sign up for SSO and SPO. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 11AZ. Orchestral Repertoire and Technique for Violin. 0 Units.

Open to major and non-majors who would like to learn orchestral pieces and performance technique, including the works from the Stanford Symphony Orchestra's concert program. Priority is given to students who sign up for SSO and SPO. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 11N. A View from the Podium: The Art of Conducting. 3 Units.

How a conductor interprets music, realizes a personal vision through the rehearsal process, and communicates with orchestra and audience. Conducting as based on human communication skills. How to apply these lessons to other fields of endeavor.

MUSIC 11Q. Art in the Metropolis. 3 Units.

This seminar is offered in conjunction with the annual "Arts Immersion" trip to New York that takes place over the spring break and is organized by the Stanford Arts Institute (SAI). Participation in the trip is a requirement for taking part in the seminar (and vice versa). The trip is designed to provide a group of students with the opportunity to immerse themselves in the cultural life of New York City guided by faculty and the SAI programming director. Students will experience a broad range and variety of art forms (visual arts, theater, opera, dance, etc.) and will meet with prominent arts administrators and practitioners, some of whom are Stanford alumni. For further details and updates about the trip, see <http://artsinstitute.stanford.edu>.

Same as: ARTSINST 11Q

MUSIC 12A. Introductory Piano Class. 1 Unit.

"(A=level 1; B=level 2; C=level 3) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Preference to department majors. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 12AZ. Introductory Piano Class. 0 Units.

"(A=level 1; B=level 2; C=level 3) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Preference to department majors. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeat for credit for 0 unit and total completion allowed 99.

MUSIC 12B. Introductory Piano Class. 1 Unit.

This class is closed by design. To enroll, please sign up on the Axess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3) Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 12BZ. Introductory Piano Class. 0 Units.

This class is closed by design. To enroll, please sign up on the Axess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3) Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 12C. Introductory Piano Class. 1 Unit.

This class is closed by design. To enroll, please sign up on the Axess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3.) May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 12CZ. Introductory Piano Class. 0 Units.

This class is closed by design. To enroll, please sign up on the Axess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3.) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 12SC. Musical Collisions and Radical Creativity. 2 Units.

The margins of musical culture; nonconformist, maverick, and eccentric creative impulses that expand the definition of art. Laboratory atmosphere and daily rehearsals in which students create collaborative works with a final public concert involving collaborations with local musicians and presentations of student-composed works created during the course.

MUSIC 13Q. Classical Music and Politics: Western Music in Modern China. 3 Units.

Preference to sophomores. Social history, cultural studies, China studies, international relations, and music. From the Italian Jesuit, Matteo Ricci who presented a clavichord to the Chinese emperor to the emergence of a modern generation of Chinese musicians.

MUSIC 13SC. Performing America: The Broadway Musical. 2 Units.

This seminar explores how the themes, characters, stories, and, above all, the songs of the Broadway musical have played a key role in forming ideas of American identity from the early 20th century to the present. Musical theater is a perennial site for negotiating social themes of race, class, gender roles, and sexual identity. The American musical has been in constant dialogue with vernacular song and dance idioms, from ragtime and early jazz to rock, pop, disco, hip-hop, and electronic dance music. Jazz musicians have regularly looked to musical theater for their iquest;standards,iquest; as have talent shows from the vaudeville era to American Idol. Disney musicals, the television series *Glee* and *Smash*, and the High School Musical franchise all illustrate how iquest;musicals,iquest; serve as a medium for negotiating personal identity from childhood through early adulthood, staging the conflicts and attachments that define our everyday lives while connecting these with the culture we live in through the collective medium of song. nWe will look at a variety of influential historical musicals (*Oklahoma*, *Guys and Dolls*, *Gypsy*, *The Music Man*, *West Side Story*) and a few recent shows such as *Wicked*, *Hairspray*, *Bloody Bloody Andrew Jackson*, *American Idiot*, and *The Book of Mormon*, asking what the relation is between individual numbers and the overall themes and structures of the shows. How do lyrics and music combine in a successful song, and how does a song contribute to shape of the show? How do the dynamics of live theater relate to the presentation of musicals in the mediums of film and television? In addition to working on selected songs and scenes with the help of Stanford voice and drama faculty, students will attend, discuss, and review Bay area productions (San Jose, San Francisco), including the Broadway by the Bay (Redwood City) production of *Cabaret* opening on September 13, 2013. Grading will be based on class discussion, production analysis and reviews, and a choice between a final creative project and a short research paper.

MUSIC 14N. Women Making Music. 3 Units.

Preference to freshmen. Women's musical activities across times and cultures; how ideas about gender influence the creation, performance, and perception of music.

MUSIC 15N. The Aesthetics of Data. 3 Units.

Focus on visual and auditory display of data, specifically, the importance of aesthetic principles in effective data display, and the creative potential of scientific, biological, environmental and other data as inspiration for artistic expression.

MUSIC 17N. The Operas of Mozart. 3 Units.

Preference to freshmen. Four of Mozart's mature operas, the earliest works in the operatic repertoire never to go out of fashion. What accounts for this extraordinary staying power? Focus on the history of their composition, performance, and reception, and their changing significance from Mozart's time to the present.

MUSIC 17Q. Perspectives in North American Taiko. 4 Units.

Preference to sophomores. Taiko, or Japanese drum, is a newcomer to the American music scene. Emergence of the first N. American taiko groups coincided with increased Japanese American activism, and to some it is symbolic of Japanese American identity. N. American taiko is associated with Japanese American Buddhism. Musical, cultural, historical, and political perspectives of taiko. Hands-on drumming. Japanese music and Japanese American history, and relations among performance, cultural expression, community, and identity.

MUSIC 18A. Jazz History: Ragtime to Bebop, 1900-1940. 3 Units.

From the beginning of jazz to the war years.
Same as: AFRICAAM 18A

MUSIC 18B. Jazz History: Bebop to Present, 1940-Present. 3 Units.

Modern jazz styles from Bebop to the current scene. Emphasis is on the significant artists of each style.
Same as: AFRICAAM 18B

MUSIC 19A. Introduction to Music Theory. 3 Units.

For non-music majors and Music majors or minors unable to pass the proficiency test for entry to MUSIC 21. The fundamentals of music theory and notation, basic sight reading, sight singing, ear training, keyboard harmony; melodic, rhythmic, and harmonic dictation. Skill oriented, using piano and voice as basic tools to develop listening and reading skills.

MUSIC 19B. Intermediate Music Theory. 3 Units.

This course is an introduction to music theory geared toward students who have basic literacy skills (i.e. fundamental notation, identifying major and minor scales, keys, etc). Using musical materials from repertoire selected from campus and area concerts, and incorporating the opportunity to attend these concerts, the course will introduce elements of harmony, melody, form, orchestration and arrangement. The course is an appropriate successor to Music 19A. Students who successfully complete Music 19B can go on directly to Music 21.

MUSIC 20A. Jazz Theory. 3 Units.

Introduces the language and sounds of jazz through listening, analysis, and compositional exercises. Students apply the fundamentals of music theory to the study of jazz. Prerequisite: 19 or consent of instructor. Same as: AFRICAAM 20A

MUSIC 20B. Advanced Jazz Theory. 3 Units.

Approaches to improvisation through listening and transcribing, and developing familiarity with important contributors to this music. Topics: scale theory, altered dominants, and substitute harmony. Prerequisite: 20A or consent of instructor.

MUSIC 20C. Jazz Arranging and Composition. 3 Units.

Jazz arranging and composition for small ensembles. Foundation for writing for big band. Prerequisite: 20A or consent of instructor.

MUSIC 21. Elements of Music I. 3 Units.

Preference to majors. Introduction to tonal theory. Practice and analysis. Diatonic harmony focusing on melodic and harmonic organization, functional relationships, voice-leading, and tonal structures. Students must concurrently enroll in an Ear-training and musicianship lab (MUSIC 24a, 24b, or 24c as appropriate). Music majors must take 4 courses in ear training, and pass an ear training exit exam in their Junior year. Enrollment limited to 40. Prerequisites: (1) Piano Proficiency Exam (must be passed within the first two weeks of the term) or MUSIC 12A (may be taken concurrently); (2) Passing grade on a basic musical skills proficiency examination on the first day of class or MUSIC 19.

MUSIC 22. Elements of Music II. 3 Units.

Preference to majors. Introduction to chromatic harmony focusing on secondary functions, modulations, harmonic sequences, mode mixture, and the Neapolitan, and augmented sixth chords. Analysis of musical forms and harmonizations complemented by harmonic and melodic dictation, sight singing, and other practical skills. Students must concurrently enroll in an Ear-training and musicianship lab (MUSIC 24a, 24b, or 24c as appropriate). Music majors must take 4 courses in ear training, and pass an ear training exit exam in their Junior year. Prerequisites: (1) MUSIC 21; (2) Piano Proficiency Exam or MUSIC 12B (may be taken concurrently).

MUSIC 23. Elements of Music III. 3 Units.

Preference to majors. Continuation of chromatic harmony and complex forms of late Romantic period. Satisfactory passage of ear-training proficiency exam, part of the course's final, is a requirement for course completion and for continuation in the major sequence. Students must concurrently enroll in an Ear-training and musicianship lab (MUSIC 24a, 24b, or 24c as appropriate). Music majors must take 4 courses in ear training, and pass an ear training exit exam in their Junior year. Prerequisites: (1) MUSIC 22; (2) Piano Proficiency Exam or MUSIC 12C (may be taken concurrently).

MUSIC 24A. Ear Training I. 1-2 Unit.

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MUSIC 24B. Ear Training II. 1-2 Unit.

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MUSIC 24C. Ear Training III. 1-2 Unit.

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MUSIC 24K. Keyboard Harmony. 1 Unit.

In this practical introduction to keyboard harmony, students learn to play, analyze and improvise chord progressions at the keyboard. The course covers reading figured bass, playing chord progressions in all major and minor keys, and score reading. Students also analyze and perform solo repertoire that progresses through the semester from simple pieces to the level of a Bach invention and chorale. Preference given to majors. Keyboard harmony supports material learned in MUSIC 24B and 24C and counts as an ear training course. Prerequisites: (1) Piano Proficiency Exam, (2) MUSIC 24A.

MUSIC 30N. A Stranger in a Strange Land: Jewish Musics in Translation. 3 Units.

What does it mean to be a stranger in a strange land? For centuries Jewish people have struggled to shape their identities in unfamiliar surroundings, using music to remember the past and generate new, hybrid identities. In this class we adopt the metaphor of translation to think about how minority Jewish communities bridge distinct languages, musical idioms, and cultural practices. Our theme will take us on a journey across time and space; from Italy to India, New York, Syria, Russia, and Israel. We consider the case of Salomone Rossi, a 17th-century Italian Jewish composer who moved uneasily between dual careers in the synagogue and a secular/Christian court. We also explore a group of Indian Jews (Bene Israel) who combine idioms learned from Jewish and Christian missionaries with local Hindu musical traditions. In all our examples musicians translate languages, musical styles, and cultures to unite memories of a Jewish past with the realities of minority status in the present. The class format includes listening, discussion, some singing, student presentations, and guest lectures.

MUSIC 32N. Sculpting with Sounds, Images, and Words. 3 Units.

Preference to freshmen. Contemporary culture abounds in multimedia forms, in which sounds, images and words are interwoven in unique ways. What are their individual and combined powers? How would you harness them? Participants face these questions in creative projects as well as through in-class viewing, analysis and debates, readings, guest lectures and student presentations. The seminar is taught at the Center for Computer Research in Music and Acoustics where students have access to new media technologies.

MUSIC 34N. Performing America: The Broadway Musical. 3 Units.

Musical theater as a site for the construction of American identity in the twentieth century to the present. Issues of class, race, gender, and sexuality; intersections with jazz, rock, and pop; roles of lyricist, composer, director, choreographer, producer, performers. Individual shows (Showboat, Oklahoma, South Pacific, Guys and Dolls, West Side Story, Wicked, Bloody Bloody Andrew Jackson, Book of Mormon), show tunes in jazz performance, film musicals, and television. Opportunities for performance and attendance at local productions.

MUSIC 36N. Humor in Music. 3 Units.

Through theoretical readings the course will touch on psychological and neurological bases of humor, explore contingent, tactical, modal, and ontological difficulties in the apprehension of humor, and address ethical issues surrounding humor in music. In addition to in-class listening and screening sessions, analytic discussions will be led by students who will find and present examples of humor in music. Students will also be invited to compose original humorous song lyrics and to create collaborative works of musical humor.

MUSIC 38N. Singing Early Music. 3 Units.

Preference to freshmen. 15th- and 16th-century musical repertoires and their contexts; performance practice.

MUSIC 39A. Music, Health, and Medicine. 3 Units.

Explore how music relates to health and medicine surveying recent medical literature. Review different techniques in music therapy, music-related health problems, and issues related to educational and medical applications. Course materials are chosen to clearly identify music as a component of health related activity or occupation, to describe responses to music in our mind and body, and to think about the roles of music in our health. The seminars also discuss related basics in psychology and neurology. Students learn how to do literature search and write essays about relevant topics.

MUSIC 39N. The Classical String Quartet: Haydn, Mozart, Beethoven & Schubert. 3 Units.

This seminar, an in-depth historical survey of canonic works from the string quartet repertory, is intended for performers and non-performers alike. Topics to be explored include the origins of the genre in the pre-classical period; the establishment of enduring conventions in the early quartets of Haydn; aesthetic criteria that distinguish the approaches of Haydn and Mozart; the epoch-defining shifts in musical composition that are reflected in Beethoven's works for the medium; the tension between classicism and romanticism in the chamber music of Schubert; and issues of historical performance practice. Field trips will include a visit to the Beethoven Center in San Jose and attending chamber music concerts on campus. The St. Lawrence String Quartet (Stanford's ensemble-in-residence) will be joining the seminar on a regular basis to provide live demonstrations and coaching. Students who are string players are strongly encouraged to bring their instruments to class. Class activities will cover history, criticism, analysis, and performance (usually in combination). Informed listening is a primary goal of the seminar. Assignments will be tailored to student interests and abilities.

MUSIC 40. Music History to 1600. 4 Units.

Pre- or corequisite: 21.

MUSIC 41. Music History 1600-1830. 4 Units.

Pre- or corequisite: 22.

MUSIC 42. Music History Since 1830. 4 Units.

Pre- or corequisite: 23.

MUSIC 65A. Voice Class I. 1 Unit.

Group (7 students to a section) beginning voice (A = level 1; B = level 2). May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 65AZ. Voice Class I. 0 Units.

Group (7 students to a section) beginning voice (A = level 1; B = level 2). There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for 0 unit and total completion allowed 99.

MUSIC 65B. Voice Class II. 1 Unit.

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 65BZ. Voice Class II. 0 Units.

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for 0 units and total completion of 99.

MUSIC 72A. Intermediate Piano Class. 1 Unit.

For intermediate students. May be repeated for credit a total of 14 times. Prerequisites: 12C or equivalent, audition. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 72AZ. Intermediate Piano Class. 0 Units.

For intermediate students. Prerequisites: 12C or equivalent, audition. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 72C. Harpsichord Class. 1 Unit.

For beginning harpsichord students who have keyboard skills. May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Admission based on instructor consent. Contact instructor prior to enrolling to discuss availability. Class meets in Braun 201. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 72CZ. Harpsichord Class. 0 Units.

For beginning harpsichord students who have keyboard skills. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Admission based on instructor consent. Contact instructor prior to enrolling to discuss availability. Class meets in Braun 201. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 72D. Jazz Piano Class. 1 Unit.

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 72DZ. Jazz Piano Class. 0 Units.

By invitation only; priority to majors and jazz-ensemble participants. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 73. Intermediate Voice Class. 1 Unit.

For intermediate students. Admission by audition. May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the Axxess waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 73Z. Intermediate Voice Class. 0 Units.

For intermediate students. Admission by audition. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the Axxess waitlist and show up on the first day of class to receive a permission number for enrollment.

MUSIC 74A. Introductory Violin Class. 1 Unit.

(74A.1=Level 1 beginners; 74A.2=Level 2 continuing) Open to majors and non-majors. Focus is on beginning violin skills. Topics include brief history and physics of the instrument, and survey of repertoire. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 74AZ. Introductory Violin Class. 0 Units.

(74A.1=Level 1 beginners; 74A.2=Level 2 continuing) Open to majors and non-majors. Focus is on beginning violin skills. Topics include brief history and physics of the instrument, and survey of repertoire. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 74C. Classical Guitar Class. 1 Unit.

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 74CZ. Classical Guitar Class. 0 Units.

There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 74D. Harp Class. 1 Unit.

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 74DZ. Harp Class. 0 Units.

There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 75B. Renaissance Wind Instruments Class. 1 Unit.

May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 75BZ. Renaissance Wind Instruments Class. 0 Units.

May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 76. Brass Instruments Class. 1 Unit.

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 76A. Tuba Class. 1 Unit.

Basic brass techniques as they apply to the tuba including warmups, breathing, and developing a daily routine. For beginning through intermediate players. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit.

MUSIC 76AZ. Tuba Class. 0 Units.

Basic brass techniques as they apply to the tuba including warmups, breathing, and developing a daily routine. For beginning through intermediate players. This course includes a fee of \$175 for Music majors and minors, and \$200 for non Music majors. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for 0 unit.

MUSIC 76Z. Brass Instruments Class. 0 Units.

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 77. Percussion Class. 1 Unit.

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 77Z. Percussion Class. 0 Units.

There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 80T. Jewish Music in the Lands of Islam. 4 Units.

An Interdisciplinary study of Music, Society, and Culture in communities of the Jewish Diaspora in Islamic countries. The course examines the diverse and rich musical traditions of the Jews in North Africa and the Middle East. Based on the "Maqamat" system, the Arabic musical modes, Jewish music flourished under Islamic rule, encompassing the fields of sacred music, popular songs, and art music. Using musicological, historical, and anthropological tools, the course compares and contrasts these traditions from their original roots through their adaptation, appropriation, and re-synthesis in contemporary art music and popular songs.

Same as: JEWISHST 80T

MUSIC 102. Picturing Performance, Re-Envisioning the Arts. 2-4 Units.

Critical and creative exploration of the performing body as captured on film. Viewing/listening includes musicals, dance and opera on film, music video, experimental film and video, and moments of heightened musicality in feature film. Weiqest;ll focus on examples of moving media that possess a kinship with music;quest;through gesture, rhythm or affect and through visual parameters like deacute;cor, lighting, texture, camera movement and editing. Requirements include choosing and documenting a live performance, producing a short audiovisual work involving post-production, and weekly reading and viewing/listening assignments. No previous videomaking experience required.

Same as: MUSIC 202

MUSIC 112. Creative Expression: Musical Theater. 4 Units.

Students begin to create pieces that are fresh and innovative forms of musical theater that do not necessarily appeal to specifically popular audiences but perhaps to audiences more associated with high art, opera, or even contemporary independent music. Musical theater is an untapped resource of potential artistic innovation and has unfortunately become stuck in an ideal of universal accessibility. In present popular culture and the culture of contemporary art forms, musical theater almost exclusively refers to popular productions such as *Phantom of the Opera*, *Rent*, *Wicked*, *Jesus Christ Superstar*. Although excellent pieces of art in their own way, both dramatically and in their ability to evoke emotion through catchy melodies, for the most part each of them have their basis in popular and traditional musical idioms and theatrical forms, seldom exploring more advanced or avant-garde and experimental compositional and theatrical techniques.

Same as: TAPS 112

MUSIC 122A. Counterpoint. 4 Units.

Analysis and composition of contrapuntal styles from the Renaissance and Baroque periods. Use of keyboard, ear training, and sight singing underlies all written work. Prerequisites: 23 and piano-proficiency examinations.

MUSIC 122B. Analysis of Tonal Music. 4 Units.

Complete movements, or entire shorter works of the 18th and 19th centuries, are analyzed in a variety of theoretical approaches. Prerequisites: Music 23 and 24C or consent of instructor.

MUSIC 122C. Introduction to 20th-Century Composition. 4 Units.

Contemporary works, with emphasis on music since 1945. Projects in free composition based on 20th-century models. Prerequisites: 23 or consent of instructor; and successful completion of the piano-proficiency examination.

MUSIC 123. Undergraduate Seminar in Composition. 3 Units.

Current trends in composition. May be repeated for credit a total of 7 times. Prerequisites: Music major; 23 or consent of instructor.

MUSIC 124A. Songwriters Workshop. 1-3 Unit.

Laboratory for composers of any kind of vernacular music: singer-songwriters; folk singers; laptop dance music composers; rock and pop bands; rappers; writers of instrumentals or music with lyrics; solo artists and collaborators; etc. Compositional strategies for songwriting, overview of exemplars, discussion of aesthetic issues, and development of artistic personae. Weekly critique session for students and faculty to share work and offer feedback. Music theory and literacy not required. Aimed, however, at those with at least some experience as writers, whether casual or extensive. For bands at least half of members must be enrolled. Additional units invite lessons with instructor.

MUSIC 125. Individual Undergraduate Projects in Composition. 1-3 Unit.

May be repeated for credit a total of 14 times. Prerequisites: music major, and one quarter of 123.

MUSIC 126. Introduction to Thoroughbass. 1-3 Unit.

The development of continuo techniques and skills for figured-bass realization. Performance and analysis of selected repertoire, using thoroughbass principles and exercises based on historical theoretical treatises. Prerequisite: 21.

MUSIC 127. Instrumentation and Orchestration. 3 Units.

Individual instruments, instrumental groups within the orchestra, and combinations of groups. Arrangements from piano to orchestral music. Score analysis with respect to orchestration. Practical exercises using chamber ensembles and school orchestra. Prerequisite: 23.

MUSIC 128. Stanford Laptop Orchestra: Composition, Coding, and Performance. 1-5 Unit.

Classroom instantiation of the Stanford Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit.

Same as: CS 170

MUSIC 129. Advanced Ear-Training/Musicianship. 1-2 Unit.

A course in advanced aural analysis and musicianship skills for students who have completed the Music 24 series. Topics of study include analysis by ear of large scale forms, chromatic or extended-tertian harmony, modulations to distantly related keys, chromatic or atonal melodies, modal harmony and melody, as well as alternative forms of aural analysis.

MUSIC 130A. Introduction to Conducting. 3 Units.

Baton techniques and rehearsal procedures. The development of coordination of the members of the body involved in conducting; fluency in beat patterns and meters; dynamics, tempi, cueing, and use of the left hand in conducting. Prerequisites: 122B and diagnostic musicianship exam given first day of class.

MUSIC 130B. Elementary Orchestral Conducting. 3 Units.

Prerequisites: 127 or previous orchestral performance experience, 130A.

MUSIC 130C. Elementary Choral Conducting. 3 Units.

Techniques specific to the conducting of choral ensembles: warm-ups, breathing, balance, blend, choral tone, isolation principles, recitative conducting, preparation, and conducting of choral/orchestral works. Prerequisite: 130A.

MUSIC 140J. Studies in Music of the Middle Ages: Music and Memory. 3-4 Units.

Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.). Same as: MUSIC 240J

MUSIC 141. Studies in Music of the Renaissance. 2-4 Units.

Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.). Same as: MUSIC 241

MUSIC 142. Studies in Music of the Baroque. 3-4 Units.

Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.). Same as: MUSIC 242

MUSIC 143J. Studies in Music of the Classical Period: Franz Joseph Haydn. 3-4 Units.

Music and Musicians in the Age of Enlightenment Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.). Same as: MUSIC 243J

MUSIC 144J. Studies in Music of the Romantic Period: Faust in 19th-century Music. 3-4 Units.

Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.). Same as: MUSIC 244J

MUSIC 145J. Studies in Western Art Music Since 1900: The Music & Ideas of Charles Ives. 4 Units.

Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.). Same as: MUSIC 245J

MUSIC 146J. Studies in Ethnomusicology: Music Ethnography of the Bay Area. 3-5 Units.

An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing and oral history, writing fieldnotes, recording, transcription, analysis, and ethnographic writing. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.). Same as: MUSIC 246J

MUSIC 147J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: AFRICAAM 19, AMSTUD 147J, CSRE 147J, MUSIC 247J

MUSIC 147K. Studies in Music, Media, and Popular Culture: Music and Urban Film. 3-4 Units.

How music and sound work in urban cinema. What happens when music's capacity to transform everyday reality combines with the realism of urban films? Provides an introduction to traditional theories of film music and film sound; considers how new technologies and practices have changed the roles of music in film. Readings discuss film music, realistic cinema, urban musical practices and urban culture. Viewing includes action/adventure, Hindi film, documentary, film noir, hip hop film, the musical, and borderline cases by Jean-Luc Godard, Spike Lee, Wong Kar-Wai and Tsai Ming-Liang. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4 unit level only.).

Same as: MUSIC 247K

MUSIC 147L. Studies in Music, Media, and Popular Culture: Latin American Music and Globalization. 3-4 Units.

Focuses on vernacular music of Latin America and the Caribbean, including Mexico, Cuba, Dominican Republic, Peru, Brazil, Colombia, and Argentina. Musical examples discussed in relation to: globalization, migration, colonialism, nationalism, diaspora, indigeneity, politics, religion, dance, ethnicity, and gender. How music reflects and shapes cultures, identities, and social structures. Genres addressed: bachata, bossa nova, cumbia, forro, ranchero, reggaeton, rock, salsa, tango, and others. Seminar, guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: MUSIC 247L

MUSIC 148J. Studies in Perf Practice: Reactions to the Record: Early Recordings, Lost Styles, and Music's Future. 3-4 Units.

This is a seminar on the transformation of musical style in the era of recordings in light of their roots in cultural trends, including shifting hierarchies between composer and performer, work and notation, text and act. Early recordings will be studied as documents of musical values and conceptions different from those around us today. Methodologies of performance analysis will be explored and used to contextualize sources, which include historic recordings from Stanford's Archive of Recorded Sound, performance documents, and field research with performers, composers, critics, and listeners. Repertoire includes works for orchestra, piano, strings, chamber ensemble and voice. Outstanding contributions from seminar members may be featured in the Music Departmentquest;s May 2014 Reactions to the Record symposium. May be repeated for credit. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4-unit level only.).

Same as: MUSIC 248J

MUSIC 150. Musical Acoustics. 3 Units.

The physics of vibrating systems, waves, and wave motion. Time- and frequency-domain analysis of sound. Room acoustics, reverberation, and spatialization. The acoustics of musical instruments: voice, strings, and winds. Emphasis is on the practical aspects of acoustics in making music. Hands-on and computer-based lab. See <http://ccrma.stanford.edu/courses/150/>.

MUSIC 150D. The Paradigm Shift. 1 Unit.

Examination of the idea of 'paradigm shift' by considering paradigm shifts in different academic fields of inquiry. Serial accumulation of guest lectures by distinguished faculty representing the University's many and varied departments, each asking and answering the question 'What is the most important paradigm shift in the history of my field? Are paradigm shifts revolution or evolution? Do they move us closer to truth? How frequently do they occur? Can humans plan for, cause, or resist them?.'

Same as: POLISCI 133D

MUSIC 154. History of Electronic Music. 1-5 Unit.

What is electronic music? Acousmatic, computer music, algorithmic composition, tape music, glitch, electronic, musique concrègrave;te, noise, laptop music, DJ'ing, organized sound...what do these labels mean? This course will provide a brief historical survey of electroacoustic music and discuss some of the most salient questions associated with it, from both a compositional and musicological point of view. Topics to be covered include: definitions of musical sounds; Schaefferian theory and musique concrègrave;te; serialism and elektronische Musik; tape music and computer music in the USA; analysis of electroacoustic music; sampling and intellectual property; algorithmic and computer-assisted composition; live-electronics and improvisation. The course does not require previous experience in the field. Classes will be based on discussion of selected listening and reading materials, as well as hands-on digital experimentation with sounds.

MUSIC 154A. Sound Art I. 4 Units.

Acoustic, digital and analog approaches to sound art. Familiarization with techniques of listening, recording, digital processing and production. Required listening and readings in the history and contemporary practice of sound art. (lower level).

Same as: ARTSTUDI 131

MUSIC 154B. Aesthetics of Experimental Electronic Music, 1980 to Today. 3-5 Units.

In this course, students will listen to, analyze, and interpret experimental electronic music since 1980. We will explore how technologies influence music making, audiencesquest; experiences, distribution outlets and performance contexts for electronic music. How do artists generate meaning and expressivity when using experimental tools and styles? Emphasis on developing vocabulary and frameworks for informed discourse surrounding electronic music, drawing from both academic and journalistic traditions. Topics include electronic dance music, dubstep, hip hop, internet music culture, drone, noise, microsound, electroacoustic, and sound art. Highly recommended for music majors taking the MST specialization. For upper-level undergraduates and graduate students.

MUSIC 154C. Real Industry: Inside the audio and music technology industry. 1 Unit.

Real Industry explores how leading audio and music technology companies, such as Pandora, Adobe, Smule, Dolby, iZotope, Line 6, and Avid, bring products from idea to market. We examine best practices, roles, day-to-day responsibilities, desired skillsets, and department/team function. This seminar is intended for all students considering full-time positions or internships in audio industry. No prior engineering background required.nTopics include: software development in large organizations, UX/UI design, marketing, hardware development, product management, advanced technology and research, project management, sales, data and analytics, executive teams, and operations (HR, IP/patents). nOnline lectures available. Class time includes discussion and meetings with industry professionals.

MUSIC 154D. Symposium on Manufacturing Techniques for Music and Art. 1-3 Unit.

A guided symposium on the many techniques for making music and art objects. The course will be tailored to student interest and needs as it covers computer controlled machining, traditional techniques, and innovative methods of creating physical objects for music and art.

MUSIC 155. Intermedia Workshop. 3-4 Units.

Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent. May be repeated for credit.
Same as: ARTSTUDI 239, MUSIC 255

MUSIC 156. "sic": Improvisation Collective. 1 Unit.

Small ensemble devoted to learning trans-idiomatic improvisation techniques and composing indeterminate pieces in a workshop setting. One major concert. Prerequisite: access to an instrument. Improvisational experience and conventional instrumental virtuosity not required. May be repeated for credit for a total of 3 times.

MUSIC 158. Stanford Community Chorus. 1 Unit.

Chorus members explore many different types of music and singing in a fun and supportive environment, including folk, spirituals, popular songs, and traditional choral music. The course culminates in an informal performance. No audition is required to join; experienced music readers and non-readers alike are welcome. The ensemble is open to both Stanford students and community members. There is a \$25 fee for music. Offered in collaboration with Stanford Continuing Studies. Enrollment limited to 15 students and 30 community members.

MUSIC 159. Early Music Singers. 1 Unit.

Small choir specializing in Medieval, Renaissance, and early Baroque vocal music. One major concert per quarter. May be repeated for credit for a total of 15 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 159Z. Early Music Singers. 0 Units.

Small choir specializing in Medieval, Renaissance, and early Baroque vocal music. One major concert per quarter. May be repeated for credit for a total of 15 times for 0 unit. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160. Stanford Symphony Orchestra. 1 Unit.

70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://sso.stanford.edu>). All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160A. Stanford Philharmonia Orchestra. 1 Unit.

Prerequisite: audition, one year of 160, or consent of instructor. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://sso.stanford.edu>). All participants must register. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160AZ. Stanford Philharmonia Orchestra. 0 Units.

Prerequisite: audition, one year of 160, or consent of instructor. May be repeated for credit. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must register. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160B. Stanford New Ensemble. 1 Unit.

Performing compositions of the 20th century, recent works of this century, and new works by Stanford faculty and student composers. Musicians collaborate with composers and artists visiting and performing at Stanford. One concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must register. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160BZ. Stanford New Ensemble. 0 Units.

Performing compositions of the 20th century, recent works of this century, and new works by Stanford faculty and student composers. Musicians collaborate with composers and artists visiting and performing at Stanford. One concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must register. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160C. Stanford Baroque Soloists. 1 Unit.

Elite string group focusing on concerti by Corelli, Vivaldi and other Italians, Bach, Handel and other Germans, as well as theater music by Purcell and Lully. Each member expected to solo as well as play backup. Performances each quarter, played standing, student-led without conductor. Coaching will emphasize leadership and ensemble techniques, intonation and blend, particulars of eighteenth century notation and performance practice. Modern instruments, modern pitch, baroque bows as available. Limited to six violins, three violas, three cellos, bass, admission by audition. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Contact instructor for audition and enrollment information: <mailto:1martinagel@earthlink.net> May be repeated for credit for total completion of 15 and total 15 units. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160CZ. Stanford Baroque Soloists. 0 Units.

Elite string group focusing on concerti by Corelli, Vivaldi and other Italians, Bach, Handel and other Germans, as well as theater music by Purcell and Lully. Each member expected to solo as well as play backup. Performances each quarter, played standing, student-led without conductor. Coaching will emphasize leadership and ensemble techniques, intonation and blend, particulars of eighteenth century notation and performance practice. Modern instruments, modern pitch, baroque bows as available. Limited to six violins, three violas, three cellos, bass, admission by audition. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Contact instructor for audition and enrollment information: <mailto:lmartinagel@earthlink.net>. May be repeated for credit for 0 units. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160D. Stanford Chinese Music Ensemble. 1 Unit.

A performing ensemble presenting traditional Chinese music on a variety of traditional Chinese instruments. Promotes awareness of Chinese culture by by introducing the greater Stanford community to a unique style of music. Anyone with an interest in learning and playing Chinese music on Chinese instruments is welcome to join. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for total completion of 15 and total units of 15. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160DZ. Stanford Chinese Music Ensemble. 0 Units.

A performing ensemble presenting traditional Chinese music on a variety of traditional Chinese instruments. Promotes awareness of Chinese culture by by introducing the greater Stanford community to a unique style of music. Anyone with an interest in learning and playing Chinese music on Chinese instruments is welcome to join. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for 0 unit and 99 total completion. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160S. Summer Orchestra. 1 Unit.

50- to 100-member ensemble performing major orchestral works. May be repeated for credit. Auditions: June 28 & 29; Rehearsal Schedule: 6/30, 7/2, 7/6, 7/7, 7/9, 7/13, 7/14, 7/16; Dress Rehearsal 7/17, 7:00-9:30PM; Performance: 7/18, 7:30PM. Email instructor with questions: <mailto:awittstr@stanford.edu>. Please visit <http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/auditions/auditionexcerpts/> for information on audition requirements. nOnline sign-up available in Spring 2015! Stay tuned at the Stanford Symphony Orchestra website: <http://www.stanford.edu/group/sso/cgi-bin/wordpress/n>By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 160SZ. Summer Orchestra. 0 Units.

50- to 100-member ensemble performing major orchestral works. May be repeated for credit. Auditions: June 28 & 29; Rehearsal Schedule: 6/30, 7/2, 7/6, 7/7, 7/9, 7/13, 7/14, 7/16; Dress Rehearsal 7/17, 7:00-9:30PM; Performance: 7/18, 7:30PM. Email instructor with questions: <mailto:awittstr@stanford.edu>. Please visit <http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/auditions/auditionexcerpts/> for information on audition requirements. nOnline sign-up available in Spring 2015! Stay tuned at the Stanford Symphony Orchestra website: <http://www.stanford.edu/group/sso/cgi-bin/wordpress/n>By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University. nZero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 160Z. Stanford Symphony Orchestra. 0 Units.

70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161A. Stanford Wind Ensemble. 1 Unit.

40- to 50-member ensemble performing transcriptions of symphonic music, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161AZ. Stanford Wind Ensemble. 0 Units.

40- to 50-member ensemble performing transcriptions of symphonic music, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161B. Jazz Orchestra. 1 Unit.

Jazz Orchestra is an undergraduate large ensemble performance class. Admission is by audition and/or permission of instructor. The class meets three times per week and presents a minimum of one formal concert per quarter with a major jazz artist. The class endeavors to provide students with the opportunity to perform, at the highest level, jazz compositions and arrangements of a serious nature, and provide opportunities for challenging and creative improvisational situations. Emphasis is placed on the understanding of the structural, psychological, and emotional components of the materials studied and performed. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for total of 15 times. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161BZ. Jazz Orchestra. 0 Units.

Jazz Orchestra is an undergraduate large ensemble performance class. Admission is by audition and/or permission of instructor. The class meets three times per week and presents a minimum of one formal concert per quarter with a major jazz artist. The class endeavors to provide students with the opportunity to perform, at the highest level, jazz compositions and arrangements of a serious nature, and provide opportunities for challenging and creative improvisational situations. Emphasis is placed on the understanding of the structural, psychological, and emotional components of the materials studied and performed. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for total completion of 15 and 0 (zero) unit. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161C. Red Vest Band. 1 Unit.

A small ensemble of the Leland Stanford Junior University Marching Band open to members of the LSJUMB by audition and consent of instructor. Members perform at all men's and women's home basketball games and travel to some away and post-season games. Twice-weekly rehearsals focus on introduction of new student arrangements and the LSJUMB's repertoire of rock, funk, and traditional styles. May be repeated for credit a total of 7 times. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161D. Stanford Brass Ensemble. 1 Unit.

Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Performance of works for full brass choir and for smaller ensembles of brass instruments. Once weekly rehearsals. May be repeated for credit. Prerequisite: audition and consent of instructor. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161DZ. Stanford Brass Ensemble. 0 Units.

Performance of works for full brass choir and for smaller ensembles of brass instruments. Once weekly rehearsals. May be repeated for credit. Prerequisite: audition and consent of instructor. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161E. Stanford Afro-Latin Jazz Orchestra. 1 Unit.

Ensemble dedicated to the performance, interpretation and study of Afro-Latin music and its fusion with North American jazz. Repertoire includes the music of Brazil, Cuba, Dominican Republic, Puerto Rico, Peru and Argentina, as well as the United States. Idioms studied include Latin Jazz, Danzon, Son Montuno, Samba, Bossa, Traditional and Modern Salsa, Timba, Lando, and Candombe. African roots of the music are also presented including songs and rhythms from the Lucumi and Arara traditions. Focus is placed on learning rhythms, associated syncopations and also clave phrasing. One weekly rehearsal and a concert are required per quarter. Other playing opportunities available at the discretion of the group. Regular openings for brass/wind players, drummers, percussionists, pianists, bassists, and vocalists. Guest openings on violin, guitar and vibraphone. Inclusion of other instruments at the discretion of the director. Members should have basic reading ability and some related ensemble experience (e.g. jazz band). Ability to read and play complex syncopations are mandatory. Percussionists with experience in bongo, congas, timbales and pandeiro desired. Vocalists with fluency or exposure to Spanish and/or Portuguese also preferred. May be repeat for credit. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 161EZ. Stanford Afro-Latin Jazz Orchestra. 0 Units.

Ensemble dedicated to the performance, interpretation and study of Afro-Latin music and its fusion with North American jazz. Repertoire includes the music of Brazil, Cuba, Dominican Republic, Puerto Rico, Peru and Argentina, as well as the United States. Idioms studied include Latin Jazz, Danzon, Son Montuno, Samba, Bossa, Traditional and Modern Salsa, Timba, Lando, and Candombe. African roots of the music are also presented including songs and rhythms from the Lucumi and Arara traditions. Focus is placed on learning rhythms, associated syncopations and also clave phrasing. One weekly rehearsal and a concert are required per quarter. Other playing opportunities available at the discretion of the group. Regular openings for brass/wind players, drummers, percussionists, pianists, bassists, and vocalists. Guest openings on violin, guitar and vibraphone. Inclusion of other instruments at the discretion of the director. Members should have basic reading ability and some related ensemble experience (e.g. jazz band). Ability to read and play complex syncopations are mandatory. Percussionists with experience in bongo, congas, timbales and pandeiro desired. Vocalists with fluency or exposure to Spanish and/or Portuguese also preferred. May be repeat for credit for total of 0 (zero) unit. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 162. Symphonic Chorus. 1 Unit.

180- to 200-voice choral ensemble, performing major choral masterworks with orchestra. One concert per quarter. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 162Z. Symphonic Chorus. 0 Units.

180- to 200-voice choral ensemble, performing major choral masterworks with orchestra. One concert per quarter. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 163. Memorial Church Choir. 1 Unit.

Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 163Z. Memorial Church Choir. 0 Units.

Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 165. Chamber Chorale. 1 Unit.

Select 24-voice choral ensemble, specializing in virtuoso choral repertoire from all periods of Western art music. Annual touring commitment required. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 165Z. Chamber Chorale. 0 Units.

Select 24-voice choral ensemble, specializing in virtuoso choral repertoire from all periods of Western art music. Annual touring commitment required. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 167. University Singers. 1 Unit.

Select, 50-voice choral ensemble, performing choral repertoire from all periods of Western art music. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 167S. Summer Chorus. 1 Unit.

80- to 100-voice non-auditioned ensemble, performing major choral masterworks and choral repertoire from all periods of Western art music. Concert July 31, 2015 in Memorial Church. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for a total of 0(zero) unit. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 167SZ. Summer Chorus. 0 Units.

80- to 100-voice non-auditioned ensemble, performing major choral masterworks and choral repertoire from all periods of Western art music. Concert July 31, 2015 in Memorial Church. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for a total of 0 (zero) unit. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 167Z. University Singers. 0 Units.

Select, 50-voice choral ensemble, performing choral repertoire from all periods of Western art music. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 169. Stanford Taiko. 1 Unit.

Select 15- to 18-member North American taiko ensemble, performing all-original repertoire for Japanese drums. Multiple performances in Winter and Spring quarters, also touring; instrument construction and maintenance. Admission by audition in Autumn Quarter only. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 169Z. Stanford Taiko. 0 Units.

Select 15- to 18-member North American taiko ensemble, performing all-original repertoire for Japanese drums. Multiple performances in Winter and Spring quarters, also touring; instrument construction and maintenance. Admission by audition in Autumn Quarter only. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 170. Collaborative Piano. 1 Unit.

Performance class in a workshop setting. Techniques of collaboration with vocalists and instrumentalists in repertoire ranging from songs and arias to sonatas and concertos. Prerequisite: private-lesson proficiency level in piano, or consent of instructor.

MUSIC 171. Chamber Music. 1 Unit.

Admission based on audition. Weekly one-hour coachings from Music department faculty. Search for instructor section in Axess. Classical string quartets and piano/string groups are supervised by the St. Lawrence String Quartet. Two masterclasses and one performance per quarter are required. May be repeated for credit. All participants must enroll. Zero unit enrollment option available with instructor permission. See website for policy, procedure, and audition sign up: <http://music.stanford.edu/> By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 171Z. Chamber Music. 0 Units.

Admission based on audition. Weekly one-hour coachings from Music department faculty. Search for instructor section in Axess. Classical string quartets and piano/string groups are supervised by the St. Lawrence String Quartet. Two masterclasses and one performance per quarter are required. May be repeated for credit. All participants must enroll. Zero unit enrollment option available with instructor permission. See website for policy, procedure, and audition sign up: <http://music.stanford.edu/> By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 172A. Piano. 1-3 Unit.

Private lessons and group master class weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 172B. Organ. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 172C. Harpsichord. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 172D. Jazz Piano. 1-3 Unit.

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 172E. Fortepiano. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 175F. Saxophone. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 175G. Baroque Flute. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 175H. Jazz Saxophone. 1-3 Unit.

May be repeated for credit a total of 15 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 176A. French Horn. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 176B. Trumpet. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 176C. Trombone. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 176D. Tuba. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 176E. Jazz Trumpet. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 177. Percussion. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 177A. Drum Set Lessons. 1-3 Unit.

These lessons will be geared toward the individual student's desires and needs. All levels are welcome, but students should contact instructor to set up initial meeting, prior to enrolling in the course. Students will explore drumset technique, coordination, reading and a study various styles including, Jazz, Rock, R&B, Blues, Latin and Brazilian music. Students will use different texts as needed. These texts may include: Syncopation by Ted Reed, Modern Reading Text in 4/4 by Louis Bellson, A Funky Primer by Charles Dowd, Advanced Techniques for the Modern Drummer by Jim Chapin, and others. Students will also use material created by David for his classes "Around the World on a Drumset" and "Chart Reading Demystified." These lessons are designed to be both fun and challenging. Students will play along with recordings and are encouraged to bring in recordings of music that they enjoy. May be repeated for credit a total of 15 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 179Z. Applied Music Private Lessons. 0 Units.

Students enroll in appropriate instructor section for private instrumental/vocal lessons using this zero unit enrollment option. Available only with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information.

MUSIC 182. Diction for Singers. 1 Unit.

The international phonetic alphabet and its application to German, French, and Italian vocal literature. Open also to pianists interested in vocal coaching and choral conducting.

MUSIC 183A. German Art Song Interpretation. 1 Unit.

By audition only. For advanced singers and pianists as partners. Performance class in a workshop setting. Composers include Beethoven, Schubert, Wolf and Strauss. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists) or 182 (singers).

MUSIC 183B. French Art Song Interpretation. 1 Unit.

By audition only. For advanced singers and pianists as partners. Performance class in a workshop setting. Composers include Faureacute;, Debussy, Ravel and Poulenc. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists) or 182 (singers).

MUSIC 184A. Editing and Performing Early Music. 1-3 Unit.

This course is a practical workshop in early music vocal repertoire. The main focus of this course is to use original source material to explore editorial practice. Having prepared the score, students learn to perform the piece from an historically informed performance practice point of view. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 184AZ. Editing and Performing Early Music. 0 Units.

This course is a practical workshop in early music vocal repertoire. The main focus of this course is to use original source material to explore editorial practice. Having prepared the score, students learn to perform the piece from an historically informed performance practice point of view. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. All participants must enroll. May be repeated for a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 184B. Topics in Opera Stagecraft. 1-3 Unit.

This course is a practical workshop in vocal repertoire for the stage. Each quarter's offering emphasizes a specific genre or period, therefore the course can be repeated with permission of the instructor. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal etiquette for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 184BZ. Topics in Opera Stagecraft. 0 Units.

This course is a practical workshop in vocal repertoire for the stage. Each quarter's offering emphasizes a specific genre or period, therefore the course can be repeated with permission of the instructor. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal etiquette for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

MUSIC 184C. Dramatic Vocal Arts: Songs and Scenes Onstage. 1-2 Unit.

Studies in stagecraft, acting and performance for singers, culminating in a public performance. Repertoire to be drawn from the art song, opera, American Songbook and musical theater genres. Audition or consent of instructor required.

MUSIC 185. Music Across Media: Music Video to Postclassical Cinema. 4 Units.

What makes music videos, YouTube clips and musical numbers in today's films engaging? What makes them tick? Emphasis is on aesthetics and close reading. How music videos and its related forms work. Uses of the body, how visual iconography operates, what lyrics and dialogue can do, how and what music can say, and how it can work with other media. Questions of representation such as how class, ethnicity, gender, race, and nationality function. Viewership and industry practices.

Same as: FILMSTUD 141, FILMSTUD 341, MUSIC 385

MUSIC 186. Religion and Music in South Asia. 4-5 Units.

How music and other arts in South Asia are intertwined with religion. Classical, devotional, folk, and popular examples introduce Gods as musicians, sound as God, music as yoga, singing as devotion, music as iquest;ecstasyquest;-inducing, music as site for doctrinal argument, music and religion as vehicles for nationalism. Co-taught by professors of Music and Religious Studies, focusing Hinduism and Islam in India, Pakistan, and the diaspora. Music practice along with academic study; guest artists and films; no background required.

Same as: MUSIC 286, RELIGST 259

MUSIC 186A. Music and Religious Experience in the Contemporary World. 3-5 Units.

Explores the central role of music in the performance and experience of religion, positioning music not as an adjunct to silent rituals and liturgy, but as the catalyst and carrier of religious experience, indeed as religious experience itself. Topics include: trance, spirit possession, heightened religious experience, sacred sound and chant, shamanism, politics, and identity. Musical traditions include: Zimbabwean mbira music, African-American church music, Southeast Asian Buddhist ritual music, South Asian Hindu and Islamic devotional music, shamanistic music of Southeast Asia.

Same as: MUSIC 286A, RELIGST 156, RELIGST 256

MUSIC 186B. American Song in the 20th Century and after. 3-4 Units.

Critical and creative exploration of song in the Americas. About twenty-five key examples will guide discussion of the interactions between words, music, performance and culture. Weekly listening, reading and assignments will be organized around central themes: love, sex and romance; war and politics; labor and money; place; identity; society and everyday life. Genres include art song; blues, gospel, jazz and country; pop, soul, rock and hip-hop; bossa nova, nueva cancioacute;n and salsa; electronic and experimental. Takehome and in-class assignments will include critical and creative writing, and music composition, production and performance; final projects may emphasize any of the above.

Same as: AMSTUD 186B, MUSIC 286B

MUSIC 186C. Music and the Postcolonial World. 3-4 Units.

Explores the creation and dissemination of music in postcolonial settings. Focus is on the relationships between music, nationalism, and globalization and the ways in which postcolonial music confounds and exceeds territorial boundaries: through colonial travel, postcolonial diaspora, technologies of radio and sound recording, and the global capitalist commodification of world music. Specific topics on these themes include studies of Algeria, India, West Africa, and South Africa.

Same as: MUSIC 286C

MUSIC 186D. Hearing and Seeing in the Long Nineteenth Century. 3-4 Units.

Ideas about vision and hearing in science and culture from 1790 through 1910. The development of sensory physiology in the wake of Kant's *Critique of Pure Reason*, including Maine de Biran, Goethe, Helmholtz. Treatments of the senses in different spheres of culture and the arts: Baudelaire's *flacirc;neur*, Impressionist painting, sound-reproduction technologies, the musical avant-garde, early cinema. Case studies include Ceacute;zanne, Debussy, and Russolo. Focus is on the complex relationships between science and culture and the role of the senses in the formation of the 'modern' subject. HISTORY241E/341E must be taken for 4 units.

Same as: HISTORY 241E, HISTORY 341E, MUSIC 286D

MUSIC 187. Music and Culture from the Land of Fire: Introduction to Azerbaijani Mugham. 1-5 Unit.

Nestled in the Caucasus, Azerbaijan is a crossroads between East and West; its rich musical heritage contains threads of Turkish, Central Asian, Persian, Caucasian, Russian, and Arabic traditions. In this course, master-musician Imamyar Hasanov teaches students to perform and appreciate Azeri music. Content includes classical mugham, Eastern theory, improvisation and microtonality. We will discuss Azeri music culture, supplemented by guest lecturers and Skype interviews with musicians in Azerbaijan. Open to students with any experience playing a musical instrument (including voice). No previous experience with Azeri music necessary. Supported by the SF World Music Festival. Questions? Email schultz@stanford.edu.

MUSIC 192A. Foundations of Sound-Recording Technology. 3 Units.

For upper division undergraduates and graduate students; preference given to Music majors with MST specialization. Topics: elementary electronics; the physics of sound transduction and microphone operation, selection, and placement; mixing consoles; connectors and device interconnection; grounding and shielding; principles of analog magnetic recording; operation maintenance of recording equipment; and principles of recording engineering. Enrollment limited. Prerequisites: MUSIC 150, algebra, physics basics, and consent of instructor.

MUSIC 192B. Advanced Sound Recording Technology. 3 Units.

Topics: noise reduction techniques; dynamics and time-delay audio effects; the principles of digital audio; disk- and tape-based digital recorders; digital audio workstations and editing; advanced multitrack techniques; SMPTE and MIDI time code and device synchronization; MIDI sequencing and synchronization. See <http://ccrma.stanford.edu/courses/>. Prerequisite: 192A.

MUSIC 192C. Session Recording. 1-2 Unit.

Independent engineering of recording sessions. May be repeated for credit a total of 14 times. Prerequisites: 192A,B.

MUSIC 197. Undergraduate Teaching Apprenticeship. 1-2 Unit.

Work in an apprentice-like relationship with faculty teaching a student-initiated course. Prerequisite: consent of instructor. (Staff).

MUSIC 198. Concentrations Project. 4 Units.

For concentration program participants only. Must be taken in senior year. Multiple concentrators may enroll in one section of 198 per concentration.

MUSIC 199. Independent Study. 1-5 Unit.

For advanced undergraduates and graduate students who wish to do work outside the regular curriculum. Before registering, student must present specific project and enlist a faculty sponsor. May be repeated for credit a total of 14 times.

MUSIC 200A. Proseminar in Musicology and Music Bibliography. 3-4 Units.

Introduction to research in music, bibliographical materials, major issues in the field, philosophy, and methods in music history. Guest lecturers and individual research topics.

MUSIC 200B. Proseminar in Ethnomusicology. 3-5 Units.

A graduate-level introduction to the field of ethnomusicology. Issues and debates are traced through the history of the discipline, with emphasis on influences from anthropology, performance studies, linguistics, and cultural studies. Topics include music and: social organization, "culture," structure, practice, comparison, representation, globalization, identity, transcription, and embodiment.

MUSIC 201. CCRMA Colloquium. 1 Unit.

Weekly review of work being done in the field, research taking place at CCRMA, and tools to make the most of the CCRMA technical facilities.

MUSIC 202. Picturing Performance, Re-Envisioning the Arts. 2-4 Units.

Critical and creative exploration of the performing body as captured on film. Viewing/listening includes musicals, dance and opera on film, music video, experimental film and video, and moments of heightened musicality in feature film. We will focus on examples of moving media that possess a kinship with music; through gesture, rhythm or affect and through visual parameters like color, lighting, texture, camera movement and editing. Requirements include choosing and documenting a live performance, producing a short audiovisual work involving post-production, and weekly reading and viewing/listening assignments. No previous videomaking experience required. Same as: MUSIC 102

MUSIC 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field. Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

MUSIC 220A. Fundamentals of Computer-Generated Sound. 2-4 Units.

Techniques for digital sound synthesis, effects, and reverberation. Topics: summary of digital synthesis techniques (additive, subtractive, nonlinear, wavetable, spectral-modeling, and physical-modeling); digital effects algorithms (phasing, flanging, chorus, pitch-shifting, and vocoding); and techniques for digital reverberation. Majors (undergraduate or graduate) must take for 4 units. See <http://ccrma.stanford.edu/>.

MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Computational Music. 2-4 Units.

The use of high-level programming language as a compositional aid in creating musical structures. Advanced study of sound synthesis techniques. Simulation of a reverberant space and control of the position of sound within the space. See <http://ccrma.stanford.edu/>. Prerequisite: 220A.

MUSIC 220C. Research Seminar in Computer-Generated Music. 2-4 Units.

Individual projects in composition, psychoacoustics, or signal processing. See http://ccrma.stanford.edu. May be repeated for credit. Prerequisite: 220B.

MUSIC 220D. Research in Computer-Generated Music. 1-10 Unit.

Independent research projects in composition, psychoacoustics, or signal processing. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220C.

MUSIC 221. Topics in the History of Theory. 3-5 Units.

The intersection of music theory and compositional practice in different eras of Western music history. Primary sources in music theory and issues such as notation, rhythm, mode, dissonance treatment, counterpoint, tonality, form, rhetoric, affect and imitation, expression, linear analysis, 12-tone and set theory, in light of relevant repertoire and modern scholarship. May be repeated for credit a total of 5 times.

MUSIC 222. Sound in Space. 1-4 Unit.

Historical background, techniques and theory on the use of space in music composition and diffusion. Listening and analysis of relevant pieces. Experimental work in spatialization techniques leading to short studies to be diffused in concert at the end of the quarter.

MUSIC 223. Composition for Electronic Musicians. 1-4 Unit.
Composition for any combination of acoustic and electroacoustic instrumentation, computer-generated sound, invented instruments, sound-sculptures, and multi-disciplinary elements including theater and visual media. Project-based laboratory to advance original student works, supported by lectures on the fundamentals of composition. Concert performance of final works. Taught at CCRMA with a focus on engendering deliberate conversation on the enrichment of a cultural context for new media. Open to undergraduates and graduates.

MUSIC 223T. Computer Music Improvisation and Algorithmic Performance. 2-4 Units.

This seminar will investigate how to approach configuring a set of composition tools for real time composition. Composition programming, ensemble rehearsal, and performance. Determining algorithmic composition beginning by imagining a process or a structure, applying a mapping process to transform that structure (which resides in the conceptual domain), into sound (which may reveal the original conception). Investigation of gestural mapping that occurs when a sonic result is achieved by an act of interpretation, whether it be reading a score and/or improvising.

MUSIC 230. Advanced Orchestral Conducting. 2-4 Units.

May be repeated for credit a total of 8 times. Prerequisite: 130B.

MUSIC 231. Advanced Choral Conducting. 2-4 Units.

Individual instruction continuing trajectory of Music 130C. Focus on gestural technique and analysis of works by genre and historical period. May be repeated for credit a total of 8 times. Prerequisite: 130C.

MUSIC 236. Future Media, Media Archaeologies. 3-4 Units.

Hand-on. Media technologies from origins to the recent past. Students create artworks based on Victorian era discoveries and inventions, early developments in electronic media, and orphaned technologies. Research, rediscover, invent, and create devices of wonder and impossible objects. Readings in history and theory. How and what media technologies mediate. Same as: ARTSTUDI 236

MUSIC 240J. Studies in Music of the Middle Ages: Music and Memory. 3-4 Units.

Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.). Same as: MUSIC 140J

MUSIC 241. Studies in Music of the Renaissance. 2-4 Units.

Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.). Same as: MUSIC 141

MUSIC 242. Studies in Music of the Baroque. 3-4 Units.

Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.). Same as: MUSIC 142

MUSIC 243J. Studies in Music of the Classical Period: Franz Joseph Haydn. 3-4 Units.

Music and Musicians in the Age of Enlightenment Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.). Same as: MUSIC 143J

MUSIC 244J. Studies in Music of the Romantic Period: Faust in 19th-century Music. 3-4 Units.

Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.). Same as: MUSIC 144J

MUSIC 245J. Studies in Western Art Music Since 1900: The Music & Ideas of Charles Ives. 4 Units.

Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.). Same as: MUSIC 145J

MUSIC 246J. Studies in Ethnomusicology: Music Ethnography of the Bay Area. 3-5 Units.

An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing and oral history, writing fieldnotes, recording, transcription, analysis, and ethnographic writing. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: MUSIC 146J

MUSIC 247J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: AFRICAAM 19, AMSTUD 147J, CSRE 147J, MUSIC 147J

MUSIC 247K. Studies in Music, Media, and Popular Culture: Music and Urban Film. 3-4 Units.

How music and sound work in urban cinema. What happens when music's capacity to transform everyday reality combines with the realism of urban films? Provides an introduction to traditional theories of film music and film sound; considers how new technologies and practices have changed the roles of music in film. Readings discuss film music, realistic cinema, urban musical practices and urban culture. Viewing includes action/adventure, Hindi film, documentary, film noir, hip hop film, the musical, and borderline cases by Jean-Luc Godard, Spike Lee, Wong Kar-Wai and Tsai Ming-Liang. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4 unit level only.).

Same as: MUSIC 147K

MUSIC 247L. Studies in Music, Media, and Popular Culture: Latin American Music and Globalization. 3-4 Units.

Focuses on vernacular music of Latin America and the Caribbean, including Mexico, Cuba, Dominican Republic, Peru, Brazil, Colombia, and Argentina. Musical examples discussed in relation to: globalization, migration, colonialism, nationalism, diaspora, indigeneity, politics, religion, dance, ethnicity, and gender. How music reflects and shapes cultures, identities, and social structures. Genres addressed: bachata, bossa nova, cumbia, forro, ranchero, reggaeton, rock, salsa, tango, and others. Seminar, guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: MUSIC 147L

MUSIC 248J. Studies in Perf Practice: Reactions to the Record: Early Recordings, Lost Styles, and Music's Future. 3-4 Units.

This is a seminar on the transformation of musical style in the era of recordings in light of their roots in cultural trends, including shifting hierarchies between composer and performer, work and notation, text and act. Early recordings will be studied as documents of musical values and conceptions different from those around us today. Methodologies of performance analysis will be explored and used to contextualize sources, which include historic recordings from Stanford's Archive of Recorded Sound, performance documents, and field research with performers, composers, critics, and listeners. Repertoire includes works for orchestra, piano, strings, chamber ensemble and voice. Outstanding contributions from seminar members may be featured in the Music Department's May 2014 Reactions to the Record symposium. May be repeated for credit. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4-unit level only.). Same as: MUSIC 148J

MUSIC 250A. Physical Interaction Design for Music. 3-4 Units.

This lab and project-based course explores how we can physically interact with real-time electronic sound. Students learn to use and design sensors, circuits, embedded computers, communication protocols and sound synthesis. Advanced topics include real-time media, haptics, sound synthesis using physical model analogs, and human-computer interaction theory and practice. Course culminates in musical performance with or exhibition of completed design projects. See <http://ccrma.stanford.edu/>.

MUSIC 250B. Interactive Sound Art. 1-4 Unit.

A project based course where students will create Interactive Sound Art Installations focusing on the acoustical properties of reverberation. See <http://ccrma.stanford.edu/courses/250b/>.

MUSIC 251. Psychophysics and Music Cognition. 1-5 Unit.

Lecture, lab and experiment-based course in perception, psychoacoustics, cognition, and neuroscience of music. (WIM at 4 or 5 units only.)

MUSIC 252. Introduction to Music Notation Software. 1-2 Unit.

Learn to use music notation programs Finalereg; Sibeliusreg; and open-source alternatives.

MUSIC 253. Symbolic Musical Information. 2-4 Units.

Focus on symbolic data for music applications including advanced notation systems, optical music recognition, musical data conversion, and internal structure of MIDI files.

Same as: CS 275A

MUSIC 254. Music Query, Analysis, and Style Simulation. 2-4 Units.

Leveraging off three synchronized sets of symbolic data resources for notation and analysis, the lab portion introduces students to the open-source Humdrum Toolkit for music representation and analysis. Issues of data content and quality as well as methods of information retrieval, visualization, and summarization are considered in class. Grading based primarily on student projects. Prerequisite: 253 or consent of instructor. Same as: CS 275B

MUSIC 255. Intermedia Workshop. 3-4 Units.

Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent. May be repeated for credit.

Same as: ARTSTUDI 239, MUSIC 155

MUSIC 256A. Music, Computing, and Design I: Software Paradigms for Computer Music. 1-4 Unit.

Software design and implementation for computer audio. Strategies, best practices, and tradeoffs in building audio software systems of various sizes (S, M, L, XL), with a focus on interactive (real-time) systems. Lectures examine high-level designs as well as dissect code in a hands-on manner. Course work includes small programming assignments and a final software project. This course is the prerequisite for MUSIC 256B. Prerequisite: experience in C/C++ and/or Java.

Same as: CS 476A

MUSIC 256B. Music, Computing, Design II: Mobile Music. 1-4 Unit.

Aesthetic, design, and implementation of mobile music, centered around the modern super smartphones such as the iPhone). Similarities and intrinsic differences between mobile and traditional computing and design for music. Topics include mobile software design, social and cloud computing, mobile interface design, and programming phones, in the service of music. Prerequisite: MUSIC 256A.

Same as: CS 476B

MUSIC 257. Neuroplasticity and Musical Gaming. 3-5 Units.

What changes in a musician's brain after hours and years of daily practice? How do skills that make a great violinist transfer to other abilities? Can directed neuroplasticity be used to target skill learning? This course will include fundamentals of psychoacoustics and auditory neuroscience. Focus will be development of video games that use perceptually motivated tasks to drive neural change. Emphasis will be on music, linguistic, and acoustic based skills. Programming experience is highly recommended, but not required.

MUSIC 260. Music of South Asia. 3-4 Units.

Focuses on the history, theory, and practice of South Asian music with particular emphasis on the classical traditions of North and South India. Also addresses regional folk, popular, and devotional musical styles of India, Pakistan, and Afghanistan. Topics include: raga, tala, vocal and instrumental genres, improvisation, aesthetics, music transmission, musical nationalism, social organization of musicians, music and ritual, music and gender, and technology. Lecture with discussion, some singing (no experience necessary), guest performances, reading, listening, and analysis.

MUSIC 269. Research in Performance Practices. 1-5 Unit.

Directed reading and research. May be repeated for credit a total of 5 times.

MUSIC 272A. Advanced Piano. 1-3 Unit.

Private lessons and group masterclass weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 272B. Advanced Organ. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 272C. Advanced Harpsichord. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 272D. Advanced Jazz Piano. 1-3 Unit.

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 272E. Advanced Fortepiano. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 272F. Advanced Carillon. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 275G. Advanced Baroque Flute. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 275H. Advanced Jazz Saxophone. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 276A. Advanced French Horn. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 276B. Advanced Trumpet. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 276C. Advanced Trombone. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 276D. Advanced Tuba. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 276E. Advanced Jazz Trumpet. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 277. Advanced Percussion. 1-3 Unit.

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 277A. Advanced Drum Set. 1-3 Unit.

May be repeated for credit a total of 15 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

MUSIC 280. TA Training Course. 1 Unit.

Required for doctoral students serving as teaching assistants. Orientation to resources at Stanford, guest presentations on the principles of common teaching activities, supervised teaching experience. Students who entered in the Autumn should take 280 in the Spring prior to the Autumn they begin teaching.

MUSIC 286. Religion and Music in South Asia. 4-5 Units.

How music and other arts in South Asia are intertwined with religion. Classical, devotional, folk, and popular examples introduce Gods as musicians, sound as God, music as yoga, singing as devotion, music as iquest;ecstasyquest;-inducing, music as site for doctrinal argument, music and religion as vehicles for nationalism. Co-taught by professors of Music and Religious Studies, focusing Hinduism and Islam in India, Pakistan, and the diaspora. Music practice along with academic study; guest artists and films; no background required.

Same as: MUSIC 186, RELIGST 259

MUSIC 286A. Music and Religious Experience in the Contemporary World. 3-5 Units.

Explores the central role of music in the performance and experience of religion, positioning music not as an adjunct to silent rituals and liturgy, but as the catalyst and carrier of religious experience, indeed as religious experience itself. Topics include: trance, spirit possession, heightened religious experience, sacred sound and chant, shamanism, politics, and identity. Musical traditions include: Zimbabwean mbira music, African-American church music, Southeast Asian Buddhist ritual music, South Asian Hindu and Islamic devotional music, shamanistic music of Southeast Asia.

Same as: MUSIC 186A, RELIGST 156, RELIGST 256

MUSIC 286B. American Song in the 20th Century and after. 3-4 Units.

Critical and creative exploration of song in the Americas. About twenty-five key examples will guide discussion of the interactions between words, music, performance and culture. Weekly listening, reading and assignments will be organized around central themes: love, sex and romance; war and politics; labor and money; place; identity; society and everyday life. Genres include art song; blues, gospel, jazz and country; pop, soul, rock and hip-hop; bossa nova, nueva cancioacute;n and salsa; electronic and experimental. Takehome and in-class assignments will include critical and creative writing, and music composition, production and performance; final projects may emphasize any of the above.

Same as: AMSTUD 186B, MUSIC 186B

MUSIC 286C. Music and the Postcolonial World. 3-4 Units.

Explores the creation and dissemination of music in postcolonial settings. Focus is on the relationships between music, nationalism, and globalization and the ways in which postcolonial music confounds and exceeds territorial boundaries: through colonial travel, postcolonial diaspora, technologies of radio and sound recording, and the global capitalist commodification of world music. Specific topics on these themes include studies of Algeria, India, West Africa, and South Africa.

Same as: MUSIC 186C

MUSIC 286D. Hearing and Seeing in the Long Nineteenth Century. 3-4 Units.

Ideas about vision and hearing in science and culture from 1790 through 1910. The development of sensory physiology in the wake of Kant's *Critique of Pure Reason*, including Maine de Biran, Goethe, Helmholtz. Treatments of the senses in different spheres of culture and the arts: Baudelaire's *flacirc;neur*, Impressionist painting, sound-reproduction technologies, the musical avant-garde, early cinema. Case studies include Ceacute;zanne, Debussy, and Russolo. Focus is on the complex relationships between science and culture and the role of the senses in the formation of the 'modern' subject. HISTORY241E/341E must be taken for 4 units.

Same as: HISTORY 241E, HISTORY 341E, MUSIC 186D

MUSIC 300A. Medieval Notation. 3-4 Units.

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.

MUSIC 300B. Renaissance Notation. 4 Units.

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.

MUSIC 300C. Medieval Methodologies. 3 Units.

An introduction to the essential tool-kit for medievalists, this course will give all medievalists a great head start in knowing how to access and interpret major works and topics in the field. Stanford's medieval faculty will explain the key sources and methods in the major disciplines from History to Religion, French to Arabic, English to Chinese, and Art History to German and Music. In so doing, students will be introduced to the breadth and interdisciplinary potential of Medieval Studies. A workshop devoted to Digital Technologies and Codicology/Palaography will offer elementary training in these fundamental skills.

Same as: DLCL 300

MUSIC 302. Research in Musicology. 1-5 Unit.

Directed reading and research. May be repeated for credit a total of 14 times.

MUSIC 305A. Analysis and Repertoire: Medieval and Renaissance. 4 Units.

Analytical approaches to genres, styles, forms, and techniques of Western music from [chant and early polyphony through the sixteenth century]. Issues of aesthetics, history, and interpretation viewed through representative repertoire, readings, and analytical methods.

MUSIC 305B. Analysis and Repertoire: Baroque to Early Romantic. 4 Units.

Analytical approaches to genres, styles, forms, and techniques of Western music from the seventeenth through the mid-nineteenth centuries. Issues of aesthetics, history, and interpretation viewed through representative repertoire, readings, and analytical methods.

MUSIC 305C. Analysis and Repertoire: Late-Romantic to Contemporary. 4 Units.

Analytical approaches to genres, styles, materials and techniques of Western music from the mid-nineteenth century through the present. Questions of aesthetics, history and performance explored through musical analysis. Representative repertoire and readings, and a range of analytical methods.

MUSIC 310. Research Seminar in Musicology. 3-5 Units.

For graduate students. Topics vary each quarter. May be repeated for credit a total of 8 times.

MUSIC 310A. Music and Critical Theory. 3-5 Units.

The seminar provides an opportunity to study some of the seminal texts of Critical Theory dealing with music. Concentrating on Theodor Adorno's writings on music, we will also include key philosophers who informed Adorno's thinking (in particular Kant, Hegel and Nietzsche), influential nineteenth-century aesthetics of music (Hoffmann, Schopenhauer and Hanslick), other contemporaries of Adorno (for example, Ernst Bloch), and some later authors whose work was influenced by the Frankfurt School (such as Carl Dahlhaus). We will also consider the impact of Critical Theory on recent scholarship. Weekly meetings will be organized around various topics, ranging from central concepts such as "Enlightenment" and "musical material" to individual composers. Music by Wagner, Mahler, Schoenberg, Stravinsky and Weill will feature prominently on the syllabus. Same as: GERMAN 310A

MUSIC 312A. Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche. 4 Units.

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.

MUSIC 312B. Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today. 4 Units.

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.

MUSIC 318. Advanced Acoustics. 1-5 Unit.

Current topics. May be repeated for credit.

MUSIC 319. Research Seminar on Computational Models of Sound Perception. 1-3 Unit.

All aspects of auditory perception, often with emphasis on computational models. Topics: music perception, signal processing, auditory models, pitch perception, speech, binaural hearing, auditory scene analysis, basic psychoacoustics, and neurophysiology. See <http://ccrma.stanford.edu/courses/>. May be repeated for credit a total of 14 times.

MUSIC 320A. Introduction to Audio Signal Processing Part I: Spectrum Analysis. 3-4 Units.

Digital signal representations and transforms for music and audio research. Topics: complex numbers, sinusoids, spectrum representation, sampling and aliasing, the Discrete Fourier Transform (DFT), Fourier theorems, z transform, Laplace transform, and associated Matlab software. See <http://ccrma.stanford.edu/courses/320/>.

MUSIC 320B. Introduction to Audio Signal Processing Part II: Digital Filters. 3-4 Units.

Digital filters for music and audio research. Topics: digital filter structures, frequency response, z transforms, transfer-function analysis, and associated Matlab software. See <http://ccrma.stanford.edu/courses/320/>.

MUSIC 321. Readings in Music Theory. 1-5 Unit.

Directed reading and research. May be repeated for credit a total of 15 times.

MUSIC 323. Doctoral Seminar in Composition. 3-4 Units.

Illustrated discussions of compositional issues and techniques. Presentation of relevant topics, including students' own compositional practice. May be repeated for credit a total of 14 times.

MUSIC 324. Graduate Composition Forum. 1 Unit.

Community forum for all graduate student composers. Discussion of completed and in-progress work by students, faculty, and visiting composers. Repertoire listening sessions. Planning of upcoming Department events. Special area exam topic presentations, final doctoral project presentations, and review of portfolios. Many sessions are open to the public. May be repeated for credit.

MUSIC 325. Individual Graduate Projects in Composition. 1-5 Unit.

May be repeated for credit.

MUSIC 330. Musicology Dissertation Colloquium. 1-4 Unit.

Weekly meetings for all musicology students 4th year and beyond to discuss research and writing strategies, share and critique work in progress, and discuss issues in professional development (preparing abstracts, conference papers, C.V. and job interviews, book reviews, submitting articles for publication). Open to 3rd-year students.

MUSIC 341. Ph.D Dissertation. 1-10 Unit.

May be repeated for credit a total of 5 times.

MUSIC 351. Seminar in Music Perception and Cognition. 1-3 Unit.

A seminar on topics in music perception and cognition. Students will study and discuss recent research as well as design and implement experiments.

MUSIC 385. Music Across Media: Music Video to Postclassical Cinema. 4 Units.

What makes music videos, YouTube clips and musical numbers in today's films engaging? What makes them tick? Emphasis is on aesthetics and close reading. How music videos and its related forms work. Uses of the body, how visual iconography operates, what lyrics and dialogue can do, how and what music can say, and how it can work with other media. Questions of representation such as how class, ethnicity, gender, race, and nationality function. Viewership and industry practices.

Same as: FILMSTUD 141, FILMSTUD 341, MUSIC 185

MUSIC 390. Practicum Internship. 1 Unit.

On-the-job training under the guidance of experienced, on-site supervisors. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of adviser.

MUSIC 399. D.M.A. Final Project. 1-10 Unit.

May be repeated for credit a total of 5 times.

MUSIC 408C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

MUSIC 420A. Signal Processing Models in Musical Acoustics. 3-4 Units.

Computational methods in musical sound synthesis and digital audio effects based on acoustic physical models. Topics: acoustic simulation with delay lines, digital filters, and nonlinear elements; comb filters; allpass filters; artificial reverberation; delay-line interpolation and sampling-rate conversion; phasing, flanging, and chorus effects; efficient computational models of strings, woodwinds, brasses, and other musical instruments. See <http://ccrma.stanford.edu/courses/420/>. Prerequisites: MUSIC 320A and MUSIC 320B or equivalent; PHYSICS 21 or equivalent course applying Newton's laws of motion; and CS 106B or equivalent programming in C and C++.

MUSIC 421A. Audio Applications of the Fast Fourier Transform. 3-4 Units.

Spectrum analysis and signal processing using Fast Fourier Transforms (FFTs) with emphasis on audio applications. Topics: Fourier theorems; FFT windows; spectrum analysis; spectrograms; sinusoidal modeling; spectral modeling synthesis; FFT convolution; FIR filter design and system identification; overlap-add and filter-bank-summation methods for short-time Fourier analysis, modification, and resynthesis. See <http://ccrma.stanford.edu/courses/421/>. Prerequisite: Music 320 or equivalent background in spectrum analysis and linear systems.

Same as: FFT

MUSIC 421B. Projects in Spectral Audio Signal Processing. 1-10 Unit.

Frequency-domain methods for analysis and/or synthesis of sound. The principal activity is a software project. Continuing 421A, additional frequency-domain techniques for analysis, modification, and/or synthesis of audio signals will be discussed.

MUSIC 422. Perceptual Audio Coding. 3 Units.

History and basic principles: development of psychoacoustics-based data-compression techniques; perceptual-audio-coder applications (radio, television, film, multimedia/internet audio, DVD, EMD). In-class demonstrations: state-of-the-art audio coder implementations (such as AC-3, MPEG) at varying data rates; programming simple coders. Topics: audio signals representation; quantization; time to frequency mapping; introduction to psychoacoustics; bit allocation and basic building blocks of an audio codec; perceptual audio codecs evaluation; overview of MPEG-1, 2, 4 audio coding and other coding standards (such as AC-3). Prerequisites: knowledge of digital audio principles, familiarity with C programming. Recommended: 320, EE 261. See <http://ccrma.stanford.edu/>.

MUSIC 423. Graduate Research in Music Technology. 1-10 Unit.

Research discussion, development, and presentation by graduate students, visiting scholars, and CCRMA faculty in the areas of music and/or audio technology. See <http://ccrma.stanford.edu/courses/423/> for latest information. May be repeated for credit.

MUSIC 424. Signal Processing Techniques for Digital Audio Effects. 3-4 Units.

Techniques for dynamic range compression, reverberation, equalization and filtering, panning and spatialization, digital emulation of analog processors, and implementation of time-varying effects. Single-band and multiband compressors, limiters, noise gates, de-essers, convolutional reverberators, parametric and linear-phase equalizers, wah-wah and envelope-following filters, and the Leslie. Students develop effects algorithms of their own design in labs. Prerequisites: digital signal processing, sampling theorem, digital filtering, and the Fourier transform at the level of 320 or EE 261; Matlab and modest C programming experience. Recommended: 420 or EE 264; audio effects in mixing and mastering at the level of 192.

MUSIC 451A. Basics in Auditory and Music Neuroscience. 2-5 Units.

Understanding basic concepts and techniques in cognitive neuroscience using electroencephalography (EEG) specific to auditory perception and music cognition via seminar and laboratory exercise work. Acquiring and practicing skills in experimental design, data analysis, and interpretation, writing for scientific reports and research proposals, and giving a critical review of others' scientific work. Seminar discusses related literature in neuroanatomy, neurophysiology, psychology, and neuroimaging. Laboratory focuses on electroencephalography (EEG) techniques, classic paradigms for recording evoked response, and associated data analysis methods.

MUSIC 451B. Advanced Research in Auditory and Music Neuroscience. 2-5 Units.

Advancing research skills in cognitive neuroscience specific to auditory perception and music cognition by doing individual research project. Activities include surveying literature, designing own study, discussing others' research and giving constructive criticisms, writing research proposals, reports and critical reviews. Laboratory works covers advanced electroencephalography (EEG) recording and analysis techniques. Seminar discusses related literature in basic and clinical research in neurophysiology and neuropsychology. Final project is aimed at producing presentable data based on hypothesis-driven experiment. Prerequisite: Music 451A.

MUSIC 801. TGR Project. 0 Units.

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MUSIC 802. TGR Dissertation. 0 Units.

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Native American Studies Courses

NATIVEAM 102. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3-5 Units.

This interdisciplinary seminar explores challenges and avenues for furthering protection of the cultural heritage rights enshrined in the UN Declaration on the Rights of Indigenous Peoples. Using an innovative combination of online lectures by Stanford faculty and students, and recorded interviews with Indigenous leaders, artists, performers, scholars and museum professionals, the seminar will explore and problematize: historic and contemporary understandings of "Indigenous cultural heritage" and the impact of colonialism, urbanization and other forces on Indigenous identity and cultural heritage; current and potential domestic and international legal and non-legal frameworks for Indigenous cultural heritage protection and repatriation; past and present museum approaches to Indigenous peoples and their cultural material; and optimal methods of resolving repatriation disputes. While the seminar will cover primarily the situation of Indigenous peoples in North America, comparisons will be drawn with other regions of the globe. The on-campus component of the seminar will involve directed discussions of the online content, the online forum, assigned readings and short writing assignments. Students can choose between a final exam, paper or video project. Lunch is provided. Same as: ANTHRO 102C, ARCHLGY 101, ARCHLGY 202, CSRE 102

NATIVEAM 103S. Native American Women, Gender Roles, and Status. 5 Units.

Historical and cultural forces at work in traditional and contemporary Native American women's lives through life stories and literature. How women are fashioning gendered indigenous selves. Focus is on the diversity of Native American communities and cultures. Same as: CSRE 103S, FEMGEN 103S

NATIVEAM 108S. American Indian Religious Freedom. 5 Units.

The persistence of tribal spiritual beliefs and practices in light of legal challenges (sacred geography and the 1st Amendment), treatment of the dead and sacred objects (repatriation), consumerism (New Age commodification), and cultural intellectual property protection (trademark, copyright, patent law). Focus is on contemporary issues and cases, analyzed through interdisciplinary scholarship and practical strategies to protect the fundamental liberty of American Indian religious freedom. Same as: CSRE 108S

NATIVEAM 109A. Federal Indian Law. 5 Units.

Cases, legislation, comparative justice models, and historical and cultural material. The interlocking relationships of tribal, federal, and state governments. Emphasis is on economic development, religious freedom, and environmental justice issues in Indian country. Same as: CSRE 109A

NATIVEAM 111B. Muwekma: Landscape Archaeology and the Narratives of California Natives. 3-5 Units.

This course explores the unique history of San Francisco Bay Area tribes with particular attention to Muwekma Ohlone- the descendent community associated with the landscape surrounding and including Stanford University. The story of Muwekma provides a window into the history of California Indians from prehistory to Spanish exploration and colonization, the role of Missionaries and the controversial legacy of Junipero Serra, Indigenous rebellions throughout California, citizenship and land title during the 19th century, the historical role of anthropology and archaeology in shaping policy and recognition of Muwekma, and the fight for acknowledgement of Muwekma as a federally recognized tribe. We will visit local sites associated with this history and participate in field surveys of the landscape of Muwekma.

Same as: ANTHRO 111B, ARCHLGY 111B

NATIVEAM 115. Introduction to Native American History. 5 Units.

This course surveys Native American history beginning with the forced removal of the Cherokee and other tribes from their eastern homelands to the geographic area of what is now the state of Oklahoma. This course will examine key issues including specific cases, i.e. the Marshall trilogy through a historic lens. The course material will cover Native American history to events leading up to the era of the civil rights movement in the twentieth century. The subject of sovereignty and self-determination will be discussed as part of the historic experience of Native Americans through assigned readings, short films, and other media.

NATIVEAM 121. Discourse of the Colonized: Native American and Indigenous Voices. 5 Units.

Using the assigned texts covering the protest movements in the 20th century to the texts written from the perspective of the colonized at the end of the 20th century, students will engage in discussions on decolonization. Students will be encouraged to critically explore issues of interest through two short papers and a 15-20 minute presentation on the topic of interest relating to decolonization for Native Americans in one longer paper. Approaching research from an Indigenous perspective will be encouraged throughout.

Same as: CSRE 121

NATIVEAM 123A. American Indians and the Cinema. 5 Units.

Hollywood and the film industry have had a major influence on American society for nearly a century. Initially designed to provide entertainment, the cinema broadened its impact by creating images perceived as real and essentialist. Hollywood's Indians have been the main source of information about who American Indians are and Hollywood has helped shape inaccurate and stereotypical perceptions that continue to exist today. This course looks chronologically at cinematic interpretations and critically examines accurate portrayals of American Indians and of American history. Same as: CSRE 123A

NATIVEAM 134. Museum Cultures: Material Representation in the Past and Present. 5 Units.

Students will open the iquest;black boxiquest; of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores iquest;museum culturesiquest;; representations of iquest;selfiquest; and iquest;otheriquest;; within museums and institutional cultures of the museum world itself.

Same as: AMSTUD 134, ARCHLGY 134, ARCHLGY 234, ARTHIST 284B, CSRE 134, EDUC 214

NATIVEAM 138. American Indians in Comparative Historical Perspective. 4 Units.

(Graduate students register for 238.) Demographic, political, and economic processes and events that shaped relations between Euro-Americans and American Indians, 1600-1890. How the intersection of these processes affected the outcome of conflicts between these two groups, and how this conflict was decisive in determining the social position of American Indians in the late 19th century and the evolution of the doctrine of tribal sovereignty.

Same as: SOC 138, SOC 238

NATIVEAM 139. American Indians in Contemporary Society. 4 Units.

(Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions such as tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history.

Same as: SOC 139, SOC 239

NATIVEAM 143A. American Indian Mythology, Legend, and Lore. 3-5 Units.

(English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, "Black Elk Speaks."

Same as: ENGLISH 43A, ENGLISH 143A

NATIVEAM 163. Endangered Languages and Language Revitalization. 3-4 Units.

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages.

Same as: ANTHRO 163A, ANTHRO 263A, LINGUIST 163A, LINGUIST 263

NATIVEAM 167. Performing Indigeneity on Global Stage. 4 Units.

Explores how indigeneity is expressed and embodied through performance on the global stage.

Same as: DANCE 167

NATIVEAM 200R. Directed Research. 1-5 Unit.

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NATIVEAM 200W. Directed Reading. 1-5 Unit.

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NATIVEAM 240. Psychology and American Indian Mental Health. 3-5 Units.

Western medicine's definition of health as the absence of sickness, disease, or pathology; Native American cultures' definition of health as the beauty of physical, spiritual, emotional, and social things, and sickness as something out of balance. Topics include: historical trauma; spirituality and healing; cultural identity; values and acculturation; and individual, school, and community-based interventions. Prerequisite: experience working with American Indian communities.

Same as: EDUC 340

NATIVEAM 255. Native American Identity in the American Imagination: 19th Century to Present. 5 Units.

Because cultural identity is similar to and overlaps with identity politics, this course will examine Native American identity in current culture through American imagination and perspective as to what it is to be Native American today. Historic perspectives from the 19th century to the present will be covered as well.

Neurobiology Courses

NBIO 101. Social and Ethical Issues in the Neurosciences. 2-4 Units.

Influences on public debate and policy of scientific advances in the study of the brain and behavior: theories of brain function; philosophical and scientific approaches; advances in the neurosciences, possible uses in medical therapy, and interventions involving genetic screening, genetic selection, enhancement of neurological functioning, and manipulation of behavior; questions related to medical therapy, social policy, and broader considerations of human nature such as consciousness, free will, personal identity, and moral responsibility. May be taken for 2 units without a research paper. Prerequisite: Neuroscience, Biology, or Symbolic Systems major; or Human Biology core; or consent of instructor.

Same as: NBIO 201

NBIO 198. Directed Reading in Neurobiology. 1-18 Unit.

Prerequisite: consent of instructor. (Staff).

NBIO 199. Undergraduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

NBIO 201. Social and Ethical Issues in the Neurosciences. 2-4 Units.

Influences on public debate and policy of scientific advances in the study of the brain and behavior: theories of brain function; philosophical and scientific approaches; advances in the neurosciences, possible uses in medical therapy, and interventions involving genetic screening, genetic selection, enhancement of neurological functioning, and manipulation of behavior; questions related to medical therapy, social policy, and broader considerations of human nature such as consciousness, free will, personal identity, and moral responsibility. May be taken for 2 units without a research paper. Prerequisite: Neuroscience, Biology, or Symbolic Systems major; or Human Biology core; or consent of instructor.

Same as: NBIO 101

NBIO 206. The Nervous System. 7-8 Units.

Structure and function of the nervous system, including neuroanatomy, neurophysiology, and systems neurobiology. Topics include the properties of neurons and the mechanisms and organization underlying higher functions. Framework for general work in neurology, neuropathology, clinical medicine, and for more advanced work in neurobiology. Lecture and lab components must be taken together.

NBIO 216. Genetic Analysis of Behavior. 3 Units.

Advanced seminar. Findings and implications of behavioral genetics as applied to invertebrate and vertebrate model systems. Topics include biological clocks, and sensation and central pattern generators. Relevant genetic techniques and historical perspective. Student presentation.

Same as: MCP 216

NBIO 218. Neural Basis of Behavior. 5 Units.

Advanced seminar. The principles of information processing in the nervous system and the relationship of functional properties of neural systems with perception, behavior, and learning. Original papers; student presentations. Prerequisite: NBIO 206 or consent of instructor.

NBIO 220. Central Mechanisms in Vision-based Cognition. 2-4 Units.

Contemporary cognitive neuroscience, emphasizing the use of the primate visual and oculomotor systems to explore neural mechanisms underlying perception, attention, learning, and decision-making. Eight foundational topics in cognitive neuroscience; intensive study and critical discussion of selected papers from the contemporary literature. Student presentations, seminar-style discussions. Class enrollment is limited to 12 students. First priority will be given to students from the neurosciences graduate program.

NBIO 221. Frontiers in Translational Medicine. 1 Unit.

Small group course for first year MSTP and Master's in Medicine students only. Focus is on pathways for combining science and medicine during graduate and postdoctoral training and in one's career, and practical aspects of translational medicine. Guest lecturers are physician-scientists who have advanced the frontiers of translational medicine. Previous lecturers have included Drs. Gilbert Chu, Jamie Topper, Irv Weissman, Beverly Mitchell, Geoff Duyk, William Mobley, Judy Shizuru, Carla Shatz, Linda Boxer and David Cox. Prerequisite: consent of instructor.

NBIO 227. Understanding Techniques in Neuroscience. 2 Units.

Topics include molecular, genetic, behavioral, electrophysiological, imaging, and computational approaches used in the field of neuroscience. Presentations and discussions led by senior graduate students, assigned readings from the primary neuroscience literature, and optional laboratory demonstrations. Intended for graduate students from any discipline and for advanced undergraduates in the biosciences, engineering, or medicine.

NBIO 228. Mathematical Tools for Neuroscience. 2 Units.

Student-instructed. For students with no math background beyond basic calculus, or as a review for more advanced students. Techniques useful for analysis of neural data including linear algebra, Fourier transforms, probability and statistics, signal detection, Bayesian inference, and information theory.

NBIO 254. Molecular and Cellular Neurobiology. 3-5 Units.

For graduate students. Includes lectures for BIO 154. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases. Same as: BIO 254

NBIO 258. Information and Signaling Mechanisms in Neurons and Circuits. 4 Units.

How synapses, cells, and neural circuits process information relevant to a behaving organism. How phenomena of information processing emerge at several levels of complexity in the nervous system, including sensory transduction in molecular cascades, information transmission through axons and synapses, plasticity and feedback in recurrent circuits, and encoding of sensory stimuli in neural circuits.

NBIO 299. Directed Reading in Neurobiology. 1-18 Unit.

Prerequisite: consent of instructor.

NBIO 300. Professional Development and Integrity in Neuroscience. 1-2 Unit.

Required of Neurosciences Ph.D. students every quarter. Develops professional skills in critical assessment and oral presentation of findings from current neuroscience literature in the visual presentation of quantitative data and writing research grants. The role of animals in lab research, fraud in science, the responsibility of authors and reviewers, science in a multicultural environment, and the relationship between student and mentor. Student and faculty presentations and discussions.

NBIO 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

NBIO 399. Graduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Neurology Neurological Sciences Courses

NENS 67N. Intracellular Trafficking and Neurodegeneration. 3 Units.

Preference to freshmen. Cell structures and functions, the intracellular trafficking system that maintains exchanges of materials and information inside cells, and clinical features and pathologies of neurodegenerative diseases. Techniques for examining cellular and subcellular structures, especially cytoskeletons; functional insights generated from structural explorations. Prerequisite: high school biology.

NENS 199. Undergraduate Research. 1-18 Unit.

Students undertake research sponsored by an individual faculty member. Prerequisite: consent of instructor.

NENS 202. Longevity. 4 Units.

Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.

Same as: HUMBIO 149L, PSYCH 102

NENS 204. Stroke Seminar. 1 Unit.

Standing at the intersection of many fields of medicine, including neurology, internal medicine, cerebrovascular surgery, diagnostic and interventional radiology, and emergency medicine, as the third leading cause of death and the leading cause of disability, stroke is a critical topic for all practitioners of medicine. This seminar draws upon Stanford's leaders in stroke research to present and discuss the causes, presentation, treatment, and imaging characteristics of the disease.

NENS 205. Neurobiology of Disease Seminar. 3 Units.

Case demonstrations of selected disorders, discussion of the pathophysiological basis of the disorder, presentation of the basic principles underlying modern diagnostic and therapeutic management, and a discussion of recent research advances for each disease entity. Prerequisite: Neurobiology 206 or consent of instructor.

NENS 206. Introduction to Neurology Seminar. 1 Unit.

Exploration of aspects of neurology, including subspecialties. Current issues, clinical cases, and opportunities in the field.

NENS 207. Neuroscience Core Curriculum: Translational Neuroscience. 1 Unit.

Emphasis on basic and preclinical research in selected categories of neurological disease, and understanding how these discoveries are being translated into therapies. Readings include primary scientific literature in mechanisms of disease and translational approaches and selected current reviews. Enrollment limited to 20 students. For first year Neuroscience graduate students, open to other graduate students as space permits with preference given to Neurosciences students .

NENS 220. Computational Neuroscience. 4 Units.

Computational approaches to neuroscience applied at levels ranging from neurons to networks. Addresses two central questions of neural computation: How do neurons compute; and how do networks of neurons encode/decode and store information? Focus is on biophysical (Hodgkin-Huxley) models of neurons and circuits, with emphasis on application of commonly available modeling tools (NEURON, MATLAB) to issues of neuronal and network excitability. Issues relevant to neural encoding and decoding, information theory, plasticity, and learning. Fundamental concepts of neuronal computation; discussion focus is on relevant literature examples of proper application of these techniques. Final project. Recommended for Neuroscience Program graduate students; open to graduate, medical, and advanced undergraduate students with consent of instructor. Prerequisite: NBIO 206. Recommended: facility with linear algebra and calculus.

NENS 230. Analysis Techniques for the Biosciences Using MATLAB. 2 Units.

Data analysis and visualization techniques commonly encountered in biosciences research. Fundamentals of the MATLAB computing environment, programming and debugging, data import/export, data structures, plotting, image analysis, introduction to statistical tools. Examples and assignments draw from a range of topics applicable to bioscience research: frequency analysis, genetic data mining, ion channel kinetics, neural spike rasters and spike-triggered averages, cell counting in fluorescence images, regression, PCA, and stochastic simulation. Assignments are practical in nature and demonstrate how to implement specific analyses that a biosciences student is likely to encounter.

NENS 267. Molecular Mechanisms of Neurodegenerative Disease. 4 Units.

The epidemic of neurodegenerative disorders such as Alzheimer's and Parkinson's disease occasioned by an aging human population. Genetic, molecular, and cellular mechanisms. Clinical aspects through case presentations.

Same as: BIO 267

NENS 299. Directed Reading in Neurology and Neurological Science. 1-18 Unit.

Prerequisite: consent of instructor.

NENS 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

NENS 399. Graduate Research. 1-18 Unit.

Students undertake research sponsored by individual faculty members. Includes laboratory work in neurophysiology and neurochemistry.

Neurosciences Program Courses

NEPR 299. Directed Reading in Neurosciences. 1-18 Unit.

Prerequisite: consent of instructor.

NEPR 399. Graduate Research. 1-18 Unit.

Student investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

NEPR 801. TGR Project. 0 Units.

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NEPR 802. TGR Dissertation. 0 Units.

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Neurosurgery Courses

NSUR 70Q. Experimental Stroke. 2 Units.

Preference to sophomores. How stroke is studied in the laboratory; advances in stroke research over the last two decades; and future directions. Topics include: cellular and molecular mechanisms of neuronal death and survival in the brain after stroke, including necrosis, apoptosis, inflammation, and cell signaling pathways; experimental tools for stroke treatment, such as gene therapy, cell therapy, hypothermia, preconditioning, postconditioning, and other pharmacological treatments; the gap and barrier between laboratory research and clinical translation.

NSUR 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

NSUR 200SI. Narratives in Neurosurgery. 1 Unit.

Introduces medical, non-medical graduate and undergraduate students to careers in neurosurgery. Focuses on a progressive walk through the educational milestones of a neurosurgical career, starting with perspectives of 4th year medical students and working up to day-to-day functions and lifestyles of senior neurosurgical faculty. Additional topics covered include: global health neurosurgery, private practice neurosurgery, and academic neurosurgery.

NSUR 261. Principles and Practice of Stem Cell Engineering. 3 Units.

Quantitative models used to characterize incorporation of new cells into existing tissues emphasizing pluripotent cells such as embryonic and neural stem cells. Molecular methods to control stem cell decisions to self-renew, differentiate, die, or become quiescent. Practical, industrial, and ethical aspects of stem cell technology application. Final projects: team-reviewed grants and business proposals.

Same as: BIOE 261

NSUR 280. Early Clinical Experience in Neurosurgery. 1-2 Unit.

Provides an observational experience as formulated by the instructor and student. Prerequisite: consent of instructor.

NSUR 287. Brain Machine Interfaces - Theory and Technology Course Information. 1-3 Unit.

(Same as MCP 287) There is a growing number of methods to interact with the living nervous system. This seminar will review methods, principal results, and ideas for designing devices that either act on or read out data from the nervous system. A principal objective of designing these devices is to use them for sensory prosthetics (retinal implants and motor control units), and also for reducing the symptoms of different diseases (Parkinsons, Depression, Epilepsy). We will consider a wide variety of applications, but our emphasis will be on electronic devices that either stimulate or read-out from the human brain.

Same as: PSYCH 287

NSUR 299. Directed Reading in Neurosurgery. 1-18 Unit.

Prerequisite: consent of instructor.

NSUR 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

NSUR 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Obstetrics Gynecology Courses

OBGYN 81Q. Perspectives on the Abortion Experience in Western Fiction. 3 Units.

Explores the role of media in delivering abortion-related messages as well as the broader questions of how abortion and related issues are fundamentally integrated into the social fabric of US and global societies. Abortion remains one of the most controversial and polarizing challenges of our time. Yet, it has been a clinical, social, political, and cultural fact in a broad swath of societies for centuries. As is common for such lightning rod issues, the topic of abortion has featured prominently in novels and films. Each treatment provides a unique perspective on at least one aspect of abortion, whether it be clinical, social, political or cultural. How abortion is portrayed in novels and films provides the student of history, anthropology, and biology with insights into the author's or director's perspectives, and into societal attitudes and mores.

OBGYN 199. Undergraduate Research in Reproductive Biology. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

OBGYN 202. Assisted Reproductive Technologies. 1-3 Unit.

Primary and current literature in basic and clinical science aspects of assisted reproductive technologies (ART), and demonstrations of current ART techniques including in vitro fertilization and embryo culture, and micromanipulation procedures such as intracytoplasmic sperm injection and embryo biopsy and cryopreservation. Class only may be taken for 1 unit. 2 units includes papers and attendance at clinical demonstrations. 3 units includes a term paper. Recommended: DBIO 201, or consent of instructors. Same as: HUMBIO 150A

OBGYN 216. Current Issues in Reproductive Health. 1 Unit.

Reproductive Health is a broad subject encompassing many concepts and practices. Issues and services within the context of reproductive health include such diverse topics as fertility, pregnancy, contraception, abortion, sexuality, menopause and parenting. Course focuses on topics related to abortion services, fertility and contraception; current research and practices in family planning; legislation and issues of access.

OBGYN 256. Current Controversies in Women's Health. 2-3 Units.

Interdisciplinary. Focus is primarily on the U.S., with selected global women's health topics. Topics include: leading causes of morbidity and mortality across the life course; reproductive (e.g. gynecologic & obstetric) health issues; sexual function; importance of lifestyle (e.g. diet, exercise, weight control), including eating disorders; mental health; sexual and relationship abuse; issues for special populations. In-class Student Debates on key controversies in women's health. Guest lecturers. Undergraduates must enroll in HumBio 125 for 3 units. PhD minor in FGSS, enroll in FEMGEN 256 for 3 units and for a letter grade. Med students enroll in OBGYN 256 for 2 units. Spring.

Same as: FEMGEN 256, HUMBIO 125

OBGYN 280. Early Clinical Experience in Obstetrics and Gynecology. 1-2 Unit.

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

OBGYN 282. Pregnancy, Birth, and Infancy. 3 Units.

Comprehensive clinical experience where pre-clinical medical students follow pregnant women receiving care at Stanford hospitals to attend prenatal visits, delivery, and postnatal visits. Continuity clinic format, combined with didactic lessons and discussion seminars. Students are exposed to clinical activities in a meaningful context, bolstering classroom studies in anatomy, physiology, embryology and human development, and emphasizing social, economic, and personal issues related to medicine. This program spans one quarter, covering topics related to pregnancy, labor and delivery and newborn care. In addition to clinic experiences, students are expected to spend 1-2 hours/week in lectures and to complete a reflection of their experiences in the course. Prerequisite: pre-clinical medical student. Same as: PEDS 282

OBGYN 299. Directed Reading in Obstetrics and Gynecology. 1-18 Unit.

Prerequisite: consent of instructor.

OBGYN 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

OBGYN 399. Graduate Research in Reproductive Biology. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Operations Information Technology Courses

OIT 245. Optimization and Simulation Modeling. 2 Units.

This course provides basic skills in quantitative modeling. The objective is to familiarize students with the main steps in an analytical approach to business decision making: constructing an abstract model for a relevant business problem, formulating it in a spreadsheet environment such as Microsoft Excel, and using the tools of optimization, Monte Carlo simulation and sensitivity analysis to generate and interpret recommendations. The class will be taught in a lab style, with short in-class exercises done in small teams, focusing on a variety of applications drawn from advertising, healthcare, finance, supply chain management, revenue and yield optimization.

OIT 247. Optimization and Simulation Modeling - Accelerated. 2 Units.

The course is similar in content and emphasis to OIT 245, but is aimed at students who already have background or demonstrated aptitude for quantitative analysis, and thus are comfortable with a more rapid coverage of the topics, in more depth and breadth.

OIT 249. MSx: Data and Decisions. 2 Units.

Data and Decisions an introductory course in probability, statistics and decision analysis. Our goal is to teach you how to evaluate quantitative information and to make sound decisions in complex situations. 'D&D' combines two areas of management science: The first area, probability, provides a foundation for modeling uncertainties, such as the uncertainties faced by financial investors or insurers. We will study the mechanics of probability (manipulating some probabilities to get others) and the use of probability to make judgments about uncertain events. The second area, statistics, provides techniques for interpreting data, such as the data a marketing department might have on consumer purchases. Statistical methods permit managers to use small amounts of information (such as the number of people switching from Verizon to AT&T in an iPhone test marketing program) to answer larger questions (what would AT&T's new market share be if the iPhone is launched nationally?).

OIT 256. Electronic Business. 2 Units.

This course focuses on the intersection of strategy and information technology. It considers how you can take advantage of new technology opportunities and how they change the structure of firms, industries and value chains, with an emphasis on business issues. Classes combine lecture and case study discussions and the workload is above the GSB average. Same as: Accelerated

OIT 258. Incentive Mechanisms for Societal Networks. 2 Units.

In many of the challenges faced by the modern world, from overcrowded road networks to overstretched healthcare systems, large benefits for society come about from small changes by very many individuals. This course survey the problems and the cost they impose on society. It describes a series of pilot projects which aim to develop principles for inducing small changes in behavior in Societal Networks--transportation networks, wellness programs, recycling systems and, if time permits, energy grids. Students will learn how low-cost sensing and networking technology can be used for sensing individual behavior, and how incentives and social norming can be used to influence the behavior. The effectiveness of this approach in pilots conducted in Bangalore (commuting), Singapore (public transit system), Stanford (congestion and parking), and a wellness program at Accenture-USA will be discussed. Students may experience the incentive platform as participants.

OIT 262. Operations. 3 Units.

This course focuses on basic managerial issues arising in the operations of both manufacturing and service industries. The objectives of the course are to familiarize students with the problems and issues confronting operations managers and to introduce language, conceptual models, and analytical techniques that are broadly applicable in confronting such problems. The spectrum of different process types used to provide goods and services is developed and then examined through methods of process analysis and design.

OIT 265. Data and Decisions. 4 Units.

This is the base version of D&D. This course introduces the fundamental concepts and techniques for analyzing risk and formulating sound decisions in uncertain environments. Approximately half of the course focuses on probability and its application. The remainder of the course examines statistical methods for interpreting and analyzing data including sampling concepts, regression analysis, and hypothesis testing. Applications include inventory management, demand analysis, portfolio analysis, surveys and opinion polls, A/B testing, environmental contamination, online advertising and the role of analytics in business settings more generally. The course emphasizes analytical techniques and concepts that are broadly applicable to business problems.

OIT 267. Data and Decisions - Accelerated. 4 Units.

Data and Decisions - Accelerated is a first-year MBA course in probability, statistics, multiple regression analysis, and decision trees for students with strong quantitative backgrounds. Probability provides the foundation for modeling uncertainties. Statistics provides techniques for interpreting data, permitting managers to use small amounts of information to answer larger questions. Regression analysis provides a method for determining the relationship between a dependent variable and predictor variables. Decision tree analysis consists of quantitative approaches to decision making under uncertainty. Students taking this course need to be comfortable with mathematical notation, algebra, and some calculus. If you are not confident with your quantitative abilities, then you should enroll in OIT 265. Accelerated D&D will cover material covered in OIT 265 plus some additional topics such as discrete dependent variable models. While OIT 267 focuses on real world applicability, we will explore the mathematical underpinnings of these topics in more depth than OIT 265 as an avenue for deeper understanding. The group regression project is a key component of the course.

OIT 268. Making Data Relevant. 4 Units.

Data is everywhere. Firms collect it. Data on customers' preferences are collected through websites or loyalty programs or cash registers. Data on employees' traits are collected through in-house databanks or social networking sites. All of us are used to thinking about data. How can you make data relevant to doing your job? How can data analysis serve to increase your competitive advantage over that of others? This class goes beyond graphing data in bar charts or time trends. It makes you think about causal relationships. The examples we use are primarily taken from talent management, because it's easy to think about our own careers or those of our employees. But the tools covered extend to all contexts, and your project is on an idea of your choosing. The class focuses on the use of regressions to think experimentally. To take the class, you should have covered regression analysis in a former class (such as an econometrics course for economics majors) or be comfortable with learning basic math concepts quickly. You also should understand distributions of data (such as the Bell curve, or normal distribution), but this topic is not covered. There are no required proofs or derivations; you've done that as undergraduates. This is about using data: we use cases, examples, Notes written for the class, and a quiz, final exam, and several assignments in which you play with data sets to answer questions. Note that this 4-unit course, if successfully completed, counts for the Data Analysis foundations requirement.

OIT 269. MSx: Operations. 3 Units.

This course focuses on basic managerial issues arising in the operations of both manufacturing and service industries. The objectives of the course are to familiarize students with the problems and issues confronting operations managers and to introduce language, conceptual models, and analytical techniques that are broadly applicable in confronting such problems. The spectrum of different process types used to provide goods and services is developed and then examined through methods of process analysis and design.

OIT 273. Value Chain Innovations in Developing Economies. 2 Units.

This course is about how to use entrepreneurship and innovations in the value chains to create values in developing economies. The course will cover important principles and ways in which the value chains can be re-engineered or new business models can be designed to create values. In addition to materials covering a diversity of industries and geographical regions, the course will also enable students to be exposed to some of the interventions that the Stanford Institute of Innovation in Developing Economies (SEED) is working on in West Africa. Work and exam requirements: Students are expected to develop a project report on either portfolio companies related to SEED or other enterprises to show how value chain innovations can be advanced.

OIT 333. Design for Extreme Affordability. 4 Units.

This course is a Bass Seminar. Project course jointly offered by School of Engineering and Graduate School of Business. Students apply engineering and business skills to design product or service prototypes, distribution systems, and business plans for entrepreneurial ventures that meet that challenges faced by the world's poor. Topics include user empathy, appropriate technology design, rapid prototype engineering and testing, social technology entrepreneurship, business modeling, and project management. Weekly design reviews; final course presentation. Industry and adviser interaction. Limited enrollment via application; see <http://extreme.stanford.edu/index.html> for details.

OIT 334. Design for Extreme Affordability. 4 Units.

This course is a Bass Seminar. Project course jointly offered by School of Engineering and Graduate School of Business. Students apply engineering and business skills to design product or service prototypes, distribution systems, and business plans for entrepreneurial ventures that meet that challenges faced by the world's poor. Topics include user empathy, appropriate technology design, rapid prototype engineering and testing, social technology entrepreneurship, business modeling, and project management. Weekly design reviews; final course presentation. Industry and adviser interaction. Limited enrollment via application; see <http://extreme.stanford.edu/index.html> for details.

OIT 343. D-Lab: Design for Service Innovation. 4 Units.

Students in multidisciplinary teams work with a partner organization to design new services that address the needs of an underserved population of users. Teams identify an unmet customer needs, develop and prototype new service designs (e.g. web services, services with a product component, educational campaigns), test these services with real customers and develop an implementation plan. Fundraising strategies are also explored and tested. We will offer two sections: financial services (MW: 1:15 pm - 3:00 pm); health services (MW: 4:15 pm - 6:00 pm). The specific domains for the two sections will be announced in the fall based on the needs of partner organizations. Possible domains for financial services: financial literacy for young adults, planning for major expenses at retirement, financial services for the underserved. For health services: transition to adulthood of pediatric patients with chronic conditions, transitions to nursing care for elderly patients. See <http://designforservice.stanford.edu/>.

OIT 344. Design for Service Innovation. 4 Units.

Design for service innovation is an experiential course in which students work in multidisciplinary teams to design new services (including but not limited to web services) that will address the needs of an underserved population of users. Through a small number of lectures and guided exercises, but mostly in the context of specific team projects, students will learn to identify the key needs of the target population and to design services that address these needs. Our projects this year will focus on services for young adult survivors of severe childhood diseases. For the first time ever, children who have cystic fibrosis, rheumatoid arthritis, major cardiac repairs, organ transplants, genetic metabolic disorders, and several forms of cancer are surviving. The first wave of these survivors is reaching young adulthood (ages 18-25). Many aspects of the young adult world are not yet user-friendly for them: applying to and then entering college, adherence to required medication and diet, prospects for marriage and parenthood, participation in high school or college sports, driving, drinking, drugs, and more. Our aspiration is to develop services to improve these young adults' options for a fulfilling and satisfying life. The course is open to graduate students from all schools and departments: business (MBA1, MBA2, PhD, Sloan), Medicine (medical students, residents, fellows and postdocs), engineering (MS and PhD), humanities, sociology, psychology, education, and law. Students can find out more about this course at: <http://DesignForService.stanford.edu>; GSB Winter Elective BBL Jan 10th, 12 noon - 1 pm; D-School Course Exposition Feb 3rd, time TBA. Admission into the course by application only. Applications will be available at <http://DesignForService.stanford.edu> on Jan 13th. Applications must be submitted by Feb 4th midnight. Students will be notified about acceptance to the course by Feb 7th. Accepted students will need to reserve their slot in the course by completing an online privacy training course. Details about online training will be provided to accepted students. The training is related to the protection of our partners' privacy. Application Deadline: Noon, Feb 4th.

OIT 356. Electronic Business. 2 Units.

This course focuses on the intersection of strategy and information technology. It considers how you can take advantage of new technology opportunities and how they change the structure of firms, industries and value chains, with an emphasis on business issues. Classes combine lecture and case study discussions and the workload is above the GSB average. While the advanced course will generally cover the same topics as OIT 256, it will go into more advanced techniques in a number of areas.

OIT 361. Technology Concepts for Managers. 4 Units.

Electronics, computing, networks and software applications have become an integral part of business. The course is aimed at the student who wishes to learn those electronic and computer science concepts needed to understand how computers, networks, and the software that runs them operate, but who lacks background in engineering or computer science. The premise of the course is that adequate knowledge of technology is now a prerequisite for a successful manager, but that knowledge does not have to be at the level of rigor required in the practice of engineering or computer science. This course is intended to provide a basic literacy in these areas, with an emphasis on implications for managers and organizations. A meaningful course that focuses on particular technologies is difficult because rapid changes in any technology can quickly render today's lessons obsolete. Therefore, this course will stress fundamentals and trends, rather than a snapshot of the current status of different technologies. As a result, classroom coverage of current "hot" topics in technology is subordinate to giving the technology concepts necessary for one to learn such current (and future) topics on their own. Investigation of technology will be facilitated by lectures readings and homework assignments. Students will have an opportunity to investigate and learn more about a particular technology in more depth as part of a term project. The general flow of the course will focus upon four areas approximately as follows: Part I Electronic Systems: Fundamental Electronics (2 sessions), Digital and Microelectronics (2 sessions), Computer Hardware and Systems (2 sessions), Technology Trends (1 session), Communications including wireless (2 sessions); Part II Networks: Networked Computing (1 session), the Internet (2 sessions); Part III Software: Software and software development (3 sessions), Data Base Technology (1 session); and Part IV The Web: Clients and Servers (1 session), Case study of a web site (1 session), Video/Multimedia (1 session). The course is specifically designed for students with liberal arts or soft science backgrounds who have career ambitions in high-tech or who wish to be more technically aware as managers. Students with hard science, engineering or computer science backgrounds are welcome but must avoid redirecting the class discussion into narrow or advanced material that causes dysfunction to less technical colleagues. Students may elect either to take a final exam or do a term project. Students electing to do a term project will create it as a Web page. Separate training for building a Web page will be offered.

OIT 364. Global Operations. 3 Units.

Globalization of businesses has resulted in companies having to manage global networks of suppliers, integrators, contract manufacturers, logistics service providers, distributors, and service support operators in geographically dispersed locations. The customer network is also globally distributed. This course will focus on (1) how global and international companies can overcome the geographical, cultural, and organizational barriers, and leverage the strengths of the network to create values, and (2) how these companies may use different ways to manage operations in different regions to take full advantage of the local strengths and limitations. The course will be based on cases on innovative strategies and tactics used by global and international companies.

OIT 367. Business Intelligence from Big Data. 4 Units.

The objective of this course is to analyze real-world situations where significant competitive advantage can be obtained through large-scale data analysis, with special attention to what can be done with the data and where the potential pitfalls lie. Students will be challenged to develop business-relevant questions and then solve for them by manipulating large data sets. Problems from advertising, eCommerce, finance, healthcare, marketing, and revenue management are presented. Students learn to apply software (such as R and SQL) to data sets to create knowledge that will inform decisions. The course covers fundamentals of statistical modeling, machine learning, and data-driven decision making. Students are expected to layer these topics over an existing facility with mathematical notation, algebra, calculus, probability, and basic statistics.

OIT 384. Biodesign Innovation: Needs Finding and Concept Creation. 4 Units.

This is the first quarter of a two-quarter course series (OIT 384/OIT 385). In this course, students learn how to develop comprehensive solutions (most commonly medical devices) to some of the most significant medical problems. The first quarter includes an introduction to needs finding methods, brainstorming and concept creation. Students learn strategies for understanding and interpreting clinical needs, researching literature and searching patents. Working in small entrepreneurial multidisciplinary teams, students gain exposure to clinical and scientific literature review, techniques of intellectual property analysis and feasibility, basic prototyping and market assessment. Students create, analyze and screen medical technology ideas, and select projects for future development. Final presentations at the end of the winter quarter to a panel of prominent inventors and investors in medical technology provide the impetus for further work in the spring quarter. Course format includes expert guest lecturers (Thu: 4:15 to 6:05 pm), faculty-led practical demonstrations and coaching sessions, and interactive team meetings (Tues: 4:15 to 6:05 pm). Projects from previous years included: prevention of hip fractures in the elderly; methods to accelerate healing after surgery; less invasive techniques for bariatric surgery; point of care diagnostics to improve emergency room efficiency; novel devices to bring specialty-type of care to primary care community doctors. More than 300,000 patients have been treated to date with technologies developed as part of this program and more than thirty venture-backed companies were started by alums of the program. Students must apply and be accepted into the course. The application is available online at <http://biodesign.stanford.edu/bdn/courses/bioe374.jsp>.

OIT 385. Biodesign Innovation: Concept Development and Implementation. 4 Units.

Two-quarter sequence (see OIT384 for complete description of the sequence). The second quarter focuses on how to take a conceptual solution to a medical need forward into development and potential commercialization. Continuing work in teams with engineering and medical colleagues, students will learn the fundamentals of medical device prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing a commercialization route (licensing vs. start-up); marketing, sales and distribution strategies; ethical issues including conflict of interest; fundraising approaches and cash requirements; financial modeling; essentials of developing a business or research plan/canvas; and strategies for assembling a development team. Final project presentations are made to a panel of prominent venture and corporate investors. New students (i.e. students who did not take OIT384 in the winter quarter) may be admitted, depending on team needs. Candidates need to submit an application at <http://biodesign.stanford.edu/bdn/courses/bioe374app.jsp> by March 1.

OIT 522. Field Trips to Grassroots Innovators in Health Care: Improving Access & Outcomes for the Underserved. 2 Units.

Some of the most impressive innovations in health care are developed at hospitals and other non-profit organizations by dedicated health care professionals (drs, nurses, administrators) who are not afraid to roll up their sleeves and work hard to solve an important health care problem they face in their everyday patient encounters. Because of limited financial resources and because they often target underserved market segments, these innovations lack a validated business model and commercialization pathway. In this seminar we will gain hands-on experience of some of these grassroots innovations through field trips to a local public hospital (a candidate hospital is San Francisco General Hospital) and a non-profit product incubator (hopelab.org). We will then work in teams to identify and address the main barriers to commercialization for two specific innovations presented in these field trips: An electronic referral system to promote access to specialist care in underserved communities; A video game to promote healthy lifestyles in at-risk youth. We will learn and apply the brainstorming approach to come up with innovative solutions to overcome these barriers. On the last day we will meet key executives in both organizations to present our recommendations.

OIT 530. Advanced Modeling Seminar. 2 Units.

Modern spreadsheet and simulation software now makes it possible for general managers themselves to model complex and uncertain business situations on their personal computers. This seminar will consist of hands-on experience with advanced applications for modeling situations that include both uncertainty and discontinuous change. These situations often are called "ill-behaved" because they defeat the traditional tools of analysis covered in the Foundations Modeling courses. For example, financial spreadsheet models involving discontinuous change, such as winning an auction or unexpectedly altering a production process or marketing campaign (so-called "black swan" events), may arise in business projections, but actual models of such events are rarely, if ever, considered for optimization under uncertainty. As another example, the Operations formulas used to estimate throughput times in models involving congestion and delay often cannot be applied to systems that include unexpected service interruptions or complex routing of items (e.g., modern hospitals). The mission of this seminar is to utilize recent advances in software and the speed of modern multi-core PC's that have produced easy-to-use tools for interactively building and analyzing such models. Each day, students will build models of these more-realistic situations, using the software tools "hands-on" and working with the instructors as coaches in a laboratory setting. We will use a more advanced version of the Excel Solver add-in, called Risk Solver, which combines optimization with Monte Carlo simulation, as well as ExtendSim, a graphical tool for constructing and analyzing discrete event simulation models. Exercises will include optimization under uncertainty such as Value at Risk in financial statement projections, capacity expansion plans involving Real Options, customer service and manufacturing workflow systems, courtroom scheduling, and airport security policies. The first 2.5 sessions of the course will focus on learning and using Risk Solver to analyze risk-based spreadsheet models with an emphasis on interpreting Value at Risk and Conditional Value at Risk constraints in such models. The second 2.5 sessions will focus on learning and using ExtendSim to model operational situations in services and manufacturing, with an emphasis on dealing with congestion and delay in complex settings. Who should take this seminar? Our intended audience consists of students who: nna. Want to develop a deeper appreciation for how discontinuous change, risk, and uncertainty affect decision-making in financial and operational settings, and nnb. Want to learn how advanced optimization and simulation software allows you to examine easily the effects of such events directly, rather than through complex and unwieldy mathematical approximations. nnnHow much computer background is necessary? We want the seminar to be illuminating, fun, and easy to master. The seminar is designed specifically for both non-technical ("poet") and technical ("quant") students who have completed the introductory concepts of optimization with Excel Solver, as covered in Foundations Modeling (either basic or advanced), and are comfortable building Excel spreadsheets. We will assume that students have no prior experience with optimization of risk-based models or with discrete event simulation software, and would like to gain that experience now in a hands-on, build-your-own-model setting. Students will use the software both for individual preparation via tutorial documents and for classroom exercises. Each session will be team-taught by Professors Moore and Patell and will be a combination of lectures, demonstration, and coaching to help you experiment with the tools.

OIT 536. Data for Action: From Insights to Applications. 2 Units.

Data for Action is an MBA compressed course dedicated to identifying value in and creating value from data. It deals with the technical, legal, regulatory and business strategic decisions that must be considered when delivering solutions to customers.

OIT 537. Introduction to Programming for Data Analysis. 2 Units.

Many post-MBA jobs require the ability to analyze very large data sets and proficiency with Microsoft Excel is no longer sufficient. MBA graduates frequently shy away from more advanced analysis tools because of the need to write computer code to manipulate data. The course will seek to break that mental barrier by introducing students to the basic programming skills that would allow them to be productive later on. The focus of the course will be on SQL and R. This course assumes no prior programming experience.

OIT 538. Environmental Science for Managers - Accelerated. 3 Units.

This course satisfies the MBA distribution requirement in Optimization and Simulation Modeling (OSM). It is challenging but doable for students without an undergraduate degree in science or engineering; it does not assume experience in environmental science or quantitative analysis beyond admission requirements for the MBA program. Students will learn fundamental science of ecosystems, climate and energy systems, by building decision-support models for managing these systems. In so doing, students will develop widely-applicable skills in model representation in a spreadsheet, optimization, and Monte Carlo simulation. nnnStudents are strongly encouraged to take the follow-on course on renewable energy, OIT 540 Environmental Science for Managers II. nnnFor the joint MBA-MS in Environment and Resources degree, students are required to take OIT 540, and either OIT 538 or OIT 539.

OIT 539. Environmental Science for Managers - Advanced. 3 Units.

Fundamental science of ecosystems, climate and energy. Spreadsheet modeling, optimization, and Monte Carlo simulation applied to resource management and environmental policy. Similar to OIT 338, but allocates more class time to environmental/energy science and implications for management and policy, and less class time to fundamentals of modeling/optimization/simulation.

OIT 540. Environmental Science for Managers II. 1 Unit.

This course provides an introduction to renewable sources of electricity and fuel, and is required for the joint MBA-MS in Environment and Resources degree. nnnStudents are strongly encouraged, but not required, to take OIT 538 or OIT 539 prior to taking this course.

OIT 542. Price and Revenue Optimization. 2 Units.

This is the Advanced Application option in the menu of courses that satisfy the Management Foundations requirement in Optimization and Simulation Modeling(OSM). Three core modeling topics are covered in rapid-review fashion - model representation in a spreadsheet environment, optimization theory, and stochastic models - but primary emphasis is on the application domain described immediately below. OIT 542 is a two-unit course, with nine class sessions plus a final exam. nnnSystems for price and revenue optimization - also called yield management, dynamic pricing, or revenue management - combine the use of information technology, statistical forecasting, and mathematical optimization to make tactical decisions about pricing and product availability. A familiar example is the passenger airline industry, where a carrier may sell seats on the same flight at many different fares, with fare availability changing as time advances and uncommitted capacity declines. Over the last 30-35 years, revenue optimization practices have transformed the transportation and hospitality industries, where fixed capacity and advance reservations by customers are important structural factors. But model-based, data-driven pricing systems are increasingly common in other industries that have different structures, such as financial services and retail clothing.nnnIn this course students learn about the model structures and modelling techniques that underlie systems for price and revenue optimization. Two topics are given roughly equal emphasis: model-based tactical pricing, including customized pricing and retail markdown management; and classical revenue management, where automated logic is used for booking control (that is, to make yes-or-no decisions in response to booking requests from customers), rather than to set prices explicitly.nnnOIT 542 is tailored to students who already have command of basic modelling techniques and wish to learn about their application in an important business context. To be specific, a prior college course on optimization modelling is assumed as background. (Typically, such courses focus on linear programming, or linear optimization, with secondary coverage of non-linear programming and discrete optimization.) Various aspects of optimization theory will be covered in quick-review format, along with the basics of spreadsheet model representation and stochastic modelling, in order to standardize terminology and establish certain conventions that facilitate grading. In exceptional cases, for students who have strong math background and high mathematical aptitude but no prior coursework on optimization, the background knowledge assumed in OIT 542 may be acquired through self-study; appropriate study materials will be suggested by the instructor upon request. The course is entirely appropriate for second-year MBA students who have completed either base or accelerated MODS in their first year.nnnOIT 542 draws on knowledge acquired and skills developed in two other Management Foundations courses that are taken simultaneously: Data and Decisions (OIT 265) and Microeconomics (MGTECON 200 or 203). Students are required to construct and analyze at least one model for every class session.

OIT 556. Electronic Business and Commerce. 2 Units.

Beyond the hype surrounding the rise and fall of "dot-com" businesses, Information Technology has fundamentally changed the costs of transactions and communications, affecting the ways firms are internally managed and the ways they deal with customers and business partners. This course focuses on approaches to value creation using Information Technology and their application to a variety of business settings. It explores ways in which firms can use electronic business to create value, and strategies for capturing a portion of that value. The course will examine such issues as: how Information Technology affects information flows within the firm; electronic commerce # applications and pitfalls; how electronic business is likely to change traditional supply chains, logistics and payment systems; and the impact of electronic business on established industries and companies.

OIT 558. Designing Large-Scale Nudge Engines. 1 Unit.

In many of the challenges faced by the modern world, from overcrowded road networks to overstretched healthcare systems, large benefits for society come about from small changes by very many individuals. This course survey the problems and the cost they impose on society. It describes a series of pilot projects which aim to develop principles for inducing small changes in behavior in Societal Networks--transportation networks, wellness programs, recycling systems and, if time permits, energy grids. Students will learn how low-cost sensing and networking technology can be used for sensing individual behavior, and how incentives and social norming can be used to influence the behavior. The effectiveness of this approach in pilots conducted in Bangalore (commuting), Singapore (public transit system), Stanford (congestion and parking), and a wellness program at Accenture-USA will be discussed. Students may experience the incentive platform as participants. This course significantly overlaps with OIT 258 - Incentive Mechanisms for Societal Networks. If you took this class last year, you may not take OIT 558.

OIT 562. Supply Chain Management & Technology. 2 Units.

This course offers an overview of eight technologies for enterprise computing. They are: ERP (Enterprise Resource Planning), EAI (Enterprise Application Interface), data mining, cloud computing, eCommerce, RFID/NFC, mobile technologies, and social network data analytics. On each topic, we discuss underlying technologies and applications using a variety of business cases.

OIT 563. Advanced Topics in Supply Chain Management and Technologies. 2 Units.

In this course we will have a series of guest speakers who will discuss real businesses applying various technologies. Students come to class prepared by reading the assigned material and discuss the topic with the speakers in class. The course will provide opportunities to learn how different technologies are integrated to create values to end users. Students are expected to have some basic understanding of technologies and review them with readings on their own, so we will not discuss the technology per se in class.

OIT 565. The Role of Information Technology in the New Energy Economy. 2 Units.

One of the most interesting and underexplored areas in modern technology is, as Dan Reicher at Stanford has put it, "where energy technology (ET) meets information technology (IT)". The main driver of widespread use of computing in the modern age is the rapid reduction in the cost of computing services caused by Moore's law. At the same time, a substantial increase in the energy efficiency of computing (doubling every year and a half for more than six decades) has led to a proliferation of mobile computers, sensors, and controls, with implications that have only recently begun to be understood. This class will explore the direct and indirect implications of applying information technology to the production, delivery, and use of energy and associated services. It will first review current knowledge about the direct energy use associated with information technology, including data centers, personal computers, cellular telephones, mobile sensors, and other IT equipment. It will also summarize the state of knowledge about the types, amount, and growth rates of energy services delivered in the US and globally. Finally, it will explore the applications to which information technologies have been put in the energy industry, ranging from the use of visualization and analysis techniques to improve the results of oil and gas exploration, to the computer-aided design of wind turbines and automobiles, to the implications of wireless sensors and controls for the more efficient and effective use of energy. The class will culminate in student projects, typically business plans for new ventures using IT to radically transform how we understand and respond to the world around us.

OIT 571. Homeland Security: Operations, Strategy and Implementation. 2 Units.

This course is a Bass Seminar. This course covers a variety of topics in homeland security: bioterrorism (attacks with contagious agents such as smallpox or non-contagious agents such as anthrax, and attacks on the food supply), pandemic influenza, nuclear security at ports and around cities, the biometric aspects of the US-VISIT Program, the intersection of homeland security and immigration, and suicide bombings. For each of these topics, students will typically read one academic paper that focuses on the operations aspects of the problem, and one reading about the strategic aspects of the problem. For each topic, the professor will spend part of the class lecturing on the problem (including how the results of the academic paper were implemented), and a student will be assigned as a discussant (in addition to a classwide discussion).

OIT 581. Biodesign Innovation: Needs Finding and Concept Creation. 2 Units.

OIT581 is a two-unit version of the Biodesign Innovation course (OIT384). In this course, students learn how to develop comprehensive solutions (most commonly medical devices) to some of the most significant medical problems. In OIT581, students learn the basic principles of biodesign innovation: methods of validating medical needs; techniques for analyzing intellectual property; basics of regulatory (FDA) and reimbursement planning; early market analysis; design principles; brainstorming and early prototyping; university licensing. Course format includes expert guest lecturers and faculty-led practical demonstrations. Students apply the concepts learned by serving as "commercialization and marketing consultants" to multidisciplinary teams of students in the four-unit course (OIT 384). Consultants interact with their teams on a regular basis and provide a consulting report on market analysis and competitive dynamics. Projects from previous years included: prevention of hip fractures in the elderly; methods to accelerate healing after surgery; less invasive procedures to perform bariatric surgery; low cost healing devices for diabetic ulcers; point of care diagnostics to improve emergency room efficiency; novel devices to bring specialty-type of care to primary care community doctors. More than 40,000 patients have been treated to date with technologies developed as part of this program and more than ten venture-backed companies were started by alums of the program. Students must apply and be accepted into the course. The application is available online at <http://www.stanford.edu/group/biodesign/courseapplication.html>, and the application deadline is November 20, 2010. Students must indicate whether they are applying for the four-unit version (OIT384) or two-unit version (OIT581).

OIT 582. Biodesign Innovation, Project A. 2 Units.

Students work in multidisciplinary teams at the intersection of medicine, engineering and business to develop a comprehensive solution to an important medical need of their choice. With coaching from faculty and real-world experts, the teams identify an important medical need and through brainstorming they develop several potential conceptual approaches to solving the need and pursue initial prototyping, along with planning for regulatory and reimbursement pathways. The project culminates with a presentation to a panel of venture investors and entrepreneurs. In previous years, student teams examine needs in emergency and acute care, orthopedics, cardiovascular, wound closure etc. Concurrent registration at OIT581 is required. An application needs to be submitted online.

OIT 583. Biodesign Innovation Core, Spring. 2 Units.

Two quarter sequence (continuation of OIT581 -- see OIT 581 for a general description of the Biodesign Innovation course and OT384/385 for a description of the four unit option). The second quarter focuses on how to take a conceptual solution to an important medical need forward from early concept to technology translation, development and possible commercialization. Students expand on the topics they learned in OIT581 to learn about prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing translation and commercialization route (licensing vs. start-up); marketing, sales and distribution strategies; ethical issues including conflict of interest; fundraising approaches and cash requirements; financial modeling; essentials of writing a business or research plan; strategies for assembling a development team. Students serve as "commercialization consultants" to a multidisciplinary team in OIT385. Students interact regularly with their team and prepare a consulting report that outlines a funding strategy and validates the financial model developed by the team. (OIT581 or OIT384 are a pre-requisite). New students (i.e. students who did not take OIT581/OIT384) in the winter quarter will need to submit an application at <http://www.stanford.edu/group/biodesign/courseapplication.html> by February 19, 2011. In the application they should indicate whether they are applying for the 2-unit or 4-unit version. Students who took OIT581/OIT384 in the winter quarter are automatically accepted into the spring quarter and they can choose the version they want: 2 unit or 4 unit.

OIT 584. Biodesign Innovation Project, Spring. 2 Units.

Students work in multidisciplinary teams at the intersection of medicine, engineering and business to further develop and refine the solutions they identified in OIT 582. The focus this quarter is on implementation. The teams select the most promising solution from the concepts of the first term and move forward into prototyping and project planning. Teams develop specific strategies for patenting, FDA submission, commercialization and third-party reimbursement, along with funding strategies (e.g. licensing agreement or launching a start-up). The project culminates with a presentation to a panel of venture investors. OIT 583 should be taken concurrently. Permission of instructor needed if student has not taken OIT 582.

OIT 587. Global Biodesign. 1 Unit.

This course examines the development and commercialization of innovative medical technologies in different global settings. Faculty and guest speakers from the medtech field will discuss the status of the industry, as well as opportunities in and challenges to medical technology innovation unique to seven primary geographic regions: Africa, China, Europe, India, Japan, United States and Latin America. Students will be exposed to the biodesign innovation process, which provides a proven approach for identifying important unmet medical needs and inventing meaningful solutions to address them. They will also explore key differences between the covered geographies, which range from emerging markets with vast bottom-of-the-pyramid and growing middle class populations, to well-established markets with sophisticated demands and shifting demographics.

OIT 601. Fundamentals of OIT. 3 Units.

The goal of this course is to provide first-year Ph.D. students in OIT with sufficient fundamentals to subsequently take advanced research seminars. The course covers the very basics of six topics: queueing theory, inventory theory, multi-echelon inventory theory, game theory, stochastic dynamic programming and econometrics. Lectures will be given by advanced Ph.D. students in OIT.

OIT 602. Dynamic Pricing and Revenue Management I. 2 Units.

In tandem with OIT 603, this course explores the application of stochastic modeling and optimization to two closely related problem areas: (a) dynamic price selection, and (b) dynamic allocation of limited capacity to competing demands. As background, students are assumed to know stochastic process theory at the level of Statistics 217-218, microeconomics at the level of Economics 202N, and optimization theory at the level of MS&E 211, and to have some familiarity with the basic ideas of dynamic programming. Additional dynamic programming theory will be developed as needed for the applications covered. Emphasis will be on current research topics, especially in the realm of airline revenue management.

OIT 603. Dynamic Pricing and Revenue Management II. 2 Units.

In tandem with OIT 602, this course explores the application of stochastic modeling and optimization to two closely related problem areas: (a) dynamic price selection, and (b) dynamic allocation of limited capacity to competing demands. As background, students are assumed to know stochastic process theory at the level of Statistics 217-218, microeconomics at the level of Economics 202N, and optimization theory at the level of MS&E 211, and to have some familiarity with the basic ideas of dynamic programming. Additional dynamic programming theory will be developed as needed for the applications covered. Emphasis will be on current research topics, especially involving customized pricing of financial services. OIT 602 is not a prerequisite for OIT 603 but is highly recommended.

OIT 624. Models and Applications of Inventory Management. 3 Units.

The first part of the course reviews fundamental models in inventory management. Topics include deterministic models (EOQ, power-of-two policies, ELS, serial and assembly networks), Newsvendor, multi-period stochastic models under backlogging and lost-sales, multi-echelon and supply chain models, and infinite-horizon formulations. In the process, the course also reviews several fundamental mathematical concepts in inventory theory, including convexity, duality, finite / infinite state Markov decision processes, and comparative statics. The second part discusses advanced modeling concepts, and several new application areas. Topics include distribution-free and robust models, supply uncertainty and disruptions, flexibility and supply chain design, joint pricing and inventory, and problems at the interface of supply chains and finance.

OIT 643. Special Topics in Supply Chain Management. 3 Units.

To compete successfully in today's market place, companies need to manage effectively the efficiency of activities to design, manufacture, distribute, service and recycle their products or services to their customers. Supply chain management deals with the management of materials, information and financial flows in a network consisting of suppliers, manufacturers, distributors, and customers. The coordination and integration of these flows within and across companies are critical in effective supply chain management. In parallel to the development of new practices and concepts in industry, there have been emerging research that are based on (1) structuring new processes and supply chain networks with the new technologies; (2) exploring ways to do planning and make decisions consequently; (3) quantifying the benefits as a result; and (4) aligning the incentives of multiple players in a supply chain when the costs and benefits to these players are different. This course will examine evolutionary research that focuses on the above themes. We will explore how such problems can be formulated, models can be structured, and analysis can be performed to address information-based supply chain management issues. You are all challenged to think, discuss, share, and debate on the issues brought up. The end result of this course is, hopefully, that we can start defining new, interesting and exciting research paths, and maybe even beginning to pursue some of the research ideas generated.

OIT 655. Foundations of Supply Chain Management. 3 Units.

This course provides an overview of research in supply chain management (SCM). It has three parts. The first part reviews basic tools of SCM research through selected readings in economics, IT and operations research. The second part reviews the literature in SCM, covering topics such as inventory models, information sharing, information distortion, contract design, value of integration, performance measurement, risk management, and the use of markets for procurement. The last part is devoted to recent advances in SCM research.

OIT 660. Applied OIT. 4 Units.

Description is currently unavailable because of ongoing review of the OIT PhD program by OIT faculty. Description will become available when the review is completed at the end of the Summer.

OIT 663. Methods of Operations/Information Systems. 4 Units.

This course covers basic analytical tools and methods that can be used in research in operations and information systems. The emphasis is on foundations of stochastic inventory theory. Basic topics include convexity, duality, induced preference theory, and structured probability distributions. Much of the course is devoted to Markov decision processes, covering finite and infinite horizon models, proving the optimality of simple policies, bounds and computations, and myopic policies.

OIT 664. Stochastic Networks. 3 Units.

Processing network models may be used to represent service delivery systems, multi-stage manufacturing processes, or data processing networks. The first half of this two-unit course consists of lectures on performance analysis (e.g., estimating congestion and delay) for classical product-form networks and for Brownian networks. The second half consists of student presentations of recent papers on managing processing networks, typically with game-theoretic aspects. Prerequisites: Statistics 217 and 218, or consent of instructor; some prior exposure to stochastic models in general, and queueing theory in particular, is useful but not essential.

OIT 665. Seminar on Information-Based Supply Chain Management. 4 Units.

This seminar will highlight the research evolution and advances on the smart use of information in supply chain management. Such usage has helped companies sharing information to coordinate their supply chain and to realign their incentives. It has also helped reduce the so-called bullwhip effect. Latest information technology like RFID (radio-frequency identification) has also enabled visibility and structural changes that result in significant supply chain performance enhancements. This seminar will focus on the modeling approaches used by researchers that tried to capture the values and potentials of such applications.

OIT 668. Dynamic Pricing and Revenue Management. 3 Units.

The goal of this course is to provide a comprehensive introduction to the theory and practice of revenue management. It will comprise of a set of lectures that will cover the theoretical fundamentals of the area as well as an overview of current research developments through the presentation and discussion of recent papers. Topics include capacity control (single-resource and network), consumer behavior and market response models, dynamic pricing, procurement auctions, price experimentation, supply chain management and pricing.

OIT 672. Stochastic Control in Operations and Economics. 3 Units.

The first half of this course will cover (i) the basic theory of Brownian motion, (ii) Ito stochastic calculus, and (iii) the rudiments of continuous-time stochastic control, all undertaken at a brisk pace, aimed at students who already know the basics or else have a strong enough math background to learn them quickly. The text for this part of the course will be *Brownian Models of Performance and Control*, by J. Michael Harrison, Cambridge University Press, 2013, which can be ordered from Amazon: http://www.amazon.com/Brownian-Performance-Control-Michael-Harrison/dp/1107018390/ref=sr_1_1?ie=UTF8&qid=1395420072&sr=8-1&keywords=Brownian+Models+of+Performance+and+Control. The second half of the course will explore in depth some models arising in operations research, finance and economic theory, such as the McDonald-Siegel investment model (an optimal stopping problem, treated in Chapter 5 of the textbook), Brownian versions of the classic cash balance problem (a family of stochastic control problems, treated in Chapter 7 of the textbook), and Yuliy Sannikov's continuous-time principal-agent model (*Review of Economic Studies*, 2008). The course will be rather informally organized, more of a collaboration between students and instructor than a top-down lecture format, with at least half of the class time devoted to presentation of problems by students and auditors.

OIT 673. Data-driven Decision Making and Applications in Healthcare. 4 Units.

This course aims to introduce students to research topics in data-driven decision making with specific attention to healthcare applications. However, most concepts are applicable in areas beyond healthcare as well. Examples of topics are: prediction and risk adjustment, computational and statistical challenges associated with large-scale data, and dynamic decision making under uncertainty.

OIT 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, POLECON 691, STRAMGT 691

OIT 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, POLECON 692, STRAMGT 692

OIT 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, POLECON 802, STRAMGT 802

Ophthalmology Courses

OPHT 199. Undergraduate Research. 1-18 Unit.

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

OPHT 201. Clinical Topics in Ophthalmology. 1 Unit.

Introduction to the professional opportunities available to the ophthalmologist in the areas of clinical research, community health, biotech and pharmaceutical development, international blindness prevention, graduate and post-graduate education.

OPHT 202. Clinical Topics in Ophthalmology. 1 Unit.

(Continuation of 201) Professional opportunities available to the ophthalmologist in the areas of clinical research, community health, biotech and pharmaceutical development, international blindness prevention, graduate and post-graduate education.

OPHT 203. Introduction to Ophthalmology. 1 Unit.

(Continuation of 202) Introduction to the practical skills used within the field of ophthalmology. Diagnostic tools and instruments; applications of these tools; practice using instruments under the guidance of faculty and residents; practice in microsurgical techniques with one-on-one guidance.

OPHT 280. Early Clinical Experience in Ophthalmology. 1-2 Unit.

Provides an observational experience as formulated by the instructor and student. Prerequisite: consent of instructor.

OPHT 299. Directed Reading in Ophthalmology. 1-18 Unit.

Prerequisite: consent of instructor.

OPHT 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

OPHT 399. Graduate Research. 1-18 Unit.

Students to undertake investigations sponsored by individual faculty members. Opportunities are available at both predoctoral and postdoctoral levels. Prerequisite: consent of instructor.

Oral Communications Courses

ORALCOMM 10C. Debate Club. 1 Unit.

Enrollment in this course is limited to students selected as members of Stanford Debate Club. All enrollees must complete at least 30 hours of participation evidenced by traveling to at least one competition during the quarter and attending regular practices. Participation must be verified by the Debate Club leadership in order to receive credit.

ORALCOMM 91. The Mythic Life. 3 Units.

Why in the twenty-first century do many of our most acclaimed and popular stories carry narrative forms that are thousands of years old? Star Wars, The Lord of the Rings, Titanic, Batman; all are deeply informed by ancient myth, folklore, and oral traditions. One reason is that the deep stories of myth and folklore act as a bridge between our personal lives and the profoundest aspects of the human condition; they offer a way to understand our lives and how to live them. This course offers an in-depth study and experience of myth and folklore, the roots of modern story and the roots of our own stories. You will hear these myths live, as people have for thousands of years; from Trickster folk tales to the medieval Arthurian grail epic Parzival. You will also draw from these epics to create and tell a mythic story of your own. This will give you an appreciation for myth as a living principle, not just something from a long time ago. It will also help you become a good storyteller by developing your memory, improvisation, and image-based thinking. This ability to tell a story well is at the root of authentic leadership and helps us bring a powerful, embodied perspective to championing a cause or just debating over coffee.

ORALCOMM 105. Voice and Articulation Intensive for Non-Native English Speakers. 1-2 Unit.

Workshop focusing on exercises designed to help foreign students improve their articulation and delivery in English. Work includes breath, sound, enunciation, melody, and colloquialism. Course was previously offered as CTL 105.

ORALCOMM 115. Voice Workshop. 1-2 Unit.

Focus is on breath, voice production, expansion of vocal range and stamina, and clarity of articulation. Geared toward public speaking including presentations, lectures, and job talks. May be taken in conjunction with ORALCOMM 117. ORALCOMM 115/215 was previously listed as CTL 115/215.

Same as: ORALCOMM 215

ORALCOMM 117. The Art of Effective Speaking. 3 Units.

The principles and practice of effective oral communication. Through formal and informal speaking activities, students develop skills framing and articulating ideas through speech. Strategies for speaking extemporaneously, preparing and delivering multimedia presentations, formulating persuasive arguments, refining critical clarity of thought, and enhancing general facility and confidence in oral self-expression. ORALCOMM 117/217 was previously listed as CTL 117/217. Same as: ORALCOMM 217

ORALCOMM 118. Public Speaking: Romancing the Room. 3 Units.

A practical approach to the art of public speaking. Emphasis is on developing skills in speech types including impromptu, personal experience, interviewing, demonstration, persuasive, and special occasion. Materials include videotape, texts of famous speeches, and a final dinner program of speeches. Students evaluate presentations by others. \$55 materials fee. Course was previously offered as CTL 118.

ORALCOMM 119. Oral Communication Tutor Teaching Practicum. 2 Units.

Seminar. For students with a strong background in public speaking who wish to train as public speaking tutors for the Oral Communication Program. Readings, exercises, and supervised teaching refine speaking skills. Preparation to serve as a peer tutor in a variety of academic disciplines. Prerequisite: application and consent of instructor. Course was previously offered as CTL 119.

ORALCOMM 121. STEM Speak: Oral Communication for Technical Fields. 3 Units.

This course addresses the principles and practices of effective oral communication and is tailored specifically to those students coming from STEM (science, technology, engineering and math) fields. Students will learn to speak about technical topics to a variety of audiences, will develop their own visual aids, will participate in multiple in-class presentations and will receive both group and one-on-one feedback throughout this course. Special attention will be paid to the effective presentation of data as part of an oral presentation.

Same as: ORALCOMM 221

ORALCOMM 122. "The TED Commandments": The Art and Heart of Effective Public Speaking. 3 Units.

Designed around the presentation principles of TED talks, this course approaches public speaking as an art of engagement and possibility. Students will learn a range of strategies shy;- both traditional and innovative shy;- for crafting a compelling message and delivering it with clarity, authenticity, and power. Limited enrollment. Course was previously offered as CTL 122/222.

Same as: ORALCOMM 222

ORALCOMM 177. Performance of Power: Oratory and Authority from the Ancient World to the Postmodern. 4 Units.

Speech as action has long been seen as essential to leadership. Theories and examples of oratory, from Aristotle to Barack Obama, assessing each as model of voice-activated authority. The impact of mass media technologies as they transform the public space of oratory. Course was previously offered as CTL 177.

ORALCOMM 215. Voice Workshop. 1-2 Unit.

Focus is on breath, voice production, expansion of vocal range and stamina, and clarity of articulation. Geared toward public speaking including presentations, lectures, and job talks. May be taken in conjunction with ORALCOMM 117. ORALCOMM 115/215 was previously listed as CTL 115/215.

Same as: ORALCOMM 115

ORALCOMM 217. The Art of Effective Speaking. 3 Units.

The principles and practice of effective oral communication. Through formal and informal speaking activities, students develop skills framing and articulating ideas through speech. Strategies for speaking extemporaneously, preparing and delivering multimedia presentations, formulating persuasive arguments, refining critical clarity of thought, and enhancing general facility and confidence in oral self-expression. ORALCOMM 117/217 was previously listed as CTL 117/217.

Same as: ORALCOMM 117

ORALCOMM 219. Oral Communication for Graduate Students. 1-2 Unit.

(Formerly CTL 219.) Graduate student speaking activities such as teaching (delivering lectures, guiding discussion, and facilitating small groups), professional presentations and conference papers, and preparing for oral exams and defenses. In-class projects, discussion, and individual evaluation assist students in developing effective techniques for improving oral communication skills.

ORALCOMM 221. STEM Speak: Oral Communication for Technical Fields. 3 Units.

This course addresses the principles and practices of effective oral communication and is tailored specifically to those students coming from STEM (science, technology, engineering and math) fields. Students will learn to speak about technical topics to a variety of audiences, will develop their own visual aids, will participate in multiple in-class presentations and will receive both group and one-on-one feedback throughout this course. Special attention will be paid to the effective presentation of data as part of an oral presentation.

Same as: ORALCOMM 121

ORALCOMM 222. "The TED Commandments": The Art and Heart of Effective Public Speaking. 3 Units.

Designed around the presentation principles of TED talks, this course approaches public speaking as an art of engagement and possibility. Students will learn a range of strategies shy;- both traditional and innovative shy;- for crafting a compelling message and delivering it with clarity, authenticity, and power. Limited enrollment. Course was previously offered as CTL 122/222.

Same as: ORALCOMM 122

Organizational Behavior Courses

OB 205. Managing Groups and Teams. 1 Unit.

This course introduces you to the structures and processes that affect group performance and highlights some of the common pitfalls associated with working in teams. Topics include team culture, fostering creativity and coordination, making group decisions, and dealing with a variety of personalities. You will participate in a number of group exercises to illustrate principles of teamwork and to give you practice not only diagnosing team problems but also taking action to improve total team performance.

OB 206. Organizational Behavior. 2 Units.

Building on the discipline of social psychology, this course helps you cultivate mindsets and build skills to understand the ways in which organizations and their members affect one another. You will learn frameworks for diagnosing and resolving problems in organizational settings. The course relates theory and research to organizational problems by reviewing basic concepts such as individual motivation and behavior; decision making; interpersonal communication and influence; small group behavior; and dyadic, individual, and inter-group conflict and cooperation.

OB 209. Leadership Laboratory. 2 Units.

In the Leadership Labs class we ask you to consider the question, "Why would someone follow YOU?" This is a course in which you consider what kind of leader you want to be, what kind of leader you are, and how to align your leadership behavior with your leadership goals. In this class you will have an opportunity to lead your squad and in doing so to discover your strengths and challenges as a leader. You will receive feedback about your approach to leadership and you will have the opportunity to try out new skills and tools. Students will be placed into 5-6 person "squads" and the majority of class time will be spent in these squads. Your squad will meet to work on basic leadership challenges (e.g. managing conflict, assessing a team's progress). There will be the opportunity for a lot of feedback so you can achieve a deeper understanding of the impact of your behavior on others. The squads will do role-play cases and group exercises designed to help you think more deeply about the dynamics in your workgroup and to allow you to practice and experiment with new ways of leading. Each session will be divided into two segments, and one squad member will be the leader for each segment. MBA1 squad members will rotate through the segment leader position. Your squad will have an MBA2 Leadership Fellow assigned to it and he or she will also be present for these meetings in order to provide coaching to the leader and to the squad as whole. Over the course of the quarter your squad will work together on the group project for your Strategy Class. While the deliverable on this project is for your Strategy class, the experience of working together as a team provides a rich opportunity for learning about peer leadership. A number of activities in the weekly Lab will be focused on assessing and reflecting on how you are working together in both the Labs and on your Strategy project. Finally, the quarter culminates with the Executive Challenge. The Executive Challenge will be an opportunity for you to further refine your leadership skills by engaging with alumni judges in role plays that test your ability to lead effectively. The alumni will provide you feedback and evaluate your performance.

OB 219. MSx: Organizational Design. 2 Units.

This course examines fundamental issues of general management and leadership within an organization. You will learn about setting an organization's strategic direction, aligning structure to implement strategy, and leading individuals within the firm. You will study the interplay among formal structure, routines, informal networks, and culture in shaping organizational performance.

OB 259. Sloan: High Performance Leadership. 4 Units.

This course asks the question: What does it take to build a high-performance unit? The focus is on middle and upper-middle management in contemporary complex organizations. These are organizations that have complex tasks, exist in a rapidly changing environment, and have highly skilled subordinates. The premise of the course is that traditional methods of management may produce adequate levels of performance but prevent excellence from developing. New approaches to leadership will be presented that are more likely to lead to a truly high-performing system. Time will be spent discussing the components of effective leadership, what a manager can do to build a high-performing department, and what members can do to support the leader who wants to initiate such changes. The first two classes are required. In addition to class, students will meet for 2 1/2 hours each week in a Skill Development Group to apply the course material to their own personal development. (While there is minimal overlap in content between OB 259 and OB 374 and these two classes are highly complimentary, both require Journals and an evening group. We therefore recommend against taking both classes in the same quarter for workload reasons.)

OB 278. MSx: Organizational Behavior. 2 Units.

Building on the discipline of social psychology, this course helps you cultivate mindsets and build skills to understand the ways in which organizations and their members affect one another. You will learn frameworks for diagnosing and resolving problems in organizational settings. The course relates theory and research to organizational problems by reviewing basic concepts such as individual motivation and behavior; decision making; interpersonal communication and influence; small group behavior; and dyadic, individual, and inter-group conflict and cooperation.

OB 289. MSx: Negotiations. 2 Units.

This course is designed to improve students' skills in all phases of a negotiation: understanding prescriptive and descriptive negotiation theory as it applies to dyadic and multi-party settings, buyer-seller transactions and the resolution of disputes, to the development of negotiation strategy and the management of integrative and distributive aspects of the negotiation process. This course is based on a series of simulated negotiations in a variety of contexts, including one-on-one, multiparty, and team negotiations. When playing a role in a simulated conflict, you will be free to try out tactics that might feel uncomfortable in a real negotiation. You will get feedback from your classmates about how you come across. In sum, you can use this course to expand your repertoire of conflict management and negotiation skills, to hone those skills, and to become more adept in choosing strategies and tactics that are appropriate for a particular negotiation situation. This course is an intense, more compact version to the elective OB381 and is almost identical to the OB581 immersion course. Thus, students should not take either of these courses as there is considerable overlap among the three. Attendance and participation in the negotiation exercises are mandatory.

OB 322. Networks. 4 Units.

This course is designed to improve your effectiveness as a manager by introducing you to both the concepts and tools that are part of the "new science of social networks" as they apply to organizations. In this course, you will develop the skills to understand social networks and recognize social capital, both offline and online, as well as be able to identify key elements of your own and others' social networks that enhance competitive capabilities. Topics to be covered include how social networks affect power and influence, leadership, innovation and the generation of novel ideas, careers, organizational change and competitive advantage. Additional topics to be covered include the increasing importance of online social networks in organizational life and the importance of social cognition and how it can be used to enhance social capital. At the conclusion of this course you will have the skills to map out social networks, diagnose features of the networks that either help or hinder the performance of individuals, groups and companies, and be able to manage important features of social networks in organizations.

OB 324. The Psychology of Startup Teams. 3 Units.

The psychology of startup teams is a major determinant of their ultimate success. In this course, we explore the psychological dynamics specific to startup teams and identify ways to effectively lead startup teams to their optimal performance. We will discuss topics such as creating the 'dream team', leadership in start-ups, the art of vision in startups, managing a startup's culture and climate, navigating virtual interactions, and solving common interpersonal problems in startup teams. To address these topics, the course will use a mix of experiential exercises, cases, and exciting guest speakers (including well-known CEOs, venture capitalists, and speciality start-up consultants from Silicon Valley).

OB 330. Leadership Fellows I. 4 Units.

The Arbuckle Leadership Fellows Program plays an integral role in the GSB leadership curriculum by bringing together a group of talented second years to support the leadership development of the first-year class. OB330, an 8 unit two-quarter MBA2 elective course (in combination with OB331), is the academic component of this program and runs the entirety of both Autumn and Winter Quarters. Both quarters must be completed to receive any units of credit. The course is open only to those students who have applied and been accepted into the Leadership Fellows Program. Interested students apply at the start of Winter Quarter of their first year and undergo a competitive application process, after which successful applicants are invited to take part in the program. Informational meetings are held late in Autumn Quarter and during the first week of Winter Quarter and Fellows are selected from the first year class in mid-Winter Quarter. Knowing how to develop others is a crucial leadership competency. In this class, Fellows develop the advanced leadership skills of leading leaders and developing others through coaching and mentoring. Among the competencies developed in this class are: 1) Team Coaching Skills (e.g. facilitating a group, diagnosing group dynamics, debriefing, coaching without undermining the leader), 2) Individual Coaching Skills (e.g. effective inquiry, asking powerful questions, balancing support and challenge, providing effective feedback, holding others accountable, utilizing, valuing and connecting across differences and power differentials, using oneself in service of another's development) and 3) Personal Development Skills (e.g. self-reflection and self-awareness, leveraging strengths, stretching outside one's comfort zone.) In the Autumn Quarter Fellows are assigned to a squad of six MBA1s in Leadership Labs. Fellows guide their MBA1 squad through the learning process in the Labs and provide both individual and team coaching to their MBA1 squad members. In addition to the work with their MBA 1 squad, Fellows provide in-depth 1:1 coaching to three additional MBA1 students who are not members of their squad. This 1:1 coaching begins after Autumn midterms and continues through the end of Winter Quarter. Fellows classes meet twice a week for 105 minutes. There will be a reading list of conceptual material which will be supplemented during class with lectures discussions and activities. Students will apply concepts through role-playing and experiential exercises during class time as well as in their coaching and mentoring of their MBA1 coachees. Additionally, Fellows will attend weekly Leadership Labs with the first year squad to which they have been assigned and meet 1:1 with MBA1 coachees. Fellows meet regularly with five of their peers in "clinics," standing groups led by Leadership Labs Instructors who are also GSB Leadership Coaches. Fellows meet with their Leadership Coach and clinic approximately every other week during regular class time to discuss specific strategies for working with their first year students. Fellows also periodically meet with their Leadership Coach one-on-one to hone their skills and explore their areas for specific improvement. Note: OB374, Interpersonal Dynamics, is a PRE-REQUISITE for this course; students who want to be Fellows are advised to assess whether that is a class they want to take in the spring quarter of their first year. Additionally, signing up for 1:1 coaching by a Fellow as an admit strengthens a MBA1 student's application to the Arbuckle Leadership Fellows program.

OB 331. Leadership Fellows II. 4 Units.

This course is the continuation of Leadership Fellows I, an 8-unit course that begins in Autumn Quarter. During this quarter Fellows will continue to deepen their coaching and mentoring skills, and will focus exclusively on in-depth 1:1 coaching with three MBA1 coachees (who were not members of their MBA1 squad.) Classes and clinics continue as in Autumn Quarter.

OB 333. Acting with Power. 3 Units.

The ability to function effectively within a hierarchy is a crucial determinant of managerial success, yet many people struggle with "authority issues" that make certain hierarchical roles and positions difficult for them. This course draws on the craft of acting and the science of psychology to help students learn to use themselves to develop the characters that can play these roles effectively. This class is designed specifically for students who have trouble "playing" authoritative roles: those who find it difficult to act with power, status, and authority. It will also be useful for students who find it difficult to share power and authority, which involves accepting and deferring to the power and authority of others. Participants will be asked to read, think deeply about, and share some of their own feelings about power and authority, and the origins of those feelings. They will also be asked to prepare for and present a series of in-class performances that involve playing characters with and without power, in scenes that highlight the interactions and relationships between high and low power characters. These performances will take up much of our time during class. Out-of-class assignments will include reading important works on psychology, and on the theory and practice of acting, as well as writing short essays analyzing their own and others' performances.

OB 336. Insight to Outcome. 4 Units.

Getting from "strategic insight" to "desired outcome" (achieving the right result) continues to be a core challenge for many organizations and leaders. In this course, we develop a framework and approach for the "insight to outcome" sequence, study some of the key levers available to managers, and learn from some common pitfalls. The bulk of the course will be devoted to the practical application of the approach to a number of important business processes, such as merger integration, corporate and business unit transformation, and strategy development. Some class sessions will involve class visits by topical experts in these applications. The course is designed for second-year MBAs. It will appeal to students interested in an exploratory course - more of a "how to think about it" course than a "toolkit" course. Grades will be based on class participation and a group project. Class size is limited to 30.

OB 343. Scaling up Excellence in Organizations. 4 Units.

A problem for every manager is to make 'good' behaviors spread quickly and to shrink 'undesirable' behaviors quickly. This course provides you practical frameworks to accomplish these managerial goals. We will examine issues such as scaling Idea generation, scaling knowledge sharing, scaling the adoption of ideas across firms, scaling change in global firms. We will be using a newly written series of cases for this course and also draw on guest speakers. We will be require a project that may involve design thinking - so we encourage those who have not had exposure to design thinking to apply.

OB 345. Leadership Coaching. 3 Units.

The ability to coach others is an often over-looked core competency for leaders. This course will give second year MBA students an opportunity to learn the fundamental skills of coaching, so they can become coaching managers. This course is designed to be very experiential. While conceptual frameworks will be introduced through readings, lectures, demonstrations and discussions, the only real way to learn coaching skills is to both practice coaching, and to be coached. Every class session will provide opportunities to do both:## coach and be coached. Because the in-class coaching practice will not be role plays but will actually be real coaching sessions between students, this course will demand a high level of engagement and participation from each student. While OB374 is not required, we highly recommend students take OB374 either previously or concurrently with taking this course in order to maximize your learning.

OB 362. Leadership Coaching and Mentoring. 3 Units.

This two-quarter course is offered for 6 units and runs for the Winter and Spring Quarters. Both quarters must be completed to receive any units of credit. THERE IS BOTH A PREQUALIFICATION AND A PRE/CO-REQUISITE for this course. It is open to a maximum of 24 MBA2s who have passed an assessment of their potential to coach effectively, though they need not have been coached as first years. (The number of students may be increased to 36 if sufficient first-year coachees are identified.) The pre/co-requisite is OB 374-Interpersonal Dynamics. (If taken as a co-requisite, OB 374 must be taken in the winter quarter.)nn nnThere will be a reading list of conceptual material which will be supplemented during class with lectures and discussions. Students will have the opportunity to apply those concepts through role-playing and exercises during class time. Each MBA2 will be assigned three MBA1s to coach. The MBA2 coaches will meet with their MBA1s five times each quarter (i.e. a total of 10 coaching sessions) in a series of semi-structured coaching activities. In addition, the MBA2 students will meet, in groups of 6, with a Master Coach for a two-hour clinic approximately every other Friday during the Winter Quarter during class time. During Spring Quarter, students will meet every Monday (only) from 3:15 to 5:00 pm (alternating between class and clinics) with two additional Friday classes to be held on Friday, April 1, and Friday, April, 15 from 3:15 to 5:00 pm. nnnNote: Students MUST attend the first class (including waitlisted) or they will be dropped. The drop deadline for this course is Friday, January 7, at 11:59 p.m. (i.e. earlier than standard GSB add/drop deadline).

OB 363. Leadership Perspectives. 4 Units.

What does it mean to be a principled leader? What role do values play in an organization, and how do successful leaders apply their values in their daily business lives? This course examines the concept of principled leadership and the various ways that leaders try to institutionalize particular values within the organizations they lead. Equally important, it explores the difficult challenges that leaders sometimes face when trying to apply their principles in a tough, fast-paced business environment, where others may not share the same expectations. Through assigned readings, interactive lectures with visiting executives, and weekly small group discussions, students will learn how practicing leaders implement their principles, while reflecting the realities of different cultural expectations and meeting business demands. The course will provide a forum for students to learn directly from practicing leaders and to think introspectively about their own personal values, leadership styles, and long-term aspirations.

OB 368. How to Make Ideas Stick. 4 Units.

Having a good idea is not enough, we must also be able to convey our ideas in a way that people can understand and act on them. But often our messages don't persuade or persist. This course assumes that we can craft more effective messages by understanding the principles that make certain ideas stick in the natural social environment: Urban legends survive in the social marketplace without advertising dollars to support them or PR professionals to spin them. How could we make true or useful information survive as well as bogus rumors? We will use research in sociology, folklore, and psychology to analyze what kinds of ideas survive the selection process in the marketplace of ideas and to develop a set of strategic tools to craft ideas that are more likely to survive. Topics covered include crafting messages for complex information that don't exceed the capacity of human attention and memory, using emotional appeals that inspire people and motivate action, acquiring attention in a crowded environment, and gaining legitimacy for new ideas, approaches, and technologies.

OB 372. High-Performance Leadership. 4 Units.

This course asks the question: "What does it take to build high-performance?" The focus is on middle and upper-middle management in contemporary organizations that have complex tasks, exist in a rapidly changing environment, and have highly skilled subordinates. The premise of the course is that traditional methods of management may produce adequate levels of performance but prevent excellence from developing. New approaches to leadership will be presented that are more likely to lead to a truly high-performing system. Time will be spent discussing the components of effective leadership, what a manager can do to build a compelling vision, strong team, and mutual influence sideways and upwards as well as with direct reports. Also, what members can do to support the leader who wants to initiate such changes. In addition to class, students will meet for 2 1/2 hours each week in a Skill Development Group to apply the course material to their own personal development. (While there is minimal overlap in content between OB 372 and OB 374 and these two classes are highly complementary, both require Journals and an evening group. We recommend against taking both classes in the same quarter for workload reasons.) Students will have a choice as to when their SDG will meet. The expectation is full attendance at all SDG meetings. Only one excused class absence. Class on 2/23/15 is required.

OB 374. Interpersonal Dynamics. 5 Units.

PRE-QUALIFICATION IS REQUIRED BY THE DEADLINE (APPROXIMATELY FIVE WEEKS BEFORE THE QUARTER BEGINS). The focus of this course is to increase one's competencies in building more effective relationships. Learning is primarily through feedback from other group members. This course is very involving and, at times, can be quite emotional. However, this course is not a substitute for therapy; we deal more with inter-personal issues than with intra-personal ones. If you are in therapy, please talk this over with your therapist and get their advice before enrolling in this course. The students are divided into three 12-person T-groups that meet the same evening of the class. It is very important to note that when you decide to take this course, you make an explicit contract to be actively involved. Attendance to the first class is required for the 1-day/week sections of this class. Attendance to the first two classes is required for the 2-day/week sections of this class. Failure to attend the first class will result in an automatic drop. Students who are waitlisted must attend the first meeting of each section they are waitlisted for in order to secure a place in the course should space open up. It is the student's responsibility to notify respective OB 374 faculty of your attendance and wish to fulfill your waitlist requirement. T-group meetings for all sections will meet for 3 hours the same evening as 1-day/week class and the same evening of the first day of the 2-day/week section. The class has a weekend retreat the seventh or eighth week (check your specific section) of the course. Because of the highly interactive nature of this course, it is very important that all students attend all sessions. Missing class, class T-group, evening T-group, or any portion of the weekend will negatively influence your grade and may result in a student's grade being dropped one grade level (for each absence). Arriving late on Friday to the weekend will negatively influence your grade level - missing any more of the weekend beyond that will result in a U. Students must pre-qualify before taking this course. Qualification assignments are due approximately five weeks prior to the quarter. For exact due dates and complete assignment details, see: <https://sites.google.com/a/stanford.edu/ob374-prequalification/>.

OB 377. The Paths to Power. 4 Units.

Power and influence processes are ubiquitous and important in organizations, so leaders need to be able both to understand power and to act on that knowledge. This course has three objectives: 1) increasing students' ability to diagnose and analyze power and politics in organizational situations; 2) increase students' skills in exercising power effectively; and 3) helping students come to terms with the inherent dilemmas and choices, and their own ambivalence, involved in developing and exercising influence. Topics covered include: the sources of power, including individual attributes and structural position; dealing with resistance and conflict; obtaining allies and supporters; maintaining power; how and why power is lost; living in the limelight--the price of having power; preparing oneself to obtain power; and the use of language and symbolism in exercising power. The class involves a reasonably large number of written, self-reflective assignments as well as two individual projects (doing a power diagnosis on an external organization that is important to the person) and a doing-power project (using the class material during the quarter to gain power in some group or organization). The class emphasis is on both learning the conceptual material and also incorporating it into one's own strategies and behaviors.

OB 381. Conflict Management and Negotiation. 3 Units.

Conflict is unavoidable in every organization. The key question is how it will be handled: will it escalate to dysfunctional levels or will it be effectively managed? Hence, a first aim of the course is to develop your ability to analyze conflicts, to look beneath the surface rhetoric of a conflict, to isolate the important underlying interests, and to determine what sort of agreement (if any) is feasible. We'll analyze which negotiation strategies are effective in different conflicts. We'll also examine psychological and structural factors that create conflict and often pose a barrier to its resolution. But understanding how to analyze a conflict is not enough. To manage conflict effectively, you need a broad repertoire of behavioral skills. Developing these is the second aim of the course. To achieve this, negotiation exercises are used in every session. When playing a role in a simulated conflict, you will be free to try out tactics that might feel uncomfortable in a real one. You will get feedback from your classmates about how you come across. In sum, you can use this course to expand your repertoire of skills, to hone your skills, and to become more adept in choosing when to apply each skill.

OB 383. Lives of Consequence: How Individuals Discover Paths to Meaningful Engagement. 3 Units.

This Bass Seminar will examine the lives of extra-ordinary individuals who have made exceptional contributions to society, either through their impact on business, politics, science, social activism, or the arts. We will take a close look, for example, at creative individuals such as Steve Jobs, George Lucas, and Pixar's Brad Bird; political achievers such as Robert F. Kennedy, Martin Luther King and Margaret Thatcher; business leaders such as Bill and Melinda Gates, Whole Foods CEO John Mackey, and Starbuck's Howard Schultz (to name just a few). We will use these examples to develop useful ideas about the narrative unfolding of creative and extra-ordinary lives. In addition, using theories and evidence from the social and behavioral sciences, we will develop a conceptual framework for thinking about individuals' "paths to extra-ordinary achievement." Drawing on psychological and philosophical theory and research, we will also examine how human achievement relates to happiness and the perception of meaning in one's life. You will have a chance to work in small groups to study individuals or domains of special interest. Students will also have an opportunity to apply the framework to their own lives using a series of enjoyable reflective exercises, including writing and public speaking exercises. The seminar will be very discussion oriented and quite lively. The goal of the seminar is to change how you think about your self and your life!

OB 385. Leading Social Change: Educational and Social Entrepreneurship. 4 Units.

(Same as OB 385) The course provides an overview of different approaches to leading change in the social sector, drawing primarily, but not exclusively, on case examples in education. While there is a substantial need for innovation and visionary leadership in sectors such as education, social entrepreneurs who want to drive change must appreciate the significant barriers and unique opportunities presented by non-market forces in these sectors. The course will equip students with an appreciation for different mechanisms of change and theories of action as well as some of the challenges of initiating and sustaining meaningful change in social sectors such as education. The course will draw on readings and case studies, and we will benefit from the wisdom of an inspirational group of guest lecturers. While the course will benefit any student concerned with making a positive impact in the world, it is particularly (although not exclusively) appropriate for students in the joint MA/MBA program as well as those who will lead social change through nonprofit consulting or entrepreneurship.

Same as: EDUC 321X

OB 387. Redesigning Work for 21st Century Men and Women. 4 Units.

Research on the Millennial Generation (i.e., those born between 1980-2000) shows that millennials, as compared to earlier generations, have quite different values and priorities when it comes to work. For instance, millennials report that they place a high value on autonomy and creativity at work, and prefer to self-manage their personal productivity. They also report that they value being a good parent and having a good marriage over having a high-paying career. Despite this research, our organizations have been slow to respond to a new generation of workers. This has led to high levels of disengagement, and lower levels of productivity in many organizations. This class will explore the gap between how our organizations are designed, and what a new generation of workers desire in terms of work. Students will work in teams to design a new workplace that is reflective of what workers want in terms of their work. The first part of the course will focus on what the issues and problems are in how organizations are designed for an earlier generation of workers, while the second part of the course will be set aside for team-based project work and presentations.

OB 388. Leadership in the Entertainment Industry. 3 Units.

The entertainment industry is one of the largest and most important industries in the world. It is an industry characterized by tremendous opportunities and great uncertainties. The industry is currently undergoing tremendous change as new technologies transform the way entertainment is produced and disseminated throughout the world. For all of these reasons, the dynamic industry creates tremendous challenges for entrepreneurial students interested in leaving an artistic or creative imprint on the world. This course is designed to help prepare students for careers in the media industries, and to explore leadership within them. The industry is truly an intersection of art and commerce, and a major portion of the course will involve bringing to the class leaders who represent key areas of the entertainment industry, both on the business and creative sides. As with any business, the entertainment industry is driven by the vision of its leaders. These leaders daily make financial and artistic decisions, and manage staff and productions with the goal of producing entertainment product meant to be seen as widely as possible, and meant to make a profit. It is hoped that through interaction with these speakers, students taking this course will gain a greater understanding of the industry and what it takes to succeed in it. Further, the students will see the potential of strong leadership and how it works to advance entertainment companies and the films and TV programming they produce. Topics to be examined include the process of project development, production, and marketing; emerging technologies and their impact on the industry; the roles studio and network executives, directors, film and television producers, writers, actors, agents, and others play in the making and distribution of film and television productions.

OB 392. Leadership Coaching and Mentoring II. 3 Units.

This course is the continuation of a 6 unit course that runs for the Winter and Spring Quarters. Classes/clinics meet 10 times in the spring. It is open to up to 24 MBA2 students who have been selected on the basis of their having passed a screening to assess their potential to coach effectively. They also need to have taken OB 374 - Interpersonal Dynamics or will take OB 374 in the Autumn or Winter. There will be a reading list. That conceptual material will be supplemented during class time with lectures and discussions. Students will have the opportunity to apply those concepts through role-plays and exercises during class time. Each second-year student will be assigned three first-year students. The second-year coaches will meet with their coaches 5 times each quarter in a series of semi-structured coaching activities. In the spring there will be two mandatory Friday sessions, on April 1 and April 15 in addition to Monday afternoon classes.

OB 393. Leadership in Diverse Organizations. 4 Units.

How improve capacity to exercise leadership and work effectively with others within the context of culturally diverse groups and organizations. Premise is that diversity presents challenges and opportunities that push students to develop leadership skills relevant across a variety of situations. What social and psychological obstacles limit people's ability to work effectively across identity-based differences? What can people do to build the relational and organizational capacity to enable these differences to be a resource for learning and effectiveness within teams and organizations? Focus is on dynamics of race and gender; attention to other dimensions of identity and difference in organizations, including sexual orientation, nationality, class, and religion.

OB 503. Games and Decisions. 1 Unit.

This course is intended for individuals who are interested in how decisions happen in organizations, and wish to expand their knowledge about the interactive processes involved in strategic decision-making. The course will draw on behavioral game theory to analyze and make sense of individual and group decision-making. To understand how decisions happen, we will use analyses of in-class exercises and in-depth discussions of new and exciting research findings on cognitive and emotional aspects of decision making (e.g., what does "bounded-rationality" really mean? how do our emotions influence our decisions? What is unconscious thought and how can it be used to improve decisions? What drives erroneous market-entry decisions?). We will play strategic games in all our meetings to understand how various conditions (e.g., time pressure, uncertainty, information complexity, accountability) influence our decisions, but we will also read and discuss theory and research on bargaining and interdependent decision-making. So, if you enjoy in-class exercises, you will enjoy our simulations. At the same time, if you enjoy analyzing human behavior and social interactions, you will like the reading and our discussions. After taking this course, you will: (a) be better able to identify and avoid common traps in strategic decision making; (b) be able to draw on a diverse "tool-box" of skills and techniques to make you a more effective decision maker; and (c) have a deeper understanding of other people's thinking and decision making processes.

OB 504. Culture & Organizations. 1 Unit.

This course is designed for individuals who are interested in learning about the multitude of ways by which culture influences core organizational processes, including leader emergence and effectiveness, communication and social influence, decision making and negotiation. The course will also address the challenges associated with cross-cultural business interactions. To dig deep into culture's consequences, we will use analyses of real-world cases, in-class exercises, and in-depth discussions of new and exciting research findings. For example, we will discuss why some cross-cultural joint ventures succeed while others fail; engage in exercises that illustrate the challenges of working across cultural boundaries; review common pitfalls in cross-cultural interactions; and discuss when cultural variation within the organization can be an advantage, as well as how leaders can effectively manage it. Thus, class experience will include a balanced mix of hands-on exercises aimed at illustrating what culture is, and discussions aimed at analyzing its implications. After taking this course, you will: (a) be better able to identify, understand, and avoid common traps in cross-cultural business interactions; (b) learn how culture can affect and be used to enhance organizational performance; (c) possess a larger repertoire of behavioral skills to apply in various cross- and intra-cultural interactions; and (d) understand why culture can be sticky, and how to leverage it for the purpose of organizational change.

OB 522. Managing Social Networks in Organizations. 2 Units.

This course is designed to improve your effectiveness as a manager by introducing you to both the concepts and tools that are part of the "new science of social networks" as they apply to organizations. In this course, you will develop the skills to understand social networks and recognize social capital, both offline and online, as well as be able to identify key elements of your own and others' social networks that enhance competitive capabilities. Topics to be covered include how social networks affect power and influence, leadership, innovation and the generation of novel ideas, careers, organizational change and competitive advantage. Additional topics to be covered include the increasing importance of online social networks in organizational life and the importance of social cognition and how it can be used to enhance social capital. At the conclusion of this course you will have the skills to map out social networks, diagnose features of the networks that either help or hinder the performance of individuals, groups and companies, and be able to manage important features of social networks in organizations.

OB 527. The Art of Self-Coaching. 2 Units.

In 2009 a graduating student said to me, "A number of coaching resources here at the GSB have helped me develop as a person over the last two years. But after I leave school and no longer have access to those resources, how will I continue to coach myself?" This course is an attempt to help you answer that question. I define "self-coaching" as the process of guiding our own growth and development, particularly through periods of transition, in both the professional and personal realms. In this course you'll explore a range of practices and disciplines intended to help you build on what you've learned about yourself over the last two years and continue that process after graduation. While this is a self-directed process, it's not a solitary one, and you'll work with classmates in a variety of configurations (pairs, trios, small groups), so be prepared to discuss meaningful personal issues with your fellow students.

OB 537. Advanced Topics in Teams. 2 Units.

This course offers a deeper examination of team dynamics than was provided in Groups and Teams. The course goal is to provide you with tips and tools to maximize the performance of your teams at work. Topics include forming start-up teams, capitalizing on diversity in teams, managing virtual teamwork, facilitating effective discussion and debate in creative teams, and navigating informal leadership processes within top management teams. Group exercises and cases will help you learn how to create and maintain highly effective teams.

OB 541. How to Change Things When Change is Hard. 2 Units.

This course will explore case studies and research about how to create behavior change from a position without much formal authority or power: e.g., a middle manager trying to change a failing unit of a big firm or a social entrepreneur trying to influence the behavior of a community. We'll use principles from social psychology, clinical psychology, and behavioral economics to analyze cases like the following: How a new head of the equities research department at Lehman Brothers changed his group's ranking in the Institutional Investor polls from #15 to #1 over a four year period. How Teach for America teachers take unmotivated kids in neglected schools and manage on standardized tests to gain more than two year's progress in one year of schooling. How a clever application of behavioral economics managed to triple employee savings rates.

OB 543. Scaling Change. 2 Units.

A problem for every manager is to make 'good' behaviors spread quickly and to shrink 'undesirable' behaviors quickly. This course provides you practical frameworks to accomplish these managerial goals. We will examine issues such as scaling idea generation, scaling knowledge sharing, scaling the adoption of ideas across firms, scaling change in global firms. We will be using a newly written series of cases for this course and also draw on guest speakers.

OB 547. Entrepreneurial Leadership: The Six Essential Skills of Extraordinary Entrepreneurs. 2 Units.

How do some people turn ideas into enterprises that endure? Why do some people succeed why so many others fail? Based on more than 200 interviews with leading entrepreneurs conducted over the past five years by Amy Wilkinson, this course will focus on the six skills of successful entrepreneurs. The class will include brief lectures and class discussions with a set of the successful entrepreneurs featured in a recent book authored by the instructor, "The Creator's Code." The class is designed to help students integrate these skills into their own future ventures.

OB 552. The Quest for Happiness: Exploring the Psychology of Human Fulfillment. 2 Units.

In this seminar, we will explore the nature of human happiness. We will examine recent theories and new evidence from psychological research indicating who among us is likely to achieve deep and enduring happiness—and why. We also will review what we know about the determinants of happiness throughout the lifespan. We will discuss how happiness is created and sustained, even in the face of adversity and tragedy. We will describe the "geography" of happiness, examining different cultural conceptions of happiness and variations in the distribution of happiness around the globe. We will also discuss some prevalent misconceptions regarding the antecedents of human happiness—why so many people, in short, stumble in their quest for happiness. We will explore how leaders can use happiness research to create more satisfying work places. To illustrate these ideas, we will examine in detail a number of fascinating individuals, including Bill Gates, Warren Buffet, Oprah Winfrey, venture capitalist Tom Perkins, Steven Spielberg, Martha Stewart, and the Nobel physicist Richard Feynman. Students will also work, either individually or in small self-selected teams, on a case study of an individual or organization they find interesting. There will also be several reflective exercises designed to probe students' self-conceptions regarding their own happiness. This seminar will be very discussion-oriented and our time will be spent engaging in lively, provocative debate of controversial ideas and evidence about happiness.

OB 555. Mastering Life's Moments: The Challenge of Optimizing your Experience. 2 Units.

Our personal and professional lives are made up of a series of moments. Some of these moments present great opportunity, with the prospect of personal change and even transformative growth. Other moments contain the seeds of setback and even derailment of our most coveted plans. Some of life's moments are planned, while others catch us completely by surprise. Whatever moments we are afforded, we must make the most of them. This new seminar will explore what we know about the psychology of "optimal experience." We will examine how and why some individuals harvest so much joy, zest and sense of attainment from their moments, while others squander their moments or dig themselves into deeper holes when trying to respond to them. We will also examine how and why some people respond brilliantly to adversity, mastering even the most tragic moments that life presents, while others flounder and fold. To inform our thinking on this vital topic, the seminar will include a series of rich and provocative readings from psychology, behavioral economics, organizational theory and philosophy. Additionally, the seminar will include a series of compelling video cases illustrating both optimal and suboptimal responses to experience. To make the seminar more personally involving and useful to you, you will also engage in a series of reflective writing and experiential exercises. Whenever I offer a new course, I make a promise to the students who take it. For this course I promise you an intellectually deep and personally meaningful exploration of what it means to "use up" your life well. Put another way, I promise you some great educational moments in your GSB life!

OB 568. How to Make Ideas Stick. 2 Units.

This class will explore the properties shared by ideas that stick with people and change the way they think and act. The course is based on the framework in the book *Made to Stick* and focuses on hands-on exercises that will teach you how to transform your messages to make them stick: How do you get attention for your idea in a crowded marketplace of ideas? How can you convey complex information quickly? How do you make a broad, abstract idea concrete and tangible enough for people to understand? How do you provide credibility for your idea without resorting to dry statistics? Although the exercises in this course are fun and generally short, students in the past have said that they do require a lot of thinking time outside of class in order to apply the course principles to a specific message. This is particularly true of the final project which involves improving the message of a specific live client (e.g., a friend with a start-up business, the recruiting materials of a former employer). This course will be especially useful for entrepreneurs who must pitch their ideas to customers, investors, and potential employees and for students in the nonprofit sector where resources for spreading ideas are often thin.

OB 569. Strategy and Management in Developing Economies. 2 Units.

This course will explore the strategic and managerial challenges involved in running for-profit companies in developing economies. Particular emphasis will be given to understanding the challenges of running enterprises that touch the lives of the poor or the extreme poor, either by employing them or producing goods and services that improve their lives. A central theme will be the ways in which features of these economies shape the ability of firms to thrive and grow. Among the issues that may be considered are how the economic and social context affects the ability of firms to formulate successful strategies for creating and capturing value and how the context impacts the process of management within the organization.

OB 571. Diversity, Dynamics, and Influence. 2 Units.

The course is based on the premise that diversity can present unique challenges and opportunities thereby compelling students to expand their sensitivity and develop a wider repertoire of skills, many of which are relevant across a variety of situations. The course is intended for students who plan to work in culturally diverse groups or organizations and will be equally relevant to those who work in the not-for-profit, public, and for-profit sectors. Through the presentation of new concepts, participation in experiential group activities, and faculty facilitated debriefing, students are expected to improve their ability to better assess group level diversity dynamics and in turn both intentionally influence and to be influenced inclusive of three fundamental differences presented by peers - values, gender, and group identity. Students will be taught how to practice 'authentic discourse' during regular faculty facilitated small task group debriefings. 'Authentic discourse' is a skill stressed in Interpersonal Dynamics (OB374).

OB 572. High Performance Leadership for Family Business Leaders. 2 Units.

This course examines the unique leadership problems faced in family businesses. What is unique is that there are two over-lapping systems; the family system and the business system. These can be congruent or at cross-purposes. For example, the latter might stress promotion on merit while the other values family ties. There also can be difference in purpose. Is the organization to maximize shareholder value or to provide employment for family members? These and other related issues impact the communication process, how decisions are made and how power is distributed. The course will be case based. The content will overlap that of OB372 so it is not advised to take both courses. Because of the shortened nature of 572, there would be minimal overlap with OB374 Interpersonal Dynamics. In addition to class, students will meet for 1 1/2 hours each week in a Skill Development Group to apply the course material to their own personal development.

OB 574. Interpersonal Dynamics at Work. 2 Units.

This course is open to students who have taken OB 374 Interpersonal Dynamics or GSBGEN 374 Interpersonal Influence and Leadership. The objectives of OB 574 is to take what was learned in the introductory Interpersonal Dynamics course further with a specific emphasis on how those approaches are applicable in a work setting. Specifically how issues of fuller self-expression/disclosure, feedback, resolution of interpersonal difficulties and building effective relationships can apply to working with peers and one's manager as well as in a team setting. The course will meet Thursdays 3:15-5:00 for five sessions starting April 2nd and running until April 30th. The T-groups will meet that evening, 7:00-9:30. In addition, there will be one all-day meeting (instead of a weekend), Saturday, April 4th running from 9:00 a.m. to 9:30 p.m. Attendance in all class sessions, evening meetings, and the Saturday retreat is required. Any absence will result in lowering of the grade. In addition to a modest amount of reading, students will keep an on-going self-diagnostic log. One-third of the grade will be on the log and the remaining 2/3 on the extent of participation in class, risk-taking in the group, and helping building learning conditions for self and others.

OB 581. Negotiations. 2 Units.

This course is designed to improve students' skills in all phases of a negotiation: understanding prescriptive and descriptive negotiation theory as it applies to dyadic and multiparty negotiations, to buyer-seller transactions and the resolution of disputes, to the development of negotiation strategy and to the management of integrative and distributive aspects of the negotiation process. The course is based on a series of simulated negotiations in a variety of contexts including one-on-one, multi-party, and team negotiations. When playing a role in a simulated conflict, you will be free to try out tactics that might feel uncomfortable in a real one. You will get feedback from your classmates about how you come across. You will have an opportunity to reflect on your experience in your negotiation paper. In sum, you can use this course to expand your repertoire of conflict management and negotiation skills, to hone your skills, and to become more adept in choosing when to apply each skill. nnnThis course represents a shorter, more intense version of OB 381-Conflict Management and Negotiations. Students should not take both courses, as there is considerable overlap in course content. Attendance and participation in the negotiation exercises is mandatory.

OB 582. Leading Social Change: Educational and Social Entrepreneurship. 2 Units.

The course provides an overview of different approaches to change, drawing primarily on entrepreneurial initiatives in education. The course will equip students with an appreciation for different mechanisms of change as well as some of the challenges of initiating and sustaining change in social sectors such as education. nnnThe course will draw on readings and case studies, and we will benefit from the wisdom of an inspirational group of guest lecturers. While the course will benefit any student concerned with making a positive impact, it is particularly appropriate for students in the joint MA/MBA program as well as those who will lead social change through nonprofit consulting or entrepreneurship.

OB 586. Organizational Learning. 2 Units.

This is a course about how firms learn from their experiences and the opportunities created by flawed learning. It will explore common mistakes in learning and barriers to the adoption of effective practices. Understanding learning problems will help future managers avoid common mistakes and build organizations that learn more effectively; learning is particularly important for entrepreneurs who are trying out new ideas and so must adapt correctly to feedback from the environment. But understanding common mistakes is also useful for identifying possible opportunities in markets; opportunities exist when firms make mistakes and when they fail to learn effective practices. The course will introduce concepts and findings from organization theory, psychology, decision theory, and statistics. A variety of exercises, cases, and readings will be used to illustrate barriers to learning and the opportunities they create, including the book "Moneyball" by Michael Lewis which discusses market-level mistakes in professional baseball.

OB 591. Advanced Negotiation. 1 Unit.

This course is designed for individuals who have taken one of the basic negotiation courses (OB 381 or OB 581) and are interested in honing their negotiation and conflict management skills and expanding their knowledge about bargaining and dispute resolution. nnnTo dig deeper into the minds of negotiators, we will use analyses of in-class exercises and in-depth discussions of new and exciting research findings. Thus, we will play strategic games and negotiate in all our meetings, but we will also read and discuss theory and research on bargaining. So, if you enjoy negotiating, you will enjoy the classes. At the same time, if you enjoy analyzing human behavior and social interactions, you will like the reading and our discussions. nnnWe will start off the class by launching a week-long entrepreneurial negotiation assignment that will allow you to test your bargaining skills outside of class. Our in-class exercises and in-depth discussions will subsequently tackle critical issues in negotiation, including the role of power and norms in negotiation; cross-cultural negotiations; accountability, emotions, and information processing in negotiation; and creativity in negotiation. nnnAfter taking this course, you will: (a) be better able to identify and avoid common traps in negotiation; (b) have a larger repertoire of behavioral skills to apply in various negotiations; and (c) have a deeper understanding of other people's behavior in negotiation.

OB 593. Leadership in Diverse Organizations. 2 Units.

This course is designed to help students improve their capacity to exercise leadership and work effectively with others within the context of culturally diverse groups and organizations. The course is based on the premise that diversity can present unique challenges and opportunities and thereby pushes students to develop crucial leadership skills, many of which are relevant across a variety of situations. The class will address two primary questions: 1) What social and psychological obstacles limit people's ability to work effectively across identity-based differences? 2) What can you do to create contexts that enable differences to be used as a resource for learning and effectiveness within teams and organizations? Students should be prepared to experiment with various conceptual and analytic skills inside and outside of the classroom. While the course focuses on dynamics of race and gender, there will be opportunities for students to explore a variety of other dimensions of identity and difference in organizations, including (but not limited to) sexual orientation, nationality, class, and religion. The course is intended for students who expect to work in culturally diverse groups or organizations and will be equally relevant to those who plan to work in the not-for-profit, public, and for-profit sectors. The course is cross listed in the School of Education.

OB 601. Organizational Ecology. 3 Units.

This seminar examines theoretical and methodological issues in the study of the ecology of organizations. Particular attention is given to the dynamics that characterize the interface between organizational populations and their audiences.

Same as: SOC 366A

OB 622. Topics in Social Network Analysis: Structure and Dynamics. 2 Units.

This course provides coverage of both introductory and intermediate topics in social network analysis with a primary focus on recent developments in theory, methods and substantive applications. We will begin the course with a brief overview of introductory themes and concepts from various disciplines that have contributed to social network theory, including sociology, anthropology, social psychology, and organizations. Introductory topics to be included: centrality, cliques, structural and regular equivalence and cognitive social structures. The primary topics to be covered in this course include the application of network theory to the study of careers, competition, innovation, inequality/stratification, and recent research on IT mediated networks, as well as an examination of network formation and dynamics. The course will also provide hands-on experience applying social network methods in empirical research. Students will have an opportunity to learn some modern network analysis methods and apply them to network data using the R programming language. No prior experience with social network analysis or software is required.

OB 623. Stratification in Organizations. 2 Units.

Racial and sexual segregation within firms and other organizations is persistently decried as a social problem. Yet there is persistent scholarly debate about the causes, effects, and remedies for such segregation. Over five weeks this course will review several dominant economic, psychological and sociological theories of organizational stratification. We will explore how organizational scholars identify stratification as arising both from individual-level biases and from organizational policies that enable and reinforce actions stemming from those biases. The focus will be on research that has tried to identify policy interventions to reduce such stratification. nn

OB 625. Economic Development and Economic Sociology. 4 Units.

As a field, economic sociology has had little to say about economic development. Much of this quietude stems from the latter's identification with "backward," "poor" or "developing" economies, and the former's interest in many of the advanced features of the richer economies. This state of affairs not only sets up a false dichotomy but also makes it difficult by construction to theorize or research the issue of economic decline, seemingly a necessary piece of any coherent theory of development.nnnThe (admittedly ambitious) goal of this seminar is to move toward a better theory of economic development. We will review several of the more common strands of thought on development in related literatures and then consider some alternative perspectives that might bridge this research and contemporary sociology. No guarantees are made that we will have a full-fledged theory by the end of the quarter, but with luck we will have breathed some new life into an often marginalized but critically important strain of social thought and research.nnnThe class will be a seminar based around the readings. Grading will be a combination of class participation, a take-home midterm and a final paper.

OB 626. Strategy and Organizations. 2 Units.

Why are some organizations more competitive than others? This is one of the defining questions of the interdisciplinary research field known as acirc;## strategic management.acirc;## In this seminar, we will survey the field of strategic management, touching on the four main theoretical approaches that have developed there. Note that I take a very broad view of the field of strategic management, reflecting the diversity of perspectives that are seen in this field worldwide. The reading list here is a small subset of a larger reading list that would occupy a 30-session course. I will make that longer version of the course available to you, although in this short course we will only skim the surface of this deeper reading list.nnnMost work in strategic management pays little attention to particular theoretical perspectives, and is organized more by the topic acirc;## the phenomenon being studied acirc;## such as market exit, growth, performance, mergers and acquisitions, innovation, and the like. I have catalogued the research in strategic management both according to theoretical perspective and topic, and that structure can be seen in this syllabus. I encourage you to use a similar structure as you try to understand the strategy field.

OB 630. Social Norms. 3 Units.

This course covers research and theory on the origins and function of social norms. Topics include the estimation of public opinion, the function of norms as ideals and standards of judgment, and the impact of norms on collective and individual behavior. In addition to acquainting students with the various forms and functions of social norms the course will provide students with experience in identifying and formulating tractable research questions.

Same as: PSYCH 223

OB 632. Social Movements. 3 Units.

Social movement actors have helped initiate some of the major social, cultural, and political changes of the modern era. It is hard to imagine a major political or social reform that did not find its origins in a social movement or collective action. Social movement scholarship has flourished in political sociology and has recently gained a foothold in organizational theory as an explanation for innovation and organizational change. The purpose of this course is to provide you a roadmap for you to roam the terrain of movements and organizations, and be prepared to generate original research ideas that extend inquiry in your chosen area of research.nOrganizations and industries are frequent targets of collective action. Social movement activists frequently target organizations (e.g., corporations, universities) in order to bring about political and social change. Because most organizations are not democracies, movements must find ways to penetrate their closed boundaries if they are to have an influence inside organizations. At the same time, social movements make good use of organizations to carry out their own goals, creating structures that help them carry out their goals, reproduce their missions and tactics, and effectively generate collective action. Social movement organizations develop as vehicles for social change. One purpose of this course is to examine the complex relationship between social movements and organizations. nIn order to understand the empirical link between movements and organizations, we will rely on social movement and organizational theory. Like the phenomena they seek to explain, these theories are strongly intertwined. Since the 1970s, organizational theory has strongly influenced social movement theory. Mayer Zald, John McCarthy, and others imported ideas from the burgeoning field of organizational theory to move social movement scholarship beyond naiuml;ve conceptions of collective action and crowd behavior. Under the umbrella of resource mobilization and political process theory, organizational theory strongly influenced our understanding of the structural underpinnings of collective action. In recent years, social movement scholars have also begun examining the culture and social psychological dimensions of social movement organizations. nDuring most of the 1980s and 1990s, the link between social movement theory and organizational theory was a one-way road. Social movement scholars did most of the conceptual borrowing and organizational theorists, for the most part, ignored political sociology. However, in the last decade the opposing lane has been opened. The rise of economic sociology acirc;## a large theoretical domain interested in the overlap between market, political, and social processes acirc;## and a growing demand among organizational theorists (especially in institutional theory) for mechanisms that explain purposeful, strategic action (i.e., agency) created fertile grounds for social movement theory. In the first part of the 2000s, leading scholars from both fields began holding conferences and workshops and a few articles were published seeking to show the value of social movement concepts to organizational theory. This effort to link the two literatures has been well received. As more scholars began importing social movement concepts to explain organizational phenomena, organizational scholarship turned its attention (again) to issues related to power, politics, and contestation. The convergence of the two research streams has also begun to spur theoretical innovation, especially in bridging structural and cultural explanations for organizational change.nIn this course we will cover topics that explore how movements use organizations to propel change and that examine how movements help generate social change by targeting organizations. We will also evaluate the theoretical developments at the nexus of these two literatures, identifying the major innovations as well as looking for new research opportunities.

OB 635. Social Movements and Organizations. 4 Units.

This research seminar is intended for students seeking to learn more about how collective action underpins institutional change in organizations and industries, and how the success of collective action, in turn, hinges on organizational structures and processes to recruit and mobilize individuals. The purpose of this course is to provide you a roadmap for you to roam the terrain of movements and organizations, and be prepared to generate original research ideas that extend inquiry in your chosen area of research.

OB 652. Statistical Methods for Behavioral and Social Sciences. 5 Units.

For students who seek experience and advanced training in empirical research methods. Analysis of experimental data with methods ranging from simple chi-square to multiple regression models, including an introduction to mixed models. Uses the free statistical computing package R. Prerequisite: An intro stats class (Same as Psych 252 -- Co-taught with Ewart Thomas).

OB 653. Categories in Markets. 4 Units.

This seminar investigates the ways in which categories emerge in markets and shape market behavior. It covers recent theoretical and empirical work on the sociology of categories and its foundations in cognitive science. Particular attention is given to formalization.

OB 670. Designing Social Research. 3 Units.

This is a course in the design of social research, with a particular emphasis on research field (i.e., non-laboratory) settings. As such, the course is a forum for discussing and developing an understanding of the different strategies social theorists employ to explain social processes, develop theories, and make these theories as believable as possible. In general, these issues will be discussed in the context of sociological research on organizations, but this will not be the exclusive focus of the course. A range of topics will be covered, for example: formulating and motivating research questions; varieties of explanation; experimental and quasi-experimental methods, including natural experiments; counterfactual models; conceptualization and measurement; sampling and case selection; qualitative and quantitative approaches. This course is particularly oriented toward developing an appreciation of the tradeoffs of different approaches. It is well suited to Ph.D. students working on qualifying papers and dissertation proposals.

OB 671. Social Psychology of Organizations. 3 Units.

This seminar focuses on social psychological theories and research relevant to organizational behavior. It reviews the current research topics in micro-organizational behavior, linking these to foundations in cognitive and social psychology and sociology. Topics include models of attribution, decision making, emotion, coordination, influence and persuasion, and the psychology of power and culture. Prerequisites: Enrollment in a PhD program, and a graduate-level social psychology course. Also listed as Sociology 361.

OB 672. Organization and Environment. 3 Units.

This seminar considers the leading sociological approaches to analyzing relations of organizations and environments, with a special emphasis on dynamics. Attention is given to theoretical formulations, research designs, and results of empirical studies. Prerequisite: Enrollment in a PhD program. Also listed as Sociology 362.

OB 673. Perspectives on the Social Psychology of Organizations. 3 Units.

This seminar focuses on topics relevant to organizational behavior, drawing primarily on social psychological and some sociological research. Topics vary from year to year. In Fall 2014 the seminar will focus on group and team dynamics. Topics will include diversity, power and status dynamics in teams, expertise and knowledge utilization, information processing, trust and respect in teams, team leadership, and multi-level perspectives on team and group dynamics, among others. Prerequisites: Enrollment in a PhD Program. Cannot be audited or taken pass/fail.

OB 674. Perspectives on Organization and Environment: Social Movement Organizations and Environments. 3 Units.

This course examines the interaction between organizations and their environments. It is given every year by a different faculty member. What follows is the description of the course for the academic year 2012-13: This research seminar explores recent theory and research on social movement organizations and their environments. We'll consider the way in which organizational theories help us to explain social movement phenomena, and the way in which social movement theories help us to explain organizational phenomena.

OB 675. Micro Research Methods. 3 Units.

The purpose of this course is to develop students' skill at designing, executing, interpreting, and describing micro-organizational and social psychological research. The course will have a practical focus and will focus on questions such as how to identify and formulate a tractable research question, how to decide on an appropriate research design and strategy; how to operationalize independent and dependent variables, and how to build a research paper.

OB 676. Social and Political Processes in Organizations. 4 Units.

Social psychological and sociological research at the meso, or intermediate between micro and macro, level of analysis. Topics vary from year to year, but usually include organizational routines and learning; mobility and attainment processes; gender and race inequality and discrimination; social networks; cultural perspectives on organizations, and related topics. Prerequisite: Ph.D. student.

OB 678. The Design and Process of Experimental Research. 2 Units.

This year-long course takes a hands-on approach to learning about experimental research. It will cover the entire process of experimental research from idea and hypothesis generation to study design, analysis, and publication. The topical content will be customized to the specific interests of the enrolled students, but generally will be concerned with questions about behavioral phenomena in organizational contexts.

OB 679. Work and Employment in Organizations. 2 Units.

Most macro-organizational theories draw on assumptions about how work is performed within organizations; yet organizational scholarship has for a generation been filled with descriptions of how work and the employment relationship have been transformed. This course will review current scholarship on trends in employment with organizations. The focus will be on trying to trace how changes at the level of work and the job aggregate to changes in macro-level outcomes such as the distribution of wages, career opportunities and other outcomes.

OB 683. Models of Social Dynamics. 4 Units.

This seminar provides an introduction to several important theoretical and formal models in sociology, psychology, and organization theory. The purpose is, in part, to provide an overview of commonly used models. More important, participants will learn to read, criticize, and formulate models for their own research questions. The focus is on model development, deriving implications from models, comparing models, but also on how models can be and have been tested. Topics include models of size distributions, network evolution, contagion, group formation, conceptual structures, decision making, and learning.

OB 690. Organizations in Competition. 3 Units.

When organizations compete, why do some fail while others succeed? This is one of the defining questions of the interdisciplinary research field known as "strategic management." In this seminar, we will address this question from a sociological perspective. Seen from this vantage point, the field of strategic management can be understood as the study of organizations in competition. Over the past 30 years, a considerable amount of research in organizational sociology has addressed this topic, only some of which has been explicitly framed as being aimed at the field of strategic management. This course studies the central themes that have emerged from this sociological research on organizations in competition.

OB 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OIT 691, POLECON 691, STRAMGT 691

OB 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OIT 692, POLECON 692, STRAMGT 692

OB 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OIT 802, POLECON 802, STRAMGT 802

Orthopedic Surgery Courses

ORTHO 10SC. Prevention by Design: Innovation for Chronic Disease Prevention. 2 Units.

Focuses on applying design-thinking methodology to identify barriers that limit compliance with evidence-based recommendations for disease prevention, and create a new process in which health workers and patients employ a disease iquest;prevention by designiquest; approach that more effectively reduces risk-behaviors and promotes adoption of a healthy lifestyle. Students learn about the nature of chronic disease, discuss the challenges of prevention given the complexity of chronic disease, and use case studies to empirically investigate the very people who will use the prevention programs. Students create a Human-Centered Design Program that complements approaches currently being used for disease prevention and makes a critically important addition by focusing on the unique needs, context, goals, desires, strengths and limitations of the end-user. Class structure includes presentations, guest speakers, discussion, and design sessions. Includes field trips for application of knowledge. The final week focuses on an integrated plan for iquest;prevention by designiquest;.

ORTHO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine. 3 Units.

Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.

Same as: HUMBIO 97Q

ORTHO 102. Orthopaedic Surgical Anatomy. 2 Units.

Open to medical, graduate and undergraduate students. Opportunity to enhance knowledge of anatomy as it pertains to the practice of Orthopaedic Surgery and to improve dissection skills. Follows the surgical anatomy syllabus used by the Stanford Orthopaedic Surgery Residency Program. Sessions led by Stanford Orthopaedic Surgery attendings and residents. Didactic sessions, prosection review, dissection.

Same as: ORTHO 202

ORTHO 110. Practical Sports Medicine and Orthopaedic Exam. 2 Units.

Designed for students considering a career in sports medicine, orthopaedics, physical medicine and rehabilitation, emergency medicine, internal medicine, family practice, or physical therapy. Focus is on diagnosis and treatment of the most common injuries encountered in sports medicine, from head to toe and from acute trauma to chronic overuse. Students gain competence performing an efficient sports medicine exam, developing a differential diagnosis, and a treatment plan on how to safely return athletes back to their sport. Focused physical exam skills are taught for the neck, shoulder, elbow, wrist and hand, low back, hip, knee, leg, ankle and foot. Most sessions consist of anatomy review, case discussion, and hands-on exam practice in small groups. A few sessions cover specific hot topics in sports medicine such as concussion, athletic heart syndrome, and advanced performance techniques. Course requires an in-class presentation or short review paper.

Same as: ORTHO 210

ORTHO 120. Introduction to Lifestyle Medicine. 1 Unit.

Lifestyle medicine is an exciting new movement to empower practicing clinicians and aspiring physicians to facilitate behavioral change and promote a culture of health and wellness in patients. Focus is on both concrete, evidence-based findings and tangible, practical tools to readily translate into everyday clinical practice. A series of leading experts and guest lectures guide students through interactive, patient-focused activities in topics including, but not limited to: nutrition, exercise, sleep, motivational interviewing, meditation, and acupuncture.

Same as: ORTHO 220

ORTHO 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

ORTHO 201. Musculoskeletal Exam Practicum. 1 Unit.

Student initiated course. Opportunity to enhance knowledge and skills for conducting musculoskeletal exams. Sessions led by Stanford Orthopaedic Surgery attendings and residents. Didactic introductions followed by hands-on practice of specific aspects of the musculoskeletal exam.

ORTHO 202. Orthopaedic Surgical Anatomy. 2 Units.

Open to medical, graduate and undergraduate students. Opportunity to enhance knowledge of anatomy as it pertains to the practice of Orthopaedic Surgery and to improve dissection skills. Follows the surgical anatomy syllabus used by the Stanford Orthopaedic Surgery Residency Program. Sessions led by Stanford Orthopaedic Surgery attendings and residents. Didactic sessions, prosection review, dissection.

Same as: ORTHO 102

ORTHO 210. Practical Sports Medicine and Orthopaedic Exam. 2 Units.

Designed for students considering a career in sports medicine, orthopaedics, physical medicine and rehabilitation, emergency medicine, internal medicine, family practice, or physical therapy. Focus is on diagnosis and treatment of the most common injuries encountered in sports medicine, from head to toe and from acute trauma to chronic overuse. Students gain competence performing an efficient sports medicine exam, developing a differential diagnosis, and a treatment plan on how to safely return athletes back to their sport. Focused physical exam skills are taught for the neck, shoulder, elbow, wrist and hand, low back, hip, knee, leg, ankle and foot. Most sessions consist of anatomy review, case discussion, and hands-on exam practice in small groups. A few sessions cover specific hot topics in sports medicine such as concussion, athletic heart syndrome, and advanced performance techniques. Course requires an in-class presentation or short review paper.

Same as: ORTHO 110

ORTHO 220. Introduction to Lifestyle Medicine. 1 Unit.

Lifestyle medicine is an exciting new movement to empower practicing clinicians and aspiring physicians to facilitate behavioral change and promote a culture of health and wellness in patients. Focus is on both concrete, evidence-based findings and tangible, practical tools to readily translate into everyday clinical practice. A series of leading experts and guest lectures guide students through interactive, patient-focused activities in topics including, but not limited to: nutrition, exercise, sleep, motivational interviewing, meditation, and acupuncture.

Same as: ORTHO 120

ORTHO 260. Tissue Engineering. 3 Units.

Principles of tissue engineering and design strategies for practical applications for tissue repair. Topics include tissue components and dynamics, morphogenesis, stem cells, cellular fate processes, cell and tissue characterization, controlled drug and gene delivery, bioreactors, cell-materials interactions, and host integration. Present research proposal to solve a real life tissue engineering problem.

Same as: BIOE 260

ORTHO 270. Orthopaedic Tissue Engineering. 3 Units.

Biological principles underlying the use of engineering strategies and biocompatible materials for tissue repair and regeneration. Structure, physiology, and mechanics of articular cartilage, bone, and dense soft connective tissues. Current ideas, approaches, and applications being implemented as therapeutic regimens for arthritis, spinal deformities, and limb salvage. Multidisciplinary constraints on the design and creation of tissue constructs. Prerequisite: familiarity with basic cell and molecular mechanisms underlying tissue differentiation.

ORTHO 280. Early Clinical Experience in Orthopedic Surgery. 1-2 Unit.

Provides an observational experience in a surgical specialty. Prerequisite: consent of instructor.

ORTHO 290. Introductory Clinical Mentorship. 1 Unit.

Preclinical elective designed to increase early clinical exposure to Orthopaedic Surgery for medical students. The elective provides opportunities for students to participate in the operating room, on surgery rounds and in surgical clinics. It will also include mentoring from attendings, residents and fellows. Prerequisite: consent of instructor.

ORTHO 299. Directed Reading in Orthopedic Surgery. 1-18 Unit.

Consists of studies in progress including circulatory problems; hemostatic disorders; homotransplantation; orthopedic pathology; bone growth; radiation injury; immunology; bacteriology; nasal function; muscular and nerve disorders and their effect on function, hand kinetics and hand function. Prerequisite: consent of instructor.

ORTHO 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

ORTHO 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Otolaryngology Courses

OTOHNS 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

OTOHNS 200. Introduction to Otolaryngology-Head and Neck Surgery. 1 Unit.

Seminar series designed to expose students to the field, including its subspecialties and commonly performed procedures. Goals: supplement anatomical knowledge with clinical correlates; understand basic diagnosis, pathophysiology, and management of ENT problems commonly seen in primary care practice; how to perform a thorough head and neck examination. Seminars, given by faculty experts, cover major topics relating to each of the subdivisions within ENT. May be repeated for credit.

OTOHNS 299. Directed Reading in Otolaryngology. 1-18 Unit.

Prerequisite: consent of instructor.

OTOHNS 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

OTOHNS 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Outdoor Education Courses

OUTDOOR 300. Survey of Adventure Experiences. 3 Units.

An examination of the historical, psychological, social, and philosophical foundations of adventure experiences in American culture and folklore. Experience outdoor living and adventure skills in a variety of contexts.

OUTDOOR 330. Climbing Wall Experiences. 1-2 Unit.

Instructional experiences include introductory through advanced skills and concepts of rock climbing, technique, safety, equipment and climbing vernacular. Rock 1 (beginning), Rock 2 (intermediate technique), Rock 3 (lead & sport), Strength and Conditioning, Route Setting, Bouldering for Fitness, and Climbing Wall Instructorship. Requires enrollment in Stanford Recreation section at <http://apps.ideal-logic.com/stanfordoutdoor>.

OUTDOOR 400. Fundamentals of Leadership. 3 Units.

Examination of sources required for authentic leadership: connections, identity, integrity and personal power. Analysis of effective leadership practices and the application to collaborative environments.

OUTDOOR 401. Outdoor Living Skills. 1 Unit.

Introduction to essential skills for individual and group sustainability in a backcountry setting.

OUTDOOR 405. Outdoor Living and Leadership. 1-2 Unit.

Develop leadership skills necessary to lead multi-day outdoor experiences for the inexperienced participant. Topics include: outdoor living, group dynamics, outdoor risk management, situational leadership, and facilitation.

OUTDOOR 406A. Outdoor Leadership Practicum- Backpacking. 1 Unit.

Outdoor, educational & leadership theory integration through intensive field-based experiences. During these field-based experiences, students will engage with a critical self-assessment process to better understand their own levels of competence. Prerequisites: OUTDOOR 400 and OUTDOOR 401 OR OUTDOOR 405.

OUTDOOR 406B. Outdoor Leader Practicum - Winter Travel. 1 Unit.

Outdoor, education & leadership theory integration through intensive field-based experiences. During these field-based experiences, students will engage with a critical self-assessment process to better understand their own levels of competence. Prerequisites: OUTDOOR 400 and OUTDOOR 401 OR OUTDOOR 405.

OUTDOOR 406C. Outdoor Leader Practicum - Rock Climbing. 1 Unit.

Outdoor educational & leadership theory integration through intensive field-based experiences. During these field-based experiences, students will engage with a critical self-assessment process to better understand their own levels of competence. Prerequisites: OUTDOOR 400 and OUTDOOR 401 OR OUTDOOR 405.

OUTDOOR 406D. Outdoor Leader Practicum - Whitewater. 1 Unit.

Outdoor, educational & leadership theory integration through intensive field-based experiences. During these field-based experiences, students will engage with a critical self-assessment process to better understand their own levels of competence. Prerequisites: OUTDOOR 400 and OUTDOOR 401 OR OUTDOOR 405.

OUTDOOR 410. Initiative Development Practicum. 1 Unit.

This experiential education style course covers development of group facilitation skills. Students will experience and deliver group initiatives surrounding popular leadership topics and learn how to help their group take away valuable learning from an educational experience. Topics include: safety, assessing the physical, human and social environment to improve group effectiveness. Prerequisites: None.

OUTDOOR 411. Service Leadership Practicum. 1 Unit.

A practical application of essential leadership skills for students holding campus and/or community leadership positions. Includes an extensive exploration of leadership issues and skills required in both professional and volunteer settings with a focus on conflict resolution, mediation, program planning, effective communication, and mentorship. Prerequisites: OUTDOOR 400; OUTDOOR 410.

OUTDOOR 415. Adventure Experience Management. 1 Unit.

This course covers the effective design and delivery of courses and multi-day outdoor experiences. Students will learn the fundamentals of: emergency action plans; how to manage local operating procedures (LOP); standard operating procedures; Instructional design and delivery. Prerequisite: OUTDOOR 406A, OUTDOOR 406B, OUTDOOR 406C, OUTDOOR 406D or Instructor Permission.

OUTDOOR 416. Outdoor Educator Apprenticeship. 1-2 Unit.

This course provides the student an opportunity to lead a multi-day outdoor experiences in an official capacity. Experience includes: outdoor living skills, planning and logistics, leadership, risk management, environmental integration, and education. Students will plan and co-lead field outings. Prerequisites: OUTDOOR 405; OUTDOOR 406; OUTDOOR 415.

OUTDOOR 495. Outdoor Education: Assistant Instructor. 1-2 Unit.

Assist Instructor Outdoor Leadership Courses. Instructor Approval and Defined Student Goals/Benchmarks Required Prior to instructing.

Overseas Studies General Courses

OSPGEN 32. The Copenhagen-Stockholm Trans-Idiomatic Arts Practicum. 2 Units.

Reflection on the difference between "home" and "away" through the prism of art. Review arts events throughout Copenhagen and Stockholm in varying media and create similarly varied original art projects in response. Lectures, discussion, "atelier laboratories," walking tours, and regional field trips. Location: Copenhagen, Denmark and Stockholm, Sweden.

OSPGEN 37. Brazil Technology and Engineering. 2 Units.

Two-week study trip to Brazil accompanied by a Stanford professor and graduate student lead. Offered by the School of Engineering in partnership with the Bing Overseas Studies Program (BOSP). First-hand insights into technology and engineering based businesses in Brazil. Participants will: 1) gain knowledge of a wide spectrum of technology-based companies in India; 2) understand, in a comparative approach, how western companies localize to stay competitive; and 3) experience first-hand the social and environmental impact of these businesses. Prior to departure, students will go through a curriculum targeted at understanding the state of technology business in Brazil in order to maximize the learning experience students will have on the ground.

OSPGEN 39. India Technology and Engineering. 2 Units.

Two-week study trip to India accompanied by a Stanford professor and graduate student lead. Offered by the School of Engineering in partnership with the Bing Overseas Studies Program (BOSP). First-hand insights into technology and engineering based businesses in India. Participants will: 1) gain knowledge of a wide spectrum of technology-based companies in India; 2) understand, in a comparative approach, how western companies localize to stay competitive; and 3) experience first-hand the social and environmental impact of these businesses. Prior to departure, students will go through a curriculum targeted at understanding the state of technology business in India in order to maximize the learning experience students will have on the ground.

OSPGEN 49. Conservation Photography. 2 Units.

Introduction to conservation photography and the strategic use of visual communication in addressing issues concerning the environment and conservation. Basic digital photography and the theory and application of photographic techniques. Case studies of conservation issues examined through photographs and multimedia platforms including images, video, and audio. Lectures, tutorials, demonstrations, and field trips culminating in individual and group projects. Location: Costa Rica.

OSPGEN 53. Corals of Palau: Ecology, the Physical Environment, and Reefs at Risk. 2 Units.

Science-based understanding of modern threats to coral reefs through coral reef ecology, biogeochemistry, and physics. Field-based understanding of the complex array of organisms, structures, and physical and biological processes that constitute a healthy coral reef system. Skills for measuring biological, physical, and chemical time series changes on a coral reef. Proposed policy and management solutions as an entry into systems analysis and Earth Systems type thinking. Extensive field work components on small boats and/or in the water. Location: Republic of Palau.

OSPGEN 55. Island Biogeography and History of Tasmania. 2 Units.**OSPGEN 56. Food, Water and War: Life in the Mekong. 2 Units.****OSPGEN 57. History, Arts and Culture of Southeastern Europe. 2 Units.****OSPGEN 58. Magna Carta 1215 and 2015: Land, Law, Liberty. 2 Units.****OSPGEN 59. Going Medieval: Freiburg im Breisgau. 2 Units.****OSPGEN 62. St. Petersburg: Crucible of Russian History and Culture. 2 Units.****OSPGEN 63. Bio-Cultural Diversity and Community-Based Conservation in Oaxaca. 2 Units.**

Examine the conservation and use of natural resources by indigenous communities through the disciplines of ecology and indigenous culture. Test if/how academic institutions and rural indigenous institutions can jointly undertake the challenge of sustainably managing biological resources. Two complementary experiences: i) short components at the beginning and end, visiting Mexico City; National Commission of Biodiversity and UNAM in Mexico City; and ii) work in the City of Oaxaca and two indigenous communities, Ixtla and San Juan Jayatlaco, which are regarded as exemplary in sustainable use of biodiversity.

OSPGEN 137. Brazil Technology and Engineering. 2 Units.

Two-week study trip to Brazil accompanied by a Stanford professor and graduate student lead. Offered by the School of Engineering in partnership with the Bing Overseas Studies Program (BOSP). First-hand insights into technology and engineering based businesses in Brazil. Participants will: 1) gain knowledge of a wide spectrum of technology-based companies in India; 2) understand, in a comparative approach, how western companies localize to stay competitive; and 3) experience first-hand the social and environmental impact of these businesses. Prior to departure, students will go through a curriculum targeted at understanding the state of technology business in Brazil in order to maximize the learning experience students will have on the ground.

OSPGEN 139. India Technology and Engineering. 2 Units.

Two-week study trip to India accompanied by a Stanford professor and graduate student lead. Offered by the School of Engineering in partnership with the Bing Overseas Studies Program (BOSP). First-hand insights into technology and engineering based businesses in India. Participants will: 1) gain knowledge of a wide spectrum of technology-based companies in India; 2) understand, in a comparative approach, how western companies localize to stay competitive; and 3) experience first-hand the social and environmental impact of these businesses. Prior to departure, students will go through a curriculum targeted at understanding the state of technology business in India in order to maximize the learning experience students will have on the ground.

OSPGEN 259. Community Health in Oaxaca. 2 Units.

Continuation of MED 259. Close observation of clinicians at work in community health settings in Oaxaca and service with local community health organizations. Combination of classroom study and discussion with cultural immersion, language training, clinical shadowing, and community service. Topics include: Mexican healthcare system; cultural, socioeconomic and educational factors impacting health of Mexicans and Mexican immigrants to U.S.; Mexican cultural and health beliefs; Mexican migration as a multi-ethnic process. Prerequisite: Acceptance into program and successful completion of MED 259 (Spring quarter 2015).

Overseas Studies in Australia Courses

OSPAUSTL 10. Coral Reef Ecosystems. 3 Units.

Key organisms and processes, and the complexity of coral reef ecosystems. Students explore the Great Barrier Reef from the southern end which demonstrates the physical factors that limit coral reefs, to the northern reef systems which demonstrate key aspects of these high biodiversity ecosystems. Human-related changes. Emphasis is on research experiences and development of analytical skills. Two units only counted for the Biology major.

OSPAUSTL 25. Freshwater Systems. 3 Units.

Integrated water resource management and how this applies across the globe, comparing strategies and results in the developing and more developed world. Ethics, values and politics of water and the management of extremes such as drought and flood. Ecology and hydrology in an urban context, along with important current issues such as stormwater and water sensitive urban design. Construction of a well, a water tank, and a pit latrine. Community service working with a local catchment management group on riparian and wetland restoration work. Field work complements lectures.

OSPAUSTL 30. Coastal Forest Ecosystems. 3 Units.

Prehistory of Australian rainforest and how rainforest structure and biodiversity change with altitude, latitude, and geology. Tropical coastal marine wetlands, mangrove forests, and the relationship between land- and sea-based biota. Biology and ecology of marine plants, mangroves, and tropical salt marsh. Introduction to specialized fields of marine plant biology and ecology including biogeography and evolution, aquatic plant ecophysiology, water quality and bioindicator techniques, pollution and eutrophication, and environmental control of marine plant distribution and productivity. Two units only counted for the Biology major.

OSPAUSTL 40. Australian Studies. 3 Units.

Introduction to Australian society, history, culture, politics, and identity. Social and cultural framework and working understanding of Australia in relationship to the focus on coastal environment in other program courses. Field trips.

OSPAUSTL 50. Targeted Research Project. 4 Units.

Prior to arriving in Australia, students establish a link with University of Queensland faculty to develop project ideas that combine personal interests and career goals with opportunities presented by the Australian Coastal Studies program, such as how mangrove roots find sediment rich zones of the shore, or the dynamics of ecotourism in southern and northern coastal Queensland. Project report and presentation in Australia.

Overseas Studies in Barcelona Courses

OSPBARCL 101. Language and Culture in Catalonia. 4 Units.

Preparation for students to function in the academic and social environment of Barcelona. Basic listening, reading, and comprehension in Catalan; review of Spanish with focus on writing academic papers and listening to lectures. Introduction to Barcelona with emphasis on contemporary history, culture, and politics. Bilingualism; multiculturalism; varieties of nationalism and globalization in context of Barcelona.

OSPBARCL 114. The Spanish Civil War and Historical Memory. 5 Units.

The Spanish Civil War's memory and legacy as seen in today's society, culture and politics in the context of Western Europe. Current reality of Spain and Catalonia and the value of history and its construction in the formation of the political culture of a country. Two thematic blocks: historical evolution of Spain from the Second Republic until the end of Franco and the transition to democracy; relationship between history and memory focusing on the Catalan-Spanish case.

OSPBARCL 125. 21st Century Transatlantic Literature. 5 Units.

Transatlantic narrative of XXI century in Catalonia, Spain and Latin America, based around authors of each cultural area and their essays, stories or poem in Spanish. Texts studied in their contemporary settings: migration and borders, the new internationalism, youth and citizen protest movements, communication and digital technology, citizenship and ethical solidarity. Analysis of the forms of futurity being debated today in both Spanish literature and ideas.

OSPBARCL 126. Modern Art in Barcelona: From Gaudí to Tàpies. 5 Units.

Introduction to modern art based on the city of Barcelona: from the architecture of Modernism and the painters of the "4Gats" tavern, to Picasso, Miróacute; and Dalíacute; and the post-war avant-garde. Emphasis on the relationship between different artistic disciplines as well as between these and the literature and economic and political situation of the time, all placed in the international art context.

OSPBARCL 127. Technology, Digital Cities and the Urban Experience: Barcelona "Smart City". 5 Units.**OSPBARCL 140A. Universitat de Barcelona: Humanities 1. 5 Units.**

Student selection from course catalog of Universitat de Barcelona.

OSPBARCL 170C. Universitat Politècnica de Catalunya: Engineering 3. 5 Units.

Student selection from course catalog of Universitat Politegrave;cnica de Catalunya.

Overseas Studies in Beijing Courses

OSPBEIJ 1C. First-Year Modern Chinese, First Quarter. 5 Units.

Conversation, grammar, reading, elementary composition.

OSPBEIJ 3C. First-Year Modern Chinese, Third Quarter. 5 Units.**OSPBEIJ 6C. Beginning Conversational Chinese, First Quarter. 2 Units.**

Three quarter sequence. Basic language skills in Mandarin to function abroad.

OSPBEIJ 8C. Beginning Conversational Chinese, Third Quarter. 2 Units.

Continuation of CHINLANG 7. Basic language skill in Mandarin to function abroad. Prerequisite: CHINLANG 7 or consent of instructor.

OSPBEIJ 9. Chinese Language Tutorial. 2 Units.**OSPBEIJ 11. Computers, Ethics, and Public Policy. 4 Units.**

Ethical and social issues related to the development and use of computer technology. Ethical theory, and social, political, and legal considerations. Scenarios in problem areas: intellectual property, security, privacy, reliability and risks of complex systems, and responsibility of professionals for applications and consequences of their work. Prerequisite: 106A.

OSPBEIJ 17. Chinese Film Studies. 4 Units.

Stages of Chinese cinema from the establishment of P.R. China in 1949 to the present. State policies, filmmaking trends, representative filmmakers and films, and the state of the industry in the different periods, with close readings of some important films. Historical perspective and broad knowledge of Chinese cinema; academic approaches to film studies.

OSPBEIJ 20. Communication, Culture, and Society: The Chinese Way. 4 Units.

How people communicate, what they achieve through their communications, and the social and cultural consequences of these communicative behaviors. Focus on the interactive relationship between communication, culture and society in China. How communication habits are influenced by the individual's culture and how communication acts help to change and transform the society in which we live.

OSPBEIJ 21C. Second-Year Modern Chinese. 5 Units.**OSPBEIJ 23C. Second-Year Modern Chinese. 5 Units.****OSPBEIJ 24. China's Economic Development. 5 Units.**

Historical stages, economic and political rationale, and effectiveness of the economic policies and institutional changes that have shaped China's economic emergence. China as case study for understanding how institutions and institutional change affect economic and social development. Guest speakers; field study; trip to rural areas.

OSPBEIJ 34. Urban Studies in Contemporary China. 4 Units.

Urban development in developing countries with a focus on urban issues in contemporary China urban issues in the contemporary China. Urbanization in the global context, which serves the context for further study of urban China. Trend and the uniqueness of urbanization in China since 1949., looking at issues such as the socialist ideology and institutions, the Household Registration (hukou) system, rural to urban migration and globalization will be studied. Urban transformation, with particular focus on urban restructuring, urban land and housing reform, urban infrastructure, and urban sustainability. Urban planning, urban management and governance in China.

OSPBEIJ 35. Toward a Sustainable Future: China's Environmental Challenges. 4 Units.**OSPBEIJ 42. Chinese Media Studies. 4 Units.**

Fundamental changes in Chinese media. Issues such as: how Chinese media emerge and evolve against the background of modern Chinese history; how they interact with government, sponsors, receivers, and other social institutions; and implications for Chinese social development.

OSPBEIJ 48. Chinese Literature: Tradition in Transformation. 4 Units.

Classical Chinese literature from the beginning (ca. 1000 BC) to the 14th century. Primary texts in translation with attention to the poetic works that feature Chinese literary tradition. Understanding of past experience of Chinese people living in another cultural space through observation, analysis, and reconstruction.

OSPBEIJ 60. Chinese Philosophies and Modern China. 4 Units.

Introduction to Chinese philosophy. Daoism, Confucianism, the Confucian development in the Song and Ming periods, the "liberal" and Legal school of thought, Buddhism, the Confucian thinkers of the Modern period, and "Dialectical Materialism." Chinese form of "liberalism" since the 1980s and the future of Confucian scholarship in the postmodern era. How central questions of Western philosophy pertain to the Chinese tradition, and how relevant Chinese philosophy is to the differences in approaches taken to such issues as truth, good, beauty, mind, body, spirit, being, cosmology, ontology, and epistemology.

OSPBEIJ 67. China-Africa and Middle East Relations. 4 Units.

China's relations with the outside world, with a focus on Africa and the Middle East. Historically contextualized relations; evolution of relations within the international climate during different periods, especially in the present; impact of geopolitical and geoeconomic relations on the existing international order.

OSPBEIJ 101C. Third-Year Modern Chinese. 5 Units.**OSPBEIJ 103C. Third-Year Modern Chinese. 5 Units.****OSPBEIJ 199A. Directed Reading A. 1-4 Unit.**

Course may be repeated for credit.

OSPBEIJ 199B. Directed Reading B. 1-4 Unit.

Course may be repeated for credit.

OSPBEIJ 211C. Fourth-Year Modern Chinese. 5 Units.**OSPBEIJ 213C. Fourth-Year Modern Chinese. 5 Units.**

Discussions based on short stories, essays and newspaper articles, and academic journal articles. Emphasis on social and cultural issues in contemporary China. Speed-reading techniques and subtle distinctions in Chinese language use, such as formal vs. informal styles and word choice, toward developing a more sophisticated understanding and command of the language.

Overseas Studies in Berlin Courses

OSPBER 1Z. Accelerated German: First and Second Quarters. 8 Units.

A jump start to the German language, enabling students with no prior German to study at the Berlin Center. Covers GERLANG 1 and 2 in one quarter.

OSPBER 2Z. Accelerated German, Second and Third Quarters. 8 Units.

Qualifies students for participation in an internship following the study quarter. Emphasis is on communicative patterns in everyday life and in the German work environment, including preparation for interviews.

OSPBER 3B. German Language and Culture. 5 Units.

Grammar, composition, and conversation. Increases fluency in German as rapidly as possible to help students take advantage of the many opportunities in Berlin. Corequisite: GERLANG 100B.

OSPBER 15. Shifting Alliances? The European Union and the U.S.. 4-5 Units.

The development of European integration, a model for global security and peace, and a possible replacement for the U.S. position as unilateral superpower. Competing arguments about the state of transatlantic relations.

OSPBER 17. Split Images: A Century of Cinema. 3-4 Units.

20th-century German culture through film. The silent era, Weimar, and the instrumentalization of film in the Third Reich. The postwar era: ideological and aesthetic codes of DEFA, new German cinema, and post-Wende filmmaking including *Run Lola Run* and *Goodbye Lenin*. Aesthetic aspects of the films including image composition, camera and editing techniques, and relation between sound and image.

OSPBER 21B. Intermediate German. 5 Units.

Grammar review, vocabulary building, writing, and discussion of German culture, literature, and film. Corequisite: OSPBER 100B.

OSPBER 24B. Advanced German Grammar. 2 Units.

Syntax and organizational patterns (connectors, structuring and cohesive devices) for various types of texts and arguments, contrastive vocabulary practice, and reading strategies. Skills for writing well-structured critical essays, giving effective presentations, and reading extensively as well as intensively.

OSPBER 25. Architecture, Memory, Commemoration. 5 Units.

Exploration of questions about architectural form together with a sense of place in Berlin and surrounding regional cities. Interdisciplinary approach to the study of urbanism and memory through the concerns of cultural geography, anthropology, history, fiction and films. Trips to sites to explore how memory is visualized in the built environment. Themes of the course include: "About Form," "Mapping the City," and "Heritage and Commemoration."

OSPBER 30. Berlin vor Ort: A Field Trip Module. 1 Unit.

The cultures of Berlin as preserved in museums, monuments, and architecture. Berlin's cityscape as a narrative of its history from baroque palaces to vestiges of E. German communism, from 19th-century industrialism to grim edifices of the Sachsenhausen concentration camp.

OSPBER 37. Leading from Behind? Germany in the International Arena since 1945. 4-5 Units.

Germany's changing role in European and world politics. Have old principles based on lessons from World War II become obsolete? Can Germany be a leading power in global affairs?.

OSPBER 39. Globalization and the Fate of Western Art Music. 2 Units.

An activity based directed group. Attendance of several concert performances required.

OSPBER 40. Global Trends: Anticipating the Future in Order to Shape It. 4-5 Units.

Examination of megatrends such as globalization and interdependence, demographic change, the rise of new powers, increasing prosperity and inequality, demand for limited resources, diffusion of power, and demands on governments everywhere; how they interact, and possible implications for the international system. Also examination of potential game changers such as climate change, new technologies, the global economy, and what the United States does/does not do. Goal is enhanced understanding of the challenges, how they interact, and what can or must be done to preserve peace and prosperity, maximize benefits, and minimize risks.

OSPBER 40B. Introductory Electronics. 5 Units.

Electrical quantities and their measurement, including operation of the oscilloscope. Function of electronic components including resistor, capacitor, and inductor. Analog circuits including the operational amplifier and tuned circuits. Digital logic circuits and their functions. Lab assignments. Prerequisite: PHYSICS 43.

OSPBER 41. Directed Reading on Global Issues/International Relations. 3 Units.

Directed reading/tutorial on a wide range of international relations topics including China's rise, grand strategy, nuclear proliferation, and climate change. Students will be expected to demonstrate understanding of key ideas, core issues, and possible implications of alternative hypotheses. Choice of topic will determine whether a paper is required or mastery of subject can be demonstrated through discussion alone.

OSPBER 43. Culture Clashes: Race, Ethnicity and Migration in Germany and the U.S.. 3 Units.

This course interrogates cultural products from Germany and the U.S. (novels, graphic narratives, tv and film, advertising images) to explore the cultural imaginaries through which people understand themselves, their compatriots, and the incoming migrants to the geopolitical regions in which they live. In asking what it might take to create racial and ethnic justice in our time, we look at the diversity of group formation, attend to conflicting claims to national belonging, and debate theoretical perspectives on race and ethnicity.

OSPBER 44. Berlin and its Artists. 4 Units.

Visual environment of Berlin, shaped and reshaped by artists who in turn were transformed by the city. Links between their biographies and Berlin. Retracing artists' lives to unveil contemporary background and characteristic circumstances under which their work was created. Images of Berlin through the eyes of those who contributed to shaping it: from Schluuml;ter to Liebermann to Eliacut;esson. Visits to museums and locations related to the life and work of the artists complement the theoretical discussions. Introduction to the art of drawing, using sketchbooks as a tool for exploring the artworks in Berlin and for understanding what moved the artist to create them.

OSPBER 46. Gardens of Earthly Delight: Berlin's Culture of Landscape and Public Space. 1-2 Unit.

This course examines the cultural geography of Germany; its social spaces as sites for the development of the personal, social, and political experiences of a German cultural identity. Focusing on literary forms, landscape art, and garden history in Berlin and its environs, we consider the roles of landscape and garden design and how they represent the cultural and social ideology of their times. Activities include readings and field trips. Additional writing for students who choose the 2 unit option.

OSPBER 50M. Introductory Science of Materials. 4 Units.

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

OSPBER 66. Theory from the Bleachers: Reading German Sports and Culture. 3 Units.

German culture past and present through the lens of sports. Intellectual, societal, and historical-political contexts. Comparisons to Britain, France, and the U.S. The concepts of *Kouml;rperkultur*, *Leistung*, *Show*, *Verein*, and *Haltung*. Fair play, the relation of team and individual, production and deconstruction of sports heroes and heroines, and sports nationalism. Sources include sports narrations and images, attendance at sports events, and English and German texts. Taught in German.

OSPBER 68. Protestant Reformation. 4 Units.

New forms of Christian religious thought and practice that emerged in Western Europe in the early to mid-sixteenth century and decisively shaped the course of Western history. Religious status quo and other forms of religious dissent that challenged late medieval Christendom; proposals for reform exemplified by Martin Luther, Andreas Karlstadt, Thomas Muuml;ntzer; impact of the changes in religion and the conflicts over religion for society more broadly.

OSPBER 70. The Long Way to the West: German History from the 18th Century to the Present. 4-5 Units.

Battles still current within Germany;quest;s collective memory. Sources include the narrative resources of museums, and experts on the German history in Berlin and Potsdam. Field trips.

OSPBER 100B. Berlin Heute. 2 Units.

Required for students enrolled in OSPBER 21B; open to students in other German language classes. Active use of German, including vocabulary from a variety of fields and disciplines, and discussion of current issues.

OSPBER 101A. Contemporary Theater. 5 Units.

Texts of plays supplemented by theoretical texts or reviews. Weekly theater visits, a tour of backstage facilities, and discussions with actors, directors, or other theater professionals. In German. Prerequisite: completion of GERLANG 3 or equivalent.

OSPBER 101B. Advanced German. 5 Units.

For intermediate and advanced students. Focus is on Berlin through film, literature, music, live performance, news media, and field trips. Essay writing, vocabulary building, and in-class presentations. Reading literature and news stories, essay writing, vocabulary building, and in-class presentations.

OSPBER 115X. The German Economy: Past and Present. 4-5 Units.

The unsteady history of the German economy in the Wilhelmine Empire, the Weimar Republic, the Third Reich, the post WWII divided and united Germany. Special attention on the economic policy of the Third Reich and the present role of Germany in the world economy.

OSPBER 126X. A People's Union? Money, Markets, and Identity in the EU. 4-5 Units.

The institutional architecture of the EU and its current agenda. Weaknesses, strengths, and relations with partners and neighbors. Discussions with European students. Field trips; guest speakers.

OSPBER 161X. The German Economy in the Age of Globalization. 4-5 Units.

Germany's role in the world economy: trade, international financial markets, position within the European Union; economic relations with Eastern Europe, Russia, the Third World, and the U.S. International aspects of German economic and environmental policies. The globalization of the world's economy and Germany's competitiveness as a location for production, services, and R&D, focusing on the German car industry.

OSPBER 174. Sports, Culture, and Gender in Comparative Perspective. 5 Units.

Theory and history of mass spectator sports and their role in modern societies. Comparisons with U.S., Britain, and France; the peculiarities of sports in German culture. Body and competition cultures, with emphasis on the entry of women into sports, the modification of body ideals, and the formation and negotiation of gender identities in and through sports. The relationship between sports and politics, including the 1936 Berlin Olympic Games.

OSPBER 198D. Humboldt Universitat: Humanities 2. 1-3 Unit.

Course may be repeated for credit.

OSPBER 198F. Humboldt Universitat: Social Sciences 2. 1-3 Unit.

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OSPBER 198H. Freie Universitat: Humanities 3. 1-5 Unit.

Course may be repeated for credit.

OSPBER 198K. Weissensee Art University 1. 1-4 Unit.

Course may be repeated for credit.

OSPBER 198L. Weissensee Art University 2. 1-4 Unit.

Course may be repeated for credit.

OSPBER 198M. Weissensee Art University 3. 1-4 Unit.

Course may be repeated for credit.

OSPBER 199A. Directed Reading A. 2-4 Units.

Course may be repeated for credit.

OSPBER 199B. Directed Reading B. 2-3 Units.

Course may be repeated for credit.

OSPBER 199C. Directed Reading C. 1-3 Unit.

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OSPBER 199D. Humboldt Universitat: Humanities. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199F. Humboldt Universitat: Social Sciences. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199G. Freie Universitat: Social Sciences 1. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199H. Freie Universitat: Humanities 1. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199J. Freie Universitat: Natural Sciences 1. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199K. Freie Universitat: Social Sciences 2. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199L. Freie Universitat: Humanities 2. 1-3 Unit.

Course may be repeated for credit.

OSPBER 199M. Freie Universitat: Natural Sciences 2. 1-3 Unit.

Course may be repeated for credit.

Overseas Studies in Cape Town Courses

OSPAPTWN 16. South Africa Sites of Memory. 2 Units.

Required Course. Relation between conventional histories and different kinds of individual and collective memory that are focused on places and spaces, testing the relation between grand narratives and more particularized pasts. Questions of cultural heritage, in particular its contestations among individual, familial, local, national, and international interests.

OSPCPTWN 18. Xhosa Language and Culture. 2 Units.

History of the Xhosa language; understanding Xhosa culture and way of life. Listening, speaking, reading and writing, combined with the social uses of the language in everyday conversations and interactions. Intercultural communication. Content drawn from the students' experiences; experiences in local communities through their service learning/volunteer activities to support the building of the relationships in these communities. How language shapes communication and interaction strategies. Course may be repeated for credit.

OSPCPTWN 24A. Targeted Research Project in Community Health and Development. 3 Units.

Two-quarter sequence for students engaging in Cape Town-sponsored community based research. Introduction to approaches, methods and critical issues of partnership-based, community-engaged research and to the community-based research partners. Qualitative data gathering and analysis methods in community-based research; effective collaboration with community partners and data sources; race and privilege in community-based research. Preparation of research proposals and plans for research carried out during the second quarter through OSPCPTWN 24B.

OSPCPTWN 24B. Targeted Research Project in Community Health and Development. 5 Units.

Two-quarter sequence for students engaging in Cape Town-sponsored community-based research. Substantive community health or development investigations in collaboration with the Stanford Centre's community partners: Western Cape NGOs or government agencies, or community-based organizations or groups. Students' research supported through methods workshops, sharing of progress and problems, and data and findings presentations. Prerequisite: OSPCPTWN 24A.

OSPCPTWN 31. Political Economy of Foreign Aid. 3 Units.

Political economy approach to foreign aid. Context of debate on development: differences between developed and less developed countries, concept of poverty, how to measure development. History of foreign aid; main actors and characteristics of official development assistance. Theoretical and empirical impact of aid with regard to economic growth and governance. Benefits and problems associated with aid.

OSPCPTWN 33. Southern Africa: from Liberation Struggles to Region-Building. 4 Units.

Process by which the region moved from colonialism/apartheid to majority rule through a series of liberation struggles, and the outcomes of those struggles. Cases of Angola and Mozambique, Zimbabwe, Namibia and South Africa. Transitions from apartheid to democracy in Namibia and South Africa through negotiated settlements. Topics include: Truth and Reconciliation Commission; role of the Southern African Development Community; challenges in region today; influence of violent past and legacies of struggle against colonialism and apartheid on present situation.

OSPCPTWN 36. The Archaeology of Southern African Hunter Gatherers. 4 Units.

Archaeology, history and ethnography of the aboriginal hunter gatherers of southern Africa, the San people. Formative development of early modern humans and prehistory of hunters in southern Africa before the advent of herding societies; rock paintings and engravings of the subcontinent as situated in this history. Spread of pastoralism throughout Africa. Problems facing the descendants of recent hunter gatherers and herders in southern Africa, the Khoisan people.

OSPCPTWN 38. Genocide: African Experiences in Comparative Perspective. 3-5 Units.

Genocide as a major social and historical phenomenon, contextualized within African history. Time frame ranging from the extermination of indigenous Canary Islanders in the fourteenth and fifteenth centuries to more recent mass killings in Rwanda and Darfur. Emphasis on southern African case studies such as Cape San communities and the Herero people in Namibia. Themes include: roles of racism, colonialism and nationalism in the making of African genocides. Relevance of other social phenomena such as modernity, Social Darwinism, ethnicity, warfare and revolution. Comparative perspective to elucidate global dimensions.

OSPCPTWN 43. Public and Community Health in Sub-Saharan Africa. 4 Units.

Introduction to concept of public health as compared with clinical medicine. Within a public health context, the broad distribution of health problems in sub-Saharan Africa as compared with U.S. and Europe. In light of South Africa's status as a new democracy, changes that have occurred in health legislation, policy, and service arenas in past 16 years. Topics include: sector health care delivery, current distribution of infectious and chronic diseases, and issues related to sexual and reproductive health in South Africa. Site visits to public sector health services and health related NGOs.

OSPCPTWN 44. South African Urban Challenges in Comparative Context. 4 Units.

Material and socio-cultural dimensions of the multiple spaces making up South African cities. The gendered, placed, sexual, and racial character of homes, neighborhoods, and cities. Ways in which crises such as housing shortages and tenure insecurity are materially and socially embodied in economically impoverished families and communities; lives. Interplay of this body politic with economic and political contexts in which the meaning of citizenship is crafted. Urban fieldwork with the Valhalla Park United Civic Front, a community-based organization in Cape Town.

OSPCPTWN 47. South Africa's Role as an Emerging Power: Global and Regional Dimensions. 3 Units.

Emerging role of middle income countries like China, India and Brazil with South Africa being the only African country belonging to this new cluster. This dynamic country group is regarded as a distinct feature of a new global landscape. Topics include: Academic and policy debate on emerging countries; South Africa's role on the continent and on the global level (historical background: before / after 1994, South Africa as an 'emerging power', South Africa's regional role in different areas, security South Africa's role on a global level, intellectual and political capacity to be an emerging country, other regional powers in Africa); South Africa and other emerging powers.

OSPCPTWN 49. Water in South Africa: Human Right, Public Trust, or Market Commodity?. 4 Units.

History of South Africa's current water policies and its approach to the management of its water resources, guaranteeing all citizens a "minimum basic quantity of water" - a human right to water - as well as providing for "ecological water reserves" to meet environmental needs. Market concepts to help meet its water goals. How is South Africa doing in meeting its water goals and what policy measures might better realize those goals? Meetings with local and national water officials, non-profit leaders, and water users to discuss the water challenges that the nation faces.

OSPCPTWN 50. [Independent Study] Conservation & Resources in Sub-Saharan Africa. 2-3 Units.

Independent research and writing on topics related to conservation and resources in Sub-Saharan Africa. Potential topics include climate change and adaptation to South Africa, community-based conservation in Sub-Saharan Africa (examining conservation experiments such as the Lewa Conservancy and the Northern Rangeland Trust in Kenya), the provision of energy in South Africa, and citizen rights to healthy environment in African nations.

OSPCPTWN 51. Urban Design and Development: Opportunities and Limitations of WDCCT 2014. 4 Units.

Examination of the arguments that urban design has the capacity to change the way people live and think about community using opportunities presented through Cape Townquest's role as World Design Capital (WDC) for 2014. WDC projects to focus on reconnecting the city and reconciling communities. Student service learning in locations where World Design Capital projects will likely be implemented; analysis of objectives, the intended and unintended consequences; impact of the project on people living in its vicinity.

OSPCPTWN 54. Monuments and Memory. 3 Units.

Required course. How do particular Eastern Cape historical sites reflect the history of South Africa? How have the objects of public memory changed over time? In what ways, and to what ends are people and events remembered today? What kinds of personal identities are involved? Critical engagement with the concept of heritage and its institutions, private and public (incl. National Heritage Council, SA Heritage Resource Agency, and various museums). Focus on Eastern Cape sites, via week-long field trip, which will include Qunu; Albany; Port Elizabeth; King Williams Town; and Alice.

OSPCPTWN 55. Arts of Change. 2-4 Units.

Required course. What role have the creative arts played in South African society? Using a wide variety of artistic media (literature, the visual and performing arts) study cultural productions that reflect South Africa's social dynamic and that, in some cases, have affected the course of history. Historical perspective (e.g. Soweto 1976) combined with a contemporary one in the week-long National Arts Festival in Grahamstown. Service-learning component in Cape Town.

OSPCPTWN 56. HIV Policy Issues and Models. 3 Units.

Application of mathematical, statistical, economic, and systems models to problems in HIV policy. Areas covered include: biology, epidemiology and economics of HIV disease; role of policy modeling in informing policy decisions; HIV screening; HIV treatment; HIV prevention among various at-risk groups; potential effect of HIV vaccines and drugs that act as vaccines; effects of co-infections; and analysis of potential portfolios of investment in HIV prevention and treatment programs. Analyses includes modeling techniques such as simple cost analysis; cost-effectiveness analysis; statistical and probabilistic analysis; simulation; Markov models; epidemic modeling; and simulation, analysis, and control of dynamic systems. Local field trips to better understand the local healthcare system and politics, and the spread and impact of HIV and relative diseases.

OSPCPTWN 57. Directed Study in Health Systems and Policy. 1-3 Unit.

Directed study projects focusing on some aspect of health systems and policy in the Southern African context. Example topics include analysis of: local HIV control policies; the South African health care system; health care delivery patterns; investments in health infrastructure as an enabler of health care delivery; health systems strengthening and concomitant improvements in population health; and social networks and influences in disease risk. Students will be expected to write an in-depth term paper that carefully analyzes the problem under consideration. Analyses that include the development of mathematical or analytical models are encouraged.

OSPCPTWN 58. Racism, Colonialism and Genocide. 3-5 Units.

Introduction to the social and historical phenomenon of genocide, contextualized within the contours of world history as well as the histories of European colonialism and Western racist thought from the start of European colonial expansion in the fifteenth century to the twentieth century. Global comparative perspective focusing on southern African, North American and Australian case studies. Theoretical engagement with the concept of genocide and approaches to the subject. In addition to racism and colonialism, themes include: roles of settler regimes; development of the global economy; nationalism in the making of these genocides.

OSPCPTWN 68. Cities in the 21st Century: Urbanization, Globalization and Security. 4 Units.

Cities in a globalizing world. Themes: challenges posed by globalization; general and specific responses of cities to these challenges; security issues created by globalization and urbanization. Concerns related to food security, resource availability, and threat of political instability. Policies recommended by World Bank. Case study method.

OSPCPTWN 70. Youth Citizenship and Community Engagement. 5 Units.

Critical thinking about core concepts in community engagement such as community, self, and identity. The course aims to cultivate a critical consciousness about the meaning of charity, caring, social justice and the aims of engagement with communities to enhance self awareness, awareness of others who are different, awareness of social issues, and an ethic of care where students can be change agents. The meaning of youth citizenship as it relates to engagement with communities will be explored.

OSPCPTWN 71. Power and Performance in Community Practice. 4 Units.

Critical consideration of core concepts in community engagement. Community engagement as a practice, varying subject positions that are given or performed upon and by the community members and those engaging with the community. Dominant models of community engagement: how each model positions students and how the model positions the community members. Seminar topics include issues of biopower, performance of identity (particularly racial identities) and practices of knowledge/power. Critical and reflexive application of these concepts related to community-engaged practice. Guidance in application of critical reflexive thought in practice. Particular attention to the ethics of North-South community engagements.

OSPCPTWN 199A. Directed Reading A. 2-4 Units.

Course may be repeated for credit.

OSPCPTWN 199B. Directed Reading B. 1-5 Unit.

Course may be repeated for credit.

Overseas Studies in Florence Courses

OSPFLOR 1A. Accelerated First-Year Italian, Part 1. 5 Units.

Accelerated sequence that completes first-year Italian in two rather than three quarters. For students with previous knowledge of Italian or with a strong background in another Romance language. Prerequisite: advanced-level proficiency in another Romance language Prerequisite: Placement .

OSPFLOR 1F. First-Year Italian, First Quarter. 5 Units.

All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities.

OSPFLOR 2A. Accelerated First-Year Italian, Part 2. 5 Units.

Continuation of ITALLANG 1A. Accelerated sequence that completes first-year Italian in two rather than three quarters. For students with previous knowledge of Italian or with a strong background in another Romance language. Prerequisite: Placement Test, ITALLANG 1A or consent of instructor. Fulfills the University language requirement.

OSPFLOR 2F. First-Year Italian, Second Quarter. 5 Units.

Continuation of ITALLANG 1. All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. Prerequisite: Placement Test, ITALLANG 2.

OSPFLOR 3F. First-Year Italian, Third Quarter. 5 Units.

Continuation of ITALLANG 2. All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. Prerequisite: Placement Test, ITALLANG 2 or consent of instructor. Fulfills the University language requirement.

OSPFLOR 11. Film, Food and the Italian Identity. 5 Units.

Food in Italian cinema staged as an allegory of Italy; social, political and cultural milieu. Intersections between food, history and culture as they are reflected in and shaped by Italian cinema from the early 1900s until today. Topics include: farmer's tradition during Fascism; lack of food during WWII and its aftermath; the Economic Miracle; food and the Americanization of Italy; La Dolce Vita; the Italian family; ethnicity, globalization and the re-discovery of regional culinary identity in contemporary Italy. Impact of cinema in both reflecting and defining the relationship between food and culture.

OSPFLOR 17. The Evolution of Modern Italian Design. 5 Units.

Cultural context that gave rise to the globally recognized phenomenon of "Italian Design" in the 20th century. Historical complexity of Italian design through an analysis of selected case studies. Several on-site visits to important areas of design innovation and production offer students hands-on opportunities.

OSPFLOR 19. Florence for Foodies: Discovering the Italian Culinary Tradition. 1 Unit.

Factors that shape modern Italian cuisine such as historical heritage, foreign influences, and the "Mediterranean diet." Explore the Italian culinary tradition as well as its more modern face, open to innovation and to technology. Four cooking classes, tastings, on-site visits, and meetings with guest speakers who are experts in their fields.

OSPFLOR 20. Design Driven Innovation: Italian Excellence. 5 Units.

Focus on fashion, furniture and food, the three Fiquets of Italian style. Historical knowledge combined with contemporary analysis; tools to understand the role of Italian design and its contribution to the innovation process. Masters and masterpieces of each discipline starting from the point of view of design itself with case studies specifically dedicated to each of the three Fiquets. On-site classes complement lectures.

OSPFLOR 21F. Accelerated Second-Year Italian, Part A. 5 Units.

Review of grammatical structures; grammar in its communicative context. Listening, speaking, reading, and writing skills practiced and developed through authentic material such as songs, newspaper articles, video clips, and literature. Insight into the Italian culture and crosscultural understanding. Prerequisite: one year of college Italian if completed within two quarters of arriving in Florence, or ITALLANG 21.

OSPFLOR 22. The Italian Way to Car Design. 5 Units.

The history of car design, analysis of the most famous Italian car companies: Alfa Romeo, Lamborghini, Maserati. Car body designers such as Pininfarina, Touring, Castagna and Zagato as well as individual designers. On site visits to relevant historical collections and museums.

OSPFLOR 22F. Accelerated Second-Year Italian Part B. 5 Units.

Grammatical structures, listening, reading, writing, speaking skills, and insight into the Italian culture through authentic materials. Intermediate to advanced grammar. Content-based course, using songs, video, and literature, to provide cultural background for academic courses. Prerequisite: ITALLANG 21 within two quarters of arriving in Florence or ITALLANG 21A or OSPFLOR 21F.

OSPFLOR 25. Italian Food: A Cultural History. 5 Units.

Why is Italian cooking so popular? And why does it play such a key role in the national identity? Observing a meal, we can explain everything, or almost, about people. Eating is a universal experience. However, not only we do not eat the same things but also the ways, places and times we eat change according to traditions and habits. The culture of food is deeply embedded in history. This course will use documentary sources as well as art, literature, cultural studies, statistical data, and movies to describe how meals can paint a fresco of the history of Italians and their food. Economy, culture, class, gender, race, geography, international relations: all have a part in depicting the outline of this history of Italian food in the last 150 years. And all raise questions: how can food mark social differences, set cultural boundaries, raise ethical and religious controversies, involve agribusiness and politics, question our own identities? A tasty travel to the very roots of our human sociality.

OSPFLOR 29. Topics in Medicine and Ethics. 2-4 Units.

Independent study with weekly meetings. Topics: a) Comparative analysis of legislation of human fertilization and embryology in the U.S. and UK; b) History and structure of the health care systems in Italy, Canada, and the U.S.; c) Herbicides, Fungicides, Pesticides in soil and water: a comparative analysis of the State of California and the Toscana. d) Lives of admirable precepts but dubious practice such as Seneca, the Stoics, and Rousseau; e) Promise and pitfalls of genetically modified plant and animal food. Primarily in English, but some topics might require Italian.

OSPFLOR 30. Independent Studies on the European Financial Crisis. 1-3 Unit.

Research the distinctive aspects of the European Financial crisis on an EU member country of choice. Particularly interesting cases include Greece, Spain, Ireland, Italy, France, Germany. Research the effects on and contributions to the European financial crisis made by accession countries.

OSPFLOR 31F. Advanced Oral Communication: Italian. 3 Units.

Refine language skills and develop insight into Italian culture using authentic materials. Group work and individual meetings with instructor. Minimum enrollment required. Prerequisite: ITALLANG 22A, 23 or placement.

OSPFLOR 34. The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art. 4 Units.

Influence and position of women in the history of Florence as revealed in its art. Sculptural, pictorial, and architectural sources from a social, historical, and art historical point of view. Themes: the virgin mother (middle ages); the goddess of beauty (Botticelli to mannerism); the grand duchess (late Renaissance, Baroque); the lady, the woman (19th-20th centuries).

OSPFLOR 41. The Florentine Sketchbook: A Visual Arts Practicum. 3-5 Units.

The ever-changing and multifaceted scene of contemporary art through visual and sensorial stimulation. How art is thought of and produced in Italy today. Hands-on experience. Sketching and exercises on-site at museums and exhibits, plus workshops on techniques. Limited enrollment.

OSPFLOR 42. Academic Internship. 1-5 Unit.

Mentored internships in banking, education, the fine arts, health, media, not-for-profit organizations, publishing, and retail. May be repeated for credit.

OSPFLOR 44. Galileo: Genius, Innovation and the Scientific Revolution. 5 Units.

Galileo's life and scientific progress starting from his student years at the University of Pisa. Departure from traditional natural philosophy leading to radical reformation of cosmology and physics, emphasizing the science of motion. His innovative use of observation and measurement instruments, emphasizing the telescope. Cultural and social context.

OSPFLOR 46. Images of Evil in Criminal Law: Icons and the Visual Representation on Wrongdoing. 5 Units.

Iconographic component of criminal law; reasons and functions of the visual representation of criminal wrongdoing. Historical roots of "evil typecasting;" consideration of its variations with respect to common law and civil law systems. Fundamental features of the two legal systems. Sources, actors, enforcement mechanisms of the criminal law compared; study of cases in the area of murder, sex offences, organized crime and terrorism. Different techniques of image typecasting highlighted and discussed. International criminal law, which takes the burden to describe, typecast and punish forms of "enormous, disproportionate evil," such as genocide and other mass atrocities.

OSPFLOR 47. Independent Study in Geological and Environmental Sciences. 1-3 Unit.

Potential independent study topics include: Are we living through a mass extinction? What controls the distribution of seismic and volcanic hazard and risk in Italy? Why does Mount Etna contribute 10% of the global volcanic carbon dioxide flux to the atmosphere? How does Italian geology and climate influence the production of Italian wines? Was the collapse of the Roman Empire influenced by long-term soil degradation? Weekly meeting to review progress.

OSPFLOR 48. Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition. 4 Units.

The city's art and theories of how art should be presented. The history and typology of world-class collections. Social, economic, political, and aesthetic issues in museum planning and management. Collections include the Medici, English and American collectors of the Victorian era, and modern corporate and public patrons.

OSPFLOR 49. On-Screen Battles: Filmic Portrayals of Fascism and World War II. 5 Units.

Structural and ideological attributes of narrative cinema, and theories of visual and cinematic representation. How film directors have translated history into stories, and war journals into visual images. Topics: the role of fascism in the development of Italian cinema and its phenomenology in film texts; cinema as a way of producing and reproducing constructions of history; film narratives as fictive metaphors of Italian cultural identity; film image, ideology, and politics of style.

OSPFLOR 50M. Introductory Science of Materials. 4 Units.

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

OSPFLOR 52. Mass Extinctions and the Geology of Italy. 4 Units.

Understanding of Earth processes and Earth history as a basis for informed citizen decisions regarding public policies and private actions. How the Earth works; perspective on modern global change through detailed examination of comparable events in Earth's past. Insights focused through the geology of Italy, which provides exceptional exposures of rocks recording ancient mass extinction events as well as opportunities to examine current volcanic and tectonic activities and their impact on nearby human populations. Designed to be open to all undergraduate students.

OSPFLOR 54. High Renaissance and Mannerism: the Great Italian Masters of the 15th and 16th Centuries. 5 Units.

The development of 15th- and early 16th-century art in Florence and Rome. Epochal changes in the art of Michelangelo and Raphael in the service of Pope Julius II. The impact of Roman High Renaissance art on masters such as Fra' Bartolomeo and Andrea del Sarto. The tragic circumstances surrounding the early *maniera*: Pontormo and Rosso Fiorentino and the transformation of early Mannerism into the elegant style of the Medicean court. Contemporary developments in Venice.

OSPFLOR 55. Academy of Fine Arts: Studio Art. 1-5 Unit.

Courses through the *Accademia delle Belle Arti*. Details upon arrival. Minimum Autumn and Winter Quarter enrollment required; 1-3 units in Autumn. May be repeated for credit.

OSPFLOR 56. University of Florence Courses. 1-5 Unit.

May be repeated for credit.

OSPFLOR 58. Space as History: Social Vision and Urban Change. 4 Units.

A thousand years of intentional change in Florence. Phases include programmatic enlargement of ecclesiastical structures begun in the 11th century; aggressive expansion of religious and civic space in the 13th and 14th centuries; aggrandizement of private and public buildings in the 15th century; transformation of Florence into a princely capital from the 16th through the 18th centuries; traumatic remaking of the city's historic core in the 19th century; and development of new residential areas on the outskirts and in neighboring towns in the 20th and 21st centuries.

OSPFLOR 67. The Celluloid Gaze: Gender, Identity and Sexuality in Cinema. 4 Units.

Film in the social construction of gender through the representation of the feminine, the female, and women. Female subjects, gaze, and identity through a historical, technical, and narrative frame. Emphasis is on gender, identity, and sexuality with references to feminist film theory from the early 70s to current methodologies based on semiotics, psychoanalysis, and cultural studies. Advantages and limitations of methods for textual analysis and the theories which inform them. Primarily in Italian.

OSPFLOR 69. Abstract Art: Creativity, Self-Expression and Depicting the Unimaginable. 4 Units.

Overview of the birth and evolution of abstract art with visual background necessary to produce works of art free of a realistic representation. Movements and trends in abstract art; experimentation with different media and techniques.

OSPFLOR 71. A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence. 4 Units.

Recent trends in art, current Italian artistic production, differences and the dialogue among visual arts. Events, schools, and movements of the 20th century. Theoretical background and practical training in various media. Work at the Stanford Center and on site at museums, exhibits, and out in the city armed with a sketchbook and camera. Emphasis is on drawing as the key to the visual arts. Workshops to master the techniques introduced. Limited enrollment.

OSPFLOR 75. Florence in the Renaissance: Family, Youth and Marriage in the Fourteenth and Fifteenth Centuries. 5 Units.

Using a series of texts written by 14th and 15th century Florentines, look at the urban values of the city's citizens. Topics include: thinking about urban space; social relations; the values attached to politics, money, family, religion. How meanings of words such as "state", "government", and "family" might have changed over time.

OSPFLOR 78. The Impossible Experiment: Politics and Policies of the New European Union. 5 Units.

Institutional design of EU, forthcoming changes, and comparison of the old and new designs. Interactions between the EU, member states, organized interests, and public opinion. Major policies of the EU that affect economics such as competition or cohesion policies, market deregulation, and single currency. Consequences of the expansion eastwards. The role of institutions as a set of constraints and opportunities for the economic actors; relationships between political developments and economic change in the context of regional integration; lessons for other parts of the world.

OSPFLOR 84. Life in the Balance: Knowing how nutrient intake can match energy expenditure. 4 Units.

Review of the anatomy and cellular structure of taste, food absorption and digestion, using the anatomical wax models of the "La Specola" Museum of Zoology and Natural History of the University of Florence. Conditions of anorexia nervosa and obesity as illustrations of imbalances in energy intake and output. Genetic contributions to regulating the physiologic and endocrine adaptations to food restriction or overconsumption. Religious fasting practices in Judaism, Christianity and Islam as examples of fine-tuning the energy equilibrium based on cultural traditions. Nutrient imbalances and links to increased rates of metabolic syndrome and cardiac disease. New research findings related to nutrigenetics and the composition of foods beneficial to health and suitable for modulating the balance between food intake and energy expenditure.

OSPFLOR 85. Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era. 4 Units.

Birth and development of the philosophical field of bioethics based on advances in several fundamental fields of science and technology, including molecular and cell biology, information technology, neurosciences and converging technologies. Challenges for society and ethical and political issues created by new advances and opportunities for individuals and populations. Philosophical approaches developed in the Italian as well as in the European debate; special attention to controversy about the freedom of scientific research, new conditions of procreation, birth, cures, and death. Complexity of the challenges posed by the 'biotechnological revolution'quest;.

OSPFLOR 86. Stem Cells in Human Development and Regenerative Medicine. 4-5 Units.

Principles and practice of regenerative medicine. Molecular and developmental biology relevant to the understanding of differentiation and development at the molecular, cellular and organismal levels. Production of lines of multipotent and pluripotent stem cells, the conditions necessary to induce their differentiation into specific lineages and cell types, and their clinical applications. State of the art on the development of regenerative therapies for cartilage injury. Aspects of inherited or acquired diseases that could be potentially treated by stem cell therapies. Quality control and quality assurance necessary for the adequate delivery of stem cell based therapies within current legislative frameworks.

OSPFLOR 98. Origins and Consequences of the European Financial Crisis. 5 Units.

Three aspects of the European financial crisis: 1. What are the roots of the European crisis, in particular of its distinctive aspects? What does economics tell us about currency unions, and were economic prescriptions followed? 2. How did the crisis unfold and was it really unstoppable? Economic and policy events that led to, and sometimes exacerbated, the European crisis. 3. What are the consequences of the crisis for Europe itself and for its main trading partners, including the US? Tools that may help forecast the future path(s) of the crisis. Analysis at both macro and micro level.

OSPFLOR 111Y. From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence. 4 Units.

Lectures, site visits, and readings reconstruct the circumstances that favored the flowering of architecture, sculpture, and painting in Florence and Italy, late 13th to early 16th century. Emphasis is on the classical roots; the particular relationship with nature; the commitment to human expressiveness; and rootedness in the real-world experience, translated in sculpture and painting as powerful plasticity, perspective space, and interest in movement and emotion.

OSPFLOR 115Y. Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization. 4 Units.

The history, history of art, and symbolism of the two principal monuments of Florence: the cathedral and the town hall. Common meaning and ideological differences between the religious and civic symbols of Florence's history from the time of Giotto and the first Guelf republic to Bronzino and Giovanni da Bologna and the Grand Duchy.

OSPFLOR 199A. Directed Reading A. 1-4 Unit.

Course may be repeated for credit.

OSPFLOR 199B. Directed Reading B. 1-4 Unit.

Course may be repeated for credit.

OSPFLOR 199C. Directed Reading C. 1-5 Unit.

Overseas Studies in Istanbul Courses

OSPISTAN 10. Beginning Turkish. 3 Units.

Alphabet and sound systems of Turkish. Basic numbers, colors and days of the week; simple sentence forms; locative form; present continuous tense and past tense; simple adjectives, possessive pronouns, compound nouns, and case endings.

OSPISTAN 20. Intermediate Turkish. 3 Units.

General present tense; conditionals; imperative; while and when as prepositions; relative clauses.

OSPISTAN 30. Advanced Turkish. 3 Units.

Focus on reading and listening using authentic materials; work on grammar, speaking and vocabulary to support readings and listenings. Past perfect tense; DIS as emphatic or terminator participle; obligation forms; conjunctions; conditionals: past and hypotheticals; causative form.

OSPISTAN 61. State and Society in the Middle East. 4 Units.

Introduction to the politics and history of the Modern Middle. Involvement of western "Great Powers" in the region as well as internal political, social and economic dynamics of the Middle Eastern societies. Major social and political issues transforming the lives of people in the region in a radical fashion including: Ottoman and Qajar modernization efforts in the 19th century; World War I; the rise of colonial regimes; authoritarian reforms of local elites; increasing involvement of Cold War- era superpowers in numerous conflict areas; Palestine-Israeli conflict; the Islamic Revolution in Iran; the Gulf Crisis and the American occupation of Iraq; and 'Arab Spring'.

OSPISTAN 62. Business Policy and Strategy in a Global Environment. 4 Units.

Management problems from the perspective of the entire enterprise in a domestic and international setting; strategy formulation, environmental analysis and strategy implementation applied to actual companies. Course relies heavily on cases and on presentations to business leaders.

OSPISTAN 63. Soundscape Studies: Listening to Istanbul. 4 Units.

Introduction to the field of soundscape studies: physical underpinnings; wider context of sensory studies; relevant terminology, concepts and methodology; practical aspects of sound recording, storing and editing. Particular emphasis on how historians and art historians have used this field to open new paths of inquiry in their respective disciplines. The city of Istanbul will serve as a case study for a more in-depth examination of different elements of the urban soundscape, past and present, and the transformations it has experienced over the centuries. Hands-on experience through guided research projects on Istanbul's historical and/or contemporary soundscape.

OSPISTAN 64. Travels in the Ottoman History with Evliya Çelebi. 4 Units.

Studies by modern historians related to Ottoman history compared to writings of Evliya Ccedil;elebi.

OSPISTAN 65. Comparative Political Economy of Emerging Powers. 4 Units.

Political economy account of the rise of emerging powers. Topics include: contemporary debates on political economy of the late industrialization; relationship between development and democracy; relationship between state and the economy; importance of institutions in the development process; rise of BRICS and near-BRICS in the changing global order. Theoretical themes are applied to the case studies of China, India, Russia, Brazil, Mexico, Argentina, Indonesia, Malaysia and Poland; the political economy of Turkey in comparative perspective.

OSPISTAN 67. Istanbul, the Fabric of its "Cities". 4 Units.

Long lasting stories that have preceded and shaped the contemporary city of Istanbul. Urban histories: fragments and insights within the locality that makes the urban and suburban spaces of Istanbul. Chronological progression with general approaches paralleled by plunges in specific themes, peoples and spaces. Long processes of transformations with subtle meanings that historians, archaeologists, art historians and others try capturing through research and on-site work. Field work in Istanbul to uncover some of the more subtle and hidden sides of the city's histories.

OSPISTAN 68. Istanbul: Space, Memory, and Protest. 5 Units.

City of Istanbul as a dynamic social and historical space. How people live in socially cosmopolitan, historically contested, and politically vibrant cities in a global context. Topics include: the complex history of urban development in the city; the cultural and religious orientations of its neighborhoods; competing memories of violence and belonging; and the enduring culture of protests, which have oriented political activity in Istanbul since its foundation. Field research projects in the city.

Overseas Studies in KCJS Kyoto Courses

OSPKYOC 103A. Third-Year Japanese I. 12 Units.

Preparation for function beyond basic level in a Japanese-speaking environment by developing and enhancing communicative competence through: review of basic grammar; new grammar; reading short essays and articles with help of dictionary; short writing and speaking assignments using formal style to describe, explain, and discuss sociocultural topics; enhancing listening comprehension.

OSPKYOC 103B. Third-Year Japanese II. 12 Units.

Preparation for function beyond basic level in a Japanese-speaking environment by developing and enhancing communicative competence through: review of basic grammar; new grammar; reading short essays and articles with help of dictionary; short writing and speaking assignments using formal style to describe, explain, and discuss sociocultural topics; enhancing listening comprehension.

OSPKYOC 104A. Fourth-Year Japanese I. 12 Units.

Emphasis on applications of correct grammar and strengthening academic communication skills through: reading longer essays, articles, and novels with some dictionary work; reading and writing assignments in paragraph format using formal style to describe, explain and discuss sociocultural topics; developing listening comprehension.

OSPKYOC 104B. Fourth-Year Japanese II. 12 Units.

Emphasis on applications of correct grammar and strengthening academic communication skills through: reading longer essays, articles, and novels with some dictionary work; reading and writing assignments in paragraph format using formal style to describe, explain and discuss sociocultural topics; developing listening comprehension.

OSPKYOC 105A. Fifth-Year Japanese I. 12 Units.

For students with advanced proficiency. Goals include advanced command of grammar, composition, and stylistics. Emphasis is on academic Japanese preparing students to audit classes at a Japanese university.

OSPKYOC 105B. Fifth-Year Japanese II. 12 Units.

For students with advanced proficiency. Goals include advanced command of grammar, composition, and stylistics. Emphasis is on academic Japanese preparing students to audit classes at a Japanese university.

OSPKYOC 118. Political Economy of Japan. 6 Units.

Introduction to contemporary Japanese political economy. In a comparative framework, discuss and debate issues such as government role in economic growth, political participation, and party politics.

OSPKYOC 128. Families and Work in Post-war Japan. 6 Units.

Factors that promoted both change and continuity in the social division of labor between the interdependent spheres of work and family. How cultural strategies for organizing contemporary Japanese social life were conditioned 1) by rapid industrialization and growth and 2) by later economic stasis. Class, gender, and regional variations; role of social psychology in Japanese responses to work-family conflicts.

OSPKYOC 131. International Business Strategies in Japan and Asia. 6 Units.

Regional as opposed to national approaches for business strategies. Interconnectedness of the region's economies and businesses. International business strategies with particular relevance to Japan and Asia; key players in Asian business; how to utilize knowledge of Japan in greater Asian international business context.

OSPKYOC 146. Postwar Japanese Cinema and Visual Culture. 6 Units.

Films of Japanese directors Ozu Yasujiro, Mizoguchi Kenji and Kurosawa Akira from the late 1940s and 1950s and their focus on the human condition and the perception of truth, history, beauty, death in the postwar period. Connections to other visual media such as painting, photography, and printmaking.

OSPKYOC 179. Kyoto Artisans and their Worlds. 6 Units.

Textile workshops of Nishijin in the northwest of the city; ceramic workshops in the southeast around Gojozaka; and web of artisans supporting traditional artist guilds such as pigment producers, papermakers, stencil cutters, gold and silver foil craftsmen, carvers and printers. Historical, cultural, and technological background for each topic. Visits to studios and museums for first-hand experience of not only the crafts, but also their changing role in supporting the lifeblood of Kyoto as a city.

OSPKYOC 180. The Arts of Japan. 6 Units.

Introduction to the major artistic traditions of Japan, from the Neolithic period to the present. How arts developed in and through history and how art and architecture were used for philosophical, religious and material ends. Topics include: places of Shinto and impact of Buddhism; narrative illustration; changing roles of aristocratic, monastic, shogunal and merchant patronage.

OSPKYOC 197. Independent Studies. 6 Units.

Focused research using the Japanese language and taking advantage of local Kyoto resources. Directed reading and research, weekly meetings with professor, and final research paper. For full-year students with language skills adequate for the proposed research.

Overseas Studies in Kyoto Courses

OSPKYOTO 2K. First-Year Japanese Language, Culture, and Communication, Second Quarter. 5 Units.

Continuation of JAPANLNG 1. First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. Prerequisite: JAPANLNG 1 if taken 2012-13 of later (JAPANLNG 7 if taken 2011-12 or earlier).

OSPKYOTO 3K. First-Year Japanese Language, Culture, and Communication, Third Quarter. 5 Units.

(Formerly OSPKYOTO 9K). Continuation of 2K. First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. Fulfills University Foreign Language Requirement. Prerequisite: JAPANLNG 2 or OSPKYOTO 2K if taken 2012-13 or later (JAPANLNG 8 if taken 2011-13 or earlier).

OSPKYOTO 10. Gamelan to Kabuki: Musical Traditions of Far East Asia. 4 Units.

Introduction to traditional musical cultures of the Far East with an emphasis on Japan. Listening, viewing and study of prominent musical examples. Survey of unique traditional instruments and ensembles in a range of performance contexts, from sacred rituals to secular dance and theater. Traditional genres and their impact on local and global musical culture of today. Development of critical listening skills. Live performances and encounters with local masters; early morning monastery chanting; visits to Bunraku and Kabuki theaters.

OSPKYOTO 11. Experiencing Ma: Time & Space in Japanese Arts. 4 Units.

The study, experience, and expression of Ma, a key concept in Japanese art, through field trips, meetings with artists, empirical research, presentations, and creative projects. Exploration and comparative examination of landscape gardens, architecture, calligraphy, ikebana, tea ceremony, poetry, theater, classical music, media art, installation art, dance, and cuisine. Visits to gardens, temples, museums, concerts, and events in Kyoto and nearby cities as catalysts for discussion of Japanese cultural identity and its distinctiveness within the global community.

OSPKYOTO 13. Contemporary Japanese Religion. 4-5 Units.

Japanese attitudes to religion and popular forms of religiosity. Syncretic nature of beliefs and practices drawn on a variety of interwoven concepts, beliefs, customs and religious activities of native Japanese, Korean, Chinese, and Indian origins as background. Topics include: pursuit of worldly benefits, religion and healing, fortune-telling, ascetic practices, pilgrimage, festivals (matsuri), new religions and their image, impact of the internet, response of religion in times of crisis.

OSPKYOTO 17R. Religion and Japanese Culture. 4-5 Units.

Major religious traditions of Japan. Topics include: relation between religion and culture; ancient Japanese religion and Shinto; Buddhist schools of Heian Japan; Zen Buddhism as it flourished in the Kamakura period; Confucianism, as originally conceived in ancient China and as transmitted to Japan in the Edo period in its neo-Confucian form; characteristic modern practices. Field trips to religious centers to observe current religious practices.

OSPKYOTO 21K. Second-Year Japanese Language, Culture, and Communication, First Quarter. 5 Units.

(Formerly OSPKYOTO 17K.) Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: JAPANLNG 3 if taken 2012-13 or later (JAPANLNG 7 if taken 2011-12 or earlier).

OSPKYOTO 22K. Second-Year Japanese Language, Culture, and Communication, Second Quarter. 5 Units.

(Formerly OSPKYOTO 18K). Continuation of JAPANLNG 21. Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: JAPANLNG 21 if taken 2012-13 or later (JAPANLNG 17 if taken 2011-12 or earlier).

OSPKYOTO 23K. Second-Year Japanese Language, Culture, and Communication, Third Quarter. 5 Units.

Formerly OSPKYOTO 19K). Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: JAPANLNG 22 or OSPKYOTO 22K if taken 2012-13 or later (JAPANLNG 18 if taken 2011-12 or earlier).

OSPKYOTO 27. Japanese Popular Culture. 4-5 Units.

Introduction to forms and categories of Japanese popular culture including: Japanese movies and television, animation and manga, magazines, newspapers and other printed materials, characters and product brands, sports and other entertainment industries, music and idols, fashion, food and drink, consumer goods, shopping malls and other places for consumption. Using a cultural studies framework, analyze these various forms of popular culture considering the following: different groups in society; historical variability; industry, government and media interests; and advertising policies.

OSPKYOTO 40K. Introductory Electronics. 5 Units.

Electrical quantities and their measurement, including operation of the oscilloscope. Function of electronic components including resistor, capacitor, and inductor. Analog circuits including the operational amplifier and tuned circuits. Digital logic circuits and their functions. Lab assignments. Prerequisite: PHYSICS 43.

OSPKYOTO 45. Japan's Energy-Environment Conundrum. 4-5 Units.

Japan's energy-environment challenges and their consequences for Japan; wider society and economy. Question of how Japan's policy makers will balance energy and environmental needs and how the answers will affect the country's future as a leading regional power. Students will gain a sound understanding of the structure of Japan's energy-environment challenges and a practical analytical framework by which they can evaluate these challenges and develop their own balanced assessments.

OSPKYOTO 54. Escaping Galapagos: Japan's New Innovation Boom. 5 Units.

Changing paradigms in Japan's patterns of innovation. Key factors driving Japan's recent innovation boom; 'wisdom innovation' model, retaining Japan's traditional emphasis on quality, craftsmanship and service while adding a new focus on wider applicability to the globalized economy. Industries leading this change, including telecommunications, e-commerce, finance, energy, media, tourism and retail. Insights into Japanese business culture.

OSPKYOTO 61. The Fourier Transform and its Applications. 3 Units.

The Fourier transform as a tool for solving physical problems. Fourier series, the Fourier transform of continuous and discrete signals and its properties. The Dirac delta, distributions, and generalized transforms. Convolutions and correlations and applications; probability distributions, sampling theory, filters, and analysis of linear systems. The discrete Fourier transform and the FFT algorithm. Multidimensional Fourier transform and use in imaging. Further applications to optics, crystallography. Emphasis on relating the theoretical principles to solving practical engineering and science problems. Prerequisites: Math through ODEs, Fourier series at the level of 102A, and linear algebra. Same as EE 261.

OSPKYOTO 64. Japanese Popular Culture. 4-5 Units.

Origin, history and production of genres of Japanese popular culture such as manga, anime, popular music, television drama, film and new media, and their link to current phenomena. Themed units: disaster anime; politics of shojo; otakuology; keitai studies. Analysis of media texts and how age, gender, race, ethnicity and socio-economic class are represented. Social context in which popular culture is produced and consumed. Local field trips.

OSPKYOTO 67. Kyoto in the Literature of Japan. 4-5 Units.

Overview of Japanese literature from the earliest times to the present, with an emphasis on works set in or around Kyoto. Examine the texts in relation to their historical context generally, with a secondary emphasis on how the backdrop of Kyoto plays a role in different historical works and different historical periods. In addition, touch on issues relevant to the texts and to Japanese history and culture, including nature, community, religion, nationalism, individualism, gender, family, and moral values.

OSPKYOTO 68. Independent Study in Japanese Culture. 1-3 Unit.

Examination of any of the following topics, according to student interest: Japanese Poetry of any genre or period; Haiku in Japanese and/or English; Dramatic Manga; Travel Writing.

OSPKYOTO 102K. Third-Year Japanese Language, Culture, and Communication, Second Quarter. 5 Units.

Continuation of JAPANLNG 101. Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: JAPANLNG 101 if taken 2012-13 or later (JAPANLNG 117 if taken 2011-12 or earlier).

OSPKYOTO 103K. Third-Year Japanese Language, Culture, and Communication, Third Quarter. 5 Units.

(Formerly OSPKYOTO 119K). Continuation of 118K. Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: JAPANLNG 102 or OSPKYOTO 102K if taken 2012-13 or later (JAPANLNG 118 if taken 2011-12 or earlier).

OSPKYOTO 199A. Directed Reading A. 1-4 Unit.

May be repeated for credit.

OSPKYOTO 199B. Directed Reading B. 1-4 Unit.

May be repeated for credit.

OSPKYOTO 210K. Advanced Japanese. 5 Units.

Overseas Studies in Madrid Courses

OSPMADR 8A. Architecture, Culture and Nature in Madrid: Towards a Sustainable City. 2 Units.

Architecture and the city, with a focus on recent currents in the progress of both, such as sustainability, environmentalism and the relationship with nature. Topics underpinned by discussion of theory, and illustrated by a study of the city of Madrid: an example of a hybrid architectural/planning experiential environment that looks to the future with an ambition for modernization.

OSPMADR 8B. Debating Design: Spanish and International Fashion. 2 Units.

Culture and society in Spain as viewed through the lens of the fashion industry. Social changes, trends, and the evolution of life styles. Industrial, commercial and media involvement in the internationalization of the industry.

OSPMADR 8C. Appreciating Spanish Music. 2 Units.

Unique aspects of Spanish art music. Participation in concert outings and field trips for live performances of studied repertoire. No previous knowledge of music required.

OSPMADR 8D. Spanish Chorus. 2 Units.

Through the study of both popular and classic Hispanic songs, the course will exercise memory, phonetic pronunciation and cultural immersion while also developing a sense of rhythm, melodic intonation, and a love of music and singing. Open to all students; no previous musical experience required, only a willingness to learn and enjoy singing. Choral exchange with a local choir and a final performance. Repertoire focus on learning and interpreting Hispanic folklore, and may include compositions in Castilian, Catalan, Galician, or Basque, and possibly Latin, Quechua or Aymara.

OSPMADR 12M. Accelerated Second-Year Spanish I. 5 Units.

Intensive sequence integrating language, culture, and geo/sociopolitics of Spain. Emphasis is on achieving advanced proficiency in oral and written discourse, including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: one year of college Spanish or 11 or 21B more than two quarters (six months) prior to arriving in Madrid.

OSPMADR 13M. Accelerated Second-Year Spanish II. 5 Units.

Intensive sequence integrating language, culture, and geo/sociopolitics of Spain. Emphasis is on achieving advanced proficiency in oral and written discourse, including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: 11 or 21B within two quarters (six months) of arriving in Madrid or 12 or 22B.

OSPMADR 14. Introduction to Spanish Culture. 1 Unit.

Required for Madrid students. Spain's historical, physical, and sociocultural diversity. Includes a weekend study trip and other cultural encounters. Linguistic skills and cultural knowledge through museum visits, readings, and writing a paper in Spanish. Study trips: Autumn Quarter to Cantabria-Lea; Winter Quarter to Andalusia and Extremadura; Spring Quarter to Catalonia and Galicia.

OSPMADR 15. Flamenco Dance. 1 Unit.

Practical instruction. The rhythms and styles of flamenco and the expression of feelings proper to this art form which synthesizes song, music, and dance. *Zapateado* (footwork), *braceo* (arm positions and movement technique), and choreographies, including Rumba flamenca and Sevillanas. Enrollment limited. May be repeated for credit.

OSPMADR 22. Spain on Stage: La cartela de 2014. 5 Units.

Students attend theater and analyze works currently in performance in Madrid, including canonical plays, and performances at smaller historical and alternative theaters. History of Spanish theater; background on the plays. Skills and strategies for reading dramatic works as literature and analyzing scenic languages of performance.

OSPMADR 25. Politics of "Culture/s" in the Iberian's World: the Multicultural Debate. 4 Units.

Exploration of the category of "culture" as an arena of political debate and social imaginary across history in the Iberian Peninsula. Use of history of this part of the world, where the Mediterranean and Atlantic worlds have historically converged, to better understand and deal with contemporary debates of multiculturalism. Multidisciplinary approach, bringing political philosophy, history, anthropology and comparative cultural studies into a dialog. Continuities and major changes in the Iberian ethnoscapes. Debate on European contemporary backlash against multiculturalism.

OSPMADR 28. Independent Study: Topics in European Survey Research and Public Opinion. 2-4 Units.

Exploration of social questions using public opinion data for the European Union, including the EuroBarometer and the European Social Survey. Research paper on a question students develop, either focusing on Spain or comparing Spain with other EU nations, using their own data analysis.

OSPMADR 30. Instituto de Empresa Universidad: Social Science. 3 Units.

Attend class with students in a Spanish university. Introduction to basic economic thinking as a tool for future professions.

OSPMADRD 33. Spanish Language Tutorial. 2 Units.

May be repeated for credit. Prerequisite: three years of Spanish at Stanford or placement.

OSPMADRD 41. Dissidence and Continuity: Spanish Theater, 1907 to the Present. 4-5 Units.

Tradition, transformation, experimentation, rupture, renovation, and innovation in the theater in Spain as a reflection of the artistic, social and historical commotion that led to the Spanish Civil War, Franco, and the present democratic monarchy. Ortega y Gasset, Benavente, Grau, Valle-Inclán, Garcíá Lorca, Buero Vallejo, Sastre, Arrabal, Fernán Gómez, Paloma Pedrero, Yolanda Pallián or other playwrights who may be staged in Madrid theaters.

OSPMADRD 42. A European Model of Democracy: The Case of Spain. 4 Units.

Current Spanish political system, its main judicial and political institutions, outstanding actors' and the political process of the last decade. Historic antecedents; immediate precedents; and the current political system and life. Relation between the elements that constitute a political system; results of the process of democratization; integration to the EU.

OSPMADRD 43. The Jacobean Star Way and Europe: Society, Politics and Culture. 5 Units.

The Saint James' Way as a tool to understand historic dynamics from a global perspective. Its effect on the structures that form a political and institutional system, and its society, economy, and ideology.

OSPMADRD 45. Women in Art: Case Study in the Madrid Museums. 4 Units.

Viewing the collections at the Prado Museum through study and analysis of the representations of women. Contemporary literary texts and images that situate paintings in the historical, social, and political conditions that produced the works.

OSPMADRD 46. Drawing with Four Spanish Masters: Goya, Velázquez, Picasso and Dalí. 3 Units.

Approaches, techniques, and processes in drawing. Visits to Madrid museums to study paintings and drawings by Goya, Velázquez, Picasso, and Dalí; and to explore the experience of drawing. Subject matter: the figure, still life, interiors, landscape, and non-representational drawing. No previous experience required. Enrollment limited.

OSPMADRD 50. Flirting with Spanish Metafiction: Cervantes, Velázquez, Fuentes, Almodóvar. 4-5 Units.

Literary theory and critical analysis of peninsular and Latin American texts. Emphasis is on the origins and development of self-conscious fiction (metafiction). Works by Cervantes, Velázquez, Unamuno, Borges, Fuentes, Torrente Ballester, and Almodóvar. Attendance at music, art, cinema, and Spanish novelist events. In Spanish.

OSPMADRD 52. Revolution and Reconciliation in Film. 4 Units.

Using the Spanish political experience in the 20th Century as a starting point, focus on the human and social effects of the numerous political upheavals in the transitions from democracy to authoritarianism and back again. Films about revolutionary change in several different societies treated as the 'texts' to motivate thinking; examination of both the process of social breakdown during periods of civil strife and the role of reconciliation in the reconstruction of societies. Multiple elements of social consequences in political transitions, including gender, children, non-violent resistance, racism, social class, and the role of the United States.

OSPMADRD 57. Health Care: A Contrastive Analysis between Spain and the U.S.. 4 Units.

History of health care and evolution of the concept of universal health care based on need not wealth. Contrast with system in U.S. Is there a right to health care and if so, what does it encompass? The Spanish health care system; its major successes and shortcomings. Issues and challenges from an interdisciplinary perspective combining scientific facts with moral, political, and legal philosophy.

OSPMADRD 60. Integration into Spanish Society: Service Learning and Professional Opportunities. 5 Units.

Engagement with the real world of Madrid through public service work with NGOs and public service professions such as teaching. Depending on availability, topics relevant to present-day Spain may include: the national health plan, educational system, immigration, prostitution, refugees, youth, and fair trade. Fieldwork, lectures, and research paper. Limited enrollment. May be repeated for credit. Prerequisite: two years of college level Spanish or equivalent.

OSPMADRD 61. Society and Cultural Change: The Case of Spain. 4 Units.

Complexity of socio-cultural change in Spain during the last three decades. Topics include: cultural diversity in Iberian world; social structure; family in Mediterranean cultures; ages and generations; political parties and ideologies; communication and consumption; religion; and leisure activities.

OSPMADRD 62. Spanish California: Historical Issues. 4 Units.

Spanish exploration and colonization of California from the 16th century to the end of the Spanish colonial period in 1821. Themes include: geographical explorations in the context of European colonial expansion; demographic evolution of Native American inhabitants and immigrant population; general social and economic development of the colony; controversies surrounding the mission system; role of the Pacific coasts of North America in the Spanish enlightenment and in strategies for imperial defense and development in the revolutionary era of the late 18th and early 19th centuries.

OSPMADRD 71. Sociology of Communication. 5 Units.

Understanding the sociocultural diversity of communication in Spain with the help of theoretical and practical tools. How communication happens through language and other means; significance of images in today's world; vision of the world produced by media; problems of social communication from perspective of reception. Offered at the Universidad Complutense with an additional tutorial for Stanford students.

OSPMADRD 72. Issues in Bioethics Across Cultures. 4 Units.

Ethical dilemmas concerning the autonomy and dignity of human beings and other living creatures; principles of justice that rule different realms of private and public life. Interdisciplinary approach to assessing these challenges, combining scientific facts, health care issues, and moral philosophy. Sources include landmark bioethics papers.

OSPMADRD 73. The Neuroscience of Language Learning. 3 Units.

How the brain implements fundamental functions such as sensory information processing, motor coordination, learning, and memory through the study of language learning. Topics introduced with a brief lecture and discussion of assigned reading followed by work in small teams to identify outstanding questions in the topic area and to design experiments to address those questions.

OSPMADRD 74. Islam in Spain and Europe: 1300 Years of Contact. 4 Units.

Primary problems and conflicts in the contemporary Islamic world and its relations with the West, as well as the relationship between Spain and Islam throughout history. Special attention to the history of al-Andalus, an Islamic state in the Iberian Peninsula during the Middle Ages, evaluating the importance of its legacy in Europe and in contemporary Spain. Spain's leading role in relations between Europe and the Mediterranean Islamic states from the Modern Era to the present day.

OSPMADRD 75. Sefarad: The Jewish Community in Spain. 4 Units.

The legacy of Sefarad, the Jewish community in Spain. Historical evolution of the Sephardic community, under both Muslim and Christian rule, including the culmination of Anti-Semitism in 1492 with the expulsion of the Jews. Cultural contribution of the Hebrew communities in their condition as a social minority, both in al-Andalus, the peninsular Islamic State, and in the peninsular Christian kingdoms.

OSPMADR 76. Independent Study: Gender Disparities in Science and Science Education. 2-4 Units.

Independent study with weekly meetings. May include trips to local schools and research institutes to explore the perspective of Spanish teachers, students and scientists on the underrepresentation of women in science and other gender disparities in science and science education.

OSPMADR 77. Independent Study Topics in Systems Neuroscience. 2-4 Units.

Independent study with weekly meetings. Potential topics include: neural coding of information, the neural mechanisms of learning and memory, the neural control of movement, and neural mechanisms of timing.

OSPMADR 78. Topics in Spanish Literature and History. 1-3 Unit.

Independent study offered on topics in Spanish literature or modern history. Students propose a topic to the instructor who will help craft a reading list and appropriate on-site field trips or archives. Student and instructor will meet weekly; outside work will be tailored to student interest.

OSPMADR 79. Earth and Water Resources' Sustainability in Spain. 4 Units.

Interdisciplinary focus on the relationship between earth systems and human activities. Nature and distribution of natural resources, their uses and exploitation, environmental impacts associated with exploitation, and sustainable development initiatives, including the restoration and rehabilitation of the land affected by extraction activities. Water management: understanding of the resource and its location; the development of efficient tools; an associated regulatory apparatus; and economics.

OSPMADR 80. Word, Image and Power. 4 Units.

Relationships and uses of oral discourse, art, and iconography in politics in different countries through history. Case studies from ancient Egypt, the Greek Paideia, Cesar Augustus, medieval Europe, Spanish modern empire, French revolutionary discourse, and proletarian national identity in Russia and China.

OSPMADR 81. From Altamira to Picasso: Artistic and Literary Representation from Realism to Metafiction. 4-5 Units.

Texts in fine and literary arts with emphasis on the origins and development of Spain; art history between realistic and fictional stages from Altamira to Picasso, through Romanesque, Gothic, Renaissance, Baroque, Modern and Post-modern times in El Greco, Velázquez, Cervantes, Goya, Gaudí, Dalí, Picasso, Borges, Almodóvar and other authors. Emphasis on fine arts with a historical approach. Occasional attendance to fine art (El Prado, Reina Sofía, Thyssen Museums), cinema, and literary events (El Quijote public reading), besides regular classes at the Stanford Center. Taught in Spanish.

OSPMADR 102M. Composition and Writing Workshop for Students in Madrid. 3-5 Units.

Advanced. Writing as craft and process, emphasizing brainstorming, planning, outlining, drafting, revising, style, diction, and editing. Students choose topics related to their studies. Prerequisite: 13, 23B, or equivalent placement.

OSPMADR 199A. Directed Reading. 1-5 Unit.

Overseas Studies in Moscow Courses

Overseas Studies in Oxford Courses

OSPOXFRD 22. British Politics Past and Present. 4-5 Units.

The political system of the United Kingdom; contemporary scholarly debates about UK politics and the UK constitution; and critical analysis of these debates and of current issues in UK politics (including constitutional reform), using contemporary political science and political theory.

OSPOXFRD 24. British and American Constitutional Systems in Comparative Perspective. 4-5 Units.

Introduction to the study of constitutions and constitutional systems of government. The workings of the British and American systems of government. Comparative study of the most important constitutional issues facing Britain and the U.S. such as how suspected terrorists should be treated in a time of war. How to think about fundamental constitutional questions.

OSPOXFRD 45. British Economic Policy since World War II. 5 Units.

Development of British economic policy making from 1945, focusing on political economy including: ideological motives of governments; political business cycle; and the influence of changing intellectual fashions. Policy areas: attitude to the pound; control of the business cycle; and the role of the state in the economy. Prerequisite: ECON 50.

OSPOXFRD 50. Approaches to Shakespeare. 5 Units.

Different ways in which we might approach Shakespeare, and to what ends. Consideration of Shakespeare's own historical context, his changing reputation, alongside modern critical readings. Read several of the works and use film and theatrical productions to discuss the differences between page and stage. Intended to serve both as an introduction for those who have not studied Shakespeare before and an exploration of different critical approaches for those who are already familiar with his work.

OSPOXFRD 57. The Rise of the Woman Writer 1660-1860. 5 Units.

Emergence and rise of the professional woman writer from playwright and Royalist spy Aphra Behn (1640-89) to novelist and proto-feminist Charlotte Brontë (1816-55). How women writers dealt with criticism for writing publicly, placing each author and text in its historical and literary context. Range of poets, playwrights, and novelists including Eliza Haywood, Frances Burney, and Mary Elizabeth Braddon. Topics: gender roles and proto-feminism, the public versus the private sphere, sexuality, courtship and marriage.

OSPOXFRD 70. The History of London. 5 Units.

London's physical growth, emphasizing characteristics which set it apart from other capitals, and its economic, social and political development, including the problems of poverty and the inner city, the provision of public services, and the growth of suburbs and public transport. Challenges facing London in modern times. Walking tours, especially less frequented areas.

OSPOXFRD 87. The Archaeology of Britain. 5 Units.

Introduction to the archaeology of the of the British Isles, with particular attention to prehistory, Roman Britain and early medieval period. Themes: peopling of Britain and emergence of hunter-gatherer society; spread of farmers into Britain and role of ritual and community; growth of social hierarchies associated with the first metallurgy; growth of settled farming and layout of fields; growth of Iron Age tribes with their regional centers; arrival of Roman legions and transformation of the British landscape; Anglo-Saxon and Viking invasions and their response to them. Field trips to sites in southern England as well as hands-on lab sessions in the Ashmolean and Pitt-Rivers Museums in Oxford.

OSPOXFRD 89. Archaeology: Independent Study. 5 Units.

Independent study offerings in one of the following topics:n1. The spread of farmers through Europe.n2. Museums and society.n3. General Pitt-Rivers and the history of archaeology in Britain.n4. The Romans in Britain.nnStudents will be facilitated to work in libraries, museums and in the Oxford Archaeology Unit archives in order to collect information on the Roman presence in Oxfordshire and the long-term impact on the Oxfordshire landscape. Students will also be facilitated to work with the team in Reading publishing the long-term research of Professor Mike Fulford on the Roman town of Silchester.

OSPOXFRD 90. Economic Policy in Advanced Economies. 5 Units.

Major challenges for economic policy in developed economies. Topics include: policies to foster growth and combat recessions; social insurance; the re-distributional role of the tax and welfare system; and government policies in key sectors such as health care, financial services, education and energy. Weekly short papers and presentations.

OSPOXFRD 91. Independent Study Projects or Directed Reading. 3-5 Units.

Independent study projects on current topics in economic policy. Possible topics to include: government policy to foster economic growth and fight recessions, inequality and the role of the tax system in redistributing income, social insurance,.

OSPOXFRD 93. Collecting the World. 4 Units.

The art, science, and culture of the creation, transmission and collection of valuable, useful and informative objects and texts before the twentieth century, and the associated theories, purposes, and methods for collecting 'worldly' goods and other valuables. Means by which local academic practices engaged with global developments in the arts and sciences through examination of primarily early modern material and intellectual culture in and around Oxfordshire. Assessments of quality, meaning, usage, cultural significance and the reception of material objects; treasures; in the storage rooms, vaults, and on display in museums, galleries, and libraries.

OSPOXFRD 117W. Gender and Social Change in Modern Britain. 4-5 Units.

Changes in the social institutions, attitudes, and values in Britain over the past 20 years with specific reference to shifts in gender relations. Demographic, economic and social factors; review of theoretical ideas. Men's and women's shifting roles in a fast-moving society.

OSPOXFRD 195A. Tutorial in Anthropology. 6-7 Units.**OSPOXFRD 195B. Tutorial in Biology. 6-7 Units.****OSPOXFRD 195C. Tutorial in Classics. 6-7 Units.****OSPOXFRD 195E. Tutorial in Drama. 6-7 Units.****OSPOXFRD 195F. Tutorial in Economics. 6-7 Units.****OSPOXFRD 195G. Tutorial in Economic History. 6-7 Units.****OSPOXFRD 195J. Tutorial in Jurisprudence. 6-7 Units.****OSPOXFRD 195L. Tutorial in Health Care. 6-7 Units.**

May be repeated for credit.

OSPOXFRD 195M. Tutorial in History of Science. 6-7 Units.**OSPOXFRD 195N. Tutorial in Human Biology. 6-7 Units.****OSPOXFRD 195P. Tutorial: Interdisciplinary. 6-7 Units.****OSPOXFRD 195R. Tutorial in International Relations. 6-7 Units.****OSPOXFRD 195S. Tutorial in Computer Studies. 6-7 Units.****OSPOXFRD 195T. Tutorial in Literature. 6-7 Units.****OSPOXFRD 195U. Tutorial in Music. 6-7 Units.****OSPOXFRD 195V. Tutorial in Philosophy. 6-7 Units.****OSPOXFRD 195W. Tutorial in Physics. 6-7 Units.****OSPOXFRD 195Z. Tutorial in Political Science. 6-7 Units.****OSPOXFRD 196A. Tutorial in Psychology. 6-7 Units.****OSPOXFRD 196B. Tutorial in Religion. 6-7 Units.**

Course may be repeated for credit.

OSPOXFRD 196C. Tutorial in Sociology. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 196E. Tutorial in History. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 196F. Tutorial in History of Art. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 196G. Tutorial in Chemistry. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 196K. Tutorial in Zoology. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 196M. Tutorial in Public Policy. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 196N. Tutorial in Mathematics. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197A. Tutorial in Anthropology. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197B. Tutorial in Biology. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197C. Tutorial in Classics. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197E. Tutorial in Drama. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197F. Tutorial in Economics. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197J. Tutorial in Jurisprudence. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197L. Tutorial in Health Care. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197M. Tutorial in History of Science. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197N. Tutorial in Human Biology. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197P. Tutorial: Interdisciplinary. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197R. Tutorial in International Relations. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197S. Tutorial in Computer Studies. 6-7 Units.

OSPOXFRD 197T. Tutorial in English Literature. 6-7 Units.

Course may be repeated for credit.

OSPOXFRD 197U. Tutorial in Music. 6-7 Units.

May be repeated for credit.

OSPOXFRD 197V. Tutorial in Philosophy. 6-7 Units.

May be repeated for credit.

OSPOXFRD 197Z. Tutorial in Political Science. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198A. Tutorial in Psychology. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198B. Tutorial in Religion. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198C. Tutorial in Sociology. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198E. Tutorial in History. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198F. Tutorial in History of Art. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198K. Tutorial in Zoology. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198M. Tutorial in Public Policy. 6-7 Units.

May be repeated for credit.

OSPOXFRD 198N. Tutorial in Mathematics. 6-7 Units.

May be repeated for credit.

OSPOXFRD 199A. Directed Reading A. 2-4 Units.

Course may be repeated for credit.

OSPOXFRD 199B. Directed Reading B. 2-5 Units.

Course may be repeated for credit.

OSPOXFRD 199D. Directed Reading. 1-3 Unit.

Course may be repeated for credit.

OSPOXFRD 221Y. Art and Society in Britain. 4-5 Units.

Themes in 18th-, 19th-, and 20th-century British art. Painting, sculpture, and design. Comparisons between the British experience and that of continental Europe and the U.S. Readings address questions related to the role of art in modern society. Limited Enrollment.

Overseas Studies in Paris Courses

OSPPARIS 10A. Engineering Research Internship. 6 Units.

For Paris Program students with academic experience in electronics, telecommunications or signal and image processing. Under direct guidance of researchers at Institut Supérieur d'Électronique de Paris (ISEP), and where applicable, in collaboration with other French and international graduate students, contribute to the ISEP's ongoing research projects.

OSPPARIS 10B. Biology and Bio-Engineering Research Internship. 6 Units.

Laboratory of the National Museum of Natural History. Work with international research team on project elucidating the origin of the diversity of animal form. Modern techniques in functional genomics. Applied questions on human development in an environment where embryology, paleontology and medicine converge. Two days a week commitment required.

OSPPARIS 10D. Climate Change Research Internship. 6 Units.

Work with the CDC Climat center (a subsidiary of the French financial organization Caisse de Dépôts et Consignations), which serves as an important Paris-based think tank devoted to innovative scientific investigation and publication. Carbon offsetting; bio-economy and climate mitigation policies and projects. Work three days a week for six months; produce and post a research report on one aspect of climate and energy policy.

OSPPARIS 11. Special Internship. 1-6 Unit.

Often initiated by special contacts between students and professionals in France. Involvement may be based more on field work, and activity, rather than on fulfilling traditional academic requirements. Prerequisites: Written permission from the program director.

OSPPARIS 12. Paris Photography Workshop. 3 Units.

Exploration of Paris through camera and lab techniques. Both theoretical and practical aspects of creative photography. Extensive field work. Enrollment limited.

OSPPARIS 12C. French Through Songs Workshop. 3 Units.

French culture and language through songs. Classics of French songs as well as their composers and singers. Working in teams, learn lyrics through games, quizzes and riddles. Phonetics, vocalization and breathing exercises in preparation for final production. Enrollment limited; minimum of five for the course to be offered.

OSPPARIS 12D. Public Speaking in French Workshop: Phonetics, Rhythm and Confidence. 3 Units.

Reading texts such as poems, theater scenes and speeches aloud in French. Analysis of ideas, words, punctuation and rhythm of texts. Importance of gestures and body language while speaking. Optional public presentation at end of quarter. Enrollment limited, but minimum enrollment of five for course to be offered.

OSPPARIS 14. Media Internship. 3 Units.

Case studies and independent research as groundwork for comparative analysis of media on both sides of the Atlantic. Nature of media in the U.S. and in France. Media as a means for understanding culture.

OSPPARIS 15. Hospital Internship. 3 Units.

Observation of medical services in Paris hospitals. How hospital teams work in France; how medical decisions are made; how patients are treated by nurses and doctors.

OSPPARIS 16. Independent Study: Women Writers in Paris. 5 Units.

Expatriate women writers - American and British - who lived and wrote in Paris between the wars. Among them: Edith Wharton, Gertrude Stein and Alice B. Toklas, H.D., Djuna Barnes, Margaret Anderson, Janet Flanner, Natalie Barney, Kay Boyle, Mina Loy, Romaine Brooks, Mary Butts, Radclyffe Hall, Colette, and Jean Rhys. A central theme will be Paris as a lure and inspiration for bohemian female modernists -- especially the so-called 'Sapphic modernists' (Stein, Barnes, Barney, Flanner et al) -- and the various alternative and emancipatory literary communities they created.

OSPPARIS 16A. French Schooling Internship. 2-3 Units.

Working with French schoolchildren in one of three settings: a neighborhood support association in the outskirts of Paris; or two after-school support association in the city. Commitment for a minimum of three hours a week on site plus meetings with internship instructor and a final paper. Number of placements depends on the needs of the sponsoring institutions. Previous work with children advised.

OSPPARIS 17. Engaged Intellectual. 5 Units.

Laboratory format to create works of art inspired by the local urban environment. Projects include: sonic scavenger hunts to record Paris' sound ecology as basis for electronic music works; solo and group performance art, and public poetry readings related to and staged throughout the city at idiosyncratic locations; temporary public visual art such as chalk art; bricolage art projects that result in sculpture and two-dimensional visual art constituted by found objects salvaged from the Parisian cityscape. No experience required.

OSPPARIS 19. Arranged Internship 1. 3-6 Units.

Two-quarter stay required. Internships can be arranged in a number of areas including the arts, architecture, politics, engineering, marketing and PR, media and journalism, health and psychological services, IT, NGO's, research, and hospitality administration.

OSPPARIS 22P. Intermediate French I. 5 Units.

Prerequisite: one year of college French if completed within two quarters of arriving in Paris, or FRENLANG 21C.

OSPPARIS 23P. Intermediate French II. 5 Units.

Prerequisite: FRENLANG 21C within two quarters of arriving in Paris, or FRENLANG 22C or OSPPARIS 22P.

OSPPARIS 24. Introduction to French Society. 1 Unit.

Required of Paris program participants. Engagement with French society through language immersion, lectures, projects with French students, encounters with prominent figures, and visits to French political and cultural institutions. May be repeated for credit.

OSPPARIS 26. France: Present and Future. 2 Units.

Students read and discuss lead articles and associated issues in a daily French newspaper, usually *Le Monde*. Additional articles from past newspapers and scholarly essays to provide context.

OSPPARIS 27. Paris and Politics. 5 Units.

Development of Paris as a capital city over the past four centuries, emphasizing how political entities and ideals and sociopolitical challenges have shaped its physical setting and urban culture. Field trips.

OSPPARIS 30. The Avant Garde in France through Literature, Art, and Theater. 4 Units.

Multiple artistic trends and esthetic theories from Baudelaire to the Nouveau Roman, from the Surrealists to Oulipo, from the theater of cruelty to the theater of the absurd, from the Impressionists to Yves Klein. Interdisciplinary approach to reflect on the meaning of avant garde and modernity in general, and on the question of why revolutionary artists in France remained in search of institutional recognition, nonetheless.

OSPPARIS 32. French Politics in Cross-National Perspective. 5 Units.

Key aspects of French politics including the constitutional framework, institutions, political parties and ideology, elections, political cultures, religion and politics, political elites and public policy-making, grass-root citizen participation, decentralization and local politics, and the major issues that structure and inform public debate, including attitudes and policies vis-à-vis the US.

OSPPARIS 34. Franco-American Encounters: Paris-New York in the 20th Century. 4 Units.

Double vision of American artists and intellectuals of Paris, as well as their French counterparts of New York, throughout the 20th century. Exploration of Franco-American relations through two very problematic itineraries. Superposing the two will create a rich and complex image of the interaction between the two cultures. Migration of American artists and intellectuals to Paris in the 1920s and of French artists and intellectuals to New York during the Second World War. Through study of films, texts and images, view the two cities through eyes of immigrants, both temporary and permanent. Major figures such as Hemingway, Josephine Baker, and Louis-Ferdinand Céline.

OSPPARIS 36. French Writing Workshop. 3 Units.

Offered upon request for students who have completed an Advanced French course. Focus on French writing style, enabling students to understand and master the subtleties of French writing.

OSPPARIS 40P. Introductory Electronics. 5 Units.

Electrical quantities and their measurement, including operation of the oscilloscope. Function of electronic components including resistor, capacitor, and inductor. Analog circuits including the operational amplifier and tuned circuits. Digital logic circuits and their functions. Lab assignments. Prerequisite: PHYSICS 43.

OSPPARIS 41. EAP: Perspective, Volume, and Design. 2 Units.

Mastering the techniques of spatial representation and developing a good visualization of volume. Offered by a major studio arts school in Paris, the "Ecole d'Arts Plastiques" (EAP). Preference for Art Practice, Art History, Product Design, Architecture or STS majors or minors with good language skills. In French. May be repeated for credit.

OSPPARIS 41E. EAP: Sculpture. 2 Units.

Control of volume through use of materials such as clay or plaster in order to master three dimensioned representations. Offered by a major studio arts school in Paris, the "Ecole d'Arts Plastiques" (EAP). Preference for Art Practice, Art History, Product Design, Architecture or STS majors or minors with good language skills. In French. May be repeated for credit.

OSPPARIS 42. EAP: Drawing with Live Models. 2 Units.

Solid foundation in drawing; concepts of proportions, composition and analysis through observation. Perception of space, movement and forms. Techniques include: graphite, charcoal, chalk, pastel, watercolor, monotype, markers. Offered by a major studio arts school in Paris, the "Ecole d'Arts Plastiques" (EAP). Preference for Art Practice, Art History, Product Design, Architecture or STS majors or minors with good language skills. In French. May be repeated for credit.

OSPPARIS 43. EAP: Painting and Use of Color. 2 Units.

Different painting techniques for pictorial representation through various themes supporting the development of creativity. Offered by a major studio arts school in Paris, the "Ecole d'Arts Plastiques" (EAP). Preference for Art Practice, Art History, Product Design, Architecture or STS majors or minors with good language skills. In French. May be repeated for credit.

OSPPARIS 44. EAP: Analytical Drawing and Graphic Art. 2 Units.

Focus on observation of a model to be copied. Analysis of one aspect of a general structure while using various materials and techniques in a limited amount of time. Offered by a major studio arts school in Paris, the "Ecole d'Arts Plastiques" (EAP). Preference for Art Practice, Art History, Product Design, Architecture or STS majors or minors with good language skills. In French. May be repeated for credit.

OSPPARIS 44E. EAP: Computer Art. 2 Units.

Learn and develop efficient technique of modern graphic design. Offered by a major studio arts school in Paris, the "Ecole d'Arts Plastiques" (EAP). Preference for Art Practice, Art History, Product Design, Architecture or STS majors or minors with good language skills. In French. May be repeated for credit.

OSPPARIS 50M. Introductory Science of Materials. 4 Units.

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

OSPPARIS 54. The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France. 4 Units.

Synergy between artists, their workshops, patrons, models and the public in 19th and 20th century France. Weekly sessions in museums, artists' studios, and special venues within and around Paris, attempting to understand the world of the artist, and how, in many cases, this world became not only a place of refuge, but a metaphor of the artistic creation itself.

OSPPARIS 60. Representations of Women in Christian Art: Boldness and Virtue. 4 Units.

Representation of women as biblical heroes and saints in Christian art. Codes of iconography and the attributes of women saints from the Renaissance to the 19th century; underlying social and moral force of these women figures throughout history. Class sessions in Paris museums.

OSPPARIS 61A. SAP: Overview of Modern French Art. 1 Unit.

One-week intensive course for Stanford Paris Program students who want to explore or enhance their knowledge of French art, including art of the 19th-20th century and the contemporary art scene. Held after the end of Spring Quarter, in-class sessions offered each morning with special visits and case studies each afternoon, including private visits to the Centre Pompidou and other major art galleries in Paris. Prerequisite: enrollment in a BOSP Paris art course during autumn, winter or spring quarter.

OSPPARIS 61B. SAP: Overview of Studio Art. 1 Unit.

One-week intensive course intended for Stanford in Paris students who want to explore or enhance their knowledge of studio art. Each day of the week is devoted to a different aspect of artistic expression including painting, drawing with live model, perspective, graphic and computer art. Held after the end of Spring Quarter. French and International art students also enroll in this course. Prerequisite: enrollment in a BOSP Paris art course during autumn, winter or spring quarter.

OSPPARIS 61C. SAP: Overview of Computer Art. 1 Unit.

One-week intensive course intended for Stanford in Paris students who want to explore or enhance their knowledge of computer art. Each day of the week is devoted to a different aspect of artistic expression, using software such as Photoshop and Blender, to explore techniques of colorisation, 3D animation, shading, lighting, etc. Held after the end of Spring Quarter. Prerequisite: enrollment in a BOSP Paris art course during autumn, winter or spring quarter.

OSPPARIS 72. The Ceilings of Paris. 4 Units.

Seventeenth century transformation of the ceilings of Paris, religious, private and public. Itinerary of this transformation from artists' quest; initial drawings to their finished work. In conjunction with an exhibition in the Louvre on this topic, study the original drawings as well as the venues in and around Paris. Sites vary from the most illustrious (Versailles) to the lesser known (Hocir;tel Lauzun). Reflection on the changing religious, social and political aspirations as represented in these new artistic forms.

OSPPARIS 79. Film and Immigration in Contemporary French Cinema. 3 Units.

Current debates in France regarding immigration, national identity, and the integration of immigrants and their descendants, notably from the former colonies (Maghreb, Africa, Vietnam), as reflected in the political sphere and in cinema from the 1990's to the present. Visual and discursive rhetorical strategies used in films and other media to represent ethnic, cultural, and religious minorities, discrimination, inter-racial marriages, or women rights. Representation of space and the movement between physical and symbolic spaces and the diverse groups that inhabit in or transit through these spaces. Discussions with French film directors and critics; visit to the Cinéacutemgrave;que francceuil;aise and the Citeacutemgrave; nationale de l'histoire de l'Immigration.

OSPPARIS 81. France During the Second World War: Between History and Memory. 5 Units.

French politics and society from the causes of the collapse of the French Third Republic and the emergence of the French State at Vichy. The political and cultural measures of this regime in the shadow of Nazi Germany. Anti-Jewish laws and action; deportations by Vichy, the Germans, the French Fascists, and reactions to the fate of the Jews. Visions of the Resistance, the combat for liberation, and WW II in the collective memory of France.

OSPPARIS 82. Independent Studies. 2-3 Units.

Topics in French Literature and Culture: Possible topics include: French Renaissance Literature (Rabelais, Montaigne); American Writers in Paris in the 20th century; images and Realities of Islam in Contemporary France; Women and Politics.

OSPPARIS 91. Globalization and Its Effect on France and the European Union. 5 Units.

Economic and political impact of globalization on France and the EU and influence of France and the EU on the process of globalization. Issues of sovereignty and national identity for France; protection from versus integration into the network of globalization.

OSPPARIS 92. Building Paris: Its History, Architecture, and Urban Design. 4 Units.

The development of Parisian building and architecture from the 17th century to the present. Interaction of tradition and innovation in its transformation and its historical, political, and cultural underpinnings. Visits and case studies throughout Paris illustrate the formation of the city landscape and its culture.

OSPPARIS 103A. French Lecture Series 1. 1 Unit.

May be repeated for credit.

OSPPARIS 104A. French Lecture Series 2. 1 Unit.

May be repeated for credit.

OSPPARIS 105A. French Lecture Series 3. 1 Unit.

May be repeated for credit.

OSPPARIS 122X. Challenges of Integration in the European Union. 4-5 Units.

European integration is now an economic, social, and political reality. This integration has a history of mutation and a transformation of its very foundation. Topics: the evolution of welfare states, elites, political parties, and systems in Europe; lobbies, trade unions, voluntary associations, social movements, popular protest, citizenship, democracy.

OSPPARIS 124P. Advanced French I. 5 Units.

Complexities of French grammar and precise use of syntactic structures. Introduction to French essay-writing. Intensive Language course is included. Intensive component required of all Paris students; Advanced French I is optional. Prerequisite: FRENLANG 23C or OSPPARIS 23P or equivalent placement.

OSPPARIS 124X. Building the European Economy: Economic Policies and Challenges Ahead. 5 Units.

Issues and challenges of European economic construction. The European Economic Union at the end of the 50s; European industrial, agricultural, social, and monetary economic policies. Topics: wider definitions of Europe, its relations with industrial and developing countries, and its challenges in confronting global economic crises.

OSPPARIS 125P. Advanced French II. 5 Units.

Prerequisite: FRENLANG 23C, or OSPPARIS 23P or equivalent placement.

OSPPARIS 153X. Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time. 5 Units.

Should health systems be organized or left to the free market? What is the role of the state in the delivery of health care? The evolution of the health profession, health policy, and reform in France and the U.S.; measures restraining professional autonomy such as prescription guidelines in the French Medical Convention. Is the solution to the increase of health expenditures and reduced access to health care the end of autonomy for the medical profession?.

OSPPARIS 180. Paris Special Topics. 1-6 Unit.

May be repeated for credit.

OSPPARIS 186F. Contemporary African Literature in French. 4 Units.

Focus is on African writers and those of the diaspora, bound together by a common history of slave trade, bondage, colonization, and racism. Their works belong to the past, seeking to save an oral heritage of proverbs, story tales, and epics, but they are also contemporary.

OSPPARIS 195C. Paris University: Health and Science 1. 1-6 Unit.

May be repeated for credit.

OSPPARIS 195D. Paris University: Health and Science 2. 1-6 Unit.

May be repeated for credit.

OSPPARIS 196C. Paris University: Humanities 1. 1-6 Unit.

May be repeated for credit.

OSPPARIS 196D. Paris University: Humanities 2. 1-6 Unit.

May be repeated for credit.

OSPPARIS 196E. Paris University: Humanities 3. 1-6 Unit.

May be repeated for credit.

OSPPARIS 197C. Paris University: Social Science 1. 1-6 Unit.

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OSPPARIS 197D. Paris University: Social Science 2. 1-6 Unit.

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OSPPARIS 198A. International Design and Construction Project. 1-6 Unit.

Working as part of a French team of designers and engineers, invent a new product and present it to a jury of professors from French Institutes. While engineers insure the product functions and designers insure ease of use, Stanford students additionally help assess whether product will be used locally or globally. Winter and Spring enrollment required.

OSPPARIS 198C. Paris University: Engineering 1. 1-6 Unit.

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OSPPARIS 198D. Paris University: Engineering 2. 1-6 Unit.

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OSPPARIS 199A. Directed Reading A. 1-6 Unit.

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OSPPARIS 199B. Directed Reading B. 1-6 Unit.

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OSPPARIS 199C. Directed Reading: C. 1-6 Unit.

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Overseas Studies in Santiago Courses

OSPSANTG 12S. Accelerated Second-Year Spanish, Part I: Chilean Emphasis. 5 Units.

Intensive sequence integrating language, culture, and sociopolitics of Chile. Emphasis is on achieving advanced proficiency in oral and written discourse including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: one year of college Spanish, or 11 or 21B if taken more than two quarters prior to arriving in Santiago.

OSPSANTG 13S. Accelerated Second-Year Spanish, Part II: Chilean Emphasis. 5 Units.

Intensive sequence integrating language, culture, and sociopolitics of Chile. Emphasis is on achieving advanced proficiency in oral and written discourse including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: 11 or 21B within two quarters of arriving in Santiago, or 12 or 22B.

OSPSANTG 14. Women Writers of Latin America in the 20th Century. 4-5 Units.

Key figures in poetry, narrative fiction, theater, and testimonio, such as Mistral, Garro, Lispector, Poniatowska, Valenzuela, Elit and Menchuaacute;. Close reading technique. Issues raised in literary texts that reflect the evolution of the condition of women in Latin America during the period. Topics include gender differences and relationships, tradition versus transgression, relationship between changes in the status of women and other egalitarian transformations, and women writers and the configuration of literary canons.

OSPSANTG 29. Sustainable Cities: Comparative Transportation Systems in Latin America. 4-5 Units.

Energy and environmental challenges resulting from the growing size and complexity in Latin American cities. Key issues: way in which public authorities deal with the dynamics of urban growth and complexity; related environmental and energy issues, particularly related to different public transportation models. Systemic approach as seen in Curitiba, Bogota, Santiago, and Medellin. Analysis centering on different approaches used to tackle these related issues; different institutional strategies.

OSPSANTG 30. Short Latin American Fiction of the 20th Century. 4-5 Units.

Introduction to short narrative fiction produced in Latin America during the 20th Century. Key features of the short story genre, as defined by Chekhov in the 19th Century and redefined by Kafka and Borges in the 20th Century. Main literary movements of the period in Latin America, including Regionalism, Social Realism, the Avant-Garde, the Boom of the 1960s and Magical Realism, the Post-Boom, etc. Close reading course with strong emphasis on analysis and discussion of the required texts. Readings placed in the context of the main developments in Latin American history and culture in the period.

OSPSANTG 31. The Chilean Energy System: 30 Years of Market Reforms. 4-5 Units.

Design and evaluation of energy policies in Chile, a developing country facing a growing public concern for energy and environmental issues. Market reforms pioneered by Chile in the 1980s and subsequently followed in other Latin American countries. Analysis of reforms in three parts: 1) through questions on how to develop and power system, 2) by looking at the reforms themselves and their implementation, and 3) by reviewing the local and global environmental costs associated with electric power generation.

OSPSANTG 32. Global Work. 4 Units.

History and challenges of global work as well as on the technologies that support it. Topics include strategic reasons for distributing work, challenges associated with geographic distance, time zone differences, language and cultural differences, and the implications of using various collaboration technologies to work together across national boundaries. Examination of group dynamics, interpersonal relationships, how to structure distributed work, how to work more effectively as a global team member, and how to lead more effectively in these situations. Guest speakers from and/or visits to international firms located in and around Santiago for discussions about experiences in managing and working on global teams.

OSPSANTG 33. Spanish Language Tutorial. 2 Units.

Prerequisite: two years of college Spanish or equivalent placement. May be repeated for credit.

OSPSANTG 34. Independent Study Topics. 5 Units.

Range of topics related to history, economics and sociology. Historical projects examining politics of inequality in Chile over time; micro-level evidence evaluating plausibility of either economic resource curse or political resource curse. Other possible topics include Politics of Globalization, International Political Economy, Comparative Political Behavior, and Political Economy of Taxation, each with a focus on Chile or Latin America. Other areas to be discussed with instructor.

OSPSANTG 35. Independent Study in Organizational Behavior. 2-4 Units.

Focus on one of the following topics based on the interest of the student: 1) Team Dynamics; 2) Technology & Work; 3) Topics in Organizational Behavior. Students conduct review of relevant research on the topic selected and, for 4 units, conduct original empirical research of their own (such as interviews with relevant people).

OSPSANTG 39. INDEPENDENT STUDY OPTIONS. 1-2 Unit.

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OSPSANTG 40. Academic Internship. 2-3 Units.

May be repeated for credit.

OSPSANTG 41. Political Economy: Chile in Comparative Perspective. 5 Units.

Why are some countries rich while others are poor? Why do some countries regularly adopt bad economic policies? What is the impact of political institutions on the policies countries implement? Why do some countries have institutions associated with policies that promote development and human welfare? Examine determinants of economic and political development with a focus on the historical experience of Chile and Latin America more generally. Factors influencing choices in a variety of policy areas including international trade, foreign direct investment, fiscal and monetary policy, education, and social insurance.

OSPSANTG 58. Living Chile: A Land of Extremes. 5 Units.

Physical, ecological, and human geography of Chile. Perceptions of the Chilean territory and technologies of study. Flora, fauna, and human adaptations to regional environments. Guest lectures; field trips; workshops.

OSPSANTG 62. Topics in Chilean History. 4-5 Units.

Independent study topics concerning any aspect of Chilean history such as independence and nation building, social and economic development, ideas and culture, dictatorship and democracy. Research paper based on primary and secondary sources.

OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 Units.

Major themes of 19th-century Latin American history, including independence from Spain, the emergence of nation states, and the development of a new social, political, and economic order.

OSPSANTG 71. Santiago: Urban Planning, Public Policy, and the Built Environment. 4-5 Units.

Santiago's growth and development over time and in comparison to other mega cities in the world; impact of urban highways on the built environment; shopping malls and the development of new urban sub-centers. Topics: brief history of the city, from 1541 to 1940; urban development since 1940; the 1960 Inter-communal Urban Plan; planning and the configuration of modern Santiago; housing policy as an instrument to combat poverty; social housing policy and Santiago's built environment.

OSPSANTG 85. Marine Ecology of Chile and the South Pacific. 5 Units.

Relationships among physical processes in the ocean, biological productivity, and the exploitation of resources by high-trophic-level predators including human beings. Characterization of ecological patterns; identification of processes operating on marine systems. Open ocean ecosystems, intertidal and benthic regions of the world's oceans, and ecological research developed along coastal regions, focusing on Chile's 4,000 km coastline.

OSPSANTG 102S. Composition and Writing Workshop for Students in Santiago. 3-5 Units.

Advanced. Writing as craft and process: brainstorming, planning, outlining, drafting, revising, style, diction, and editing. Non-Spanish majors or minors may choose topics related to their studies. Prerequisite: SPANLANG 13C, 13R, 13S, 23B, or equivalent.

OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century. 5 Units.

Chile's strides towards becoming a developed country have engendered high levels of alienation and disaffection among significant sectors of the population. The roots of this apparent paradox of modernization, focusing on newly emerging actors in the Chilean political scene: Mapuche organizations, women's groups, the environmental movement, and new features of the established ones like trade unions and human rights activists.

OSPSANTG 118X. Artistic Expression in Latin America. 5 Units.

Elite, mass-media, and popular cultural changes in Chile under conditions of economic and political liberalization. The reception of cultural meanings from the center of the world social system (U.S., EU, and Japan), reformulation to respond to local conditions, and export in the shape of cultural artifacts. Innovative elements rooted in the regional and local culture.

OSPSANTG 119X. The Chilean Economy: History, International Relations, and Development Strategies. 5 Units.

The Chilean economy in five stages, taking into account: the international economic position of Chile; internal economic structures closely related to the inherited historical conditions and to the changing international economic position of the country; and the economic strategies prevalent during the period and the concrete development policies conducted by government authorities.

OSPSANTG 129X. Latin America in the International System. 4-5 Units.

Latin America's role in world politics, with emphasis on the history of and models for explaining U.S.-Latin American relations. Latin America's evolving relationship in the international system.

OSPSANTG 130X. The Chilean Economy in Comparative Perspective. 5 Units.

Introduction to the main debates and approaches developed to understand and analyze the economies of Latin America. Recent processes of transition to market economies. Common characteristics among countries of the region; the differences and special traits of individual countries. Historical, analytical, and empirical perspectives on topics at the center of controversies and specific policy problems over several decades. Recommended: ECON 1, 51, and 52.

Pathology Courses

PATH 101. Cancer Biology. 4 Units.

Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor. Same as: CBIO 101

PATH 103Q. Lymphocyte Migration. 1 Unit.

Preference to sophomores. Lymphocytes migrate from blood vessels into tissues to participate in immune surveillance and the development of inflammation. The lymphocyte and blood vessel endothelia molecules that control lymphocyte migration, and are implicated in the development of human diseases such as asthma, type 1 diabetes, and multiple sclerosis are discussed.

PATH 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

PATH 204SI. Medical Etymology. 1 Unit.

A survey of medical etymology and terminology that parallels preclinical medical education. Topics focus on Greek and Latin roots and their appearances in the medical lexicon.

PATH 210. Stem Cells in Development and Disease. 1-2 Unit.

Molecular and cellular mechanisms underlying the basic self-renewal and differentiation properties of stem cells in multiple tissues and organisms. How abnormal stem cell behavior may contribute to diseases such as cancer. How to manipulate stem cell behavior in vitro or in vivo for therapeutic purposes. Classical papers and recent literatures in the field of stem cell biology. Open to graduate, medical, and advanced undergraduate students. Prerequisite: consent of instructor.

PATH 213. Gross Autopsy Pathology Laboratory. 2-3 Units.

Examine/discuss unfixed dissected organs from current autopsies and correlate morphologic findings with the clinical history. Students view postmortem examinations and may participate (in a small group) in one postmortem examination with the assistance of residents and staff, and present the case to the class. Class scheduling is flexible. Additional unit for participation in a postmortem examination. Class may not be repeated. Prerequisite: HHD220.

PATH 218. Computational Analysis of Biological Information: Introduction to Python for Biologists. 2 Units.

Computational tools for processing, interpretation, communication, and archiving of biological information. Emphasis is on sequence and digital microscopy/image analysis. Intended for biological and clinical trainees without substantial programming experience.

Same as: GENE 218, MI 218

PATH 233. The Biology of Small Modulatory RNAs. 2 Units.

Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal.

Same as: GENE 233, MI 233

PATH 234. Fundamentals of RNA Biology. 2 Units.

For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students.

Same as: GENE 234, MI 234

PATH 240. Clinical Studies in Pathology I. 3-9 Units.

A broad exposure to the practice of pathology in an academic medical center. Students are assigned a faculty mentor and work closely with pathology residents, fellows and faculty. Two months are spent in surgical pathology where students help examine surgical resection specimens and biopsies and participate in making a final diagnosis. One month is spent in autopsy pathology where students perform autopsy prosecutions and formulate final anatomic diagnoses under the supervision of faculty. This course must be combined with Clinical Studies in Pathology II, and two additional quarters of PATH 399, Directed Research, to fulfill a 12 month Post-Sophomore year Fellowship in Pathology. Prerequisite: MD candidate; instructor consent.

PATH 241. Clinical Studies in Pathology II. 3-9 Units.

An in-depth exposure to the practice of pathology for students who have completed Clinical Studies in Pathology I. Students are assigned a faculty mentor and work closely with pathology residents, fellows and faculty. Two months are spent in surgical pathology where students help examine surgical resection specimens and biopsies and participate in making a final diagnosis. One month is spent in sub-specialty areas of pathology that include dermatopathology, neuropathology, renal pathology, lymph node pathology or cytology. This course must be combined with Clinical Studies in Pathology I and two additional quarters of PATH 399, Directed Research, to fulfill a 12-month Post-Sophomore year Fellowship in Pathology. Prerequisite: consent of instructor and successful completion of Clinical Studies in Pathology I (PATH 240).

PATH 280. Early Clinical Experience in Pathology. 1-2 Unit.

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

PATH 290. Pediatric Nonmalignant Hematology and Stem Cell Biology. 2 Units.

Pediatric hematologic disorders provide an important paradigm to study other developmental systems. Subjects covered include hematopoiesis, basic stem cell biology, endothelial cell development, alternative models to study nonmalignant hematology and stem cell biology (zebrafish and drosophila), defects in white cell function, basic research in stem cell transplantation, state of the art methods in nonmalignant hematology and stem cell biology (genomics, proteomics, and gene therapy), and bioinformatics. The course is also open to graduate students and junior and senior undergraduate students who are pre-med.

PATH 299. Directed Reading in Pathology. 1-18 Unit.

Prerequisite: consent of instructor.

PATH 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

PATH 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Opportunities at the molecular, cellular, and clinicopathologic levels.

Prerequisite: consent of instructor.

Pediatrics Courses

PEDS 50N. Translating Science to Disease Treatment. 3 Units.

Investigates how scientific research informs how physicians take care of patients and how clinical research informs how scientific experiments are conducted. Topics include how these two processes have improved health and have resulted in innovation and scientific progress; specific human disease areas in allergy and immunology that affect all ages of patients globally, including food allergy; scientific concepts of research that helped in discovery of novel diagnostics and treatment of disease; ethical roles of physicians and scientists in conducting translational research in human disease.

PEDS 51N. How Discovery and Innovation Have Transformed Medicine. 3 Units.

Topics include the science behind vaccines and why some refuse vaccination, how antibiotics are discovered and what can be done about increasing resistance to antibiotics, stem cells and their potential use, the role of genomics in modern medicine, development of drugs to treat HIV/AIDS, discovery of surfactant, personal responsibility in health and wellness and how technology relates to the "cost conundrum" of healthcare in the U.S. Appreciate important connections between science, discovery and human health and think critically about the potential impact of new discoveries on life and death, and their ethical and spiritual boundaries.

PEDS 60Q. Famine in the Modern World. 3 Units.

This seminar is devoted to an investigation of famine uest; mass starvation uest; which throughout recorded history has been more lethal than war. Students will assess the relative weight of natural, economic, and political factors as causes of famine over the past two centuries. Students will acquire a background into the central facts about and controversies surrounding the major famines of modern history. Case studies include the Great Irish Famine of the 1840s, the Bengal famine of 1943-44, the Soviet famines of 1921-22 and 1932-33, the Great Famine in China in 1959-61, and the famines in Ethiopia and Somalia since the 1970s.

PEDS 65N. Understanding Children's Health Disparities. 3 Units.

The social and economic factors that affect children and their health status. The principal sources of disparities in the health of children in the U.S. are not biologic, but social and economic. Topics include ethnic, cultural, and behavioral factors that affect children's health, both directly and indirectly; lack of health insurance; and current proposals for health care reform, focusing specifically on how they will impact existing health disparities among children.

PEDS 65Q. Understanding Children's Health Disparities. 3 Units.

The social and economic factors that affect children and their health status. The principal sources of disparities in the health of children in the U.S. are not biologic, but social and economic. Topics include ethnic, cultural, and behavioral factors that affect children's health, both directly and indirectly; lack of health insurance; and current proposals for health care reform, focusing specifically on how they will impact existing health disparities among children. Includes instruction addressing written assignments and required oral presentations.

PEDS 105. Health Promotion and the Campus Culture. 4 Units.

Multidisciplinary perspectives of public health and health psychology. The prevalence of health risk behaviors on the contemporary college campus and the challenges of risk reduction. Students apply theoretical frameworks to peer health promotion campus projects. Limited enrollment. Prerequisite: consent of instructor following first meeting.

Same as: PEDS 215

PEDS 106. Pursuit of Happiness and Health. 3 Units.

Evidence-based research findings, theoretical concepts and applied experiences related to emotional well-being, and physical and mental health. Topics include basic cognitive neuroscience and psychological research in pro-social emotions, such as gratitude, compassion, forgiveness and mindfulness practice. Course offers lecture, readings, and applied practices that enhance mental health, resiliency and well-being. Emphasis on issues relevant to high-achieving young adults.

Same as: PEDS 206

PEDS 116. Alcohol Issues and the Campus Culture. 4 Units.

Multidisciplinary perspectives of public health, health psychology, and sociology. The prevalence and scope of alcohol-related problems; challenges of risk reduction and intervention strategies. Students apply theoretical frameworks to alcohol-related research topics and projects. Limited enrollment. Prerequisite: consent of instructor following first meeting.

PEDS 130. Pediatrics Journal Club. 1 Unit.

Open to MD, graduate, and undergraduate students. Each session focuses on a current article in pediatric medicine. Discussions led by faculty experts in the area covered that session. Topics may range widely, depending on the available literature and students' interests. Students are expected to review the chosen article before class and participate in discussion. Discussion includes methodology and statistical analysis of each study and its relevance to pediatric practice.

Same as: PEDS 230

PEDS 150. Social and Environmental Determinants of Health. 3 Units.

How race/ethnicity and SES contribute to health disparities, how vulnerable populations are uniquely at health risk, and how the built environment relates to health and wellness. Topics include: gender, age, race/ethnicity, language, education, individual SES and neighborhood SES as related to health; individual and structural race bias; health needs of vulnerable populations (e.g., the homeless, the incarcerated, immigrant populations, children, and uninsured/underinsured); and environmental forces (e.g., urban design/planning, traffic/car culture, green space, housing, food access/culture, law enforcement, and media).

Same as: PEDS 250

PEDS 159A. Addressing Child Health Disparities through Community-based Service Learning. 2 Units.

First quarter of a three-quarter service-learning practicum providing opportunities to engage in local community-academic projects aimed at reducing child health disparities. Stanford pediatric residents provide mentorship and guidance during the development and implementation of a community service and/or research project. Topics include principles of community engagement, community-engaged research methodologies, and practical aspects of working with community partners. Interest in health disparities, community engagement, community-based participatory research, reflective learning, and civic responsibility desired. Application required.

Same as: PEDS 259A

PEDS 159B. Addressing Child Health Disparities through Community-based Service Learning. 2 Units.

Second quarter of a three-quarter service-learning practicum providing opportunities to engage in local community-academic projects aimed at reducing child health disparities. Stanford pediatric residents provide mentorship and guidance during the development and implementation of a community service and/or research project. Topics include principles of community engagement, community-engaged research methodologies, and practical aspects of working with community partners. Interest in health disparities, community engagement, community-based participatory research, reflective learning, and civic responsibility desired. Prerequisite: PEDS 159A/259A.

Same as: PEDS 259B

PEDS 159C. Addressing Child Health Disparities through Community-based Service Learning. 2 Units.

Third quarter of a three-quarter service-learning practicum providing opportunities to engage in local community-academic projects aimed at reducing child health disparities. Stanford pediatric residents provide mentorship and guidance during the development and implementation of a community service and/or research project. Topics include principles of community engagement, community-engaged research methodologies, and practical aspects of working with community partners. Interest in health disparities, community engagement, community-based participatory research, reflective learning, and civic responsibility desired. Prerequisite: PEDS 159B/259B.

Same as: PEDS 259C

PEDS 199. Undergraduate Directed Reading/Research. 1-18 Unit.

Prerequisite: consent of instructor.

PEDS 202A. Practical Applications for Qualitative Data Analysis. 3 Units.

(Same as MED 200A) First quarter of a two-quarter course. Gain experience analyzing qualitative data using qualitative analysis software (i.e. Nvivo, Dedoose). Conduct analysis using your own or existing data sources. Explore multiple qualitative data analysis topics through class lectures, foundational readings and hands-on learning. Core topics include: grounded theory, qualitative data analysis approaches, software-based analysis, cleaning and coding of data, and interpreting data. Note: Preference will be given to medical students and undergraduate students that have successfully completed an introductory qualitative methods course. Enrollment in subsequent PEDS 202B required.

PEDS 202B. Practical Applications for Qualitative Data Analysis. 3 Units.

(Same as MED 200B) Second quarter of a two-quarter course provides hands-on experience summarizing qualitative data and describing findings for dissemination. Final course product will be a draft manuscript for submission with students listed as co-authors. Core topics include: identifying themes and representative quotes, community-engaged dissemination, abstract submission, posters, oral presentations, manuscript writing, and journal selection. Prerequisite: Successful completion of PEDS 202A.

PEDS 202C. Qualitative Research Methods and Study Design. 3 Units.

Introduction to qualitative research methods and study design. Students gain practical experience designing a qualitative study. Explore qualitative methods through class lectures, foundational readings and hands-on learning. Core topics include: theoretical frameworks, research questions, methodological approaches (i.e. interviews, focus groups, participant observation, photovoice), data collection, sampling, reliability and validity, and IRB protocols. This course is designed for students needing support to plan and design an independent research project (i.e. Med Scholars, Honors Thesis). Prerequisite: Consent from instructor for undergraduates.

PEDS 203SI. Flu Crew: Advanced Vaccinator Education. 1 Unit.

Students receive clinically relevant advanced training as preparation for Flu Crew clinic shifts both on- and off-campus during Autumn Quarter. Course includes informational sessions, speakers, and hands-on workshops focusing on the most clinically relevant influenza knowledge and skills. Topics covered include influenza epidemiology, misconceptions, patient education, vaccine selection, vaccinator Spanish, and advanced vaccination technique. Students required to attend three clinics.

PEDS 206. Pursuit of Happiness and Health. 3 Units.

Evidence-based research findings, theoretical concepts and applied experiences related to emotional well-being, and physical and mental health. Topics include basic cognitive neuroscience and psychological research in pro-social emotions, such as gratitude, compassion, forgiveness and mindfulness practice. Course offers lecture, readings, and applied practices that enhance mental health, resiliency and well-being. Emphasis on issues relevant to high-achieving young adults.

Same as: PEDS 106

PEDS 211. Medical-Legal Issues in Children's Health. 2-4 Units.

(Same as LAW 643) Explores the link between poverty and children's health and how the medical and legal fields can work together to improve health outcomes for low income children. Weekly class meetings covering medical legal issues such as asthma immigration, health insurance; intake interviews with patient families and analysis of their medical legal issues; group project focused on a medical legal policy issue; final paper cowritten by law and medical students. May be taken for 2 units (weekly 2.5 hour seminar meetings only), 3 units (participation in either intake interviews or policy work) or 4 units (full participation in all course components). Prerequisite: instructor consent. Preference to students committed to full participation.

PEDS 212. Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations. 3 Units.

An emerging area of inquiry. Topics include: global migration trends, health Issues/aspects of migration, healthcare and the needs of immigrants in the US, and migrants as healthcare providers: a new area of inquiry in the US. Class is structured to include: lectures lead by the instructor and possible guest speakers; seminar, discussion and case study sessions led by students.

Same as: HUMBIO 122M

PEDS 213. Critical Issues in Child Health. 2 Units.

Develop an integrated understanding of the physical and psychosocial health factors from birth through adolescence that result in a healthy child. Uses a multidisciplinary perspective to review the basic physiology and pathophysiology associated with common childhood illnesses and integratenthis with socio-environmental factors that influence child health. Students gain perspective on child health challenges around the world and develop a broad understanding of how the cultural context influences and defines the individual living therein.

PEDS 214. Introduction to Pediatrics Lecture Series. 1 Unit.

Introduction to the various aspects of pediatrics, directed at pre-clinical MD students, undergraduates, or graduate students. Course composed of interactive lectures conducted by pediatric faculty on subjects ranging from normal development to topics in different pediatric subspecialties. current issues in the field, and opportunities for students considering this specialty. Speakers also touch on their career paths and choices and are available to answer questions about their areas of interest. By special arrangement students may have the opportunity to shadow general pediatricians or pediatric specialists. Intended to stimulate interest in pediatrics and to inform students about the breadth of the field.

PEDS 215. Health Promotion and the Campus Culture. 4 Units.

Multidisciplinary perspectives of public health and health psychology. The prevalence of health risk behaviors on the contemporary college campus and the challenges of risk reduction. Students apply theoretical frameworks to peer health promotion campus projects. Limited enrollment. Prerequisite: consent of instructor following first meeting.

Same as: PEDS 105

PEDS 222. Beyond Health Care: Seeking Health in Society. 3 Units.

Available evidence at the national and cross-country level linking social welfare interventions and health outcomes. If and how non-health programs and policies could have an impact on positive health outcomes. Evaluation of social programs and policies that buffer the negative health impact of economic instability and unemployment among adult workers and their children. Examination of safety nets, including public health insurance, income maintenance programs, and disability insurance. Prerequisites: HUMBIO 4B or equivalent, and background in research methods and statistics.

Same as: HUMBIO 122

PEDS 223. Human Rights and Global Health. 3 Units.

Open to medical students, graduate students, and advanced undergraduates. Examines the newly emerging field of human rights and global health, beginning with the essential background into the field of human rights, and the recent emergence of health as a human right. Emphasis is on the pioneering work of Dr. Paul Farmer and Partners in Health and the challenge he and his organization have posed to the conventional wisdom about approaches to combating poor health and disease worldwide. Topics include the "big three" infectious diseases -- tuberculosis, malaria, and HIV/AIDS -- as well as emerging infectious diseases, clean water and sanitation, and malnutrition and famine.

PEDS 224. Genocide and Humanitarian Intervention. 3 Units.

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan. Same as: HISTORY 224C, HISTORY 324C, JEWISHST 284C, JEWISHST 384C

PEDS 225. Humanitarian Aid and Politics. 3 Units.

Open to medical students, graduate students, and undergraduate students. Examines the moral dilemmas and political realities that complicate the delivery of humanitarian aid, especially when undertaken by the United Nations and non-governmental organizations (NGOs). Emphasis is on what humanitarians call "complex humanitarian emergencies": crises often characterized by famine and/or epidemic disease and typically the result of war and/or civil war. Provides background into the history of humanitarian aid, though focus is on the post-Cold War era, up to the recent crises in Libya and Syria.

PEDS 226. Famine in the Modern World. 3 Units.

Open to medical students, graduate students, and undergraduate students. Examines the major famines of modern history, the controversies surrounding them, and the reasons that famine persists in our increasingly globalized world. Focus is on the relative importance of natural, economic, and political factors as causes of famine in the modern world. Case studies include the Great Irish Famine of the 1840s; the Bengal famine of 1943-44; the Soviet famines of 1921-22 and 1932-33; China's Great Famine of 1959-61; the Ethiopian famines of the 1970s and 80s, and the Somalia famines of the 1990s and of 2011.

Same as: HISTORY 226E, HISTORY 326E

PEDS 230. Pediatrics Journal Club. 1 Unit.

Open to MD, graduate, and undergraduate students. Each session focuses on a current article in pediatric medicine. Discussions led by faculty experts in the area covered that session. Topics may range widely, depending on the available literature and students' interests. Students are expected to review the chosen article before class and participate in discussion. Discussion includes methodology and statistical analysis of each study and its relevance to pediatric practice.

Same as: PEDS 130

PEDS 231. Medicine for Innovators and Entrepreneurs. 3-4 Units.

Interdisciplinary, project-based course in which bioscience, bioinformatics, biodesign, bioengineering students learn concepts and principles to understand human disease and work together to propose solutions to medical problems. Diabetes mellitus is used as a paradigm for understanding human disease. Guest medical school and outside faculty. Field trips to Stanford clinics and biotechnology companies. Prerequisite: college level biology.

Same as: IMMUNOL 231

PEDS 246. Developmental Disabilities: From Biology to Policy. 3 Units.

Fifteen percent of US children have disabilities. While advances in medicine and technology have increased life expectancy for these children, health care delivery, education, and public attitudes have not kept pace. Students in this course will learn the possibilities and limitations of new biomedical treatments of Down syndrome, cerebral palsy, and autism. Students will also evaluate the impact of public policy initiatives, such as the Individuals with Disabilities Education Act and Americans with Disabilities Act on inclusion and participation in society.

Same as: HUMBIO 146D

PEDS 250. Social and Environmental Determinants of Health. 3 Units.

How race/ethnicity and SES contribute to health disparities, how vulnerable populations are uniquely at health risk, and how the built environment relates to health and wellness. Topics include: gender, age, race/ethnicity, language, education, individual SES and neighborhood SES as related to health; individual and structural race bias; health needs of vulnerable populations (e.g., the homeless, the incarcerated, immigrant populations, children, and uninsured/underinsured); and environmental forces (e.g., urban design/planning, traffic/car culture, green space, housing, food access/culture, law enforcement, and media).

Same as: PEDS 150

PEDS 251A. Medical Ethics I. 2 Units.

Required for Scholarly Concentration in Biomedical Ethics and Medical Humanities. The field of bioethics, including theoretical approaches to bioethical problems. Contemporary controversies and clinical cases. Values that arise in different situations and clinical encounters. Issues include: genetics and stem cell research, rationing, ethical issues in care at the end of life, organ transplantation issues.

PEDS 251B. Medical Ethics II. 2 Units.

The integration of ethical theory with applications of theory or conceptual issues in medicine, health care, and the life and social sciences. Topic varies by year. Possible topics include: ethical issues in stem cell research; death and dying; genetics and ethics; concepts of health and disease; the ethics of international research; and ethical implications of new reproductive technology.

PEDS 254. Pediatric Physical Findings Rounds. 1 Unit.

Pediatric patients with specific physical findings and hospitalized at LPCH are identified and introduced to students. Students in small groups examine patients at the bedside to note the physical finding and discuss it within the context of the patient's clinical problem. Emphasis is on basic science discussion to understand the cause of the finding.

PEDS 258. Developing and Defining Strong Community-Academic Partnerships. 2 Units.

Applying the principles of community-based participatory research to medical scholars research projects. Strategies for developing strong, equitable and sustainable community-academic partnerships. Identify and assess proposed faculty mentors and community partners, and establish proposed goals and objectives for med scholars research.

PEDS 259A. Addressing Child Health Disparities through Community-based Service Learning. 2 Units.

First quarter of a three-quarter service-learning practicum providing opportunities to engage in local community-academic projects aimed at reducing child health disparities. Stanford pediatric residents provide mentorship and guidance during the development and implementation of a community service and/or research project. Topics include principles of community engagement, community-engaged research methodologies, and practical aspects of working with community partners. Interest in health disparities, community engagement, community-based participatory research, reflective learning, and civic responsibility desired. Application required.

Same as: PEDS 159A

PEDS 259B. Addressing Child Health Disparities through Community-based Service Learning. 2 Units.

Second quarter of a three-quarter service-learning practicum providing opportunities to engage in local community-academic projects aimed at reducing child health disparities. Stanford pediatric residents provide mentorship and guidance during the development and implementation of a community service and/or research project. Topics include principles of community engagement, community-engaged research methodologies, and practical aspects of working with community partners. Interest in health disparities, community engagement, community-based participatory research, reflective learning, and civic responsibility desired. Prerequisite: PEDS 159A/259A.

Same as: PEDS 159B

PEDS 259C. Addressing Child Health Disparities through Community-based Service Learning. 2 Units.

Third quarter of a three-quarter service-learning practicum providing opportunities to engage in local community-academic projects aimed at reducing child health disparities. Stanford pediatric residents provide mentorship and guidance during the development and implementation of a community service and/or research project. Topics include principles of community engagement, community-engaged research methodologies, and practical aspects of working with community partners. Interest in health disparities, community engagement, community-based participatory research, reflective learning, and civic responsibility desired. Prerequisite: PEDS 159B/259B.

Same as: PEDS 159C

PEDS 280. Early Clinical Experience. 2-4 Units.

Provides students an opportunity to see patients and correlate clinical findings with preclinical coursework. Students spend a half day or a full day in a pediatric subspecialty clinic (e.g., infectious diseases, endocrine, gastroenterology), participate in conferences and accompany attending physicians. Students have directed reading and meet with faculty for one hour per week to discuss their reading.

PEDS 281. Childhood Chronic Illness: Impact on Family Development. 1 Unit.

The Pals Program is a volunteer activity serving Lucile Packard Children's Hospital chronically ill patients and their siblings. Modeled after the Big Brother/Big Sister Program, Pals matches first- and second-year medical students with pediatric patients or their siblings. The patients and/or their siblings enjoy the support and companionship of their Pals, and the medical students learn firsthand about the emotional and social aspects of chronic illness during childhood. Pals meet regularly throughout the year to participate in fun activities such as movies, ball games, museums, and picnics. The activities and personal relationships are overseen by the LPCH Pals social worker. Bimonthly class meetings introduce the students to pediatric chronic diseases such as leukemia, cystic fibrosis and pulmonary hypertension. The class brings in physicians to give the medical perspective as well as patients and families to get their perspective. Prerequisite: approval of the LPCH social worker for Pals.

PEDS 282. Pregnancy, Birth, and Infancy. 3 Units.

Comprehensive clinical experience where pre-clinical medical students follow pregnant women receiving care at Stanford hospitals to attend prenatal visits, delivery, and postnatal visits. Continuity clinic format, combined with didactic lessons and discussion seminars. Students are exposed to clinical activities in a meaningful context, bolstering classroom studies in anatomy, physiology, embryology and human development, and emphasizing social, economic, and personal issues related to medicine. This program spans one quarter, covering topics related to pregnancy, labor and delivery and newborn care. In addition to clinic experiences, students are expected to spend 1-2 hours/week in lectures and to complete a reflection of their experiences in the course. Prerequisite: pre-clinical medical student. Same as: OBGYN 282

PEDS 299. Directed Reading in Pediatrics. 1-18 Unit.

Prerequisite: consent of instructor.

PEDS 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

PEDS 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members.

Philosophy Courses

PHIL 1. Introduction to Philosophy. 5 Units.

Is there one truth or many? Does science tell us everything there is to know? Can our minds be purely physical? Do we have free will? Is faith rational? Should we always be rational? What is the meaning of life? Are there moral truths? What are truth, reality, rationality, and knowledge? How can such questions be answered? Intensive introduction to theories and techniques in philosophy from various contemporary traditions. Students must enroll in lecture AND one of the 4 discussion sections listed.

PHIL 2. Introduction to Moral Philosophy. 5 Units.

A survey of moral philosophy in the Western tradition. What makes right actions right and wrong actions wrong? What is it to have a virtuous rather than a vicious character? What is the basis of these distinctions? Why should we care about morality at all? Our aim is to understand how some of the most influential philosophers (including Aristotle, Kant, and Mill) have addressed these questions, and by so doing, to better formulate our own views. No prior familiarity with philosophy required.

Same as: ETHICSOC 20

PHIL 5N. The Art of Living. 4 Units.

Whether we realize it or not, all of us are forced to make a fundamental choice: by deciding what is most valuable to us, we decide how we are going to live our life. We may opt for a life of reason and knowledge; one of faith and discipline; one of nature and freedom; one of community and altruism; or one of originality and style. We may even choose to live our lives as though they were works of art. In every case, hard work is required: our lives are not just given to us, but need to be made. To live well is, in fact, to practice an art of living. Where, however, do such ideals come from? How do we adopt and defend them? What is required to put them into practice? What do we do when they come into conflict with one another? And what role do great works of art play in all this? "The Art of Living" will explore the various ways in which it is possible to live well and beautifully, what it takes to implement them, and what happens when they come under pressure from inside and out.

PHIL 6N. Pictures and the Imagination. 3 Units.

Paintings, drawings, and photographs often function as pictures or images of the preexisting things they take as subjects. They represent these subjects from specific spatial vantage points in ways that may be more or less definite, more or less detailed, and more or less faithful to what the subjects are actually like. One longs to know how this works: how vision, imagination, and background knowledge come together when we experience a picture as a picture. Certain forms of imagining and remembering involve mental picturing, mental imagery. Sometimes we imagine or remember things in visual terms from a specific spatial vantage point, with the result that we feel brought face to face with the things imagined or remembered, however far away they may actually be. How is the physical picturing that goes on in paintings, drawings, and photographs both like and unlike the mental picturing that goes on when things swim before the mind's eye? What role does mental picturing play in physical picturing? What kinds of artistic value and interest attach to paintings, drawings, and photographs in virtue of what they picture and how they picture it?

PHIL 7Q. What is Truth. 3 Units.

This question can be answered precisely in some important cases. We begin with the language of propositional logic where truth is defined by simple tables. This is already sufficient for description of many important problems and leads to a famous (\$1 000 000) problem $P=NP$. We use Sudoku puzzles for illustration. Close connection between propositional truth and proof is established by the resolution method forming a basis of most automated theorem provers. The language of predicate logic covers much more and illustrates the notion of completeness. Register machines provide connection with computations and lead to a fundamental classification of problems of truth with respect to decidability. The language of arithmetic exhibits a new phenomenon of incompleteness that changed significant part of philosophy in 20-th century.

PHIL 8N. Free Will and Responsibility. 4 Units.

In what sense are we, or might we be free agents? Is our freedom compatible with our being fully a part of the same natural, causal order that includes other physical and biological systems? What assumptions about freedom do we make when we hold people accountable morally and/or legally? When we hold people accountable, and so responsible, can we also see them as part of the natural, causal order? Or is there a deep incompatibility between these two ways of understanding ourselves? What assumptions about our freedom do we make when we deliberate about what to do? Are these assumptions in conflict with seeing ourselves as part of the natural, causal order? We will explore these and related questions primarily by way of careful study of recent and contemporary philosophical research on these matters.

PHIL 9N. Philosophical Classics of the 20th Century. 4 Units.

Last century's best and most influential philosophical writings. Topics include ethics (what is the nature of right and wrong?), language (how do meaning, reference, and truth arise in the natural world?), science (can science claim objectively accurate descriptions of reality?), existence (are there things that don't exist?), and the mind (could robots ever be conscious?). Authors include Bertrand Russell, Ludwig Wittgenstein, Rudolf Carnap, Willard Quine, Thomas Kuhn, John Rawls, and Saul Kripke. The lay of the land in contemporary philosophy.

PHIL 10N. Bounded Rationality. 3 Units.

This course takes a philosophical approach to a cutting edge debate in psychology. Readings include texts in contemporary cognitive science as well as in philosophy of mind.

PHIL 11N. Skepticism. 3 Units.

Preference to freshmen. Historical and contemporary philosophical perspectives on the limits of human knowledge of a mind-independent world and causal laws of nature. The nature and possibility of a priori knowledge. Skepticism regarding religious beliefs.

PHIL 12N. Paradoxes. 3 Units.

In this course, we will use paradoxes like these as foci for discussions of some of the deepest issues in philosophy and mathematics. No prior knowledge of logic, philosophy or mathematics will be assumed and there will be minimal use of symbolism. Students will be expected to complete problem sheets, and to write a very short final paper. The seminars will be discussion-based.

PHIL 14N. Belief and the Will. 3 Units.

Preference to freshmen. Is there anything wrong with believing something without evidence? Is it possible? The nature and ethics of belief, and belief's relation to evidence and truth. How much control do believers have over their belief?

PHIL 15N. Freedom, Community, and Morality. 3 Units.

Preference to freshmen. Does the freedom of the individual conflict with the demands of human community and morality? Or, as some philosophers have maintained, does the freedom of the individual find its highest expression in a moral community of other human beings? Readings include Camus, Mill, Rousseau, and Kant.

PHIL 20S. Introduction to Moral Philosophy. 3 Units.

What makes right actions right and wrong actions wrong? Must right actions promote some further good? What is the role of consequences in the evaluation of actions as right or good? Focus is on traditional attempts to account for what determines which actions are right, what is worth promoting, and what kind of person one ought to be. Readings from primarily historical figures such as Aristotle, Hume, Kant, Mill, and others.

PHIL 23A. The Cognitive Science of Mathematics. 2 Units.

Mathematics has two features which, taken together, are quite puzzling: (i) its objects (numbers, functions, derivatives, manifolds, and the like) are very unlike everyday concrete material objects, yet (ii) it seems to be the source of our most certain knowledge. In this course, we will examine the role in which findings from empirical theories of mathematical cognition can help address and possibly dissolve this puzzle. The course will be broken up into three units: Philosophical Foundations, Numerical Cognition, and Metaphor and Higher Mathematical Thought.

PHIL 23B. Truth and Paradox. 2 Units.

Philosophical investigation of the concept of truth is often divided along two dimensions: investigation of the nature of truth and investigation of the semantics of truth claims. This tutorial will focus on the second kind of concern. One key impetus for a philosophical interest in the semantics and definability of truth is the challenge posed by semantic paradoxes such as the Liar paradox and Curry's paradox. Despite each having the initial appearance of a parlor trick, philosophers and logicians have come to appreciate the deep implications of these paradoxes. The main goal of this tutorial is to gain an appreciation of the philosophical issues -shy; both with respect to formal and natural languages shy; which arise from consideration of the paradoxes. To this end, we will study some of the classic contributions to this area including Tarski's famous result that, in an important sense, the semantic paradoxes render truth undefinable, and Kripke's much later attempt to provide a definition of truth in the face of Tarski's limitative result. Further topics include the debate between paracomplete and paraconsistent solutions to the semantic paradoxes (notably defended by, respectively, Field and Priest); the relationship between deflationism about truth and the paradoxes; and the notion of revenge problems; (roughly, the claim that any solution to the paradoxes can be used to construct a further paradox). The tutorial will avoid excessive technical discussions, but will aim to engender appreciation for some philosophically interesting technical points and will assume a logic background of PHIL150 level.

PHIL 23C. Counterfactuals. 2 Units.

Reasoning about counterfactual conditionals plays an important role in contemporary philosophy. Not only have counterfactual analyses been proposed for central philosophical notions, including causation, laws of nature, free will, and knowledge, but also counterfactuals have become objects of interest in their own right, both in the philosophy of language and in logic. This tutorial will introduce the standard approaches to the semantics of counterfactuals, focusing on the work of David Lewis and Robert Stalnaker. Prerequisite: one logic course (e.g., 50, 150, or 151) or consent of instructor.

PHIL 23D. Principia as Paradigm: Mechanics After Newton. 2 Units.

Newton's Principia is widely and rightly acknowledged as a landmark achievement in physics that has had a profound impact on the subsequent development of science. This tutorial will focus on what sorts of influence the Principia had on the development of mechanics in roughly the first century following its publication. The work of Euler, Lagrange, and Laplace will serve as the primary examples of this development. Kuhn's description of paradigms in *The Structure of Scientific Revolutions* provides a starting point for understanding some of these forms of influence. In particular, this tutorial will try to explore two central areas of influence. The first is Newton's conceptual framework and how it was modified in the further development of mechanics during this period. The second is how projects suggested by residual problems within the Principia shaped ongoing study.

PHIL 23E. Embodied Cognition. 2 Units.

Where does the mind stop and the world begin? A standard assumption is that thinking is somehow local to the central nervous system; that is, cognition just amounts to brain activity. A wave of recent work in philosophy and cognitive science has questioned this assumption, insisting that the mind cannot be understood outside the context of a living body interacting dynamically with an environment. To put it more dramatically, the mind extends out into the world. We shall read some of the main proponents of this move toward embodied and embedded cognition, and try to assess the extent to which it seriously calls into question more traditional views about how mind, brain, body, and world fit together.

PHIL 23F. Forgive and Punish. 2 Units.

Are we ever justified in forgiving those who wrong us? Do we have more reason to seek revenge and/or punishment than we do to forgive? Does it matter if wrongdoers apologize and repent for their offenses? Are there some acts and/or persons that should not be forgiven? This tutorial will take up these questions by examining (mostly recent) philosophical writings about: forgiveness, retribution, the question of reactive attitudes (such as resentment and hatred), and, more generally, how humans should (and should not) respond to wrongdoing.

PHIL 23G. Pessimism, Philosophy, and Human Nature. 2 Units.

In different ways, Thucydides, Hobbes, Rousseau, Kant, and Schopenhauer all emphasize a just so, descriptive account of humankind that, on the surface at least, reveals a profound pessimism with respect to their views about human nature. But for these thinkers pessimism represents a sort of intellectual honesty about human nature, and these insights invariably underscore a profound optimism, in spite of their pessimism, with respect to what they view as the more pressing question concerning what humankind can make itself to be. Our guiding question will be to explore whether and how each of these thinkers reconciles their philosophical optimism with their psychological pessimism about human nature.

PHIL 23H. Perfectionism: The Idea of the Perfect in Nature, Ethics, and Politics. 2 Units.

Perfection is the full realization of what is best or most excellent. In this tutorial course we will explore philosophical thought on perfection in three different contexts: natural teleology, individual ethical life, and utopian and anti-utopian social thought. Throughout the course, we will ask the following questions: What is a perfect being? Why is perfection per se good or desirable? Do evaluative comparisons presuppose some absolute standard of perfection? Does it make sense to aim at perfection in ethical and political life? What are the virtues of imperfection? What are the hazards of pursuing perfection in the political realm? Is perfectionism compatible with pluralism about values? Is perfectionism compatible with government based on popular will? The primary emphasis is on close reading and discussion of classic texts in ethical theory, including selections from Plato, Aristotle, Aquinas, Rousseau, Kant, and Tocqueville, accompanied by contemporary selections.

PHIL 23J. On the Notion of Respect: Politics, Deliberation and Disagreements. 2 Units.

The notion of respect plays a crucial role in a variety of human contexts. We respect many different things and we respect them in many different ways: from parents and elders, to public institutions and the law, and other people's dignity, feelings and rights. Many, in fact, claim that all people deserve respect; some way or another. Public conversations lately have been plagued with calls to respect the environment, life in all of its forms, citizenship; sexual orientation, etc. Additionally, it is also urged that public debates should take place under conditions of mutual respect: that above and beyond our differences and our interests, we should respect each other as persons. In particular, philosophers working in moral and political theory focus on what respect for persons might mean; including oneself and possibly other entities. Such a notion is frequently issued *inter alia* in discussions about justice and legitimacy, equality and exploitation, multiculturalism and pluralism, toleration and recognition. The main concern here centers on the ways in which citizens should respect one another in plural democracies. Explore whether or not the assumption that in order to properly respect each other as free and equal citizens we are obligated to satisfy certain requirements of justification (*viz.*, public reason) by seeking appropriate political justifications and sometimes exercising restraint in appealing to individual points of views (*viz.*, comprehensive doctrines) in political discourse.

PHIL 23K. Gender, Sexuality, and Equality. 2 Units.

We will focus on if/how social norms concerning gender and sexuality shape practical deliberation -- what options we take ourselves to have, what options we find desirable, and how we view ourselves as agents. It is from this angle that we will explore the notion of gender equality. Among the topics to be covered in the course are social and political equality, gender expectations, expression and commodification of sexuality, and adaptive preference. Readings will include: Ann Cudd, Alison Jagger, Rae Langton, Debra Satz, Susan Okin, Martha Nussbaum, John Rawls, John Stuart Mill, Catharine MacKinnon.

PHIL 23L. Love and Friendship. 2 Units.

People as different as Jesus Christ and Justin Timberlake think that love is crucial to living the good life. But what is love? What part should it play in our lives? Is it just one value among many? This course will consider questions about the nature of love, the role it plays in moral philosophy, and its effect on individual autonomy. Readings will be from both contemporary and historical sources.

PHIL 23M. Justice and Climate Change. 2 Units.

Does the current generation have a duty of justice to bear the brunt of the burden of combating climate change for the sake of future generations? If so, who should pay the costs of adapting to climate change and reducing greenhouse gas emissions? Should the costs of combating climate change be distributed according to historical emissions, to wealth, or to an equal per capita emissions principle? We will explore these questions through readings at the intersection of political philosophy and climate change. The course includes readings on the following topics: global distributive justice, human rights, historical responsibility, economic efficiency, environmental justice, sustainability, and catastrophe. Throughout the course we will reflect upon what role considerations of justice should play in seeking solutions to climate change.

PHIL 23N. Neuroscience and the Self. 2 Units.

The Self: Fiction or reality? Bundle of perceptions? Pragmatic role-concept? Fleeting moment of consciousness? Social invention? Narrative construct? Various philosophical conceptions of the self will be explored with a particular focus on the notion of the 'narrative self.' Literature from neuroscience, psychology and philosophy will be considered.

PHIL 23P. Personal Responsibility: Moral and Civic. 2 Units.

What do we as individuals owe to other people? Should we be spending our free time toiling in local politics and volunteering in soup kitchens? Should we be sending every extra penny (goodbye new shoes) to people who barely eek out a living on less than a dollar a day? Maybe we ought to spend tons of our time fighting to protect future generations from the predicted devastating effects of climate change. In this course we will explore how local, distant, and future circumstances affect our responsibilities as individuals. We'll discuss questions about what and how much we owe to others, and whether our responsibilities are part and parcel of being a morally good person, or whether they are things we owe others as good citizens of the community (and for that matter, which community do we owe them to--local, national, or global?).

PHIL 23R. What's in an essay?. 2 Units.

This course is about two questions: The first question: what is an essay? In other words, what is it that we mean when we talk about an essay instead of a precat; cis, a paper, a report, a chronicle, a scientific paper, an opinion piece, fiction or simply other kinds of academic writing. Call this first question, the demarcation question about the essay. Essays are particularly hard to pin down, to demarcate its boundaries is almost impossible. The essay represents a distinct challenge for both theory and criticism. Unlike other literary and academic genres, at least since their modern inception in Montaigne's hands, essays challenge notions and assumptions that in other genres are transparent or can be more easily set aside. The second question is: what does essaying "the embarking upon the kind of things essayists claim to be doing" have to do with the cultivation of one's self, the examination of one's actions and deeds in ordinary contexts and the project of shaping it in self-reflective ways. Call this second question, the Socratic aspiration of the essay. To answer this question, we will start from any pre-established theory or framework, but rather work our way out directly from the readings of a sample of essays drawn from various sources. By the end of the course, the student will be in a better position to confront questions such as: why are the humanities part and parcel of our educational efforts, more generally, and how could they become part of my education, more particularly? What are the difficulties and advantages, the very point of, writing one's opinions in an attempt to address others? How is self-understanding connected to philosophical endeavors? What role, if any, could finding one's voice have for the purposes of reflective and critical thinking about one's self in relation to others?.

PHIL 23T. Intellectual trust in oneself and others. 2 Units.

Most people have many false beliefs. Yet, one routinely relies on one's own beliefs and on the views of others. Does that mean that one takes oneself to be exceptionally good at forming true beliefs, and exceptionally good at detecting false beliefs in others? When is it justified to place intellectual trust in oneself and in others?.

PHIL 23U. Death and What Comes After. 2 Units.

Is it irrational to fear death? Is death bad for you? Does it make sense to want to be immortal? How does what happens after our deaths matter to us? Ancient and contemporary philosophers give surprising answers to these questions about death, answers that shed light on basic questions about what matters in life. Among those we'll read are Plato, Aristotle, Epicurus, Bernard Williams, Thomas Nagel and Samuel Scheffler.

PHIL 23V. Plato's Republic. 2 Units.

Who should rule? What is the best regime? What is the role of law? What makes a regime just? What is the relation between theory and practice in politics? This course will focus on the political philosophy of the Republic, Plato's most well known dialogue and a foundational text in the history of political thought. We will also consider how Plato's psychology underlies his political philosophy and how the political philosophy of the Republic is related to political thinking in Plato's later works. Emphasis will be on primary texts, although the instructor will recommend relevant secondary sources as needed. Students will work closely with the instructor to tailor a final assignment that engages with the text and furthers the student's educational goals and interests.

PHIL 23W. Cognition and Perception. 2 Units.

In this tutorial, we will examine a cluster of questions concerning the relationship between cognitive states, such as beliefs and desires, and perception. We will examine the question of whether, and to what extent, concepts, beliefs, and desires can influence the content of perception. If these cognitive states can influence the content of perceptual states, how worried should we be about the ability of perception to justify belief, both in everyday life and in scientific inquiry?.

PHIL 23Y. Knowledge in Action: Anscombe's Intention. 2 Units.

Anscombe's Intention is one of the foundational texts of 20th century analytic philosophy. It brings together central issues from the philosophy of mind, epistemology, philosophy of language -- and lays the ground for contemporary philosophy of action. Anscombe raises (and answers) questions regarding the nature of intentional action, intention, reasons for action, agential self-knowledge, and practical reasoning, connecting them all in one unified account. In the tutorial we will discuss these issues through a close reading of Intention. A short, terse, and marvelously rich self-contained piece of philosophical investigation, it is particularly well-suited for this purpose. Our work with the text should yield a solid basis notably in the philosophy of action, which will be useful for various other courses and areas (in philosophy of action, epistemology, philosophy of mind, and philosophy of language, and ethics). Methodologically the tutorial will foster philosophical skills regarding the analysis, interpretation, and criticism of a dense and rich philosophical text such as Anscombe's.

PHIL 25SI. The Animal-Human Relationship: Interdisciplinary Perspectives. 1 Unit.

The ethical, scientific, and spiritual problems that arise from the interaction between humans and other animals. Can animals have empathy? What does it mean for an animal to feel pain? How did humans come to dominate other animals? What moral obligations do humans have towards animals? Where do animals fit in religious thought? Is animal research ethical, and is it effective? What role does meat consumption play in modern society? How can the environmental impacts of livestock production be mitigated? Guest lecturers from philosophy, literature, biology, neurology, religious studies, psychology, anthropology, and environmental science.

PHIL 27S. Human Nature and its Discontents. 3 Units.

In different ways, Thucydides, Hobbes, Rousseau, Kant, and Schopenhauer all emphasize a just so, descriptive account of human beings that, on the surface at least, reveals a profound pessimism with respect to their views about human nature. One of the themes running throughout Thucydides' History of the Peloponnesian War, for example, is the suggestion that human nature is motivated solely by passions of fear, envy, greed, and ambition. Thucydides highlights the ways in which he sees Athens as appealing to these passions while attempting to justify its unspeakable crimes against humanity in the name of "democracy." The aim of this course will be to work through some of the more salient examples of what I will call psychological or anthropological pessimism as outlined in the works of these thinkers, asking about the role their pessimism about human nature plays in their positive philosophical project. Our guiding question will be to explore whether and how each of these thinkers reconciles their philosophical optimism with their psychological pessimism about human nature.

PHIL 30S. Justifying justice at home and abroad. 3 Units.

It is difficult to read the news today without getting enmeshed in discussions about justice both at home and abroad. Whether it be sequestration, Wall Street regulations, health care reform, the use of drones in war, or humanitarian aid abroad that grabs your attention, there is no doubt that we are living in tumultuous times. What do you think when you read about the new restrictions on abortion in Arkansas? Or about the deregulation of marijuana in Colorado? Or about the abolition of capital punishment in Connecticut? To figure out how to frame answers to these kinds of questions, we shall look at some of the main topics in social and political philosophy: rights, property, justice, criminal punishment, humanitarian intervention and just war theory.

PHIL 32S. Socrates: The Making of a Philosopher. 3 Units.

Socrates is a key figure in the history of western philosophy. He is credited for inventing moral philosophy and for revolutionizing the way we think about and do philosophy. Moreover, his historical influence is often compared to that of Jesus and Buddha, partly because his life's mission was to benefit others, but also because his life and cause remain mysterious. Interest in Socrates tends to divide along these exact lines: some (like Xenophon) are more interested in the man, his life and his impact on his friends and fellow citizens; others (like Aristotle) are more interested in his contribution to philosophy, his views, arguments and methods. In this course, we will try to learn more about both parts of Socrates' career by examining the relation between them. We will start by focusing on what is characteristic of his life: What did he do? And why did he do the things he did? In particular, how did he become a philosopher and how did he develop his distinctive approach to philosophy, his own philosophical voice?.

PHIL 34S. Good, Bad, and Rotten: The Philosophical Study of Moral Character. 3 Units.

We ordinarily think there's a sense in which someone can be a good person, over and above doing well at her particular occupation (e.g., being a good firefighter), familial role (e.g., being a good sister), or political function (e.g., being a good citizen). But what does it take to be a good person, in this very general sense? And what about the opposite -- what does it take to be a bad person? We also tend to feel strongly about whether others, or ourselves, are good or bad people. In particular, we blame people for being bad and praise them for being good. But only sometimes -- if someone is bad only because, say, he had a traumatic childhood, then we tend to hold back from blaming him. So, what must be true if someone really is deserving of blame for being bad (or, of praise for being good)? And, finally, there seems to be an important difference between being bad and being completely deprived, or evil. But what underlies this difference? What distinguishes everyday badness from extraordinary evil? This course is dedicated to learning how to look for and evaluate answers to these questions. Readings will be pulled from historical and contemporary sources, including Aristotle, Augustine, Immanuel Kant, Hannah Arendt, Philippa Foot, Bernard Williams, Susan Wolf, Gary Watson, and Nomy Arpaly,.

PHIL 41Q. Truth. 3 Units.

Preference to sophomores. Central issues animating current work in the philosophy of truth. What is truth? What is it about a statement or judgment that makes it true rather than false? Are there any propositions that are neither true nor false? Could truth be relative to individuals or communities? Do people have different notions of truth for different enterprises such as mathematics and ethics? Might truth be a matter of degree? Sources include the instructor's book manuscript and other contemporary writers.

PHIL 42. Philosophy through Theater: Choice and Chance. 4 Units.

Dramatic literature as a window into philosophical work on freedom of the will and indeterminism. Students participate in the production of original one-act plays.

PHIL 43S. Happiness: Positive Psychology and Philosophy. 3 Units.

The connection between research in positive psychology to determine what happiness is and the conditions under which human beings are happy with issues in moral philosophy regarding whether we should aim at happiness or think of it as a good. The assumptions about happiness made by positive psychologists. The philosophical insight into the question of how people should live that is gained by looking at the empirical results provide by psychologists.

PHIL 45S. Is it always good to 'be yourself'? ' Issues in Ethics and Moral Psychology. 3 Units.

It may seem obvious that it is good to 'be yourself, ' to be 'who you really are, ' or to do what you 'really' want to do ' but is it? Some believe that we are our true, or real, selves when we act on our values, what we love, or what we care most about. But if that is true, then is it still good to be yourself when what you value and care most about involves a commitment to acts of terrorism, torturing others, or a life of pain and boredom? We will look at contemporary philosophical attempts to make sense of the idea of 'being yourself, 'and what the nature of the value of this authenticity is. Authors include Bratman, Frankfurt, Korsgaard, Millgram and Williams.

PHIL 50. Introductory Logic. 4 Units.

Propositional and predicate logic; emphasis is on translating English sentences into logical symbols and constructing derivations of valid arguments.

PHIL 50S. Truth, Proof and Probability: An Introduction To Philosophical and Logical Reasoning. 3 Units.

Under what conditions does a set of true claims guarantee or make probable a particular conclusion? In this course we study rigorous tools and techniques supporting good reasoning, covering topics of particular significance to modern philosophy and logic. Contemporary philosophy continues a traditional focus on foundational problems related to value, inquiry, mind and reality, but with modern subject matter (often engaging natural, social and mathematical science) and rigorous methods, including set theory, probability theory and formal logic. This course introduces such methods, with a focus on core conceptual distinctions, motivations and debates, and basic practical skills. The presentation will be rigorous, but overly technical topics are avoided. Topics: propositional logic; valid argument forms; truth tables; Russell's paradox; infinite sets; kinds of truth; possibility and necessity; basic probability theory; subjective versus objective probability; Bayesian rule; correlation and causation. No previous philosophical or mathematical training pre-supposed. Appreciation of precise thinking an advantage. Useful preparation for relevant topics in mathematics, computer science, linguistics, economics and statistics.

PHIL 59S. Philosophy of Mathematics. 3 Units.

The purpose of this course is to explore some of the themes and questions in philosophy of mathematical practice. These will include: what is the role of mathematics in natural sciences? Can we find an explanation for the applicability of mathematics or is it a completely unreasonable phenomenon? Do mathematicians invent or discover concepts? Either way, how do mathematicians develop new concepts? Is there such thing as mathematical explanation? Are there revolutions in mathematics? These questions are studied in connection to a close historical study of developments in mathematics, and the actual practice of mathematicians.

PHIL 60. Introduction to Philosophy of Science. 5 Units.

The nature of scientific knowledge: evidence and confirmation; scientific explanation; models and theories; objectivity; science, society, and values. Same as: HPS 60

PHIL 61. Science, Religion, and the Birth of Modern Philosophy. 5 Units.

Galileo's defense of the Copernican world-system that initiated the scientific revolution of the 17th century, led to conflict between science and religion, and influenced the development of modern philosophy. Readings focus on Galileo and Descartes. Same as: HPS 61

PHIL 61S. A Meaningful Life in a Physical World. 3 Units.

Questions about the meaning of life have occupied a central place in philosophical thought throughout its history. However, the scientific view of human beings as essentially complex, evolutionarily-designed biological systems in a purely material world (one governed by fundamental physical laws) seemingly puts pressure on the idea that humans can live a life of genuine meaningfulness. The guiding questions of this course will be: Is there the prospect of our living truly meaningful lives even if we are just complex biological systems? If so, what kind(s) of meaning can we hope to achieve? If not, how should we live our lives? In exploring these questions, we will read works by philosophers (and psychologists) approaching these questions from many different traditions and perspectives. Possible authors will include Plato, Hobbes, Rousseau, Nietzsche, Sartre, Camus, Sigmund Freud, Viktor Frankl, Bertrand Russell, John Searle, Owen Flanagan, Daniel Dennett, and Ruth Millikan.

PHIL 63S. Introduction to Bioethics. 3 Units.

In this course we will explore ethical questions that arise in health care and the biological sciences. We will consider the following issues (perhaps together with others): allocation of health-care resources, the responsibilities of doctors to patients, the distinction between killing someone and letting them die, medically-assisted suicide, abortion, and the use of technologies for genetic screening and manipulation. Throughout, our focus will be on moral questions about how decisions in these areas should be made.

PHIL 64S. Introduction to Environmental Philosophy. 3 Units.

Environmental problems define and dominate the times. Climate Change threatens to displace and impoverish millions of people, species extinctions promise to be reached unprecedented numbers, and sustainability has become a buzzword in discussions of responsible business practices. In this course we will explore some of the most pivotal environmental issues facing us today using the tools of philosophy. Together we will ask questions such as: Are individuals or governments responsible for solving environmental problems? What objects should we care about in the natural world (animals, living things, ecosystems?), and what do we do when environmental problems force us to make tough choices in the face of competing values? Do we have responsibilities to future generations? This course will provide a foundation for thinking about these questions and for facing our environmental problems head on.

PHIL 65S. Technology and the Good Life. 3 Units.

Can we engineer our way to happiness? Should we try to? An introduction to select issues in engineering ethics, the course examines various threats to human welfare, environmental catastrophe, social injustice, the limitations of "human nature" that could be amenable to engineering solutions. We consider whether it is ethically permissible to address these threats via engineering (referring to various conceptions of the good life for human beings: hedonism, liberalism, virtue ethics) and what the costs of such solutions are.

PHIL 71H. Philosophy and the Real World. 2 Units.

Introduction to the humanities as an applied discipline; how literary and philosophical ideas illuminate and change how people live their lives as individuals and members of society. Focus is on short texts that illustrate how literary and philosophical ideas arise from social problems and attempt to confront those problems. Methods and approaches: how to read such texts; how to make arguments about them; how such texts shed light on contemporary situations.

PHIL 72. Contemporary Moral Problems. 4-5 Units.

This course addresses a range of important moral issues from a philosophical perspective. The primary aims of the course are to encourage students to think about difficult moral questions in the careful and systematic way characteristic of philosophical inquiry, and to help students develop the analytical skills necessary to do this. Questions to be covered include: What, and how much, are we obligated to do in order to aid the global poor? What are our obligations in cases such as the causation of climate change, in which our individual contributions (e.g. our personal greenhouse gas emissions) appear to make no difference to the badness of the outcome? How can we owe obligations to future people who do not yet exist, and what are our obligations to them? Is abortion morally wrong or morally permissible? Could it even be morally required? Can we be obligated to procreate? Or, might procreation be seriously morally problematic? What is racism, and what makes it wrong? What does it mean to be tolerant, and why might we think that tolerance is a good thing? Is there a deep tension between a commitment to feminist ideals and a commitment to multiculturalism?.

Same as: ETHICSOC 185M, POLISCI 134P

PHIL 73. Collective Action Problems: Ethics, Politics, & Culture. 3-4 Units.

When acting on one's own, it is often easy to know what the morally right action is. But many moral problems arise from the fact that many individuals act together leading to dilemmas, in which what is individually rational is collectively irrational. For example, the collective result of our consumption decisions is to warm the planet. But individual decisions seem to have no effect on climate change. Such collective action situations give rise to moral questions: Are individuals required to take their contributions to wider systemic effects into account? Does it make a difference whether or not others are doing their share, for example with regard to fighting global poverty? In many cases, the best solution for collective action problems are institutions. But when these are deficient or non-existing, what should individuals do? Do they have a duty to assist in building institutions, and what would this duty imply in practical terms? Interdisciplinary perspective, reading authors from philosophy, politics, economics and sociology such as Elinor Ostrom, Peter Singer or Liam Murphy, relating to current questions such as global poverty and climate change. No background assumed; no mathematical work required.

Same as: ETHICSOC 180M, POLISCI 131A, PUBLPOL 304A

PHIL 74. Business Ethics. 4 Units.

What do people mean when they say, "it's just business"? Do they mean that there are no moral norms in business or do they mean that there are special moral norms in business that differ from those of personal relationships and other spheres of social activity? In this class we will examine ethical questions that arise in the domain of business. We will ask, for example: What does the market reward and what should it reward? What are the moral responsibilities of a business owner in a competitive environment? Is it acceptable to employ "sweatshop labor"? How do the moral responsibilities of a business owner differ from that of a policy maker? What information does a seller (or buyer) have a moral duty to disclose? In real estate, is a strategic default morally wrong? How much government regulation of Wall Street is morally justified? We will use the writings of Plato, Aristotle, Cicero, J. S. Mill, Marx, Jevons and Menger, Hayek, Walzer, and Sandel, among others, to help us answer these questions. We will see, for example, what Aristotle thought about day trading.

Same as: ETHICSOC 182M

PHIL 74A. Ethics in a Human Life. 4 Units.

Ethical questions pervade a human life from before a person is conceived until after she dies, and at every point in between. This course raises a series of ethical questions, following along the path of a person's life; questions that arise before, during, and after she lives it. We will explore distinctive questions that a life presents at each of several familiar stages: prior to birth, childhood, adulthood, death, and even beyond. We will consider how some philosophers have tried to answer these questions, and we will think about how answering them might help us form a better understanding of the ethical shape of a human life as a whole. Seminar for Juniors and Seniors in Philosophy or Humbio - others by permission. Same as: HUMBIO 74

PHIL 75S. Liberty and Equality. 3 Units.

This course concerns recent attempts by social contract theorists to reconcile liberty and equality. We would begin by looking at Rawls's attempt to give due respect to both liberty and equality in his two principles. We would then look at criticisms of his attempt from Nozick, G.A. Cohen, possibly Mills and Okin or Pateman. I again would structure each session around a question, such as: Is there a conflict between equality and liberty? What is liberty? Equality. Equality of opportunity? Or equality of condition? What tools do these social contract theorists offer for criticizing racial or gender inequality?.

PHIL 76. Introduction to Global Justice. 4 Units.

Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls. Same as: ETHICSOC 136R, INTNLREL 136R, POLISCI 136R, POLISCI 336

PHIL 77S. Philosophy of Religion. 3 Units.

(Formerly RELIGST 62S) Explores fundamental questions about the existence of God, free will and determinism, faith and reason, through traditional philosophical texts. Course is divided into four sections: first asks what is religion; second surveys the western philosophical tradition from Boethius through Descartes, Hume, Kant, and Kierkegaard regarding the foundation for theist beliefs; third investigates questions mystical experience raises through both western and Buddhist materials; and fourth takes up the ethics of belief, what we have a right to believe, through the Clifford and James debate and the opposing stances of Camus and Pascal. Same as: RELIGST 36

PHIL 80. Mind, Matter, and Meaning. 5 Units.

Central topics in philosophy emphasizing development of analytical writing skills. Are human beings free? How do human minds and bodies interact? Prerequisite: introductory philosophy course.

PHIL 81. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English. Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, SLAVIC 181

PHIL 90A. The Philosophy of John Perry. 4 Units.

John Perry is among the most influential philosophers of the last several decades, making important contributions to the philosophy of language, metaphysics, and the philosophy of mind. Focus on Perry's work on indexicality, belief reports, reference, pragmatics, identity, personal identity, modality, and consciousness. Perry's work in these areas will be studied in conjunction with that of some key figures in the surrounding literatures, including Kaplan, Lewis, Stalnaker, Kripke, and Chalmers.

PHIL 90B. The Ethics of War. 4 Units.

Issues both in contemporary just war theory and political philosophy. Relevant questions include: Can conscription ever be justified? If not, is there anything wrong with targeting poor people as part of efforts to recruit a 'volunteer' military? If, during war itself, combatants act in ways prohibited by the moral requirements governing war's conduct, then does it make any moral difference whether they were acting as ordered? And how do we identify these moral requirements in the first place? For example, what distinguishes a legitimate target from an illegitimate one? What determines whether military action is disproportionate? What, if anything, is morally distinctive about terrorism? Explores the complexities behind these questions and others, with a view to evaluating the potential answers to them.

PHIL 90C. Predicting the Future: Puzzles of Induction. 4 Units.

Can we know that the future is likely to resemble the past? Do we have reason to believe that the Sun is even remotely likely to rise again tomorrow? Are we rationally justified in accepting the confident predictions of science and commonsense, based on well-observed regularities? Consider several paradoxes of induction (that is, extrapolation from observed to unobserved), including those raised by Hume, Hempel, and Goodman, the Doomsday and Sleeping Beauty paradoxes, as well as some attempts to solve or cope with them.

PHIL 90D. What do Philosophers do?. 4 Units.**PHIL 90E. Ethics in Real Life: How Philosophy Can Make Us Better People. 4 Units.**

Socrates thought that philosophy was supposed to be practical, but most of the philosophy we do today is anything but. This course will convince you that philosophy actually is useful outside of the classroom--and can have a real impact on your everyday decisions and how to live your life. We'll grapple with tough practical questions such as: 'Is it selfish if I choose to have biological children instead of adopting kids who need homes?' 'Am I behaving badly if I don't wear a helmet when I ride my bike?' 'Should I major in a subject that will help me make a lot of money so I can then donate most of it to overseas aid instead of choosing a major that will make me happy?' Throughout the course, we will discuss philosophical questions about blame, impartiality, the force of different 'shoulds,' and whether there are such things as universal moral rules that apply to everyone. Same as: ETHICSOC 203R

PHIL 90G. Native American Philosophy. 4 Units.

Examine traditional philosophical questions like "How do we know?" "What exists?" "What is a person?" and "What is the good life?" from the perspectives of classical and contemporary Native American thinkers. We will look at Native American beliefs about respect for persons and places; reactions to colonial doctrines of conversion, treaties, and removal; and the importance of the themes of circularity and performance in classical and contemporary Native philosophical thought. Also of importance will be to contrast some Native American approaches to philosophical questions against Western attempts to answer these same questions. How are the approaches the same? How are they different? What assumptions about the natures of reality or humanity account for the similarities or differences?.

PHIL 90J. Is it Always Good to "Be Yourself?" - Issues at the Intersection of Ethics and Moral Psychology. 4 Units.

It may seem obvious that it is always good to 'be yourself,' to be who you 'really' are, or to do what you 'really' want to do - but is it? Some philosophers believe that we are our 'true,' or 'real,' selves when we act on our values, or what we care most about. But if that is true, then is it still good to be yourself when what you value and care most about involves a commitment to acts of terrorism, torturing others, or a life of pain and boredom? We will look at contemporary philosophical attempts to make sense of the idea of 'being yourself,' and potential reasons in favor of its supposed value. Authors include Bratman, Frankfurt, Korsgaard, Millgram and Williams.

PHIL 90L. Probability and the Law. 4 Units.

What does it mean to prove guilt beyond a reasonable doubt? Can we interpret legal standards of proof probabilistically? What is the role of probability and statistics in the courtroom? How are quantitative methods changing legal proceedings? Courtroom movies, criminal and civil cases, and academic scholarship will help us address these and related questions. No statistical or legal background is expected.

PHIL 90S. Philosophical Dimensions of Cognitive Science. 4 Units.

What is consciousness? What is the relation between the mind and the body? How does the mind represent the world around it? Are our minds just sophisticated computers? If they are, what functions as the 1s and 0s in our brains? Or are our minds something else altogether? This course will look at the philosophical foundations of cognitive science with a particular focus on cognitive architecture. In addition we will consider the nature of mental representation and the challenges presented by subjective experience.

PHIL 90V. Children, and what to do with them. 4 Units.

In this course, we investigate a number of ethical questions that arise in relation to children. Is it morally appropriate to create children, knowing that, over the course of their lives, those children will inevitably be subjected to a range of serious harms? Is it permissible for parents to favor their own children, even if their children are already advantaged in comparison to many other children? Who should decide how children are educated, the government, the parents, or someone else?.

PHIL 99. Minds and Machines. 4 Units.

An overview of the interdisciplinary study of cognition, information, communication, and language, with an emphasis on foundational issues: What are minds? What is computation? What are rationality and intelligence? Can we predict human behavior? Can computers be truly intelligent? How do people and technology interact, and how might they do so in the future? Lectures focus on how the methods of philosophy, mathematics, empirical research, and computational modeling are used to study minds and machines. Undergraduates considering a major in symbolic systems should take this course as early as possible in their program of study.

Same as: LINGUIST 144, PSYCH 35, SYMSYS 100

PHIL 100. Greek Philosophy. 4 Units.

We shall cover the major developments in Greek philosophical thought, focusing on Plato, Aristotle, and the Hellenistic schools (the Epicureans, the Stoics, and the Skeptics). Topics include epistemology, metaphysics, psychology, ethics and political theory.

PHIL 101. Introduction to Medieval Philosophy. 4 Units.

Classics of Western philosophy by Augustine, Boethius, Anselm, and Aquinas. Explore the puzzles facing someone seeking to lead a good life and to understand herself and her world. A theory of will and human motivation, a theory of ethics based on the agent's intention, and a theory of divine omniscience and omnipotence consistent with divine goodness and human freedom. Works include *On Free Choice*, *The Consolation of Philosophy*, *On the Fall of the Devil*, and *Summa Theologiae*.

Same as: PHIL 201

PHIL 102. Modern Philosophy, Descartes to Kant. 4 Units.

Major figures in early modern philosophy in epistemology, metaphysics, and philosophy of mind. Writings by Descartes, Leibniz, Hume, and Kant.

PHIL 102M. Fichte. 1-2 Unit.

This three-day intensive mini-course will introduce the moral and political thought of Johann Gottlieb Fichte, the founder of the German idealist movement. The topics to be discussed are: Fichte's theory of subjectivity and transcendental idealism; Fichte's defense of radical freedom of the will; Fichte's transcendental deduction of other selves; the relation of right between rational beings and the foundations of political philosophy; Fichte's deduction of the moral law from the absolute freedom of the rational being; the application of the moral law through conscience. No previous acquaintance with Fichte's philosophy will be presupposed.

Same as: PHIL 202M

PHIL 103. 19th-Century Philosophy. 4 Units.

Focus is on ethics and the philosophy of history. Works include Mill's *Utilitarianism*, Hegel's *The Philosophy of World History*, Marx's *Economic and Philosophic Manuscripts*, Kierkegaard's *The Sickness Unto Death*, and Nietzsche's *On the Genealogy of Morals*.

PHIL 104. Philosophy of Religion. 4 Units.

Key issues in the philosophy of religion. Topics include the relationship between faith and reason, the concept of God, proofs of God's existence, the meaning of religious language, arguments for and against divine command theory in ethics and the role of religious belief in a liberal society.

PHIL 106. Ancient Skepticism. 4 Units.

The ancient Pyrrhonian skeptics who think that for any claim there is no more reason to assert it than deny it and that a life without any beliefs is the best route to happiness. Some ancient opponents of the Pyrrhonian skeptics and some relations between ancient and modern skepticism.

Same as: PHIL 206

PHIL 107. Early Plato. 4 Units.

We shall focus on Plato's early or Socratic dialogues (e.g. the *Crito*, the *Gorgias*, and the *Protagoras*). In these dialogues, Plato focuses on ethics and ethical psychology without explicitly drawing on epistemological and metaphysical claims. We will try to determine whether the Socrates of these dialogues is a purely destructive critic or whether he has a positive ethical view that he advances.

Same as: PHIL 207

PHIL 107A. The Greeks on Irrationality. 2-4 Units.

In this course, we shall examine the views of some central Greek philosophers (Plato, Aristotle, the Epicureans, and the Stoics) on the irrational and non-rational aspects of human life. What makes something irrational and what roles (negative and perhaps positive as well) does the irrational play in our lives? We shall examine their views on anger, fear, madness, love, pleasure and pain, sexual desire and so on. We shall also consider more briefly some depictions of these psychic items in ancient Greek literature.

Same as: PHIL 207A

PHIL 107B. Plato's Metaphysics and Epistemology. 4 Units.

We will read the *Theaetetus* and the *Parmenides*, and consider various definitions of knowledge, and metaphysical problems about the objects of knowledge, and a proposed method for examining and resolving such problems. Prerequisite: Philosophy 80 or consent of instructor.

Same as: PHIL 207B

PHIL 107C. Plato's Timaeus. 4 Units.

Same as: PHIL 207C

PHIL 108. Aristotle's Metaphysics Book Alpha. 4 Units.

An introduction both to Aristotle's own metaphysics and to his treatment of his predecessors on causality, included the early Ionian cosmologists, atomism, Pythagoreans, Heraclitus, Parmenides, Empedocles, Anaxagoras and Plato. Prerequisite: one course in ancient Greek philosophy.

Same as: PHIL 208

PHIL 108A. Aristotelian Logic. 2-4 Units.

A careful examination of Aristotle's syllogistic, with special emphasis on the interpretation of his modal syllogistic. This course will serve both as an introduction to ancient term logic and to the difference between sentential modal operators and modal modifiers to the copula. Topics will include the analysis of syllogisms into figures and moods, the reduction of 2nd and 3rd figure syllogisms to the first, the consistency of the modal syllogistic, models for the syllogistic, and de re versus de dicto modalities. For students with at least some introductory background in logic.

Same as: PHIL 208A

PHIL 108B. Aristotle's Physics Book One. 4 Units.

A chapter by chapter analysis of Aristotle's introductory discussions of physical theory. Topics to be considered include Aristotle's treatment of Eleatic monism, the role of opposites in pre-Socratic physics, the role of matter in physics, and an analysis of the elements of changing objects into form, privation and a subject.

Same as: PHIL 208B

PHIL 109. Topics in Ancient Philosophy: Plato and Aristotle on Art and Rhetoric. 4 Units.

Plato's and Aristotle's views on the nature of art and rhetoric and their connections with the emotions, reason and the good life. Readings include Plato's *Gorgias*, *Ion* and parts of the *Republic* and the *Laws* and Aristotle's *Poetics* and *Rhetoric*.

Same as: PHIL 209

PHIL 109A. Special Topics in Ancient Philosophy. 4 Units.

In this course we will read carefully Book I, Chapters 1-3, of Aristotle's *Physics* and the commentary on those chapters by John Philoponus. Topics to be covered include Aristotle's preliminary discussion of the principles of natural science and his detailed exposition and refutation of Eleatic Monism.

Same as: PHIL 209A

PHIL 109B. Greek philosophers read their ancestors: Intro to the ancient reception of Presocratic philosophy. 4 Units.

The first Greek philosophers are known to us only through fragments of their original works, generally few in number and transmitted by later authors, as well as through a set of testimonies covering a thousand years and more. Thus it is crucial, in order to understand archaic thought, to get a sense of how they were read by those to whom we owe their transmission. What was their aim, their method, their presuppositions or prejudices? The course will employ this perspective to examine authors such as Plato, Aristotle, Theophrastus, Diogenes Laertius, Simplicius and others. We shall also reflect, on the basis of the paradigmatic case of the Presocratics, on some of the more general problems raised by literary and philosophical approaches to the notion of reception.

Same as: PHIL 209B

PHIL 109C. Aristotle's cosmology and theology. 4 Units.

PHIL 109C/209C now meets in Raubitschek Room, Green Library Room 351. Undergrads please sign up for 109C; grads sign up for 209C.

Same as: PHIL 209C

PHIL 110. Plato. 4 Units.

Plato's *Republic*.

Same as: PHIL 210

PHIL 110C. The Stoics on Freedom and Determinism. 4 Units.

We will investigate ancient Stoic conceptions of causality and freedom, their arguments for causal determinism, and ancient attaches on and defenses of compatibilism.

Same as: PHIL 210C

PHIL 111. Aristotle and Contemporary Ethics. 4 Units.

Aristotle's *Nicomachean Ethics*, focusing on virtue, happiness, pleasure, practical reasoning, and particularism. Sources include the *Eudemian Ethics*, contemporary philosophers who have taken many of these topics up again, and contemporary material such as that by Anscombe, Foot, Hursthouse, Korsgaard, and McDowell.

Same as: PHIL 211

PHIL 113. Hellenistic Philosophy. 4 Units.

Epicureans, skeptics, and stoics on epistemology, ethics, metaphysics, and psychology.

Same as: PHIL 213

PHIL 113L. Latin 500-1600 CE. 5 Units.

The aim of the course is to familiarize students with medieval Latin and neo-Latin through a reading of various short texts drawn from philosophical, religious, political, historical, and literary works. Students will devote most of their efforts to preparing translations for class. We shall also discuss some peculiarities of post-classical Latin grammar. Prerequisite: CLASSLAT 1, 2 & 3, or equivalent.

Same as: CLASSICS 6L, ENGLISH 113L, PHIL 213L, RELIGST 173X

PHIL 115. Problems in Medieval Philosophy: Islamic Aristotelianism and Western Scholasticism. 3-5 Units.

The western world adopted Aristotle's metaphysics and natural philosophy as the foundation of its educational system and scholarly life between 1210 and 1255. Christian Europe was thereby following the example set by Islam in Spain and the Near East. Today some people believe that this development was independent, and others think that the scholastics copied even their methods from Arabic philosophers. Historical evaluation of those claims.

Same as: PHIL 215

PHIL 116. Aquinas. 4 Units.

The focus will be on Thomas Aquinas' metaphysics. Works include *Summa contra Gentiles*, and *Summa Theologiae*, as well as some smaller pieces.

Same as: PHIL 216

PHIL 117. Descartes. 4 Units.

(Formerly 121/221.) Descartes's philosophical writings on rules for the direction of the mind, method, innate ideas and ideas of the senses, mind, God, eternal truths, and the material world.

Same as: PHIL 217

PHIL 118. British Empiricism, 1660s-1730s. 4 Units.

Focus is on the big three British Empiricists and their developments of thought based on the foundational role that they give to sensory perception or experience as the source of knowledge. Topics may include the theory of ideas, idealism, personal identity, human agency, moral motivation, causation, and induction. Readings predominantly from Locke, Berkeley, and Hume.

PHIL 118A. Origins of Empiricism: Gassendi, Locke, and Berkeley. 4 Units.

Particular light is shed on both the strengths and weaknesses of empiricism by studying it as it first arose during the 17th century revolution in philosophy and the sciences initiated by Descartes. Three philosophers of that period helped to advance empiricism: Pierre Gassendi (1592-1655), John Locke (1632-1704), and George Berkeley (1685-1753). A brief introduction to Descartes is followed by Gassendi's reaction to Descartes and his influence on Locke; Locke's theory of ideas, mind, language, reality, and natural philosophy expounded in his *An Essay concerning Human Understanding* (Fourth Edition, 1689); and Berkeley's later reaction to Locke.

Same as: PHIL 218A

PHIL 119. Rationalists. 4 Units.

Developments in 17th-century continental philosophy. Descartes's views on mind, necessity, and knowledge. Spinoza and Leibniz emphasizing their own doctrines and their criticism of their predecessors. Prerequisite: 102.

Same as: PHIL 219

PHIL 120A. The Leibniz-Clarke Correspondence. 4 Units.

Correspondence on metaphysics, theology, and science.

Same as: PHIL 220A

PHIL 120W. Richard Rufus on Aristotle's Metaphysics: Ontology, Unity, Universals, & Individuation. 1-2 Unit.

Mini-Course taught by Rega Wood in association with Santiago Melo Arias & Professors Alan Code & Calvin Normore. Code, Wood, & Melo Arias have spent the last 6 months intensively studying Richard Rufus of Cornwall's commentary on Aristotle's Metaphysics Zeta, Eta, & Theta. This June we will present Rufus' views on ontology, unity, & universals. There will be 6 two hour sessions on June, 4,5, & 6 (Thurs - Saturday), 10-12 noon , 2-4 pm. Readings will be taken chiefly from Melo Arias' new translations of Rufus' circa 1238 commentary; other readings, from Aristotle and Averroes. We will consider the difference between the treatment of definition, essence and being in logic and in metaphysics, the sense in which accidents have definitions, the unity of genus and differentia in the definitions of substances, the unity of form and proximate matter in hylomorphic compounds, and the unity of the parts of the rational soul. In this context we will discuss the formal distinction pioneered by Rufus as a description of differences in formal predication consistent with real sameness. Richard Rufus was the first Western professor to lecture on Aristotle's metaphysics in Medieval Europe.

Same as: PHIL 220W

PHIL 122. Hume. 4 Units.

(Formerly 120/220; graduate students enroll in 222.) Hume's theoretical philosophy, in particular, skepticism and naturalism, the theory of ideas and belief, space and time, causation and necessity, induction and laws of nature, miracles, a priori reasoning, the external world, and the identity of the self.

Same as: PHIL 222

PHIL 124. Topics in Early Modern Philosophy. 4 Units.

Philosophical views of the highly influential rationalist philosophers Benedict (or Baruch) Spinoza (1632-1677) and G. W. Leibniz (1646-1716). Topics to be treated include: the nature of God and the question of his providential care for human beings, the concept of substance and its extension, the ontological relation of finite beings to God, the mental and its relation to the corporeal, and the nature of human freedom.

PHIL 125. Kant's First Critique. 4 Units.

(Graduate students register for 225.) The founding work of Kant's critical philosophy emphasizing his contributions to metaphysics and epistemology. His attempts to limit metaphysics to the objects of experience. Prerequisite: course dealing with systematic issues in metaphysics or epistemology, or with the history of modern philosophy.

Same as: PHIL 225

PHIL 126B. Kant's Ethical Theory. 2-4 Units.

(Graduate students register for 226B.) Kant's moral philosophy based primarily on the *Groundwork of Metaphysics of Morals*, *Critique of Practical Reason*, and *The Metaphysics of Morals*.

Same as: PHIL 226B

PHIL 127. Kant's Ethics. 4 Units.

A study of Kant's ethical thought, focusing on *The Groundwork of the Metaphysics of Morals*, *The Critique of Practical Reason*, and *The Metaphysics of Morals*. Prerequisite: Phil. 2, Phil. 170, or equivalent (consult the instructor). Designed for undergraduate department majors and graduate students.

Same as: PHIL 227

PHIL 127A. Kant's Value Theory. 4 Units.

(Graduate students register for 227A.) The role of autonomy, principled rational self-governance, in Kant's account of the norms to which human beings are answerable as moral agents, citizens, empirical inquirers, and religious believers. Relations between moral values (goodness, rightness) and aesthetic values (beauty, sublimity).

Same as: PHIL 227A

PHIL 127B. Kant's Anthropology and Philosophy of History. 4 Units.

Kant's conception of anthropology or human nature, based on his philosophy of history, which influenced and anticipated 18th- and 19th-century philosophers of history such as Herder, Fichte, Hegel, and Marx. Texts include *Idea for a Universal History*, *Conjectural Beginning of Human History*, and *Anthropology from a Pragmatic Point of View*. Topics include: Kant's pragmatic approach to the study of human nature; the difficulty of human self knowledge; the role of regulative and teleological principles in studying human history; and Kant's theory of race.

Same as: PHIL 227B

PHIL 127M. Richard Rufus of Cornwall. 1-2 Unit.

Metaphysics and Epistemology, readings from Rufus' newly translated *Contra Averroes* & *Speculum animae*. In these works, Rufus solves a problem for Aristotelian epistemology that was to bedevil later scholastics such as Thomas Aquinas. He also states for the first time a theory of individuation by form that was subsequently adopted by Duns Scotus. Though Scotus like Rufus preferred to speak of individual forms, the theory itself is often identified by a term very seldom used by Scotus, 'haecitas' or 'thiness'. Taught jointly by Rega Wood and Calvin Normore.

Same as: PHIL 227M

PHIL 128. Fichte's Ethics. 4 Units.

(Graduate students register for 228.) The founder of the German Idealist movement who adopted but revised Kant's project of transcendental philosophy basing it on the principle of awareness of free self-activity. The awareness of other selves and of ethical relations to them as a necessary condition for self-awareness. His writings from 1793-98 emphasizing the place of intersubjectivity in his theory of experience.

Same as: PHIL 228

PHIL 130. Hegel. 4 Units.

(Formerly 122/222; graduate students register for 230.) Introduction to Hegel's philosophy, emphasizing his moral and political philosophy, through study of his last major work (1821). May be repeated for credit. Prerequisite: course in the history of modern philosophy.

Same as: PHIL 230

PHIL 131W. Kant's Theory of Law and Justice. 1-2 Unit.

This course will look at Kant's theory of right or law (Recht) and its implications for morality and politics. The topics we will discuss are: the difference between right and ethics in Kant's metaphysics of morals; the relation of law to property and morality; the moral obligations of politicians as holders of rightful authority; and the standards of right as they apply to international relations and war.

Same as: PHIL 231W

PHIL 134. Phenomenology and Intersubjectivity. 4 Units.

(Graduate students register for 234.) Readings from Husserl, Stein, Heidegger, Sartre, and Merleau-Ponty on subjects related to awareness of others. Topics include solipsism, collective experience, empathy, and objectification of the other.

Same as: PHIL 234

PHIL 135. Existentialism. 4 Units.

Focus is on the existentialist preoccupation with human freedom. What constitutes authentic individuality? What is one's relation to the divine? How can one live a meaningful life? What is the significance of death? A rethinking of the traditional problem of freedom and determinism in readings from Rousseau, Kierkegaard, and Nietzsche, and the extension of these ideas by Sartre, Beauvoir, and Camus, including their social and political consequences in light of 20th-century fascism and feminism.

Same as: PHIL 235

PHIL 136. History of Analytic Philosophy. 4 Units.

(Formerly 147/247; graduate students register for 236.) Theories of knowledge in Frege, Carnap, and Quine. Emphasis is on conceptions of analyticity and treatment of logic and mathematics. Prerequisite: 50 and one course numbered 150-165 or 181-90.

Same as: PHIL 236

PHIL 137. Wittgenstein. 4 Units.

(Graduate students register for 237.) An exploration of Wittgenstein's changing views about meaning, mind, knowledge, and the nature of philosophical perplexity and philosophical insight, focusing on the *Tractatus Logico-Philosophicus* and *Philosophical Investigations*. Same as: PHIL 237

PHIL 138. Recent European Philosophy: Between Nature and History. 4 Units.

A critical introduction to the novel understandings of time, language, and cultural power developed by 20th-century continental thinkers, with close attention to work by Heidegger, Saussure, Benjamin, and Foucault. Same as: PHIL 238

PHIL 143. Quine. 4 Units.

(Formerly 183/283; graduate students register for 243.) The philosophy of Quine: meaning and communication; analyticity, modality, reference, and ontology; theory and evidence; naturalism; mind and the mental. Same as: PHIL 243

PHIL 150. Mathematical Logic. 4 Units.

An introduction to the concepts and techniques used in mathematical logic, focusing on propositional, modal, and predicate logic. Highlights connections with philosophy, mathematics, computer science, linguistics, and neighboring fields. Same as: PHIL 250

PHIL 150E. Logic in Action: A New Introduction to Logic. 4 Units.

A new introduction to logic, covering propositional, modal, and first-order logic, with special attention to major applications in describing information and information-driven action. Highlights connections with philosophy, mathematics, computer science, linguistics, and neighboring fields. Based on the open source course 'Logic in Action,' available online at <http://www.logicinaction.org/>. Fulfills the undergraduate philosophy logic requirement.

PHIL 150X. Mathematical Logic. 2 Units.

Equivalent to the second half of 150. Students attend the first meeting of 150 and rejoin the class on October 30. Prerequisite: CS 103A or X, or PHIL 50.

PHIL 151. Metalogic. 4 Units.

(Formerly 160A.) The syntax and semantics of sentential and first-order logic. Concepts of model theory. Gödel's completeness theorem and its consequences: the Löwenheim-Skolem theorem and the compactness theorem. Prerequisite: 150 or consent of instructor. Same as: PHIL 251

PHIL 151A. Recursion Theory. 4 Units.

Computable functions, Turing degrees, generalized computability and definability. "What does it mean for a function from the natural numbers to themselves to be computable?" and "How can noncomputable functions be classified into a hierarchy based on their level of noncomputability?". Theory of relative computability, reducibility notions and degree structures. Prerequisite is PHIL 150, or PHIL 151 or CS 103. Same as: PHIL 251A

PHIL 152. Computability and Logic. 4 Units.

Approaches to effective computation: recursive functions, register machines, and Turing machines. Proof of their equivalence, discussion of Church's thesis. Elementary recursion theory. These techniques used to prove Gödel's incompleteness theorem for arithmetic, whose technical and philosophical repercussions are surveyed. Prerequisite: 151. Same as: PHIL 252

PHIL 153. Feminist Theories and Methods Across the Disciplines. 2-5 Units.

(Graduate Students register for PHIL 253 or FEMGEN 203) Concepts and questions distinctive of feminist and LGBT scholarship and how they shape research: gender, intersectionality, disciplinarity and interdisciplinarity, standpoint, "queering," postmodern critiques, postcolonial critiques. Prerequisites: Feminist Studies 101 or equivalent with consent of instructor. Same as: FEMGEN 103, FEMGEN 203, PHIL 253

PHIL 154. Modal Logic. 4 Units.

(Graduate students register for 254.) Syntax and semantics of modal logic, and technical topics like completeness and correspondence theory, including both classical and recent developments. Applications to topics in philosophy, computer science, and other fields. Prerequisite: 150 or preferably 151. Same as: PHIL 254

PHIL 155. General Interest Topics in Mathematical Logic. 4 Units.

Introduction to formalization using language of logic and to problems of philosophical logic and computer science that can be handled this way. Propositional calculus, Sudoku puzzles, resolution rule, problem P=NP. Possible worlds, modal logic with emphasis on individuation problems. May be repeated for credit. Same as: PHIL 255

PHIL 157. Topics in Philosophy of Logic. 3 Units.

(Graduate students register for 257.) Disputed foundational issues in logic; the question of what the subject matter and boundaries of logic are, such as whether what is called second-order logic should be counted as logic. What is the proper notion of logical consequence? May be repeated for credit. Pre- or corequisite: 151, or consent of instructor. Same as: PHIL 257

PHIL 158. Topics in Logic: Ten Problems in Deontic Logic. 2 Units.

As witnessed by the handbook of deontic logic and normative systems, the area of deontic logic is in flux. Traditional questions and logical methods of deontic logic are being supplemented by new questions and new techniques. This tutorial gives an introduction to the current discussion in deontic logic. In what sense are obligations different from norms? Jørgensen's dilemma, from preference based modal logic to the modern approach. How to reason about dilemmas, contrary-to-duty and defeasible norms? Distinguishing various kinds of defeasibility. How to relate various kinds of permissive and constitutive norms? Permissions as exceptions and prioritized norms. How do norms relate to other modalities like beliefs, desires, and intentions? How do norms change? What is the role of time, action and games in deontic reasoning? For each problem, we discuss traditional as well as new research questions. We see the new questions as good questions for current research, in the sense that they point to modern theories and applications. We are especially interested in new questions that make older traditional questions obsolete in the sense that they are now addressed from a modern perspective, or in a more general setting. This mini-course will run from the week of 15 April through the week of 13 May. Same as: PHIL 258

PHIL 160A. Newtonian Revolution. 4 Units.

(Graduate students register for 260A.) 17th-century efforts in science including by Kepler, Galileo, Descartes, and Huygens, that formed the background for and posed the problems addressed in *Newton's Principia*. Same as: PHIL 260A

PHIL 160B. Newtonian Revolution. 4 Units.

(Graduate students register for 260B.) *Newton's Principia* in its historical context, emphasizing how it produced a revolution in the conduct of empirical research and in standards of evidence in science. Same as: PHIL 260B

PHIL 162. Philosophy of Mathematics. 4 Units.

(Graduate students register for PHIL 262.) General survey of the philosophy of mathematics, focusing on epistemological issues. Includes survey of some basic concepts (proof, axiom, definition, number, set); mind-bending theorems about the limits of our current mathematical knowledge, such as Gödel's Incompleteness Theorems, and the independence of the continuum hypothesis from the current axioms of set theory; major philosophical accounts of mathematics: Logicism, Intuitionism, Hilbert's program, Quine's empiricism, Field's program, Structuralism; concluding with a discussion of Eugene Wigner's 'The Unreasonable Effectiveness of Mathematics in the Natural Sciences'. Students won't be expected to prove theorems or complete mathematical exercises. However, includes some material of a technical nature. Prerequisite: PHIL150 or consent of instructor.

Same as: MATH 162, PHIL 262

PHIL 163. Significant Figures in Philosophy of Science. 4 Units.

(Graduate students register for 263.) Directed study of two or more thinkers, past or present, who have made a lasting impact on contemporary philosophy of science. Subjects last year were Henri Poincaré, Pierre Duhem, and Gaston Bachelard.

Same as: PHIL 263

PHIL 164. Central Topics in the Philosophy of Science: Theory and Evidence. 4 Units.

(Graduate students register for 264.) Is reductionism opposed to emergence? Are they compatible? If so, how or in what sense? We consider methodological, epistemological, logical and metaphysical dimensions of contemporary discussions of reductionism and emergence in physics, in the sciences of complexity, and in philosophy of mind.

Same as: PHIL 264

PHIL 164A. Central Topics in Philosophy of Science: Causation. 4 Units.

(Graduate Students register for 264A.) Establishing causes in science, engineering, and medicine versus establishing them in Anglo-American law, considered in the context of Hume and Mill on causation. May be repeated for credit.

Same as: PHIL 264A

PHIL 165. Philosophy of Physics. 4 Units.

Graduate students register for 265.) Central topic alternates annually between space-time theories and philosophical issues in quantum mechanics; the latter in Winter 2013-14. Conceptual problems regarding the uncertainty principle, wave-particle duality, quantum measurement, spin, and their treatment within the 'Copenhagen interpretation' of quantum mechanics, and the related doctrine of complementarity. The issue of quantum entanglement as raised by Einstein and Schrödinger in the 1930s and the famous EPR (Einstein-Podolsky-Rosen) paper of 1935. Examination of EPR-type experimental set-ups and a result due to Bell in the 1960s, according to which no "hidden variables" theory satisfying a certain locality condition (apparently assumed by EPR) can reproduce all the predictions of quantum mechanics. Survey of several live interpretive options for standard quantum mechanics: Bohmian mechanics (a.k.a. 'pilot wave theory'), 'spontaneous collapse' theories, and Everett's relative-state interpretation. Critical scrutiny of the program that seeks to explain the classical-to-quantum transition, i.e., the emergence of the world of classical physics and macroscopic objects from quantum physics. May be repeated for credit if content is different.

Same as: PHIL 265

PHIL 166. Probability: Ten Great Ideas About Chance. 4 Units.

Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes' great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116.

Same as: PHIL 266, STATS 167, STATS 267

PHIL 166A. Foundations of Quantum Mechanics. 4 Units.

This seminar will concentrate on a variety of probability questions that arise in quantum mechanics, including some from recent experiments. Negative probabilities and nonmonotonic upper probabilities will be emphasized.

Same as: PHIL 266A

PHIL 167A. Philosophy of Biology. 2-4 Units.

(Graduate students register for 267A.) Evolutionary theory and in particular, on characterizing natural selection and how it operates. We examine debates about fitness, whether selection is a cause or force, the levels at which selection operates, and whether cultural evolution is a Darwinian process.

Same as: PHIL 267A

PHIL 167B. Philosophy, Biology, and Behavior. 4 Units.

(Graduate Students register for 267B) Philosophical study of key theoretical ideas in biology as deployed in the study of behavior. Topics to include genetic, neurobiological, ecological approaches to behavior; the classification and measurement of behaviors: reductionism, determinism, interactionism. Prerequisites: one PHIL course and either one BIO course or Human Biology core; or equivalent with consent of instructor.

Same as: PHIL 267B

PHIL 167C. Associative Theories of Mind and Brain. 4 Units.

After a historical survey of associative theories from Hume to William James, current versions will be analyzed including the important early ideas of Karl Lashley. Emphasis will be on the computational power of associative networks and their realization in the brain.

Same as: PHIL 267C

PHIL 167D. Philosophy of Neuroscience. 4 Units.

Can problems of mind be solved by understanding the brain, or models of the brain? The views of philosophers and neuroscientists who believe so, and others who are skeptical of neurophilosophical approaches to the mind. Historical and recent literature in philosophy and neuroscience. Topics may include perception, memory, neural accounts of consciousness, neurophenomenology, neuroscience and physics, computational models, and eliminativism. (Not open to freshmen.)

Same as: PHIL 267D, SYMSYS 206

PHIL 169. Evolution of the Social Contract. 4 Units.

Explore naturalizing the social contract. Classroom presentations and term papers. Texts: Binmore - Natural Justice; Skyrms - Evolution of the Social Contract.

Same as: PHIL 269

PHIL 170. Ethical Theory. 4 Units.

A more challenging version of Phil 2 designed primarily for juniors and seniors (may also be appropriate for some freshmen and sophomores - contact professor). Fulfills the Ethical Reasoning requirement. Graduate section (270) will include supplemental readings and discussion, geared for graduate students new to moral philosophy, as well as those with some background who would like more.

Same as: ETHICSOC 170, PHIL 270

PHIL 170B. Metaphor. 4 Units.

In metaphor we think and talk about two things at once: two different subject matters are mingled to rich and unpredictable effect. A close critical study of the main modern accounts of metaphor's nature and interest, drawing on the work of writers, linguists, philosophers, and literary critics. Attention to how understanding, appreciation, and pleasure connect with one another in the experience of metaphor. Consideration of the possibility that metaphor or something very like it occurs in nonverbal media: gesture, dance, painting, music.

Same as: PHIL 270B

PHIL 170D. Trust and Trustworthiness. 4 Units.

An exploration of the place of interpersonal trust in ethical thought. What is it to trust another person? How is trusting related to, though different from, other attitudes we sometimes bear towards others (e.g. justified beliefs we form about others and their conduct; ethically significant expectations we have of others, etc.)? What is involved in acquiring/possessing the virtue of trustworthiness? How should trust (and trustworthiness) figure in our thinking about important ethical activities, for example promising, friendship, or the practice of politics?.

Same as: PHIL 270D

PHIL 171. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, IPS 208, PHIL 271, POLISCI 3P, POLISCI 136S, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

PHIL 172. History of Modern Moral Philosophy. 4 Units.

This course traces the development of moral philosophy in Britain just prior to the nearly simultaneous emergence of Kant's moral philosophy and Bentham's utilitarianism in the 1780's. Emphasis is on the dialogue between empiricists and rationalists on the subject of the relationship between the natural and the normative. Authors include Hobbes, Clarke, Hutcheson, Hume, Smith, Price, and Bentham. Prerequisite: some familiarity with Kant's moral theory and utilitarianism, and demonstrated interest in philosophy.

Same as: PHIL 272

PHIL 172B. Recent Ethical Theory. 4 Units.

Study the works of several prominent contemporary moral philosophers. Possible authors include: Scanlon, Darwall, Nagel, Williams, Blackburn, Gibbard, Korsgaard. Prerequisite: students should have taken an introduction to moral philosophy (Phil. 20, Phil. 170 or equivalent).

Same as: PHIL 272B

PHIL 172D. Bernard Williams. 4 Units.

An exploration of some central themes from the work of Bernard Williams. Particular attention will be paid to his discussion of the character and identity of the self, his sustained critique of morality and moral philosophy. We will also read several of Williams' interlocutors, including Nagel, Parfit, Korsgaard, and Herman.

Same as: PHIL 272D

PHIL 172N. Prudence and Morality. 4 Units.

We sometimes think we should do something just because it will benefit us in the future, even though we don't particularly feel like doing it now (e.g. we exercise, go to the dentist for a check-up, or set aside money for retirement). And we sometimes think we should do something for the sake of another person, even when it is inconvenient, costly, or unpleasant (e.g. we stop to help a stranded motorist, donate to charity, or tell someone an embarrassing truth rather than a face-saving lie). When we do the former, we act prudently. When we do the latter, we act morally. This course explores the debate among philosophers about the source of our reasons for acting prudently and morally. Some argue that our reasons to be prudent and moral stem directly from the fact that we are rational; that it is contrary to reason to ignore our own future interests, or the interests of other people. Others disagree, arguing that the source of these reasons must lie elsewhere. Course readings will include work by Thomas Nagel, Bernard Williams, Christine Korsgaard, Derek Parfit, Philippa Foot, and others.

Same as: PHIL 272N

PHIL 173A. Aesthetics: Metaphor across the Arts. 4 Units.

What if a metaphor is an instructively compact work of art, or if finding a metaphor apt is an instructively simple case of finding something aesthetically valuable? What does this reveal about the nature of art and language? Introduction to the philosophical study of art and aesthetic value, organized around metaphor. Contemporary accounts of metaphor as a verbal device. Arguments for the existence of nonverbal metaphor in nonliterary arts. The power and appeal of metaphors drawn from art, art criticism, theoretical inquiry, and everyday life.

PHIL 173B. Metaethics. 4 Units.

This is an undergraduate only class. Can moral and ethical values be justified or is it just a matter of opinion? Is there a difference between facts and values? Are there any moral truths? Does it matter if there are not? Is anything in life really valuable or meaningful? Focus is not on which things or actions are valuable or morally right, but what is value or rightness itself. Contemporary metaethics. Prerequisites: 1 and 80.

PHIL 173W. Aesthetics. 4 Units.

This course will investigate a cluster of varied but related philosophical issues concerning the arts: painting, music, literature, poetry, photography, theater, film, etc. Issues most of which are, at the same time, problems in philosophy of mind or language, value theory, or epistemology. We will address questions like the following: What, if anything, is distinctive about art and aesthetic experience? What is aesthetic value, and how do aesthetic values relate to and interact with values of other kinds? What is fiction and why are people interested in it? In what ways are works of art expressive of feelings or emotions? What similarities and differences are there in the expressive qualities of music, literature, painting, poetry? How might we learn from works of art of one or another kind, and how might they work to change people's perspectives or attitudes? In what ways do works of art serve as vehicles of communication? Is there a fundamental difference between the value of works of art, and that of beautiful natural objects? (These various issues are related, as we shall see; we'll be exploring several of them simultaneously.) Along the way, we will bump into more specific questions such as: Why and in what ways is photography more (or less) 'realistic' than painting and drawing, or more or less revealing of reality? Does (instrumental) music have cognitive content? Is music representational in anything like the ways literature and figurative painting are? Do all literary works have narrators? Is there ever (or always?) anything like narrators in paintings, films, music?.

Same as: PHIL 273W

PHIL 174. Freedom and the Practical Standpoint. 4 Units.

(Graduate students register for 274.) Confronted with the question of how to act, people think of themselves as freely determining their own conduct. Natural science poses a challenge to this by explaining all events, including human actions, in terms of causal processes. Are people justified in thinking of themselves as free? Major philosophical approaches to this question: incompatibilism, compatibilism, and the two-standpoint view.

Same as: PHIL 274

PHIL 174A. Moral Limits of the Market. 4 Units.

Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases.

Same as: ETHICSOC 174A, PHIL 274A, POLISCI 135P

PHIL 174D. Moral Luck. 4 Units.

We draw a fundamental distinction between what a person voluntarily does, and what is beyond her control. Such a distinction seems central to how we think about what it is to justify our actions (whether to ourselves or to one another), as well as to our practice of holding one another morally responsible for what we do. Yet under pressure, this distinction can appear to collapse; we find that we cannot successfully disentangle what a person controls from what she does not when she acts. This course examines this problem in depth, and considers how we might respond in the face of it: Is it really a problem? If so, does it threaten our moral practices? How should it influence the way in which we make choices, or the way we understand those choices once we've made them?.

Same as: PHIL 274D

PHIL 174L. Betrayal and Loyalty, Treason and Trust. 2 Units.

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. SAME AS LAW 520.

Same as: ETHICSOC 174L, ETHICSOC 274L, PHIL 274L

PHIL 175. Philosophy of Law. 4 Units.

This course will explore foundational issues about the nature of law and its relation to morality, and about legal responsibility and criminal punishment, with a focus on criminal culpability for attempts. Prerequisite: PHIL 80 and one additional PHIL course.

PHIL 175A. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.]

Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

PHIL 175M. Two Ethical Theories and Being a Person. 4 Units.

The distinction between the ethics of being a person and the ethics of rules as opposed to the distinction between Kantian ethics and utilitarianism or consequentialism consequentialism. Comparison of these two types of ethics with respect to their relationship to agency and being a good person. Relations between Western ethics and those of other continents.

Same as: PHIL 275M

PHIL 176. Political Philosophy: The Social Contract Tradition. 4 Units.

(Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Study of the answers given to such questions by major political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant.

Same as: PHIL 276, POLISCI 137A, POLISCI 337A

PHIL 176A. Classical Seminar: Origins of Political Thought. 4-5 Units.

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, CLASSICS 381, PHIL 276A, POLISCI 230A, POLISCI 330A

PHIL 176B. The Economic Individual in the Behavioral Sciences. 4 Units.

(Graduate students register for 276B.)

Same as: PHIL 276B

PHIL 176C. Religion and Politics: a Latin American Perspective. 4 Units.

Religion has traditionally been banished from politics in some places in Latin America. Religious symbols may not be displayed in public buildings, political discourse is expected to be free from all religious content, and religious ministers are not allowed to run for public office, among other measures. This course examines the political motivation for this kind of policies towards religion taking a comparative perspective with American and French variants of secularism.

Same as: ETHICSOC 276R, ETHICSOC 376R, PHIL 276C

PHIL 177B. EMOTIONS: MORALITY AND LAW. 2 Units.

If emotions are the stuff of life, some emotions are the stuff of our moral and legal life. Emotions such as: guilt, shame, revenge, indignation, resentment, disgust, envy, jealousy and humiliation, along with forgiveness, compassion, pity, mercy and patriotism, play a central role in our moral and legal life. The course is about these emotions, their meaning and role in morality and law. Issues such as the relationship between punishment and revenge, or between envy and equality, or St. Paul's contrast between law and love, or Nietzsche's idea that resentment is what feeds morality, will be discussed alongside other intriguing topics.

Same as: ETHICSOC 202, ETHICSOC 302, PHIL 277B

PHIL 178. Ethics in Society Honors Seminar. 3 Units.

For students planning honors in Ethics in Society. Methods of research. Students present issues of public and personal morality; topics chosen with advice of instructor.

Same as: ETHICSOC 190

PHIL 178M. Introduction to Environmental Ethics. 4-5 Units.

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 178M, ETHICSOC 278M, PHIL 278M, POLISCI 134L

PHIL 179S. Moral Psychology, Reasons for Action, and Moral Theory. 4 Units.

What sorts of considerations does an ethical agent take to be good reasons for action? Work in moral psychology to illuminate the theory of practical reasons, and the theory of practical reasons to test the prospects for systematic moral theory. Can any systematic moral theory be reconciled with the moral psychology of ordinary, morally respectable agents?

Reading include Bernard Williams, Rosalind Hursthouse, Peter Railton, T.M. Scanlon, and Barbara Herman.

Same as: PHIL 279S

PHIL 180. Metaphysics. 4 Units.

It seems undeniable that things in the world have certain features, or properties: some apples are red, my cat is soft, the Golden Gate Bridge is 2,737 meters long, and so on. This course will focus on metaphysical issues in properties. The topics include ontic issues in properties (universals vs. tropes, realism vs. nominalism), particulars (tropes and bundle theory), and the nature of properties (quantities and causal essentialism). Prerequisites: Philosophy 80 and Philosophy 50 or equivalent (or consent of instructor). Same as: PHIL 280

PHIL 180A. Realism, Anti-Realism, Irrealism, Quasi-Realism. 4 Units.

Realism and its opponents as options across a variety of different domains: natural science, mathematics, ethics, and aesthetics. Clarify the various conceptions that fall under these terms and outline the reasons for and against adopting realism for the various domains. Highlight the general issues involved. Prerequisites: 80, 181.

Same as: PHIL 280A

PHIL 181. Philosophy of Language. 4 Units.

The study of conceptual questions about language as a focus of contemporary philosophy for its inherent interest and because philosophers see questions about language as behind perennial questions in other areas of philosophy including epistemology, philosophy of science, metaphysics, and ethics. Key concepts and debates about the notions of meaning, truth, reference, and language use, with relations to psycholinguistics and formal semantics. Readings from philosophers such as Frege, Russell, Wittgenstein, Grice, and Kripke. Prerequisites: 80 and background in logic. Same as: PHIL 281

PHIL 181B. Philosophy of Language: Contemporary Debates. 4 Units.

This course builds on the material of 181/281, focusing on debates and developments in the pragmatics of conversation, the semantics/pragmatics distinction, the contextuality of meaning, the nature of truth and its connection to meaning, and the workings of particular linguistic constructions of special philosophical relevance. Students who have not taken 181/281 should seek the instructor's advice as to whether they have sufficient background. Same as: PHIL 281B

PHIL 182. Truth. 2-4 Units.

Philosophical debates about the place in human lives and the value to human beings of truth and its pursuit. The nature and significance of truth-involving virtues such as accuracy, sincerity, and candor. Prerequisite PHIL 80 or permission of the instructor.

Same as: PHIL 282

PHIL 183T. Atheism: Hegel to Heidegger. 5 Units.

The radical changes in ideas of God between Hegel and Heidegger, arguing that their questions about theism and atheism are still pertinent today. Texts from Hegel, Feuerbach, Marx, Nietzsche, and Heidegger: on God, history, and the social dimensions of human nature. N.B.: Class size limited. Apply early at tsheehan@stanford.edu.

Same as: RELIGST 183

PHIL 184. Theory of Knowledge. 4 Units.

What is knowledge? How are beliefs justified? Contemporary theories evaluated against central problems: the regress argument, Gettier problem, and skeptical paradox. Prerequisite Phil 80 or consent of the instructor.

Same as: PHIL 284

PHIL 184C. Epistemology of Testimony. 4 Units.

Many of our beliefs come from others, and not from direct experience. Is testimony a source of fundamental reasons; reasons that do not have to be supported or validated by other sources like perception or inference? What sort of responsibility does one have to one's hearers, when one gives testimony?

Same as: PHIL 284C

PHIL 184F. Feminist Theories of Knowledge. 4 Units.

Feminist critique of traditional approaches in epistemology and alternative feminist approaches to such topics as reason and rationality, objectivity, experience, truth, the knowing subject, knowledge and values, knowledge and power.

Same as: FEMST 166, PHIL 284F

PHIL 184P. Probability and Epistemology. 4 Units.

Confirmation theory and various ways of trying to understand the concept of evidence. Discuss a series of issues in epistemology including probabilism (the view that you should assign degrees of belief to various propositions), conditionalization, confirmational holism, reliabilism and justification, and disagreement.

PHIL 184V. The Epistemology of Disagreement. 4 Units.

What should you do when you learn that equally informed and equally competent reasoners disagree with you? Should you give up your beliefs, or should you stick to your views? In this course, we'll look at the recent debate in epistemology about disagreement. We will investigate the effects of disagreement on the justification of our beliefs, and explore the implications for the justification of our religious, moral, and philosophical views.

PHIL 185. Memory. 4 Units.

Structure, content, functional role, and epistemic authority of human memories. Sources include philosophical and psychological literature from different schools and historical periods.

PHIL 185B. Philosophy of Perception. 4 Units.

The nature of perceptual experience and the role it plays in securing empirical knowledge. Focus will be on what is sometimes called "the problem of perception": the question of how perception could provide us with direct awareness of the surrounding environment given the possibility of illusions or hallucinations. Topics, include the relationship between perception and belief, the nature of perceptual phenomenology, whether or not perceptual experiences are representational states, and the philosophical relevance of empirical research on perception.

Same as: PHIL 285B

PHIL 186. Philosophy of Mind. 4 Units.

(Graduate students register for 286.) This is an advanced introduction to core topics in the philosophy of mind. Prerequisite: PHIL 80.

Same as: PHIL 286

PHIL 186B. Inner Sense. 4 Units.

Often the label "inner" is used to describe aspects of ourselves we believe are not immediately observable to another. Thoughts, feelings, sensations; these all happen on the "inside," whereas speech, mannerisms, and actions are "outward" expressions. But how useful is this way of thinking?

And what does it assume about what is "inner" versus what is "outer"? How reliable are the various internal mechanisms that allow us to know ourselves? Do we have a special kind of direct access to our own inner lives? And what can we know about the inner lives of others? Readings from philosophy of mind and cognitive science.

PHIL 187. Philosophy of Action. 4 Units.

(Graduate students register for 287.) Contemporary research in the philosophy of action. Topics include: What is it to be an agent? Is there a philosophically defensible contrast between being an agent and being a locus of causal forces to which one is subject? What is it to act purposively? What is intention? What is the relation between intention and belief? What is it to act intentionally? What is it to act for a reason? What is the relation between explaining why someone acted by citing the reasons for which she acted and causal explanation of her action? What is the relation between theoretical and practical rationality? What is the nature of our knowledge of our own intentional activity? What is it to act autonomously? What is shared cooperative activity? Prerequisite: 80.
Same as: PHIL 287

PHIL 188. Personal Identity. 4 Units.

Do you persist through time the way that a skyscraper persists through space, by having different parts at different locations? Or are you iquest;wholly present;quest; at every moment of your life, in something more like the way that an elevator is present in each place as it travels up to the top floor? What criteria determine whether you now are the very same person as some unique person located at some time in the past? Is the continuity of your memories or other mental states sufficient for your survival? Can you survive the loss or destruction of your body? Do you really exist for more than just the present moment? How do different answers to these questions bear on your moral, personal, and professional obligations? What kinds of considerations could possibly help us to answer these questions? This course explores these and related issues. Readings include a mix of introductory survey, historical, and contemporary material.
Same as: PHIL 288

PHIL 189. Examples of Free Will. 4 Units.

Examples drawn from three domains: choice, computation, and conflict of norms. Conceptually, a distinction is made between examples that are predictable and those that are not, but skepticism about making a sharp distinction between determinism and indeterminism is defended.
Same as: PHIL 289

PHIL 193C. Film & Philosophy. 4 Units.

Issues of freedom, morality, faith, knowledge, personal identity, and the value of truth explored through film; philosophical investigation of the filmic medium itself. Screenings to include *Twelve Monkeys* (Gilliam), *Ordet* (Dreyer), *The Dark Knight* (Nolan), *Vicky Cristina Barcelona* (Allen), and *Eternal Sunshine of the Spotless Mind* (Kaufman). Taught in English.
Same as: COMPLIT 154A, FRENCH 154, ITALIAN 154, PHIL 293C

PHIL 193D. Dante and Aristotle. 5 Units.

Focuses on Dante and Aristotle's writings about the cosmos, love, and the good. Readings will include Dante's *Commedia*, Aristotle's *Nicomachean Ethics* and *De caelo*, Aquinas's *Summa theologiae*, and Richard of St. Victor's *Benjamin Minor*. All readings will be in English.
Same as: ENGLISH 106E

PHIL 193H. The Art of the Movies: Story, Drama, and Image. 4 Units.

A philosophical study of how movies coordinate and transform elements they borrow from older arts of literary narrative, live theater, and graphic illustration. Examples from the career of Alfred Hitchcock.

PHIL 193W. Nietzsche, Dostoevsky, and Sartre. 4 Units.

Literary works in which philosophical ideas and issues are put forward, such as prose poems, novels, and plays. Ideas and issues and the dramatic or narrative structures through which they are presented. Texts include: Nietzsche, *Thus Spoke Zarathustra*; Dostoevsky, *The Brothers Karamazov*; and Sartre, *Nausea* and *No Exit*.

PHIL 194A. Rationality Over Time. 4 Units.

Our beliefs and intentions seem to be subject to norms of rationality that enjoin consistency and coherence at a given time. Are there also norms of rationality that concern the relations among and changes in our beliefs and intentions over time? What might such norms of rationality over time be, how might we defend them (or argue that they are not defensible), how are they related to norms of rationality at a time, and how does our approach to these rationality norms affect our overall understanding of the kind of thinkers and actors we are? Our focus will be primarily on potential norms of practical rationality concerning intention, but we will also consider potential norms of theoretical rationality concerning belief. We will proceed by studying contemporary work on these issues, including Richard Holton's *Willing, Wanting, Waiting*.

PHIL 194B. Reason and Passion. 4 Units.

An influential strand of the Western philosophical tradition maintains that human beings are composites of two motivational sources: reason and passion (sometimes called 'feeling,' or 'emotion'). What are the philosophical reasons for positing this division? If there is such a division, how are we to conceive of passion? In what ways is it like and/or unlike reason? In what ways does it interact and/or fail to interact with reason? And how are both sources related to the self as a whole? We will explore these questions by drawing on both classical and contemporary readings.

PHIL 194C. Time and Free Will. 4 Units.

Classic and contemporary reading on free will, with special attention to the consequence argument for incompatibilism, and issues involving causation and time.

PHIL 194D. Capstone Seminar: Analyticity. 4 Units.

Survey of philosophical work on analyticity. We will start with some of the classic works on the topic, including papers by Frege, Russell and Quine. Next, we'll look at the cutting edge of research on analyticity, including work by Amie Thomasson, Agustiacute;n Rayo, and Paul Boghossian.

PHIL 194E. Ethical Antitheory. 4 Units.

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PHIL 194G. Philosophical Issues in Language. 4 Units.

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PHIL 194H. Explanation and Justification. 4 Units.

We will discuss the nature of epistemic justification;quest;in particular, whether it's "internal" or "external" and how, if at all, justification can explain belief. Assignments include a term paper + an oral presentation.

PHIL 194L. Montaigne. 4 Units.

Preference to Philosophy seniors. Philosophical and literary aspects of Montaigne's *Essays* including the nature of the self and self-fashioning, skepticism, fideism, and the nature of Montaigne's philosophical project. Montaigne's development of the essay as a literary genre.

PHIL 194N. Philosophical Issues in Cognitive Science. 4 Units.

Philosophers generally do not perform systematic empirical observations or construct computational models. But philosophy remains important to cognitive science because it deals with fundamental issues that underlie the experimental and computational approach to mind. Abstract questions such as the nature of representation and computation. Relation of mind and body and methodological questions such as the nature of explanations found in cognitive science. Normative questions about how people should think as well as with descriptive ones about how they do. In addition to the theoretical goal of understanding human thinking, cognitive science can have the practical goal of improving it, which requires normative reflection on what we want thinking to be. Philosophy of mind does not have a distinct method, but should share with the best theoretical work in other fields a concern with empirical results.

PHIL 194P. Naming and Necessity. 4 Units.

Saul Kripke's lectures on reference, modal metaphysics, and the mind/body problem.

PHIL 194R. Epistemic Paradoxes. 4 Units.

Paradoxes that arise from concepts of knowledge and rational belief, such as the skeptical paradox, the preface paradox, and Moore's paradox. Can one lose knowledge without forgetting anything? Can one change one's mind in a reasonable way without gaining new evidence?.

PHIL 194S. Skepticism. 4 Units.

Modern arguments for skepticism are hard to combat, but also curiously inert in ordinary life. We will look at a variety of contemporary attempts to come to terms with skepticism about the external world, each of which seeks to exploit the curious inertness of skeptical hypotheses.

PHIL 194T. Practical Reason. 4 Units.

Contemporary research on practical reason, practical rationality, and reasons for action. Enrollment limited to 12. Priority given to undergraduate Philosophy majors.

PHIL 195A. Unity of Science. 4-5 Units.

Primarily for seniors.

PHIL 195B. Donor Seminar: Practical Reasoning. 4 Units.

Primarily for seniors. Relationships among action, deliberation, reasons, and rationality. On what basis do people decide what to do? What norms or rules structure reasoning? What constitutes rationality?.

PHIL 196. Tutorial, Senior Year. 5 Units.

(Staff).

PHIL 197. Individual Work, Undergraduate. 1-15 Unit.

May be repeated for credit.

PHIL 197I. Homeless Services in Silicon Valley. 2 Units.

This service learning Student Initiated Course places participants at local organizations to do a quarter-long mentored project, supplemented with training and group reflection sessions. Through these meaningful, hands-on experiences, we hope to engage the Stanford student body in the issue of homelessness, specifically as faced by service providers.

PHIL 198. The Dualist. 1 Unit.

Weekly meeting of the editorial board of *The Dualist*, a national journal of undergraduate work in philosophy. Open to all undergraduates. May be taken 1-3 quarters. (AU) (Potochnik, Yap).

PHIL 199. Seminar for Prospective Honors Students. 2 Units.

Open to juniors intending to do honors in philosophy. Methods of research in philosophy. Topics and strategies for completing honors project. May be repeated for credit.

PHIL 201. Introduction to Medieval Philosophy. 4 Units.

Classics of Western philosophy by Augustine, Boethius, Anselm, and Aquinas. Explore the puzzles facing someone seeking to lead a good life and to understand herself and her world. A theory of will and human motivation, a theory of ethics based on the agent's intention, and a theory of divine omniscience and omnipotence consistent with divine goodness and human freedom. Works include *On Free Choice*, *The Consolation of Philosophy*, *On the Fall of the Devil*, and *Summa Theologiae*.

Same as: PHIL 101

PHIL 201B. John Duns Scotus: Politics, Metaphysics & Philosophy of Mind. 1-2 Unit.

Life and an introduction to the difficulties of medieval biography. Franciscanism and Scotus' view on property and ownership. Proofs for the existence of God. Philosophy of mind. Metaphysics in general. Universals, Common natures, Formal Distinction, and Individuation. Formal distinction, individual forms and the precedents for Scotus' view in Richard Rufus.

PHIL 202M. Fichte. 1-2 Unit.

This three-day intensive mini-course will introduce the moral and political thought of Johann Gottlieb Fichte, the founder of the German idealist movement. The topics to be discussed are: Fichte's theory of subjectivity and transcendental idealism; Fichte's defense of radical freedom of the will; Fichte's transcendental deduction of other selves; the relation of right between rational beings and the foundations of political philosophy; Fichte's deduction of the moral law from the absolute freedom of the rational being; the application of the moral law through conscience. No previous acquaintance with Fichte's philosophy will be presupposed.

Same as: PHIL 102M

PHIL 205R. JUST AND UNJUST WARS. 2 Units.

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Same as LAW 751.

Same as: ETHICSOC 205R, ETHICSOC 305R, PHIL 305R

PHIL 206. Ancient Skepticism. 4 Units.

The ancient Pyrrhonian skeptics who think that for any claim there is no more reason to assert it than deny it and that a life without any beliefs is the best route to happiness. Some ancient opponents of the Pyrrhonian skeptics and some relations between ancient and modern skepticism.

Same as: PHIL 106

PHIL 207. Early Plato. 4 Units.

We shall focus on Plato's early or Socratic dialogues (e.g. the *Crito*, the *Gorgias*, and the *Protagoras*). In these dialogues, Plato focuses on ethics and ethical psychology without explicitly drawing on epistemological and metaphysical claims. We will try to determine whether the Socrates of these dialogues is a purely destructive critic or whether he has a positive ethical view that he advances.

Same as: PHIL 107

PHIL 207A. The Greeks on Irrationality. 2-4 Units.

In this course, we shall examine the views of some central Greek philosophers (Plato, Aristotle, the Epicureans, and the Stoics) on the irrational and non-rational aspects of human life. What makes something irrational and what roles (negative and perhaps positive as well) does the irrational play in our lives? We shall examine their views on anger, fear, madness, love, pleasure and pain, sexual desire and so on. We shall also consider more briefly some depictions of these psychic items in ancient Greek literature.

Same as: PHIL 107A

PHIL 207B. Plato's Metaphysics and Epistemology. 4 Units.

We will read the *Theaetetus* and the *Parmenides*, and consider various definitions of knowledge, and metaphysical problems about the objects of knowledge, and a proposed method for examining and resolving such problems. Prerequisite: Philosophy 80 or consent of instructor.

Same as: PHIL 107B

PHIL 207C. Plato's Timaeus. 4 Units.

Same as: PHIL 107C

PHIL 208. Aristotle's Metaphysics Book Alpha. 4 Units.

An introduction both to Aristotle's own metaphysics and to his treatment of his predecessors on causality, included the early Ionian cosmologists, atomism, Pythagoreans, Heraclitus, Parmenides, Empedocles, Anaxagoras and Plato. Prerequisite: one course in ancient Greek philosophy.

Same as: PHIL 108

PHIL 208A. Aristotelian Logic. 2-4 Units.

A careful examination of Aristotle's syllogistic, with special emphasis on the interpretation of his modal syllogistic. This course will serve both as an introduction to ancient term logic and to the difference between sentential modal operators and modal modifiers to the copula. Topics will include the analysis of syllogisms into figures and moods, the reduction of 2nd and 3rd figure syllogisms to the first, the consistency of the modal syllogistic, models for the syllogistic, and *de re* versus *de dicto* modalities. For students with at least some introductory background in logic.

Same as: PHIL 108A

PHIL 208B. Aristotle's Physics Book One. 4 Units.

A chapter by chapter analysis of Aristotle's introductory discussions of physical theory. Topics to be considered include Aristotle's treatment of Eleatic monism, the role of opposites in pre-Socratic physics, the role of matter in physics, and an analysis of the elements of changing objects into form, privation and a subject.

Same as: PHIL 108B

PHIL 209. Topics in Ancient Philosophy: Plato and Aristotle on Art and Rhetoric. 4 Units.

Plato's and Aristotle's views on the nature of art and rhetoric and their connections with the emotions, reason and the good life. Readings include Plato's *Gorgias*, *Ion* and parts of the *Republic* and the *Laws* and Aristotle's *Poetics* and *Rhetoric*.

Same as: PHIL 109

PHIL 209A. Special Topics in Ancient Philosophy. 4 Units.

In this course we will read carefully Book I, Chapters 1-3, of Aristotle's *Physics* and the commentary on those chapters by John Philoponus. Topics to be covered include Aristotle's preliminary discussion of the principles of natural science and his detailed exposition and refutation of Eleatic Monism.

Same as: PHIL 109A

PHIL 209B. Greek philosophers read their ancestors: Intro to the ancient reception of Presocratic philosophy. 4 Units.

The first Greek philosophers are known to us only through fragments of their original works, generally few in number and transmitted by later authors, as well as through a set of testimonies covering a thousand years and more. Thus it is crucial, in order to understand archaic thought, to get a sense of how they were read by those to whom we owe their transmission. What was their aim, their method, their presuppositions or prejudices? The course will employ this perspective to examine authors such as Plato, Aristotle, Theophrastus, Diogenes Laertius, Simplicius *quest*; among others. We shall also reflect, on the basis of the paradigmatic case of the Presocratics, on some of the more general problems raised by literary and philosophical approaches to the notion of reception.

Same as: PHIL 109B

PHIL 209C. Aristotle's cosmology and theology. 4 Units.

PHIL 109C/209C now meets in Raubitschek Room, Green Library Room 351. Undergrads please sign up for 109C; grads sign up for 209C.

Same as: PHIL 109C

PHIL 210. Plato. 4 Units.

Plato's *Republic*.

Same as: PHIL 110

PHIL 210C. The Stoics on Freedom and Determinism. 4 Units.

We will investigate ancient Stoic conceptions of causality and freedom, their arguments for causal determinism, and ancient attaches on and defenses of compatibilism.

Same as: PHIL 110C

PHIL 211. Aristotle and Contemporary Ethics. 4 Units.

Aristotle's *Nicomachean Ethics*, focusing on virtue, happiness, pleasure, practical reasoning, and particularism. Sources include the Eudemian *Ethics*, contemporary philosophers who have taken many of these topics up again, and contemporary material such as that by Anscombe, Foot, Hursthouse, Korsgaard, and McDowell.

Same as: PHIL 111

PHIL 213. Hellenistic Philosophy. 4 Units.

Epicureans, skeptics, and stoics on epistemology, ethics, metaphysics, and psychology.

Same as: PHIL 113

PHIL 213L. Latin 500-1600 CE. 5 Units.

The aim of the course is to familiarize students with medieval Latin and neo-Latin through a reading of various short texts drawn from philosophical, religious, political, historical, and literary works. Students will devote most of their efforts to preparing translations for class. We shall also discuss some peculiarities of post-classical Latin grammar. Prerequisite: CLASSLAT 1, 2 & 3, or equivalent.

Same as: CLASSICS 6L, ENGLISH 113L, PHIL 113L, RELIGST 173X

PHIL 215. Problems in Medieval Philosophy: Islamic Aristotelianism and Western Scholasticism. 3-5 Units.

The western world adopted Aristotle's metaphysics and natural philosophy as the foundation of its educational system and scholarly life between 1210 and 1255. Christian Europe was thereby following the example set by Islam in Spain and the Near East. Today some people believe that this development was independent, and others think that the scholastics copied even their methods from Arabic philosophers. Historical evaluation of those claims.

Same as: PHIL 115

PHIL 216. Aquinas. 4 Units.

The focus will be on Thomas Aquinas' metaphysics. Works include *Summa contra Gentiles*, and *Summa Theologiae*, as well as some smaller pieces.

Same as: PHIL 116

PHIL 217. Descartes. 4 Units.

(Formerly 121/221.) Descartes's philosophical writings on rules for the direction of the mind, method, innate ideas and ideas of the senses, mind, God, eternal truths, and the material world.

Same as: PHIL 117

PHIL 218A. Origins of Empiricism: Gassendi, Locke, and Berkeley. 4 Units.

Particular light is shed on both the strengths and weaknesses of empiricism by studying it as it first arose during the 17th century revolution in philosophy and the sciences initiated by Descartes. Three philosophers of that period helped to advance empiricism: Pierre Gassendi (1592-1655), John Locke (1632-1704), and George Berkeley (1685-1753). A brief introduction to Descartes is followed by Gassendi's reaction to Descartes and his influence on Locke; Locke's theory of ideas, mind, language, reality, and natural philosophy expounded in his *An Essay concerning Human Understanding* (Fourth Edition, 1689); and Berkeley's later reaction to Locke.

Same as: PHIL 118A

PHIL 219. Rationalists. 4 Units.

Developments in 17th-century continental philosophy. Descartes's views on mind, necessity, and knowledge. Spinoza and Leibniz emphasizing their own doctrines and their criticism of their predecessors. Prerequisite: 102.

Same as: PHIL 119

PHIL 220A. The Leibniz-Clarke Correspondence. 4 Units.

Correspondence on metaphysics, theology, and science.

Same as: PHIL 120A

PHIL 220W. Richard Rufus on Aristotle's Metaphysics: Ontology, Unity, Universals, & Individuation. 1-2 Unit.

Mini-Course taught by Rega Wood in association with Santiago Melo Arias & Professors Alan Code & Calvin Normore. Code, Wood, & Melo Arias have spent the last 6 months intensively studying Richard Rufus of Cornwall's commentary on Aristotle's Metaphysics Zeta, Eta, & Theta. This June we will present Rufus' views on ontology, unity, & universals. There will be 6 two hour sessions on June, 4, 5, & 6 (Thurs - Saturday), 10-12 noon, 2-4 pm. Readings will be taken chiefly from Melo Arias' new translations of Rufus' circa 1238 commentary; other readings, from Aristotle and Averroes. We will consider the difference between the treatment of definition, essence and being in logic and in metaphysics, the sense in which accidents have definitions, the unity of genus and differentia in the definitions of substances, the unity of form and proximate matter inhylomorphic compounds, and the unity of the parts of the rational soul. In this context we will discuss the formal distinction pioneered by Rufus as a description of differences in formal predication consistent with real sameness. Richard Rufus was the first Western professor to lecture on Aristotle's metaphysics in Medieval Europe.
Same as: PHIL 120W

PHIL 222. Hume. 4 Units.

(Formerly 120/220; graduate students enroll in 222.) Hume's theoretical philosophy, in particular, skepticism and naturalism, the theory of ideas and belief, space and time, causation and necessity, induction and laws of nature, miracles, a priori reasoning, the external world, and the identity of the self.
Same as: PHIL 122

PHIL 224. Kant's Philosophy of Physical Science. 2-4 Units.

Kant's *Metaphysical Foundations of Natural Science* (1786), published between the first (1781) and second (1787) editions of the *Critique of Pure Reason*, in the scientific and philosophical context provided by Newtonian natural philosophy and the Leibnizian tradition. The place of this work in the development of Kant's thought. Prerequisite: acquaintance with either Kant's theoretical philosophy or the contemporaneous scientific context, principally Newton, Leibniz, and Euler.

PHIL 224A. Mathematics in Kant's Philosophy. 4 Units.

Recent work in Kant's philosophy of mathematics, examined with a view to the role of mathematics, both pure and applied, within Kant's theory of experience. Particular attention to the Transcendental Deduction and the Categories of Quantity. Prerequisite: prior acquaintance with Kant's theoretical philosophy and the Critique of Pure Reason.

PHIL 225. Kant's First Critique. 4 Units.

(Graduate students register for 225.) The founding work of Kant's critical philosophy emphasizing his contributions to metaphysics and epistemology. His attempts to limit metaphysics to the objects of experience. Prerequisite: course dealing with systematic issues in metaphysics or epistemology, or with the history of modern philosophy.
Same as: PHIL 125

PHIL 226B. Kant's Ethical Theory. 2-4 Units.

(Graduate students register for 226B.) Kant's moral philosophy based primarily on the *Groundwork of Metaphysics of Morals*, *Critique of Practical Reason*, and *The Metaphysics of Morals*.
Same as: PHIL 126B

PHIL 227. Kant's Ethics. 4 Units.

A study of Kant's ethical thought, focusing on *The Groundwork of the Metaphysics of Morals*, *The Critique of Practical Reason*, and *The Metaphysics of Morals*. Prerequisite: Phil. 2, Phil. 170, or equivalent (consult the instructor). Designed for undergraduate department majors and graduate students.
Same as: PHIL 127

PHIL 227A. Kant's Value Theory. 4 Units.

(Graduate students register for 227A.) The role of autonomy, principled rational self-governance, in Kant's account of the norms to which human beings are answerable as moral agents, citizens, empirical inquirers, and religious believers. Relations between moral values (goodness, rightness) and aesthetic values (beauty, sublimity).
Same as: PHIL 127A

PHIL 227B. Kant's Anthropology and Philosophy of History. 4 Units.

Kant's conception of anthropology or human nature, based on his philosophy of history, which influenced and anticipated 18th- and 19th-century philosophers of history such as Herder, Fichte, Hegel, and Marx. Texts include *Idea for a Universal History*, *Conjectural Beginning of Human History*, and *Anthropology from a Pragmatic Point of View*. Topics include: Kant's pragmatic approach to the study of human nature; the difficulty of human self knowledge; the role of regulative and teleological principles in studying human history; and Kant's theory of race.
Same as: PHIL 127B

PHIL 227C. Rousseau and Kant. 1-2 Unit.

Kant considered Rousseau the Newton of the moral world. A portrait of Rousseau was reportedly the only decoration in Kant's study, and it was Kant's reading of Rousseau's *Emile*, or *On Education* and *On the Social Contract* in the early 1760s which, more than anything else, first awakened Kant's interest in moral philosophy. In a three-day intensive mini-course, we will explore the relation between Rousseau's philosophy and Kant's on such topics as the standards of right and virtue, human equality, the relation of reason and feeling in human nature, and the philosophy of history.

PHIL 227M. Richard Rufus of Cornwall. 1-2 Unit.

Metaphysics and Epistemology, readings from Rufus' newly translated *Contra Averroem & Speculum animae*. In these works, Rufus solves a problem for Aristotelian epistemology that was to bedevil later scolastics such as Thomas Aquinas. He also states for the first time a theory of individuation by form that was subsequently adopted by Duns Scotus. Though Scotus like Rufus preferred to speak of individual forms, the theory itself is often identified by a term very seldom used by Scotus, 'haecceitas' or 'thisness'. Taught jointly by Rega Wood and Calvin Normore.
Same as: PHIL 127M

PHIL 228. Fichte's Ethics. 4 Units.

(Graduate students register for 228.) The founder of the German Idealist movement who adopted but revised Kant's project of transcendental philosophy basing it on the principle of awareness of free self-activity. The awareness of other selves and of ethical relations to them as a necessary condition for self-awareness. His writings from 1793-98 emphasizing the place of intersubjectivity in his theory of experience.
Same as: PHIL 128

PHIL 230. Hegel. 4 Units.

(Formerly 122/222; graduate students register for 230.) Introduction to Hegel's philosophy, emphasizing his moral and political philosophy, through study of his last major work (1821). May be repeated for credit. Prerequisite: course in the history of modern philosophy.
Same as: PHIL 130

PHIL 231. Introduction to Philosophy of Education. 3 Units.

How to think philosophically about educational problems. Recent influential scholarship in philosophy of education. No previous study in philosophy required.
Same as: EDUC 204

PHIL 231W. Kant's Theory of Law and Justice. 1-2 Unit.

This course will look at Kant's theory of right or law (Recht) and its implications for morality and politics. The topics we will discuss are: the difference between right and ethics in Kant's metaphysics of morals; the relation of law to property and morality; the moral obligations of politicians as holders of rightful authority; and the standards of right as they apply to international relations and war.
Same as: PHIL 131W

PHIL 233. Husserl. 4 Units.

Husserl's phenomenology. Main themes in his philosophy and their interconnections, including consciousness, perception, intersubjectivity, lifeworld, ethics, mathematics and the sciences, and time and space. Works in English translation.

PHIL 234. Phenomenology and Intersubjectivity. 4 Units.

(Graduate students register for 234.) Readings from Husserl, Stein, Heidegger, Sartre, and Merleau-Ponty on subjects related to awareness of others. Topics include solipsism, collective experience, empathy, and objectification of the other.

Same as: PHIL 134

PHIL 234B. The Later Heidegger: Art, Poetry, Language. 3 Units.

Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from "On the Origin of the Work of Art" and Elucidations of Holderlin's Poetry.

Same as: RELIGST 277, RELIGST 377

PHIL 235. Existentialism. 4 Units.

Focus is on the existentialist preoccupation with human freedom. What constitutes authentic individuality? What is one's relation to the divine? How can one live a meaningful life? What is the significance of death? A rethinking of the traditional problem of freedom and determinism in readings from Rousseau, Kierkegaard, and Nietzsche, and the extension of these ideas by Sartre, Beauvoir, and Camus, including their social and political consequences in light of 20th-century fascism and feminism.

Same as: PHIL 135

PHIL 236. History of Analytic Philosophy. 4 Units.

(Formerly 147/247; graduate students register for 236.) Theories of knowledge in Frege, Carnap, and Quine. Emphasis is on conceptions of analyticity and treatment of logic and mathematics. Prerequisite: 50 and one course numbered 150-165 or 181-90.

Same as: PHIL 136

PHIL 237. Wittgenstein. 4 Units.

(Graduate students register for 237.) An exploration of Wittgenstein's changing views about meaning, mind, knowledge, and the nature of philosophical perplexity and philosophical insight, focusing on the *Tractatus Logico-Philosophicus* and *Philosophical Investigations*.

Same as: PHIL 137

PHIL 238. Recent European Philosophy: Between Nature and History. 4 Units.

A critical introduction to the novel understandings of time, language, and cultural power developed by 20th-century continental thinkers, with close attention to work by Heidegger, Saussure, Benjamin, and Foucault.

Same as: PHIL 138

PHIL 239. Teaching Methods in Philosophy. 1-4 Unit.

For Ph.D. students in their first or second year who are or are about to be teaching assistants for the department. May be repeated for credit.

PHIL 240. Individual Work for Graduate Students. 1-15 Unit.

May be repeated for credit.

PHIL 241. Dissertation Development Seminar. 1-4 Unit.

Required of second-year Philosophy Ph.D. students; restricted to Stanford Philosophy Ph.D. students. Prerequisite: consent of instructor.

PHIL 243. Quine. 4 Units.

(Formerly 183/283; graduate students register for 243.) The philosophy of Quine: meaning and communication; analyticity, modality, reference, and ontology; theory and evidence; naturalism; mind and the mental.

Same as: PHIL 143

PHIL 248. Medieval Latin Paleography. 3-5 Units.

The history of medieval scripts and medieval abbreviation. Dating and placing Latin European medieval manuscripts. Editing medieval texts in philosophy, psychology, physics, and theology. Class project: an early 13th century encyclopedia (with entries citing both Plato and Aristotle). Intellectually exciting, easy to read (textualis script).

PHIL 249. Evidence and Evolution. 3-5 Units.

The logic behind the science. The concept of evidence and how it is used in science with regards to testing claims in evolutionary biology and using tools from probability theory, Bayesian, likelihoodist, and frequentist ideas. Questions about evidence that arise in connection with evolutionary theory. Creationism and intelligent design. Questions that arise in connection with testing hypotheses about adaptation and natural selection and hypotheses about phylogenetic relationships.

Same as: PHIL 349

PHIL 250. Mathematical Logic. 4 Units.

An introduction to the concepts and techniques used in mathematical logic, focusing on propositional, modal, and predicate logic. Highlights connections with philosophy, mathematics, computer science, linguistics, and neighboring fields.

Same as: PHIL 150

PHIL 251. Metalogic. 4 Units.

(Formerly 160A.) The syntax and semantics of sentential and first-order logic. Concepts of model theory. Gödel's completeness theorem and its consequences: the Löwenheim-Skolem theorem and the compactness theorem. Prerequisite: 150 or consent of instructor.

Same as: PHIL 151

PHIL 251A. Recursion Theory. 4 Units.

Computable functions, Turing degrees, generalized computability and definability. "What does it mean for a function from the natural numbers to themselves to be computable?" and "How can noncomputable functions be classified into a hierarchy based on their level of noncomputability?". Theory of relative computability, reducibility notions and degree structures. Prerequisite is PHIL 150, or PHIL 151 or CS 103.

Same as: PHIL 151A

PHIL 252. Computability and Logic. 4 Units.

Approaches to effective computation: recursive functions, register machines, and Turing machines. Proof of their equivalence, discussion of Church's thesis. Elementary recursion theory. These techniques used to prove Gödel's incompleteness theorem for arithmetic, whose technical and philosophical repercussions are surveyed. Prerequisite: 151.

Same as: PHIL 152

PHIL 253. Feminist Theories and Methods Across the Disciplines. 2-5 Units.

(Graduate Students register for PHIL 253 or FEMGEN 203) Concepts and questions distinctive of feminist and LGBT scholarship and how they shape research: gender, intersectionality, disciplinarity and interdisciplinarity, standpoint, "queering," postmodern critiques, postcolonial critiques. Prerequisites: Feminist Studies 101 or equivalent with consent of instructor.

Same as: FEMGEN 103, FEMGEN 203, PHIL 153

PHIL 254. Modal Logic. 4 Units.

(Graduate students register for 254.) Syntax and semantics of modal logic, and technical topics like completeness and correspondence theory, including both classical and recent developments. Applications to topics in philosophy, computer science, and other fields. Prerequisite: 150 or preferably 151.

Same as: PHIL 154

PHIL 255. General Interest Topics in Mathematical Logic. 4 Units.

Introduction to formalization using language of logic and to problems of philosophical logic and computer science that can be handled this way. Propositional calculus, Sudoku puzzles, resolution rule, problem P=NP. Possible worlds, modal logic with emphasis on individuation problems. May be repeated for credit.

Same as: PHIL 155

PHIL 257. Topics in Philosophy of Logic. 3 Units.

(Graduate students register for 257.) Disputed foundational issues in logic; the question of what the subject matter and boundaries of logic are, such as whether what is called second-order logic should be counted as logic. What is the proper notion of logical consequence? May be repeated for credit. Pre- or corequisite: 151, or consent of instructor. Same as: PHIL 157

PHIL 258. Topics in Logic: Ten Problems in Deontic Logic. 2 Units.

As witnessed by the handbook of deontic logic and normative systems, the area of deontic logic is in flux. Traditional questions and logical methods of deontic logic are being supplemented by new questions and new techniques. This tutorial gives an introduction to the current discussion in deontic logic. In what sense are obligations different from norms? Jorgensen's dilemma, from preference based modal logic to the modern approach. How to reason about dilemmas, contrary-to-duty and defeasible norms? Distinguishing various kinds of defeasibility. How to relate various kinds of permissive and constitutive norms? Permissions as exceptions and prioritized norms. How do norms relate to other modalities like beliefs, desires, and intentions How do norms change? What is the role of time, action and games in deontic reasoning? For each problem, we discuss traditional as well as new research questions. We see the new questions as good questions for current research, in the sense that they point to modern theories and applications. We are especially interested in new questions that make older traditional questions obsolete in the sense that they are now addressed from a modern perspective, or in a more general setting. This mini-course will from the week of 15 April through the week of 13 May. Same as: PHIL 158

PHIL 260A. Newtonian Revolution. 4 Units.

(Graduate students register for 260A.) 17th-century efforts in science including by Kepler, Galileo, Descartes, and Huygens, that formed the background for and posed the problems addressed in Newton's *Principia*. Same as: PHIL 160A

PHIL 260B. Newtonian Revolution. 4 Units.

(Graduate students register for 260B.) Newton's *Principia* in its historical context, emphasizing how it produced a revolution in the conduct of empirical research and in standards of evidence in science. Same as: PHIL 160B

PHIL 262. Philosophy of Mathematics. 4 Units.

(Graduate students register for PHIL 262.) General survey of the philosophy of mathematics, focusing on epistemological issues. Includes survey of some basic concepts (proof, axiom, definition, number, set); mind-bending theorems about the limits of our current mathematical knowledge, such as Gödel's Incompleteness Theorems, and the independence of the continuum hypothesis from the current axioms of set theory; major philosophical accounts of mathematics: Logicism, Intuitionism, Hilbert's program, Quine's empiricism, Field's program, Structuralism; concluding with a discussion of Eugene Wigner's 'The Unreasonable Effectiveness of Mathematics in the Natural Sciences'. Students won't be expected to prove theorems or complete mathematical exercises. However, includes some material of a technical nature. Prerequisite: PHIL150 or consent of instructor. Same as: MATH 162, PHIL 162

PHIL 263. Significant Figures in Philosophy of Science. 4 Units.

(Graduate students register for 263.) Directed study of two or more thinkers, past or present, who have made a lasting impact on contemporary philosophy of science. Subjects last year were Henri Poincaré, Pierre Duhem, and Gaston Bachelard. Same as: PHIL 163

PHIL 264. Central Topics in the Philosophy of Science: Theory and Evidence. 4 Units.

(Graduate students register for 264.) Is reductionism opposed to emergence? Are they compatible? If so, how or in what sense? We consider methodological, epistemological, logical and metaphysical dimensions of contemporary discussions of reductionism and emergence in physics, in the sciences of complexity, and in philosophy of mind. Same as: PHIL 164

PHIL 264A. Central Topics in Philosophy of Science: Causation. 4 Units.

(Graduate Students register for 264A.) Establishing causes in science, engineering, and medicine versus establishing them in Anglo-American law, considered in the context of Hume and Mill on causation. May be repeated for credit. Same as: PHIL 164A

PHIL 265. Philosophy of Physics. 4 Units.

Graduate students register for 265.) Central topic alternates annually between space-time theories and philosophical issues in quantum mechanics; the latter in Winter 2013-14. Conceptual problems regarding the uncertainty principle, wave-particle duality, quantum measurement, spin, and their treatment within the 'Copenhagen interpretation' of quantum mechanics, and the related doctrine of complementarity. The issue of quantum entanglement as raised by Einstein and Schrödinger in the 1930s and the famous EPR (Einstein-Podolsky-Rosen) paper of 1935. Examination of EPR-type experimental set-ups and a result due to Bell in the 1960s, according to which no "hidden variables" theory satisfying a certain locality condition (apparently assumed by EPR) can reproduce all the predictions of quantum mechanics. Survey of several live interpretive options for standard quantum mechanics: Bohmian mechanics (a.k.a. 'pilot wave theory'), 'spontaneous collapse' theories, and Everett's relative-state interpretation. Critical scrutiny of the decoherence program that seeks to explain the classical-to-quantum transition, i.e., the emergence of the world of classical physics and macroscopic objects from quantum physics. May be repeated for credit if content is different. Same as: PHIL 165

PHIL 265C. Philosophy of Physics: Probability and Relativity. 4 Units.

Conceptual puzzles in formulating probability concepts to be invariant in the sense of the Lorentz transformation of special relativity. Problems arise in both classical and quantum physics.

PHIL 266. Probability: Ten Great Ideas About Chance. 4 Units.

Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes' great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116. Same as: PHIL 166, STATS 167, STATS 267

PHIL 266A. Foundations of Quantum Mechanics. 4 Units.

This seminar will concentrate on a variety of probability questions that arise in quantum mechanics, including some from recent experiments. Negative probabilities and nonmonotonic upper probabilities will be emphasized. Same as: PHIL 166A

PHIL 267A. Philosophy of Biology. 2-4 Units.

(Graduate students register for 267A.) Evolutionary theory and in particular, on characterizing natural selection and how it operates. We examine debates about fitness, whether selection is a cause or force, the levels at which selection operates, and whether cultural evolution is a Darwinian process. Same as: PHIL 167A

PHIL 267B. Philosophy, Biology, and Behavior. 4 Units.

(Graduate Students register for 267B) Philosophical study of key theoretical ideas in biology as deployed in the study of behavior. Topics to include genetic, neurobiological, ecological approaches to behavior; the classification and measurement of behaviors: reductionism, determinism, interactionism. Prerequisites: one PHIL course and either one BIO course or Human Biology core; or equivalent with consent of instructor. Same as: PHIL 167B

PHIL 267C. Associative Theories of Mind and Brain. 4 Units.

After a historical survey of associative theories from Hume to William James, current versions will be analyzed including the important early ideas of Karl Lashley. Emphasis will be on the computational power of associative networks and their realization in the brain. Same as: PHIL 167C

PHIL 267D. Philosophy of Neuroscience. 4 Units.

Can problems of mind be solved by understanding the brain, or models of the brain? The views of philosophers and neuroscientists who believe so, and others who are skeptical of neurophilosophical approaches to the mind. Historical and recent literature in philosophy and neuroscience. Topics may include perception, memory, neural accounts of consciousness, neurophenomenology, neuroscience and physics, computational models, and eliminativism. (Not open to freshmen.) Same as: PHIL 167D, SYMSYS 206

PHIL 269. Evolution of the Social Contract. 4 Units.

Explore naturalizing the social contract. Classroom presentations and term papers. Texts: Binmore - Natural Justice; Skyrms - Evolution of the Social Contract. Same as: PHIL 169

PHIL 270. Ethical Theory. 4 Units.

A more challenging version of Phil 2 designed primarily for juniors and seniors (may also be appropriate for some freshmen and sophomores - contact professor). Fulfills the Ethical Reasoning requirement. Graduate section (270) will include supplemental readings and discussion, geared for graduate students new to moral philosophy, as well as those with some background who would like more. Same as: ETHICSOC 170, PHIL 170

PHIL 270B. Metaphor. 4 Units.

In metaphor we think and talk about two things at once: two different subject matters are mingled to rich and unpredictable effect. A close critical study of the main modern accounts of metaphor's nature and interest, drawing on the work of writers, linguists, philosophers, and literary critics. Attention to how understanding, appreciation, and pleasure connect with one another in the experience of metaphor. Consideration of the possibility that metaphor or something very like it occurs in nonverbal media: gesture, dance, painting, music. Same as: PHIL 170B

PHIL 270D. Trust and Trustworthiness. 4 Units.

An exploration of the place of interpersonal trust in ethical thought. What is it to trust another person? How is trusting related to, though different from, other attitudes we sometimes bear towards others (e.g. justified beliefs we form about others and their conduct; ethically significant expectations we have of others, etc.)? What is involved in acquiring/possessing the virtue of trustworthiness? How should trust (and trustworthiness) figure in our thinking about important ethical activities, for example promising, friendship, or the practice of politics? Same as: PHIL 170D

PHIL 270E. Sexual Ethics. 4 Units.

What is sex? What are the implications of different conceptions of sex for sexual ethics? Are there any distinctively sexual ethical principles or virtues or are principles and virtues that govern the sexual domain specific instances of principles and virtues that govern human activity more generally? Readings will range from historical to contemporary sources.

PHIL 271. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors. Same as: ETHICSOC 171, IPS 208, PHIL 171, POLISCI 3P, POLISCI 136S, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

PHIL 272. History of Modern Moral Philosophy. 4 Units.

This course traces the development of moral philosophy in Britain just prior to the nearly simultaneous emergence of Kant's moral philosophy and Bentham's utilitarianism in the 1780's. Emphasis is on the dialogue between empiricists and rationalists on the subject of the relationship between the natural and the normative. Authors include Hobbes, Clarke, Hutcheson, Hume, Smith, Price, and Bentham. Prerequisite: some familiarity with Kant's moral theory and utilitarianism, and demonstrated interest in philosophy. Same as: PHIL 172

PHIL 272B. Recent Ethical Theory. 4 Units.

Study the works of several prominent contemporary moral philosophers. Possible authors include: Scanlon, Darwall, Nagel, Williams, Blackburn, Gibbard, Korsgaard. Prerequisite: students should have taken an introduction to moral philosophy (Phil. 20, Phil. 170 or equivalent). Same as: PHIL 172B

PHIL 272D. Bernard Williams. 4 Units.

An exploration of some central themes from the work of Bernard Williams. Particular attention will be paid to his discussion of the character and identity of the self, his sustained critique of morality and moral philosophy. We will also read several of Williams' requests; interlocutors, including Nagel, Parfit, Korsgaard, and Herman. Same as: PHIL 172D

PHIL 272N. Prudence and Morality. 4 Units.

We sometimes think we should do something just because it will benefit us in the future, even though we don't particularly feel like doing it now (e.g. we exercise, go to the dentist for a check-up, or set aside money for retirement). And we sometimes think we should do something for the sake of another person, even when it is inconvenient, costly, or unpleasant (e.g. we stop to help a stranded motorist, donate to charity, or tell someone an embarrassing truth rather than a face-saving lie). When we do the former, we act prudently. When we do the latter, we act morally. This course explores the debate among philosophers about the source of our reasons for acting prudently and morally. Some argue that our reasons to be prudent and moral stem directly from the fact that we are rational; that it is contrary to reason to ignore our own future interests, or the interests of other people. Others disagree, arguing that the source of these reasons must lie elsewhere. Course readings will include work by Thomas Nagel, Bernard Williams, Christine Korsgaard, Derek Parfit, Philippa Foot, and others. Same as: PHIL 172N

PHIL 273B. Metaethics. 2-4 Units.

This a graduate student only introduction to contemporary metaethics. Can moral and ethical values be justified or is it just a matter of opinion? Is there a difference between facts and values? Are there any moral truths? Does it matter if there are not? Focus is not on which things or actions are valuable or morally right, but what is value or rightness itself. Prerequisites: 181, and an ethics course.

PHIL 273W. Aesthetics. 4 Units.

This course will investigate a cluster of varied but related philosophical issues concerning the arts: painting, music, literature, poetry, photography, theater, film, etc. Issues most of which are, at the same time, problems in philosophy of mind or language, value theory, or epistemology. We will address questions like the following: What, if anything, is distinctive about art and aesthetic experience? What is aesthetic value, and how do aesthetic values relate to and interact with values of other kinds? What is fiction and why are people interested in it? In what ways are works of art expressive of feelings or emotions? What similarities and differences are there in the expressive qualities of music, literature, painting, poetry? How might we learn from works of art of one or another kind, and how might they work to change people's perspectives or attitudes? In what ways do works of art serve as vehicles of communication? Is there a fundamental difference between the value of works of art, and that of beautiful natural objects? (These various issues are related, as we shall see; we'll be exploring several of them simultaneously.) Along the way, we will bump into more specific questions such as: Why and in what ways is photography more (or less) 'realistic' than painting and drawing, or more or less revealing of reality? Does (instrumental) music have cognitive content? Is music representational in anything like the ways literature and figurative painting are? Do all literary works have narrators? Is there ever (or always?) anything like narrators in paintings, films, music? Same as: PHIL 173W

PHIL 274. Freedom and the Practical Standpoint. 4 Units.

(Graduate students register for 274.) Confronted with the question of how to act, people think of themselves as freely determining their own conduct. Natural science poses a challenge to this by explaining all events, including human actions, in terms of causal processes. Are people justified in thinking of themselves as free? Major philosophical approaches to this question: incompatibilism, compatibilism, and the two-standpoint view. Same as: PHIL 174

PHIL 274A. Moral Limits of the Market. 4 Units.

Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases. Same as: ETHICSOC 174A, PHIL 174A, POLISCI 135P

PHIL 274D. Moral Luck. 4 Units.

We draw a fundamental distinction between what a person voluntarily does, and what is beyond her control. Such a distinction seems central to how we think about what it is to justify our actions (whether to ourselves or to one another), as well as to our practice of holding one another morally responsible for what we do. Yet under pressure, this distinction can appear to collapse; we find that we cannot successfully disentangle what a person controls from what she does not when she acts. This course examines this problem in depth, and considers how we might respond in the face of it: Is it really a problem? If so, does it threaten our moral practices? How should it influence the way in which we make choices, or the way we understand those choices once we've made them? Same as: PHIL 174D

PHIL 274L. Betrayal and Loyalty, Treason and Trust. 2 Units.

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. SAME AS LAW 520.

Same as: ETHICSOC 174L, ETHICSOC 274L, PHIL 174L

PHIL 275A. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.]

Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, POLISCI 133, PUBLPOL 103D, URBANST 122

PHIL 275M. Two Ethical Theories and Being a Person. 4 Units.

The distinction between the ethics of being a person and the ethics of rules as opposed to the distinction between Kantian ethics and utilitarianism or consequentialism. Comparison of these two types of ethics with respect to their relationship to agency and being a good person. Relations between Western ethics and those of other continents. Same as: PHIL 175M

PHIL 275R. Roads Not Taken, 1880-1960. 4 Units.

This course is intended to illuminate ideas about justice, freedom, equality, democracy, peace, and social conflict, and to raise persisting questions about such topics as the role of violence in politics through looking at the ideas of American writers such as Edward Bellamy, W.E.B. DuBois, Eugene Debs, Jane Addams, Emma Goldman, John Dewey and Reinhold Niebuhr. Same as: AMSTUD 275R, ETHICSOC 275R, POLISCI 335L

PHIL 276. Political Philosophy: The Social Contract Tradition. 4 Units.

(Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Study of the answers given to such questions by major political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant. Same as: PHIL 176, POLISCI 137A, POLISCI 337A

PHIL 276A. Classical Seminar: Origins of Political Thought. 4-5 Units.

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, CLASSICS 381, PHIL 176A, POLISCI 230A, POLISCI 330A

PHIL 276B. The Economic Individual in the Behavioral Sciences. 4 Units.

(Graduate students register for 276B.).

Same as: PHIL 176B

PHIL 276C. Religion and Politics: a Latin American Perspective. 4 Units.

Religion has traditionally been banished from politics in some places in Latin America. Religious symbols may not be displayed in public buildings, political discourse is expected to be free from all religious content, and religious ministers are not allowed to run for public office, among other measures. This course examines the political motivation for this kind of policies towards religion taking a comparative perspective with American and French variants of secularism.

Same as: ETHICSOC 276R, ETHICSOC 376R, PHIL 176C

PHIL 277B. EMOTIONS: MORALITY AND LAW. 2 Units.

If emotions are the stuff of life, some emotions are the stuff of our moral and legal life. Emotions such as: guilt, shame, revenge, indignation, resentment, disgust, envy, jealousy and humiliation, along with forgiveness, compassion, pity, mercy and patriotism, play a central role in our moral and legal life. The course is about these emotions, their meaning and role in morality and law. Issues such as the relationship between punishment and revenge, or between envy and equality, or St. Paul's idea that resentment is what feeds morality, will be discussed alongside other intriguing topics.

Same as: ETHICSOC 202, ETHICSOC 302, PHIL 177B

PHIL 278M. Introduction to Environmental Ethics. 4-5 Units.

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 178M, ETHICSOC 278M, PHIL 178M, POLISCI 134L

PHIL 279S. Moral Psychology, Reasons for Action, and Moral Theory. 4 Units.

What sorts of considerations does an ethical agent take to be good reasons for action? Work in moral psychology to illuminate the theory of practical reasons, and the theory of practical reasons to test the prospects for systematic moral theory. Can any systematic moral theory be reconciled with the moral psychology of ordinary, morally respectable agents?

Reading include Bernard Williams, Rosalind Hursthouse, Peter Railton, T.M. Scanlon, and Barbara Herman.

Same as: PHIL 179S

PHIL 280. Metaphysics. 4 Units.

It seems undeniable that things in the world have certain features, or properties: some apples are red, my cat is soft, the Golden Gate Bridge is 2,737 meters long, and so on. This course will focus on metaphysical issues in properties. The topics include ontic issues in properties (universals vs. tropes, realism vs. nominalism), particulars (tropes and bundle theory), and the nature of properties (quantities and causal essentialism). Prerequisites: Philosophy 80 and Philosophy 50 or equivalent (or consent of instructor).

Same as: PHIL 180

PHIL 280A. Realism, Anti-Realism, Irrealism, Quasi-Realism. 4 Units.

Realism and its opponents as options across a variety of different domains: natural science, mathematics, ethics, and aesthetics. Clarify the various conceptions that fall under these terms and outline the reasons for and against adopting realism for the various domains. Highlight the general issues involved. Prerequisites: 80, 181.

Same as: PHIL 180A

PHIL 281. Philosophy of Language. 4 Units.

The study of conceptual questions about language as a focus of contemporary philosophy for its inherent interest and because philosophers see questions about language as behind perennial questions in other areas of philosophy including epistemology, philosophy of science, metaphysics, and ethics. Key concepts and debates about the notions of meaning, truth, reference, and language use, with relations to psycholinguistics and formal semantics. Readings from philosophers such as Frege, Russell, Wittgenstein, Grice, and Kripke. Prerequisites: 80 and background in logic.

Same as: PHIL 181

PHIL 281B. Philosophy of Language: Contemporary Debates. 4 Units.

This course builds on the material of 181/281, focusing on debates and developments in the pragmatics of conversation, the semantics/pragmatics distinction, the contextuality of meaning, the nature of truth and its connection to meaning, and the workings of particular linguistic constructions of special philosophical relevance. Students who have not taken 181/281 should seek the instructor's advice as to whether they have sufficient background.

Same as: PHIL 181B

PHIL 282. Truth. 2-4 Units.

Philosophical debates about the place in human lives and the value to human beings of truth and its pursuit. The nature and significance of truth-involving virtues such as accuracy, sincerity, and candor. Prerequisite Phil 80 or permission of the instructor.

Same as: PHIL 182

PHIL 284. Theory of Knowledge. 4 Units.

What is knowledge? How are beliefs justified? Contemporary theories evaluated against central problems: the regress argument, Gettier problem, and skeptical paradox. Prerequisite Phil 80 or consent of the instructor.

Same as: PHIL 184

PHIL 284C. Epistemology of Testimony. 4 Units.

Many of our beliefs come from others, and not from direct experience. Is testimony a source of fundamental reasons? Reasons that do not have to be supported or validated by other sources like perception or inference? What sort of responsibility does one have to one's hearers, when one gives testimony?

Same as: PHIL 184C

PHIL 284F. Feminist Theories of Knowledge. 4 Units.

Feminist critique of traditional approaches in epistemology and alternative feminist approaches to such topics as reason and rationality, objectivity, experience, truth, the knowing subject, knowledge and values, knowledge and power.

Same as: FEMST 166, PHIL 184F

PHIL 285B. Philosophy of Perception. 4 Units.

The nature of perceptual experience and the role it plays in securing empirical knowledge. Focus will be on what is sometimes called "the problem of perception": the question of how perception could provide us with direct awareness of the surrounding environment given the possibility of illusions or hallucinations. Topics, include the relationship between perception and belief, the nature of perceptual phenomenology, whether or not perceptual experiences are representational states, and the philosophical relevance of empirical research on perception.

Same as: PHIL 185B

PHIL 286. Philosophy of Mind. 4 Units.

(Graduate students register for 286.) This is an advanced introduction to core topics in the philosophy of mind. Prerequisite: PHIL 80. Same as: PHIL 186

PHIL 287. Philosophy of Action. 4 Units.

(Graduate students register for 287.) Contemporary research in the philosophy of action. Topics include: What is it to be an agent? Is there a philosophically defensible contrast between being an agent and being a locus of causal forces to which one is subject? What is it to act purposively? What is intention? What is the relation between intention and belief? What is it to act intentionally? What is it to act for a reason? What is the relation between explaining why someone acted by citing the reasons for which she acted and causal explanation of her action? What is the relation between theoretical and practical rationality? What is the nature of our knowledge of our own intentional activity? What is it to act autonomously? What is shared cooperative activity? Prerequisite: 80.

Same as: PHIL 187

PHIL 288. Personal Identity. 4 Units.

Do you persist through time the way that a skyscraper persists through space, by having different parts at different locations? Or are you iquest;wholly present; at every moment of your life, in something more like the way that an elevator is present in each place as it travels up to the top floor? What criteria determine whether you now are the very same person as some unique person located at some time in the past? Is the continuity of your memories or other mental states sufficient for your survival? Can you survive the loss or destruction of your body? Do you really exist for more than just the present moment? How do different answers to these questions bear on your moral, personal, and professional obligations? What kinds of considerations could possibly help us to answer these questions? This course explores these and related issues. Readings include a mix of introductory survey, historical, and contemporary material. Same as: PHIL 188

PHIL 289. Examples of Free Will. 4 Units.

Examples drawn from three domains: choice, computation, and conflict of norms. Conceptually, a distinction is made between examples that are predictable and those that are not, but skepticism about making a sharp distinction between determinism and indeterminism is defended. Same as: PHIL 189

PHIL 293C. Film & Philosophy. 4 Units.

Issues of freedom, morality, faith, knowledge, personal identity, and the value of truth explored through film; philosophical investigation of the filmic medium itself. Screenings to include *Twelve Monkeys* (Gilliam), *Ordet* (Dreyer), *The Dark Knight* (Nolan), *Vicky Cristina Barcelona* (Allen), and *Eternal Sunshine of the Spotless Mind* (Kaufman). Taught in English.

Same as: COMPLIT 154A, FRENCH 154, ITALIAN 154, PHIL 193C

PHIL 300. Proseminar. 4 Units.

Topically focused seminar. Required of all first year Philosophy PhD students.

PHIL 301. Dissertation Development Proseminar. 2-4 Units.

A required seminar for third year philosophy PhD students, designed to extend and consolidate work done in the dissertation development seminar the previous summer.

PHIL 305R. JUST AND UNJUST WARS. 2 Units.

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Same as LAW 751.

Same as: ETHICSOC 205R, ETHICSOC 305R, PHIL 205R

PHIL 306C. Plato on Eros and Beauty. 3-5 Units.

We read Plato's *Symposium* and *Phaedrus*; topics: love, beauty, language (oral and written). Graduate seminar, but open to seniors.

Same as: CLASSICS 336

PHIL 308. Aristotle's Politics. 4 Units.

The seminar will be a critical examination of Aristotle's political philosophy and we shall focus on his *Politics* as our primary text. We will supplement this with some other texts by Aristotle that are relevant and explore the most important connections between Aristotle's political philosophy and his ethics.

PHIL 308B. Aristotle on his Predecessors. 2-4 Units.

An introduction both to Aristotle's own metaphysics and to his treatment of his predecessors on causality, included the early Ionian cosmologists, atomism, Pythagoreans, Heraclitus, Parmenides, Empedocles, Anaxagoras and Plato. Prerequisite: one course in ancient Greek philosophy.

PHIL 309. Hume's Psychology and Political Theory. 3-5 Units.

This seminar will concentrate on Hume's political ideas, which to a large extent have been neglected, both by philosophers and political scientists. We will read passages from three important works of Hume, as listed above, together with the lively support of a strong view concerning the importance of Hume's ideas about politics. The requirement for the course will be a paper on a subject relevant to the main topic, and mutually agreed to. The first six sessions of the seminar will be held jointly by live video with Professor Russell Hardin of NYU and his students. By the end of the sixth session, NYU's Spring Term will have ended. We will decide at that point how many more joint sessions to have, and how much time should be devoted to individual consultation about the paper to be written.

PHIL 309C. Aristotle's Metaphysics Zeta and its Medieval Reception: Definition. 4 Units.

Grad seminar on the medieval reception of Book Zeta of Aristotle's *Metaphysics*.

PHIL 312. Aristotle's Psychology. 4 Units.

De Anima and parts of *Parva Naturalia*.

PHIL 314. Practical Reasoning in Plato and Aristotle. 2-4 Units.

It is often said that the greatest difference between Plato's ethics and those of Aristotle is that the latter thinks that practical and theoretical reason are distinct, but the former does not. We shall read some of both Plato and Aristotle and ask whether the above claim is true and then consider what the implications the differences between their views of practical reason have for the rest of their ethics.

PHIL 317. Topics in Plato: Middle and Late Ethics & Politics. 2-4 Units.

Examine the fundamentals of Plato's political philosophy by reading the Politics as well relevant parts of some of his other ethical and political works.

PHIL 318. Aristotle and the Object of Mathematical Reasoning. 4 Units.

The concept of definition plays a central role in Aristotle's treatment of both philosophical and scientific inquiry, as well as explanation. A definition is an account of what something is, and some definitions are used to guide causal inquiry whereas others function as explanatory starting points.

In this course we will examine texts from his logic, natural science and metaphysics in order to see what the different kinds of definition are, how they obtained, and how they capture the nature or essence of a definable object. Particular attention will be given to the role of matter in the definition of the form of a natural substance, state, process or activity. For instance, what role does a specification of physiological processes play in the definitions of emotions such as anger? No knowledge of Greek is required. May be repeat for credit.

Same as: CLASSICS 315

PHIL 319. Topics in Greek Philosophy: Plato and Aristotle on Knowledge and Action. 2-4 Units.

Aristotle's views about substance and the nature and possibility of metaphysics. Focus is on *Categories* and *Metaphysics* Book Zeta.

PHIL 321. Leibniz's Metaphysics. 2-4 Units.

Leibniz's metaphysical views during his so-called "mature period" (early 1680s to 1716). Topics will include Leibniz's conception of substance, his alleged idealism, his doctrine of possible worlds and his doctrine of pre-established harmony. Reading of the Discourse on Metaphysics (1686) and the correspondence with Arnauld (1686-1690).

PHIL 322. Hume. 2-4 Units.

Hume's theoretical philosophy emphasizing skepticism and naturalism, the theory of ideas and belief, space and time, causation and necessity, induction and laws of nature, miracles, a priori reasoning, the external world, and the identity of the self.

PHIL 323. Kant's Criticism of Metaphysics. 4 Units.

Motivations and strategies of Kant's criticisms of traditional metaphysics in the *Critique of Pure Reason*. Leibnizian and Wolffian versions of the concept containment theory of truth and the Wolffian ideal of a conceptual system of metaphysical knowledge. Kant's analytic/synthetic distinction, focusing on its place in the rejection of metaphysics and in arguments about the ideas of reason in the transcendental dialectic. Prerequisite: course on the first *Critique*, or consent of instructor.

PHIL 324. Kant's System of Nature and Freedom. 4 Units.

The aim is to acquire a sense of how the two main parts of Kant's philosophy, theoretical and practical, fit together. These two parts, according to the Critique of the Power of Judgment, concern the realm of nature and the realm of freedom respectively. We shall study parts of all three Critiques, along with appropriate supplementary materials. Prior acquaintance with both Kant's theoretical and his practical philosophy is presupposed.

PHIL 330. Social and Political Philosophy of Hegel and Marx. 4 Units.

Same as: ETHICSOC 330R, POLISCI 330

PHIL 332. Nietzsche. 2-4 Units.

Preference to doctoral students. Nietzsche's later works emphasizing *The Gay Science*, *Beyond Good and Evil*, and *On the Genealogy of Morals*. The shape of Nietzsche's philosophical and literary projects, and his core doctrines such as eternal recurrence, will to power, and perspectivism. Problems such as the proper regulation of belief, and the roles of science, morality, art, and illusion in life.

PHIL 334. Habermas. 3-5 Units.

Does Habermas have a distinctive account of normativity and normative judgements?.

PHIL 335. Topics in Aesthetics. 4 Units.

May be repeated for credit.

PHIL 339. Marx. 2-4 Units.

This course examines the works of a thinker who radically transformed the ways that we think about modern society. Marx saw fundamental problems with capitalist societies, including: un-freedom, alienation, inequality, and bureaucratization. He developed a theory to account for these problems. Our task will be to read his works critically and to evaluate their contributions to our understanding the relationship between politics, social structure, knowledge and human agency. We will also be especially interested in comparing his view with alternative diagnoses of the problems of modern capitalist societies, especially those of Max Weber and John Rawls.

Same as: POLISCI 333S

PHIL 340. Time and Free Will. 3-5 Units.

Free will and the consequence argument of Peter van Inwagen and others. Focus is on the principle that one cannot change the past and the problem of backtracking conditionals, and less on the problem raised by determinism. Hypotheses less drastic than determinism support backtrackers; given the backtracker, would someonequest; not having done something require that he change the past? Issues related to time, change, the phenomenology of agency, and McTaggart's argument about the reality of time.

PHIL 344. Narrative Knowing. 1-2 Unit.

Philosophers and historians have been debating the status of narrative explanation for well over 50 years. Until quite recently, a supposed dichotomy between natural science and history has shaped the discussion. Beginning from the origins, history, and limitations of the dichotomy, this seminar will explore how claims for narrative understanding and explanation have come to occupy an increasingly important role in the natural sciences as well as the social sciences. Some classic contributors are Hempel, Danto, Mink, Kuhn, White, Ricouer, Geertz, and Ginzburg. Current authors include Roth, Rheinberger, Kitcher, Beatty, Morgan, and (yes) Wise.

Same as: HISTORY 344

PHIL 348. Evolution of Signalling. 2-4 Units.

Explores evolutionary (and learning) dynamics applied to simple models of signaling, emergence of information and inference. Classroom presentations and term papers. nText: Skyrms - SIGNALS: EVOLUTION, LEARNING and INFORMATION and selected articles.

PHIL 349. Evidence and Evolution. 3-5 Units.

The logic behind the science. The concept of evidence and how it is used in science with regards to testing claims in evolutionary biology and using tools from probability theory, Bayesian, likelihoodist, and frequentist ideas. Questions about evidence that arise in connection with evolutionary theory. Creationism and intelligent design. Questions that arise in connection with testing hypotheses about adaptation and natural selection and hypotheses about phylogenetic relationships.

Same as: PHIL 249

PHIL 350A. Model Theory. 3 Units.

Back-and-forth arguments with applications to completeness, quantifier-elimination and omega-categoricity. Elementary extensions and the monster model. Preservation theorems. Interpolation and definability theorems. Imaginaries. Prerequisite: Phil151A or consent of the instructor.

PHIL 350B. Model Theory B. 1-3 Unit.

Decidable theories. Model-theoretic background. Dense linear orders, arithmetic of addition, real closed and algebraically closed fields, o-minimal theories.

Same as: MATH 290B

PHIL 351A. Recursion Theory. 3 Units.

Theory of recursive functions and recursively enumerable sets. Register machines, Turing machines, and alternative approaches. Gödel's incompleteness theorems. Recursively unsolvable problems in mathematics and logic. Introduction to higher recursion theory. The theory of combinators and the lambda calculus. Prerequisites: 151, 152, and 161, or equivalents.

PHIL 351B. Proof Mining. 1-3 Unit.

Uses of proof theory in analysis and number theory. Proof mining: extraction of bounds from non-effective proofs. May be repeated for credit. Prerequisite: 151, 152 or equivalents, and a calculus course.

PHIL 352A. Set Theory. 3 Units.

The basics of axiomatic set theory; the systems of Zermelo-Fraenkel and Bernays-Gödel. Topics: cardinal and ordinal numbers, the cumulative hierarchy and the role of the axiom of choice. Models of set theory, including the constructible sets and models constructed by the method of forcing. Consistency and independence results for the axiom of choice, the continuum hypothesis, and other unsettled mathematical and set-theoretical problems. Prerequisites: PHIL151 and MATH 161, or equivalents. Same as: MATH 292A

PHIL 353A. Proof Theory. 3 Units.

Gentzen's natural deduction and sequential calculi for first-order propositional and predicate logics. Normalization and cut-elimination procedures. Relationships with computational lambda calculi and automated deduction. Prerequisites: 151, 152, and 161, or equivalents. Same as: MATH 293A

PHIL 353B. Proof Theory B. 2-3 Units.

Consistency ordinal as a measure of the strength of a mathematical theory. The open problem of describing the ordinal of mathematical analysis (second order arithmetic). Present state of the problem and approaches to a solution. Prerequisites: Phil 151, 152 or equivalents.

PHIL 353C. Functional Interpretations. 4 Units.

Finite-type arithmetic. Gödel's functional interpretation and Kreisel's modified realizability. Systems based on classical logic. Spector's extension by bar-recursive functionals. Kohlenbach's monotone interpretation and the bounded functional interpretation. The elimination of weak König's lemma. Uniform boundedness. A look at Tao's hard/soft analysis distinction.

PHIL 354. Topics in Logic. 1-3 Unit.

Complexity of propositional calculi. P=NP problem. Exponential lower bounds for resolution and for intuitionistic derivations. Problem of saving proofs. Complexity of derivations in arithmetic. Inventor's paradox. Synthesis of inductive invariants. Prerequisites: Phil 151, 152 or equivalents.

PHIL 355. Logic and Social Choice. 4 Units.

Topics in the intersection of social choice theory and formal logic. Voting paradoxes, impossibility theorems and strategic manipulation, logical modeling of voting procedures, preference versus judgment aggregation, role of language in social choice, and metatheory of social choice. May be repeated for credit. Prerequisite: 151 or consent of instructor.

PHIL 356. Applications of Modal Logic. 3 Units.

Applications of modal logic to knowledge and belief, and actions and norms. Models of belief revision to develop a dynamic doxastic logic. A workable modeling of events and actions to build a dynamic deontic logic on that foundation. (Staff).

PHIL 358. Rational Agency and Intelligent Interaction. 3 Units.

For advanced undergraduates, and M.S. and beginning Ph.D. students. Logic-based methods for knowledge representation, information change, and games in artificial intelligence and philosophy. Topics: knowledge, certainty, and belief; time and action; belief dynamics; preference and social choice; games; and desire and intention. Prerequisite: propositional and first-order logic. Same as: CS 222

PHIL 359. Topics in Logic, Information and Interaction. 2-4 Units.

Logical analysis of information, interaction and games, with topics connecting philosophy, computer science, game theory, and other fields. The focus is on current research at these interfaces. Prerequisite: 151, 154/254, or equivalent background.

PHIL 360. Core Seminar in Philosophy of Science. 4 Units.

Limited to first- and second-year Philosophy Ph.D. students.

PHIL 361. Social Dimensions of Scientific Knowledge. 4 Units.

Study of philosophical issues raised by the social character of scientific research and the relation of scientific inquiry to its broader social, economic, and cultural context: values in/of science, science and policy, distribution of cognitive labor, trust in science, models of knowledge.

PHIL 365. Seminar in Philosophy of Physics. 4 Units.**PHIL 366. Evolution and Communication. 4 Units.**

Topics include information bottlenecks, signaling networks, information processing, invention of new signals, teamwork, evolution of complex signals, teamwork. Sources include signaling games invented by David Lewis and generalizations thereof, using evolutionary and learning dynamics.

PHIL 369. Philosophy of Linguistics. 4 Units.

Philosophical issues raised by contemporary work in linguistics. Topics include: the subject matter of linguistics (especially internalism vs. externalism), methodology and data (especially the role of quantitative methods and the reliance on intuitions), the relationship between language and thought (varieties of Whorfianism and anti-Whorfianism), nativist arguments about language acquisition, and language evolution. Same as: LINGUIST 204, SYMSYS 204

PHIL 370. Core Seminar in Ethics. 4 Units.

Limited to first- and second-year students in the Philosophy Ph.D. program.

PHIL 370A. Grad Seminar in Ethics. 4 Units.

Conceptions of the self in practical philosophy. Graduate seminar exploring topics at the intersection of personal identity, agency, and morality. Specific topics and authors to be determined.

PHIL 371D. Graduate Seminar on Equality. 5 Units.

This seminar will focus on ideas of equality of opportunity, with readings from political theory, as well as American constitutional law, political science, economics, and sociology. The readings will address four main questions: What is equality of opportunity? Why is equality of opportunity an important requirement of justice? What are the principal sources of inequalities of opportunity? And how might those inequalities be remedied? Readings from: Hayek, Rawls, Dworkin, Okin, Roemer, Tawney, Bourdieu, Barry, Jencks, Mazumder, Alstott, McLanahan, and Heckman.

PHIL 372. Topics in Kantian Ethics. 4 Units.

Selected topics in ethics, considering both Kant's texts and recent writings by Kant interpreters and moral philosophers in the Kantian tradition. Among the topics covered will be: Practical reason, personal relationships, duties to oneself, evil, right and politics, lying, constructivism in ethics.

PHIL 372D. Topics in Political Philosophy. 5 Units.

Leading ideas in *A Theory of Justice*, *Political Liberalism*, and *The Law of Peoples*. Same as: POLISCI 332

PHIL 372E. Graduate Seminar on Moral Psychology. 3-5 Units.

Recent philosophical works on desire, intention, the motivation of action, valuing, and reasons for action. Readings: Williams, Korsgaard, Smith, Blackburn, Velleman, Stampe, Frankfurt.

PHIL 372P. Korsgaard and her Critics. 2-4 Units.

Christine Korsgaard has developed an unusually complex and comprehensive theory of morality, according to which moral authority has its source in our authority over ourselves simply as human agents. Her view purports to be humanist without falling into relativism, subjectivism, or voluntarism. Our aim is to understand and evaluate Korsgaard's theory, which Derek Parfit has characterized as combining "Kantian, Humean, and existentialist ideas in unexpected, platitude-denying ways." Readings include Korsgaard's own works as well as selected critiques. Graduate level seminar aimed primarily at philosophy students.

PHIL 372R. Political Realism. 3-5 Units.

This seminar will explore various articulations of political realism in their historical contexts. Realism is generally taken to be a pragmatic approach to a political world marked by the competition for material interests and the struggle for power. Yet beyond a shared critique of idealism and an insistence on the priority and autonomy of the political, realists tend to have very different normative visions and political projects. We will consider the works of several political realists from the history of political and international relations thought, including: Thucydides, Machiavelli, Hobbes, Carr, Niebuhr, and Morgenthau.

Same as: POLISCI 435R

PHIL 373. GRAD SEMINAR. 4 Units.

Grad seminar on ethical topic.

PHIL 374. Caring and Practical Reasoning. 4 Units.

What is it to care about something; how is caring related to desiring, emotions, and having policies; what is the relationship between caring and the will; why do people care about things; can attention to caring help explain the phenomenon of silencing reasons? Readings from contemporary literature, including Frankfurt, Watson, Bratman, Scanlon, Williams, Helm, and Kolodny. May be repeated for credit.

PHIL 374C. Democracy and the Constitution. 5 Units.

(Same as LAW 268) Connections between democratic theory and constitutional theory. Sources include literature from political philosophy, constitutional law, and jurisprudence, and arguments about freedom of expression, campaign finance, legislative apportionment, federalism, and separation of powers. Readings from Scalia, Breyer, Ely, Ackerman, Dahl, Rawls, Habermas, Dworkin, Riker, and Schumpeter, as well as constitutional cases.

Same as: POLISCI 438

PHIL 375. Ethics, Economics and the Market. 4 Units.

Economic analysis inevitably raises moral questions. Getting clear on those moral questions, and the competing answers to them, can help improve both economic analysis and our understanding of the values involved in alternative social policies. This course focuses on a central economic institution: the market. How have the benefits and costs of using markets been understood? For example, it is often claimed that markets are good for welfare, but how is welfare to be understood? What is the connection between markets and different values such as equality and autonomy?

What, if anything is wrong with markets in everything? Are there moral considerations that allow us to, distinguish different markets? This course examines competing answers to these questions, drawing on historical and contemporary literature. Readings include Adam Smith, JS Mill, Karl Marx, Michael Walzer, Dan Hausman and Michael McPherson and Debra Satz among others. For graduate students only.

Same as: ETHICSOC 303R, POLISCI 434A

PHIL 376. Agency and Personal Identity. 4 Units.

How philosophical theories of agency interact with philosophical accounts of personal identity. Readings include David Velleman and Harry Frankfurt.

PHIL 376C. Tragic Form and Political Theory. 5 Units.

Tragic form and political theory have in common a profound interest in the conflictual foundation of human society. This course will explore how the two intellectual approaches define the actors of conflict, its causes, and its possible [or impossible] resolution.

Same as: COMPLIT 376C, ENGLISH 376C

PHIL 377. Rational and Social Agency. 2-5 Units.

Contemporary discussions of practical reason, individual rational agency, planning agency, diachronic agency, intention, belief, intentional action, shared agency, identification and self-governance. Tentative list of authors whose work will be studied includes: Michael Bratman, Margaret Gilbert, Richard Holton, Christine Korsgaard, Alfred Mele, Kieran Setiya, Scott Shapiro, Michael Smith, David Velleman, Jay Wallace, and Gary Watson. Same as: POLISCI 333

PHIL 377B. Normativity, Rationality, and Reasoning. 4 Units.

This course will explore the nature and interconnections of normativity, rationality and reasoning. It particularly concentrates on practical rationality and practical reasoning. Broome's book "Rationality Through Reasoning" will be a guide to the course.

PHIL 378. Amartya Sen's capability theory. 2-4 Units.

Amartya Sen's pioneering work attempts to open up economics to missing informational and evaluative dimensions. This seminar will explore Sen's "capability approach" and its implications for the study of economics, gender, and justice. It will look at different ways that the capability approach has been developed, in particular, by Martha Nussbaum, but also by other political philosophers.

Same as: POLISCI 436R

PHIL 378A. Special Topics in Political Philosophy. 4 Units.**PHIL 379. Graduate Seminar in Metaethics. 2-4 Units.**

Theories about the meaning of ethical terms and the content of ethical judgements. Do these theories fit with best accounts of human agency and practical deliberation? Readings from recent literature. Prerequisites: 173B/273B, 181, 187/287 or equivalent.

PHIL 380. Core Seminar in Metaphysics and Epistemology. 4 Units.

Limited to first- and second-year students in the Philosophy Ph.D. program.

PHIL 381. Graduate Seminar in Metaphysics: Recent Work on Ground. 4 Units.

Metaphysicians have done an enormous amount of work on grounding over the past ten years or so. In this seminar, we will survey this new literature, focusing on the 'pure logic of ground' and the 'impure logic of ground'. Kit Fine's "A Guide to Ground" (which is easy to find through Google) is a useful introduction to the topic.

PHIL 382. Seminar on Reference. 4 Units.

Philosophical issues concerning the relationship between linguistic expressions and the objects to which they refer. Is it possible to get one unified theory of reference for different kinds of referring expressions such as proper names, pronouns, demonstratives, and other kinds of indexicals? Unsolved problems and desiderata for a theory of reference?.

PHIL 382A. Pragmatics and Reference. 4 Units.

Grice's theory of conversational implicatures, Relevance Theory and other contemporary pragmatic theories, focusing on issues involving singular reference, "pragmatic intrusion," and the semantics - pragmatics "interface." Throughout the seminar will be developing the approach Kera Korta and Perry call "critical pragmatics."

PHIL 383. Philosophy of Mind Seminar. 2-4 Units.

May be repeated for credit.

PHIL 383B. What's an Inference?. 2-4 Units.

Fundamental issues in epistemology, philosophy of mind and language: issues relating to the notion (or rather, notions) of an inference. What's inferential justification? What's an inferential reasoning process? What are inference rules, and what distinguishes a good rule of inference from a bad rule? Subtopics to be discussed include: the problem of mental causation, the distinction between personal and sub-personal levels of explanation, preservation of content and warrant, the epistemic support relation, and time permitting the nature of perceptual justification.

PHIL 384. Seminar in Metaphysics and Epistemology. 4 Units.

May be repeated for credit.

PHIL 385. Pragmatics and Reference. 2-4 Units.

Problems about reference have played a large role in the philosophy of language since the days of Frege and Russell. An approach to reference from the point of view of pragmatics, that Kepa Korta and John Perry have developed in their book *CRITICAL PRAGMATICS*. Rely on ideas from John Perry's book *REFERENCE AND REFLEXIVITY*. Also look at other approaches to reference, and to pragmatics.

PHIL 385B. Topics in Metaphysics and Epistemology: Vagueness. 4 Units.

Contemporary proposals for how and whether to explain and accommodate vagueness in reality and in representation. Theories of mental and linguistic representation that struggle to explain imprecise representation, and metaphysical theories of the ultimate structure of reality that are threatened with incoherence if worldly boundaries are vague. May be repeated for credit.

PHIL 385C. Topics in Philosophy of Language: The Frege-Russell Problems. 2-4 Units.

Explore various approaches to the difficulties for semantic theories raised by the behavior of propositional attitude sentences. How, if Superman and Clark are the same person, can Lois have different beliefs about them? "Classic" treatments of the issues including Frege, Russell, Quine, Davidson, and Kripke. Contemporary debates about the most promising approaches, including "naive Russellianism" and "unarticulated constituent" accounts.

PHIL 385D. Topics in Philosophy of Language. 2-4 Units.

Course may be repeat for credit.

PHIL 385M. The Metaphysics of Meaning. 2-4 Units.

One central project in the philosophy of language is to explain the relationships between paradigmatically semantic phenomena like meaning, truth, and reference (as well as entailment, satisfaction, application, and others). Often the pursuit of this project generates orders of explanation in which some notions are privileged as more "fundamental" than others, in what is arguably a metaphysical sense of the expression. The dominant order of explanation in both philosophical and linguistic semantics seems to be Referentialism, according to which word/world relationships like reference and application are taken to be more fundamental than sentential truth or meaning. (Think: correspondence theory + model-theoretic semantics.) Alternatives to the orthodoxy include certain versions of conceptual-role semantics, Brandom's inferentialism, and Horwich's use theory of meaning. The aims of this seminar will be to acquaint ourselves with these and other going concerns in the theory of meaning, to organize logical space so that gaps might more easily be spotted, and to help the instructor develop his own, as yet nascent form of opposition to Referentialism. Of special interest will be the alleged normativity of meaning and the Field/Wright dispute over reference to abstracta. Besides the authors already mentioned, readings will be drawn from Katz, King, Kripke, and perhaps (time permitting) Millikan, Peacocke, and/or Taylor as well. But we should probably begin by rehashing Davidson v. Dummett.

PHIL 385R. Metaphysics of Reference. 2-4 Units.

This seminar is an investigation of the nature of reference in both private thought and public talk. Just what is it for some bits of either our shared public language or our inner thoughts to refer to or stand for bits of the world? In virtue of what does the relation of reference obtain between some bit of the world and some bit of either outer language or inner thought? What about apparent reference to putatively non-existent objects, like Santa Claus or Sherlock Holmes? We appear to think and talk about objects that do not exist. But there are no such objects. So just how do we manage to think and talk about them? Or consider abstract objects, like numbers, that are thought by some to exist outside the spatial-temporal order. We appear to think and talk about such objects as well. But it is a mystery how, if at all, the reach of our thought could possibly extend beyond even the bounds of space and time. Though we will canvass a number of different answers to this questions, proposed by a variety of philosophers, my main goal will be to develop and defend a view that I call two-factor referentialism. Readings will be drawn from a number of sources, including several chapters of my book in progress *Referring to the World*.

PHIL 386. Topics in Philosophy of Mind: Rule Following. 4 Units.

This is a graduate seminar in phil of mind, epistemology, language -- and whatever else we need to get to the heart of the rule-following considerations.

PHIL 386B. Husserl and Adam Smith. 4 Units.

Readings from Husserl and others in the phenomenological tradition, and recent work on intentionality and consciousness by philosophers and cognitive scientists.

PHIL 386C. Subjectivity. 4 Units.

Continuation of 386B.

PHIL 386D. Personal Identity. 4 Units.

Focus on personal identity as a case study in metaphysical indeterminacy. The classic puzzles of PI can be construed as arguments that it can be indeterminate whether person A is identical to person B, and indeed, whether person A exists. Can such cases of indeterminacy be plausibly interpreted as semantic (or epistemic), or do they support the possibility of worldly or "ontic" indeterminacy? Is ontic indeterminacy even coherent? How might it be modeled? Parallel questions arise in the metaphysics of ordinary material objects, of course; but it's not obvious that their answers should also run parallel. And even if they do, focusing on PI lends the questions some real urgency. How should I feel about the interests of a past or future person who's only indeterminately me? Should I fear a future in which I merely indeterminately exist? Maybe outright death is preferable to being literally liminal. Seminar. Graduate work in core philosophy a prerequisite.

PHIL 386E. About Being. 4 Units.

A pop-up course on Burgess' eponymous book project, which deals with the metaphysics of linguistic representation in the service of developing a methodology for adjudicating ontological disputes. Keywords: linguistic turn, Plato's beard, problem of intentionality, grounding, deflationism, metaontology, etc. Readings will be a mix of chapter drafts and recent, relevant work by other people, including Rayo, Sider, Manley & Hawthorne; with a couple classics by Quine and Stalnaker thrown in for good measure.

PHIL 387. Intention and Normative Judgment. 2-4 Units.

Prominent views in both metaethics and the philosophy of action hold that there are distinctively practical states of mind that nonetheless play many of the roles traditionally associated with belief. Some action theorists hold that intention is a kind of practical attitude subject to rational requirements such as requirements of consistency and coherence. Metaethical noncognitivists hold that normative judgments are distinctively practical; perhaps even a species of intention; and face the well-known Frege-Geach problem because of that commitment. We will consider what metaethicists can learn from debates about intention in the philosophy of action, and what philosophers of action can learn from debates about metaethical non-cognitivism.

PHIL 387C. Consistency and Coherence. 2-4 Units.

Some philosophers think that attitudes like belief and intention are subject to consistency and coherence requirements. Are there such general purpose cogency requirements on attitudes? If so, what is their nature and strength? What grounds these requirements; for instance, does the point or purpose of a belief or an intention ground consistency and coherence requirements on that attitude? How are such requirements on belief related to requirements on intention? How does the answer to such questions bear on understanding of the interrelations between theoretical and practical rationality?.

PHIL 387D. Rationality over Time. 2-4 Units.**PHIL 387S. Practical Reasons and Practical Reasoning. 4 Units.**

Attempts to develop alternatives to Humean, instrumentalist conceptions of practical reasoning, and alternatives to Humean, non-cognitivist views of practical reasons. Readings include Aurel Kolnai, Bernard Williams, David Wiggins, Joseph Raz, Michael Bratman, Elijah Millgram, and T.M. Scanlon.

PHIL 388. Normative Consciousness. 2-4 Units.

Topics in Normativity. May be repeated for credit.

PHIL 389. Advanced Topics in Epistemology. 2-5 Units.

Advanced topics in epistemology. Pre-requisite Phil 284. May be repeated for credit.

PHIL 391. Research Seminar in Logic and the Foundations of Mathematics. 1-3 Unit.

Contemporary work. May be repeated a total of three times for credit. Math 391 students attend the logic colloquium in 380-381T. Same as: MATH 391

PHIL 392. Workshop in Philosophical logic. 1-3 Unit.

may be repeated for credit.

PHIL 450. Thesis. 1-15 Unit.

(Staff).

PHIL 470. Proseminar in Moral Psychology. 4 Units.

Restricted to Philosophy doctoral students. May be repeated for credit.

PHIL 500. Advanced Dissertation Seminar. 1 Unit.

Presentation of dissertation work in progress by seminar participants. May be repeated for credit.

PHIL 801. TGR Project. 0 Units.**PHIL 802. TGR Dissertation. 0 Units.**

(Staff).

Physical Education Courses

PE 2. Abs and Glutes. 1 Unit.

Abs and Gluteus is a group workout that utilizes your own body weight and a variety of small equipment for resistance to help you build stronger, leaner muscles in your midsection and gluteus. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness such as: muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Fee. (AU).

PE 3. Jogging For Fitness. 1 Unit.

This course will focus on understanding the basic components of cardiovascular fitness, and flexibility. This will be achieved by teaching students how to prepare, train and pace themselves throughout a variety of workouts such as jogging and interval training. Students will gain knowledge to make intelligent choices that contribute to a healthy active lifestyle.

PE 8. Badminton: Beginning. 1 Unit.

This course is designed to teach the basic skills necessary to play the game of badminton. Fitness and training principles will be discussed as well as singles and doubles strategy.

PE 9. Badminton: Intermediate. 1 Unit.

This course will introduce the student to more advanced skills and strategies of the game of badminton. Emphasis will be placed on conditioning, shot selection, court positioning, and singles and doubles play.

PE 14. Basketball Skills. 1 Unit.

Although this course is designed for players of intermediate to advance skill level, it is open to anyone hoping to improve as a player. Focus will be placed on individual skills such as passing, dribbling, shooting, rebounding, defending, and post play. Team offensive and defensive principles will be taught through intra-class competition.

PE 16. Bellydance Fusion. 1 Unit.

This course will introduce students to the fundamentals of belly dance with a focus on fusion and tribal fusion styles. No dance experience is required for this class; however, it is also suitable for students with previous belly dance training. Over the course of the quarter students will build their technique and learn a full choreography.

PE 17. Cardio Dance. 1 Unit.

Cardio Dance combines traditional aerobic routines with dance-based choreography. This course will focus on understanding the basic components of cardiovascular fitness, and flexibility. This course will teach students how to properly warm-up, cool-down, stretch and monitor heart rate as you engage in various styles of dance week to week: swing, salsa, hip-hop, modern, African and Jazz. No experience necessary; just a love of both movement and upbeat music.

PE 20. Barre Fusion. 1 Unit.

This course is a mix of Barre exercises, Pilates exercises, Yoga poses and stretching specifically designed to increase strength and muscle tone in the entire body and overall flexibility. We focus on proper alignment and improving posture. The exercises are intense and effective yet extremely accessible. This course will also utilize class instruction, assignments and student participation to enable students to: (1) Acquire knowledge of the basic components of health and wellness. (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 23. Core Training. 1 Unit.

Exercises to build muscular strength and body core endurance, focusing on balance and stability. Equipment includes stability and medicine balls. Fee. (AU).

PE 27. Cross Training Fitness. 1 Unit.

Cross training fitness class will focus on combining different types of exercises to work the body as a whole to develop cardiovascular fitness, strength and power. All fitness levels are welcome. Class sessions will include exercises such as: indoor cycling, plyometrics, rowing, jump rope, circuit training, and various other exercises.

PE 30. Cycling: Indoor. 1 Unit.

This course is designed to teach students basic concepts associated with indoor cycling as well as build cardio-respiratory endurance, muscular strength, and flexibility through structured individually paced indoor cycling workouts. Instructors motivate participants through intervals, hill climbs and coasts for the ultimate workout. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 32. Boot Camp. 1 Unit.

This course will focus on understanding the basic components of health-related physical fitness (cardiovascular fitness, muscular strength and endurance, and flexibility). Students will have the opportunity to engage in a variety of physical activities, which will enhance all aspects of health-related fitness. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness skills and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. May be repeated for credit.

PE 33. Diving. 1 Unit.

Basic techniques and mechanics of springboard and platform diving. Five basic categories of dives will be introduced: front, back, inward, reverse and twist. Competitive aspects of diving. Fee. (AU).

PE 39. Fencing: Beginning. 1 Unit.

The sport of swordsmanship develops quick hands, strong legs, and a strategic mind. Footwork, handwork, and bouting. Emphasis is on foil technique. All equipment provided. Fee. (AU).

PE 40. Fencing, Intermediate. 1 Unit.

Continuation of 39; learn advanced footwork and handwork. Strategy and bouting. Introduction to epee and saber. All equipment provided. Prerequisite: 39. Fee. (AU).

PE 43. Futsal. 1 Unit.

Futsal is a variant of soccer that is played on a smaller playing surface and mainly played indoors. Soccer greats such as Kaka, Ronaldo, Ronaldinho, Marta and Messi grew up playing Futsal and credit it for developing their incredible skills. Learn quick reflexes, fast thinking and pin-point passing. With five-a-side play and a special low bounce ball, Futsal will improve your game through its intense pace and rapid execution.

PE 45. Field Hockey, Indoor. 1 Unit.

Learn the game and rules of indoor field hockey, prior outdoor field hockey experience required.

PE 46. Field Hockey, Intermediate. 1 Unit.

For those with prior experience. Techniques, skills, and strategy. Scrimmages and game-like scenarios. Fee. (AU).

PE 51. Golf: Beginning. 1 Unit.

Fundamentals of the golf swing: putting, chipping, and sand play. Golf etiquette and rules. Fee. (AU).

PE 52. Golf: Advanced Beginning. 1 Unit.

Further development of the golf swing and short game. How to practice. Rules and etiquette. Prerequisite: 51 or golf experience. Fee. (AU).

PE 53. Golf: Intermediate. 1 Unit.

Drills and practice on all facets of golf. How to lower scores and manage the game on the course. Prerequisite: 52 or equivalent. Fee. (AU).

PE 54. Golf: Advanced. 1 Unit.

Goal is to refine the golf swing and increase power, distance, and accuracy. Course management, mental preparation, visualization techniques. Prerequisites: 53 or experience playing and practicing, and the ability to hit shots with relative accuracy and distance. Fee. (AU).

PE 58. Gymnastics: Beginning. 1 Unit.

This course is designed to teach students the fundamental movements of gymnastics including flexibility and strength exercises taught on the Olympic apparatus including floor, balance beam, bars, and rings. The utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Fee. (AU).

PE 59. Gymnastics: Intermediate. 1 Unit.

This course is for students who have completed 58 or have a background in gymnastics. This class will focus on tumbling and somersaulting. The utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Fee. (AU).

PE 63. Hip Hop. 1 Unit.

Funky, jazzy, hip hop dance for fun and cardiovascular fitness. Fee. (AU).

PE 65. Horsemanship: Beginning Riding. 1 Unit.

This course explores beginning riding. Topics include, but are not limited to, basic horse care, equitation at the walk/trot and negotiation of simple obstacles. This course will utilize class discussions, class assignments and student participation. No experience needed. Fee. (AU).

PE 66. Horsemanship: Advanced Beginning Riding. 1 Unit.

This course will review the basics of horsemanship and provides the necessary foundation for riding. Topics that will be covered include: horsemanship and horse care; the canter and basic jumping. This course will utilize class discussions, class assignments and student participation. Prerequisite: 65 or equivalent. Fee. (AU).

PE 67. Horsemanship: Intermediate Riding. 1 Unit.

Basic veterinary skills and barn management. Riding at all gaits and completing horsemanship patterns (Western) or jumping basic courses (English). Fee. Prerequisite: 66 or equivalent. (AU).

PE 68. Horsemanship: Student Assistant. 1 Unit.

(Bartsch).

PE 69. Leadership: Assertiveness and Creativity. 1 Unit.

This class will teach leadership techniques for maximizing creativity in a group setting through facilitated interaction with horses. Students will practice increasing personal and situational mind/body awareness, develop an authentic, assertive leadership style, and access creativity in challenging circumstances. No experience needed. Fee.

PE 70. Horsemanship. 1 Unit.

This course explores the basics of horsemanship and provides the necessary foundation for beginning riding. Topics include, but are not limited to, general horse care, handling techniques, horse health and disease, and stable management. This is an un-mounted course. This course will utilize class discussions, class assignments and student participation. No experience needed. Fee.

PE 76. Kickboxing. 1 Unit.

High intensity cardio workout incorporating kicks, punches, and elbow/knee and other combinations inspired by martial arts and boxing. Fee. (AU).

PE 80. Lifeguard Training. 1 Unit.

Priority to those wanting to guard at Stanford during the year. Lifeguard characteristics and responsibilities, recognition of hazards and emergencies, patron and facility surveillance, interaction with the public, rescue skills. Community first aid and CPR for the professional rescuer. Fee. Prerequisite: pass swim test (swimmer/advanced swimmer level).

PE 87. Learn to Row for Men. 1 Unit.

This class is an introduction to the sport of rowing for men. The fundamentals of proper form, technique and workouts to develop cardiovascular fitness will be taught. The class will progress from rowing ergometer machines into rowing shells on the water. The utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 88. Learn To Row For Women. 1 Unit.

This class is an introduction to the sport of rowing for women. The fundamentals of proper form, technique and workouts to develop cardiovascular fitness will be taught. The class will progress from rowing ergometer machines into rowing shells on the water. No prior rowing experience necessary. This class is recommended if you are interested in trying out for the women's rowing team. Read notes section for additional information. Fee (AU).

PE 89. Rowing Ergometer. 1 Unit.

Introduction to aerobic based training utilizing rowing machines. The utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Fee.

PE 90. Pilates Mat. 1 Unit.

Students will focus on developing core strength, flexibility, and awareness by engaging in a variety of exercises that integrate the principles of Pilates. This course will utilize class instruction, assignments, and student participation to enable students to: (1) Acquire knowledge of the basic health-related components of physical fitness and the different dimensions of wellness. (2) Develop the skill-related components of fitness, and (3) Understand and practice the behaviors that contribute to a healthy lifestyle. May be repeat for credit.

PE 91. Pilates Mat: Intermediate / Advanced. 1 Unit.

Students will focus on developing core strength, flexibility, and awareness by engaging in a variety of exercises that integrate the principles of Pilates. This course will utilize class instruction, assignments, and student participation to enable students to: (1) Acquire knowledge of the basic health-related components of physical fitness and the different dimensions of wellness. (2) Develop the skill-related components of fitness, and (3) Understand and practice the behaviors that contribute to a healthy lifestyle.

PE 98. Sailing, Beginning. 1 Unit.

Students will learn skills, theories, and techniques to enable beginners to sail with confidence in small centerboard boats. This class utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 99. Sailing, Advanced Beginning. 1 Unit.

Students will have the opportunity to further development their sailing skills and techniques. This class utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 100. Sailing, Intermediate. 1 Unit.

Students will have the opportunity to refine their sailing skills Students will also be introduced to racing. This class utilization of class discussions, assignments and student participation will enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 102. Coaching Corps. 1 Unit.

This course is designed to build practical and educational foundations to prepare students to be instructional leaders (coaches) in sports activities. Students will have the opportunity to make a valuable contribution to youth while developing practical coaching skills. The course will explore topics including practice planning and designing curriculum, how to effectively engage youth in sports, youth development through sports, social issues facing urban youth in sports, the plight of sports programs in urban centers, and how to create a college-going culture among youth in low-income communities. Students will coach off campus at local schools/community-based organizations that offer after school sports programs.

PE 108. Social Dance: Introduction to Swing dancing: Lindy Hop. 1 Unit.

Students will learn the collection of dances known as Swing, generally considered to include Lindy Hop, East Coast Swing, and Charleston. All of these sometimes fall under the single heading of Lindy Hop and can be danced together in one dance. In addition, students will: (1) Understand basic components of health-related physical fitness, cardiovascular fitness and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

Same as: includes East Coast Swing and Charleston

PE 109. Social Dance, Beginning. 1 Unit.

Introduction to modern social partner dancing, comprised of three sections: Latin, Ballroom, and Club. You may take one or more sections in any order; no section requires any prior experience nor partner. Steps, styling, and technique are covered. niquest; Autumn: Introduction to Latin dancing: Salsa, Cha-Cha, Rumba, Samba niquest; Winter: Introduction to Ballroom dancing: Waltz, Foxtrot, Tango, Quickstepniquest; Spring: Introduction to Club dancing: Swing (Lindy Hop), Night-Club Two Step, Hustle.

PE 110. Social Dance, Intermediate. 1 Unit.

Intermediate Modern Social Dance is for those who have already taken Introduction to Modern Social Partner Dancing (ATH-109), have prior training in the basics of the dances covered, or have received permission from the instructors. Class will move beyond the basics, exposing students to more advanced techniques, style, musicality and more challenging patterns. nnWe offer three independent sections: Latin, Ballroom and Club. Students may take one or more sections in any order. Each section requires prior experience in the dances covered in that section and the ability to lead / follow basic patterns, or approval of instructors. No partner required, as we change partners frequently during class. niquest; Winter: Intermediate Latin dancing: Salsa, Cha-Cha, Rumba, Sambaniquest; Spring: Intermediate Ballroom dancing: Waltz, Foxtrot, Tango, Quickstepniquest; Please note: Next year (2015-16) we will also be offering Intermediate Club dancing: Swing (Lindy Hop), Night-Club Two Step, Hustle.

PE 113. Soccer: Indoor Beginning/Intermediate. 1 Unit.

This course is designed to teach the basic skills and concepts of soccer. Students will work on skills of moving, passing, dribbling, trapping, heading, throw-in and offensive and defensive positioning, as well as learning basic rules and terminology of the game. This course will utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 114. Soccer, Indoor: Intermediate/Advanced. 1 Unit.

This course is designed to teach more advanced skills and concepts of soccer, as well as more advanced offensive and defensive tactics. Students will have the opportunity to refine their skills of moving, passing, dribbling, trapping, heading, throw-in and offensive and defensive positioning, as well as game playing strategies. This course will utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 115. Soccer: Advanced for Men. 1 Unit.

Students will learn advanced game playing skills, strategies, and techniques. This course will utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 116. Soccer: Advanced for Women. 1 Unit.

Students will learn advanced game playing skills, strategies, and techniques. This course will utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 123. Squash, Beginning/Intermediate. 1 Unit.

Techniques, rules and practice matches. Racquets, balls, and eye guards provided. Limited enrollment. Fee.

PE 128. Swimming: Beginning I. 1 Unit.

This class is for first time swimmers and for individuals who have fear, anxiety or discomfort in water. This class is also designed for individuals who have previously taken beginning swim courses and have had little/no success or who struggle to move through water. A foundation of basic balance and movement skills will be developed through a series of fundamental water exercises. When safety or balance in the water is in question, so is the ability to move, and to some extent, the ability to breathe comfortably. As comfort and balance improves, the easier it is to accept breathing and movement skills. The goal is for a swimmer to become comfortable and in control in both shallow and deep water. The fundamental skills learned in this course will provide a foundation for learning stroke technique, such as freestyle, in an effortless manner. nPrerequisites: None.

PE 129. Swimming: Beginning II. 1 Unit.

In this class you will learn how to relax in the water, breath effectively, float and tread, swim 3 different strokes (freestyle, backstroke, breaststroke), jump in the water from the deck, use swimming equipment (kickboards, pull buoys, fins) and swim across a 25 yard pool. nIf you have fear or anxiety in the water, consider taking the ATH 128 Confidence in Water class. If you can swim across a 25 yard pool, you should take the ATH 131 Intermediate Swim class.nPrereq: non-swimmer, unable to swim across a 25 yard pool.nGoals: Learn to be safe and relaxed in shallow and deep water. Develop ease and efficiency with breathing & swimming strokes. Be safe and comfortable swimming 25 yards continuously. FEE. (AU).

PE 131. Swimming: Intermediate. 1 Unit.

This class is for those who can swim across a 25 yard pool. In this class you will learn how to: breathe effectively, tread water, dive in from the edge and use swimming equipment (kick boards, pull buoys, hand paddles, fins). You will be introduced to and gain further development of the 4 competitive swimming strokes (Freestyle, Backstroke, Breaststroke & Butterfly). An introduction to flipturns and intervals (50 yard repeats) will be taught. Underwater videotaping and stroke review and analysis will occur. nPrereq: Ability to swim across a 25 yard pool continuously. You MUST be comfortable in deep water, if you are uncomfortable in deep water please take ATH 129 Swimming Beginning.nGoals: Develop relaxed, efficient and refined swim strokes, and begin to learn how to use swimming as a form of fitness (i.e. lap swimming, triathlons, masters swimming, open water swims). Evolve to swim 500 - 1,000 yards per class. Fee. (AU).

PE 132. Swimming: Advanced. 1 Unit.

This class is for those who can swim 100 yards freestyle continuously and have had an introduction to backstroke and breaststroke. In this class you will learn: refinement of the 4 competitive swimming strokes: freestyle, breaststroke, backstroke, butterfly (review/intro) and efficient breathing techniques. You will gain additional development of flipturns using intervals (100 yard repeats), competitive starts and turns, use of swimming equipment (kick boards, pull buoys, hand paddles, fins) for fitness, and videotaping with review. nPrereq: Swim 100 yards continuous of freestyle. If you have not had an introduction to Breaststroke or backstroke, we recommend you take ATH 131 Swimming Intermediate.nGoals: Refinement of all 4 competitive strokes, execution of 100 yard interval sets with flipturns (Freestyle, Individual Medley). Build strong foundation for reaching your swimming fitness goals (i.e. lap swimming, triathlons, masters swimming, open water swimming.) Evolve to swim 1,000 iquest; 1,500 yards per class. Fee. (AU).

PE 133. Swim Conditioning. 1 Unit.

Improve cardio-respiratory endurance through directed swimming workouts. Technique corrections as needed. Prerequisite: advanced swimmer. Fee. (AU).

PE 134. Synchronized Swimming, Beginning. 1 Unit.

Students will learn basic skills and techniques associated with synchronized swimming. Students will learn how synchronized swimming is judged alongside some of the basic moves. Sculling with the arms and an 'egg beater' motion with the legs keeps the swimmer stable and allows the more advanced techniques to be performed. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscle endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Prerequisite: intermediate to advanced swimming skills. Fee. (AU).

PE 135. Aqua Boot Camp. 1 Unit.

A unique combination of swim conditioning, swim power training and dry land training offered by the staff of the Women's Swimming program. nbsp;Increase your strength and cardiovascular endurance, in and out of the water. nbsp; Prerequisites: Ability to tread deep water for 5 minutes and swim at least 50 meters continuously of backstroke, front crawl, & breaststroke. nbsp;This is not a learn-to-swim class. Fee.

PE 136. Swimming: Stroke Refinement. 1 Unit.

Review and fine tune the 4 competitive strokes (freestyle, backstroke, butterfly, and breaststroke), with a primary emphasis on improving freestyle stroke efficiency. Flipturn refinement. Drill and technique work will be heavily emphasized. On average, 1000 meters will be swum per class. nPrereq: Ability to tread deep water for 5 minutes, swim 100 meter intervals of freestyle, backstroke, and breaststroke with rhythmic breathing, and swim 200 meters continuously under 5 minutes.

PE 138. Table Tennis: Intermediate/Advanced. 1 Unit.

This class is intended for players who have experience playing table-tennis including those who have taken the beginning table-tennis class. Students should have prior experience in countering, looping, chopping, and serving.

PE 139. TABLE TENNIS: BEGINNING. 1 Unit.

Basic counters, topspins, and chops with both the forehand and backhand. Serve and return, emphasizing game situations and match play. All equipment provided. Fee.

PE 140. Taiji Quan. 1 Unit.

Taiji Quan (Tai Chi) is a Chinese martial arts system of slow meditative physical exercise designed for relaxation, balance and health. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. All levels are welcome.

Same as: Tai Chi

PE 141. Tai Chi: Intermediate. 1 Unit.

At the Intermediate level, students will develop a deeper and more internal understanding of Tai Chi. This course will introduce new concepts and movements that are more challenging. This course will also utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Prerequisite: ATHLETIC 140 or prior practice and courses in Tai Chi.

PE 144. Tennis: Beginning. 1 Unit.

Students will learn and develop the essential stroke techniques with emphasis on control. This course will also incorporate rules, etiquette, and basic play. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 145. Tennis: Advanced Beginning. 1 Unit.

Students will review and strengthen stroke techniques with emphasis on control, depth, and direction. This course will also incorporate rules, etiquette, and basic strategy and tactics. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Prerequisites: 144, or knowledge of rules and scoring and average ability in fundamental strokes but limited playing experience. Fee. (AU).

PE 146. Tennis: Intermediate. 1 Unit.

Students will review and strengthen stroke techniques with more emphasis on depth, direction, and spin. This course will also incorporate basic to advance strategies and tactics with performance enhancing cooperative and competitive drills. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Prerequisites: 145 or average ability in fundamental strokes, and regular playing experience; NTRP rating of 3.0 -3.5 . (AU).

PE 147. Tennis: Advanced. 1 Unit.

Students will refine stroke techniques with more emphasis on spin, power, and variety. This course will also incorporate advance strategies and tactics with performance enhancing competitive drills. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Prerequisite: NTRP rating above 4.0 or equivalent. (AU).

PE 151. Total Body Training. 1 Unit.

Students will learn a variety of exercises that focuses on the body as a whole. This class allows you to move, stretch and strengthen the entire body. A variety of equipment will be used to target all major muscle groups. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness such as: cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 161. Volleyball: Beginning Sand. 1 Unit.

This course is designed to help students gain proficient skills and knowledge of the game of sand volleyball. This is an introductory course for those with limited or no playing experience. Instruction will include techniques for passing, setting, serving, serve receive, hitting, blocking, digging, and transition. The course is arranged to familiarize students with the rules, terminology, offensive and defensive strategies, team organization, communication, game play, and conditioning for volleyball. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 162. Volleyball. 1 Unit.

This course is designed to help students gain proficient skills and knowledge of the game of volleyball. This is an introductory course for those with limited or no playing experience. Instruction will include techniques for passing, setting, serving, serve receive, hitting, blocking, digging, and transition. The course is arranged to familiarize students with the rules, terminology, offensive and defensive strategies, team organization, communication, game play, and conditioning for volleyball. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 163. Volleyball: Intermediate/Advanced. 1 Unit.

This course is designed for players of intermediate to advanced skill level. This course will review the basic fundamentals of volleyball, proper conditioning for volleyball, and various tournament situations. Students will learn advanced concepts in team strategy through offense and defense with varying defensive and offensive systems. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 164. Volleyball: Intermediate Sand. 1 Unit.

Further development of skills and rules. Strategy in two- and four-person sand volleyball. Fee. (AU).

PE 165. Volleyball: Advanced Sand. 1 Unit.

This course is designed to refine and improve skills and game playing strategy in two- and four-person sand volleyball. Students must have strong skills and general knowledge of team concepts. This course will utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. Prerequisite: PE 164 or consent of the instructor. Fee. (AU).

PE 169. Water Polo: Beginning. 1 Unit.

Course Description: This course is designed to teach the basic skills and concepts of Water Polo. Students will also learn game strategies associated with water polo. Classes will include scrimmage play. This course will also utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. nPE: 169 Water Polo Beginning or equivalent skills and swimming experience.

PE 170. Water Polo: Intermediate/Advanced. 1 Unit.

This course is designed to further develop game playing skills, strategies and techniques that are associated with water polo. Classes will include scrimmage play of water polo skills. Students will also be exposed to game strategy. Classes will include scrimmage play. This course will also utilize class discussions, assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle. nPrereq: PE169 Water Polo Beginning or equivalent skills and swimming experience. Fee. (AU).

PE 173. Weight Training: Intermediate. 1 Unit.

This course will allow students to expand upon skills learned in Beginning Weight Training. Students will learn to design and develop a balanced weight training program to meet their goals. This course also provides an opportunity to develop skills in specific areas of strength training, endurance, and power. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness such as: muscular strength and endurance, power, and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 174. Weight Training: Beginning. 1 Unit.

This course is designed to teach the fundamentals of weight training, including equipment use, exercise technique and safety procedures. By the end of the course, students should be able to safely demonstrate a variety of exercise techniques, as well as have a general appreciation for the benefits of strength training. Fee. (AU).

PE 175. Muscle Works. 1 Unit.

Functional Training teaches you how to move your body optimally, improve balance, build strength, and prevent injury. Class sessions incorporate a variety of exercises that work on flexibility, core, balance, strength and power, focusing on multiple movement planes. Whether your goal is to train your body to perform the activities of daily life effortlessly and without injury, improve your athletic edge, or regain lost function, this class gives you the tools to achieve these goals. All fitness levels are welcome.

PE 176. Weight Training for Women. 1 Unit.

This course is designed to teach the fundamentals of weight training, including equipment use, exercise technique, proper stretching, safety procedures and injury prevention. The basics of the physiology of strength training and planning individual programs. Fee. (AU).

PE 177. Circuit Training. 1 Unit.

This class will focus on full-body conditioning workouts, combining resistance training and high-intensity aerobics. This challenging class provides a great workout as you move through a series of stations designed to elevate your heart rate and challenge your muscles. Stations may include body weight exercises, weights, resistant bands, stability balls, treadmills, etc. Class may be modified for all levels of fitness. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness (2) Develop physical fitness skills and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 179. Wrestling and Introduction to Mixed Martial Arts. 1 Unit.

While primarily focusing on the basic techniques of collegiate wrestling, some non-striking forms of MMA, such as Brazilian jiu-jitsu and submission grappling, will be covered throughout the quarter.

Same as: MMA

PE 180. Yoga for Less-stress Living. 1 Unit.

It is not uncommon in today's world to have a sense of being overtaken by the speed of events. Deadlines, competition, finances, relationships, health challenges all create stress. Stress can be good, but when chronic it can strain the body, cause nervous tension and adversely affect the mind. The stress response is often called fight or flight mode. Its complement is rest and digest. In this course, we will explore how yogic techniques and breathing can give us the flexibility and strength to maintain a balanced being. All levels are welcome.

PE 181. YOGA: Beginning. 1 Unit.

Students will be introduced to the values and skills of Hatha Yoga (Yoga of exercise). Students will learn how to reduce tension, increase energy levels, move efficiently, reconnect to self-awareness, and learn about the body. The poses and flows are adaptable and can be personalized for any level of fitness. The emphasis of the class will be on asanas (poses) and vinyasa (flow) for increased flexibility, improved health, relaxation, and reduced stress in daily living. Students will also be exposed to the language, philosophy, history, and concepts of Yoga. A typical class will include breathing techniques, meditation and asana practice, including standing, balancing, stretching and some inverted poses. At the end of the quarter students will have: (1) Acquired knowledge of the basic components of health and wellness. (2) Developed physical fitness and motor skills, and (3) A positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 182. Yoga: Asana Practice. 1 Unit.

Yoga offers continual opportunities for growth and balance both physical and nmemotional. Challenging yourself with different approaches will help you stay nnfocused and keep your practice creative. In Asana Yoga Practice students will learn solid yoga practices that they can enjoy on their own as well as yoga foundations that they can apply in all types of yoga classes around the world.

PE 183. Yoga: Advanced. 1 Unit.

Advanced Yoga is for students who already possess a solid and ongoing yoga practice. This course will move deeper into all aspects of yoga by exploring more advanced postures, pranayama and meditation techniques. This course is designed for students who wish to challenge themselves both physically and mentally.

PE 184. Yoga/Pilates Fusion. 1 Unit.

Combination of power and restorative yoga with strength building Pilates exercises. Fee.

PE 185. Yoga: Intermediate Asana. 1 Unit.

This course is designed for students who already possess an ongoing yoga practice. This course will move deeper into all aspects of yoga by exploring more postures, pranayama and meditation techniques. This course is designed for students who wish to improve themselves both physically and mentally. Intermediate yoga will provide students with information and experience which will enable students to: (1) Acquire knowledge of the basic components of health and wellness. (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

PE 186. Zumba. 1 Unit.

Zumba combines Latin rhythms with cardiovascular exercise to create an aerobic routine. Interval and resistance training to maximize caloric output, and total body toning. (AU).

PE 189. Business Practices in Sport. 2 Units.

Planning and management of intercollegiate sports and recreation. Elements of business contracts, finance, facility development, legal issues, risk management, human resources, security, and operations and event management. How an athletic and recreation department is organized. Career opportunities in sports and recreation administration.

Physics Courses

PHYSICS 15. The Nature of the Universe. 3 Units.

The structure, origin, and evolution of the major components of the Universe: planets, stars, and galaxies. Emphasis is on the formation of the Sun and planets, the evolution of stars, and the structure and content of the Milky Way galaxy. Topics: cosmic enigmas (dark matter, black holes, pulsars, x-ray sources), star birth and death, and the origins of and search for life in the solar system and beyond.

PHYSICS 16. Cosmic Horizons. 3 Units.

The origin and evolution of the universe and its contents: stars, galaxies, quasars. The overall structure of the cosmos and the physical laws that govern matter, space, and time. Topics include the evolution of the cosmos from the origin of the elements and the formation of stars and galaxies, exotic astronomical objects (black holes, quasars, supernovae, and gamma ray bursts), dark matter, inflationary cosmology, and the fate of the cosmos.

PHYSICS 17. Black Holes. 3 Units.

Newton's and Einstein's theories of gravitation and their relationship to the predicted properties of black holes. Their formation and detection, and role in galaxies and high-energy jets. Hawking radiation and aspects of quantum gravity.

PHYSICS 18N. Frontiers in Theoretical Physics and Cosmology. 3 Units.

Preference to freshmen. The course will begin with a description of the current standard models of gravitation, cosmology, and elementary particle physics. We will then focus on frontiers of current understanding including investigations of very early universe cosmology, string theory, and the physics of black holes.

PHYSICS 19. How Things Work: An Introduction to Physics. 3 Units.

Introduction to the principles of physics through familiar objects and phenomena, including airplanes, cameras, computers, engines, refrigerators, lightning, radio, microwave ovens, and fluorescent lights. Estimates of real quantities from simple calculations. Prerequisite: high school algebra and trigonometry.

PHYSICS 21. Mechanics and Heat. 3 Units.

For biology, social science, and premedical students. Introduction to Newtonian mechanics, fluid mechanics, theory of heat. Prerequisite: high school algebra and trigonometry; calculus not required.

PHYSICS 21S. Mechanics and Heat with Laboratory. 4 Units.

For biology, social science, and premedical students. Labs are an integrated part of the summer course. Introduction to Newtonian mechanics, fluid mechanics, theory of heat. Prerequisite: high school algebra and trigonometry; calculus not required.

PHYSICS 22. Mechanics and Heat Laboratory. 1 Unit.

Guided hands-on exploration of concepts in classical mechanics and thermodynamics with an emphasis on student predictions, observations and explanations. Pre- or corequisite: PHYS 21.

PHYSICS 23. Electricity and Optics. 3 Units.

Electric charges and currents, magnetism, induced currents; wave motion, interference, diffraction, geometrical optics. Prerequisite: PHYSICS 21.

PHYSICS 23S. Electricity and Optics with Lab. 4 Units.

For biology, social science, and premedical students. Labs are an integrated part of the summer courses. Electric charges and currents, magnetism, induced currents; wave motion, interference, diffraction, geometrical optics. Prerequisite: PHYSICS 21S or 21.

PHYSICS 24. Electricity and Optics Laboratory. 1 Unit.

Guided hands-on exploration of concepts in electricity and magnetism, circuits and optics with an emphasis on student predictions, observations and explanations. Introduction to multimeters and oscilloscopes. Pre- or corequisite: PHYS 23.

PHYSICS 25. Modern Physics. 3 Units.

Introduction to modern physics. Relativity, quantum mechanics, atomic theory, radioactivity, nuclear reactions, nuclear structure, high energy physics, elementary particles, astrophysics, stellar evolution, and the big bang. Prerequisite: PHYSICS 23 or consent of instructor.

PHYSICS 26. Modern Physics Laboratory. 1 Unit.

Guided hands-on and simulation-based exploration of concepts in modern physics, including special relativity, quantum mechanics and nuclear physics with an emphasis on student predictions, observations and explanations. Pre- or corequisite: PHYSICS 25.

PHYSICS 41. Mechanics. 4 Units.

How are the motions of objects in the physical world determined by the laws of physics? In this course, students will learn to describe the motion of objects (kinematics) and then develop an understanding of why motions have the form they do (dynamics). We will emphasize how all the important physical principles in mechanics, such as conservation of momentum and energy for translational and rotational motion, follow from just three "laws" of nature -- Newton's laws of motion. We will make clear distinctions between the fundamental laws of nature and empirical rules, which are useful approximations for more complex physics. Problems will be drawn from the many examples of mechanics in everyday life. Students will develop skills in verifying that derived results satisfy criteria for correctness, such as dimensional consistency and the expected behavior in limiting cases. Discussions will be based on the language of mathematics -- in particular, vector representations, manipulation of vectors, and calculus. Physical understanding will be fostered by peer interaction and demonstrations in lecture, and discussion sections based on interactive group problem solving. Prerequisite: High school physics or concurrent enrollment in PHYSICS 41A. MATH 41 or MATH 51 or CME 100 or equivalent. Minimum Corequisite: MATH 42 or equivalent.

PHYSICS 41A. Mechanics Concepts, Calculations, and Context. 1 Unit.

Additional assistance and applications for PHYSICS 41. In-class problems in physics and engineering. Exercises in the concepts and calculations of vectors, translational and rotational velocity and acceleration, equations of motion for particles and rigid bodies, and principles of energy and linear/angular momentum. In-class participation required. Highly recommended for students with limited high school physics or calculus. Co-requisite with PHYSICS 41 for students with no high school physics.

PHYSICS 42. Classical Mechanics Laboratory. 1 Unit.

Hands-on exploration of concepts in classical mechanics: Newton's laws, conservation laws, rotational motion. Introduction to laboratory techniques, experimental equipment and data analysis. Pre- or corequisite: PHYSICS 41.

PHYSICS 43. Electricity and Magnetism. 4 Units.

What is electricity? What is magnetism? And how are they related? How do these phenomena manifest themselves in the physical world? The theory of electricity and magnetism, as codified by Maxwell's equations, underlies much of the observable universe. This course will develop both conceptual and quantitative knowledge of this theory. Topics to be covered include electrostatics; magnetostatics; simple AC and DC circuits involving capacitors, inductors, and resistors; the integral form of Maxwell's equations; and electromagnetic waves. Basic principles will be illustrated in the context of modern technologies. The course will also address broader scientific questions -- How do physical theories evolve? What is the interplay between basic physical theories and their associated technologies? Discussions will be based on the language of mathematics, particularly differential and integral calculus, and vectors. Physical understanding will be fostered by peer interaction and demonstrations in lecture, and discussion sections based on interactive group problem solving. Prerequisite: PHYSICS 41 or equivalent. MATH 42 or MATH 51 or CME 100 or equivalent. Recommended corequisite: MATH 52 or CME 102.

PHYSICS 43A. Electricity and Magnetism: Concepts, Calculations and Context. 1 Unit.

Additional assistance and applications for Physics 43. In-class problems in physics and engineering. Exercises in calculations of electric and magnetic forces and field to reinforce concepts and techniques; Calculations involving inductors, transformers, AC circuits, motors and generators.

PHYSICS 43N. Understanding Electromagnetic Phenomena. 1 Unit.

Preference to freshmen. Expands on the material presented in PHYSICS 43; applications of concepts in electricity and magnetism to everyday phenomena and to topics in current physics research. Corequisite: PHYSICS 43 or advanced placement.

PHYSICS 44. Electricity and Magnetism Lab. 1 Unit.

Hands-on exploration of concepts in electricity and magnetism and circuits. Introduction to multimeters, function generators, oscilloscopes, and graphing techniques. Pre- or corequisite: PHYSICS 43.

PHYSICS 45. Light and Heat. 4 Units.

Reflection and refraction, lenses and lens systems; polarization, interference, and diffraction; temperature, properties of matter and thermodynamics, introduction to kinetic theory of matter. Prerequisites: PHYSICS 41 or equivalent. MATH 21 or MATH 42 or MATH 51 or CME 100 or equivalent.

PHYSICS 45N. Advanced Topics in Light and Heat. 1 Unit.

Preference to freshmen. Expands on the subject matter presented in PHYSICS 45 to include optics and thermodynamics in everyday life, and applications from modern physics and astrophysics. Corequisite: PHYSICS 45 or advanced placement.

PHYSICS 46. Light and Heat Laboratory. 1 Unit.

Hands-on exploration of concepts in geometrical optics, wave optics and thermodynamics. Pre- or corequisite: PHYSICS 45.

PHYSICS 50. Astronomy Laboratory and Observational Astronomy. 3 Units.

Introduction to observational astronomy emphasizing the use of optical telescopes. Observations of stars, nebulae, and galaxies in laboratory sessions with 16- and 24-inch telescopes at the Stanford Observatory. Meets one evening per week from dusk until well after dark at the Stanford Observatory. No previous physics required. Limited enrollment. Lab.

PHYSICS 59. FRONTIERS OF PHYSICS RESEARCH. 1 Unit.

Recommended for prospective Physics and Engineering Physics majors, and anyone with an interest in learning about the big questions and unknowns that physicists tackle in their research at Stanford. Weekly faculty presentations, in some cases followed by tours of experimental laboratories where the research is conducted.

PHYSICS 61. Mechanics and Special Relativity. 4 Units.

(First in a three-part series: PHYSICS 61, PHYSICS 63, PHYSICS 65.) Advanced freshman physics. For students with a strong high school mathematics and physics background contemplating a major in Physics or interested in a rigorous treatment of physics. Special theory of relativity and Newtonian mechanics with multi-variable calculus. Postulates of special relativity, simultaneity, time dilation, length contraction, the Lorentz transformation, causality, and relativistic mechanics. Central forces, contact forces, linear restoring forces. Momentum transport, work, energy, collisions. Angular momentum, torque, moment of inertia in three dimensions. Damped and forced harmonic oscillators. Recommended prerequisites: Mastery of mechanics at the level of AP Physics C and AP Calculus B/C or equivalent. Corequisite: MATH 51.

PHYSICS 62. Classical Mechanics Laboratory. 1 Unit.

Introduction to laboratory techniques, experiment design, data collection and analysis simulations, and correlating observations with theory. Labs emphasize discovery with open-ended questions and hands-on exploration of concepts developed in PHYSICS 61 including Newton's laws, conservation laws, rotational motion. Pre- or corequisite PHYSICS 61.

PHYSICS 63. Electricity, Magnetism, and Waves. 4 Units.

(Second in a three-part series: PHYSICS 61, PHYSICS 63, PHYSICS 65.) Advanced freshman physics. For students with a strong high school mathematics and physics background contemplating a major in Physics or interested in a rigorous treatment of physics. Electricity, magnetism and waves with some description of optics. Electrostatics and Gauss' law. Electric potential, electric field, conductors, image charges. Other theorems of vector calculus. Electric currents, DC circuits. Moving charges, magnetic field, Ampere's law. Solenoids, transformers, induction, AC circuits, resonance. Relativistic point of view for moving charges. Displacement current, Maxwell's equations. Electromagnetic waves, dielectrics. Diffraction, interference, refraction, reflection, polarization. Prerequisite: PHYSICS 61 and MATH 51; Pre- or corequisite: MATH 52.

PHYSICS 64. Electricity, Magnetism and Optics Laboratory. 1 Unit.

Introduction to multimeters, breadboards, function generators and oscilloscopes. Emphasis on student-developed design of experimental procedure and data analysis for topics covered in PHYSICS 63: electricity, magnetism, circuits, and optics. Pre- or corequisite: PHYSICS 63.

PHYSICS 65. Quantum and Thermal Physics. 4 Units.

(Third in a three-part series: PHYSICS 61, PHYSICS 63, PHYSICS 65.) Advanced freshman physics. For students with a strong high school mathematics and physics background contemplating a major in Physics or interested in a rigorous treatment of physics. Introduction to quantum mechanics: matter waves, atomic structure, Schrodinger's equation. Thermodynamics and statistical mechanics: entropy and heat, Boltzmann statistics, quantum statistics. Prerequisites: PHYSICS 61 & PHYSICS 63. Pre- or corequisite: MATH 53.

PHYSICS 67. Introduction to Laboratory Physics. 2 Units.

Methods of experimental design, data collection and analysis, statistics, and curve fitting in a laboratory setting. Experiments drawn from electronics, optics, heat, and modern physics. Lecture plus laboratory format. Required for PHYSICS 60 series Physics and Engineering Physics majors; recommended, in place of PHYSICS 44, for PHYSICS 40 series students who intend to major in Physics or Engineering Physics. Pre- or corequisite: PHYSICS 65 or PHYSICS 43.

PHYSICS 70. Foundations of Modern Physics. 4 Units.

Required for Physics majors who completed the PHYSICS 40 series, or the PHYSICS 60 series prior to 2005-06. Special relativity, the experimental basis of quantum theory, atomic structure, quantization of light, Schrodinger equation, nuclear physics, elementary particles and cosmology. Prerequisites: PHYSICS 41, PHYSICS 43. Pre or corequisite: PHYSICS 45. Recommended: prior or concurrent registration in MATH 53.

PHYSICS 70N. Modern Physics in Your Life. 1 Unit.

How does modern physics intersect with your everyday life? Topics may include the quantum nature of light, atomic physics and an introduction to semiconductor physics, applications to light sources (incandescent, fluorescent, light-emitting diodes, lasers) and light sensors (photodiodes and solar cells), introduction to nuclear physics (e.g., fission, fusion, interaction of radiation with matter). Co- or pre-requisite: PHYSICS 70, PHYSICS 65, or similar high-school physics preparation.

PHYSICS 81N. Science on the Back of the Envelope. 3 Units.

Understanding the complex world around us quantitatively, using order of magnitude estimates and dimensional analysis. Starting from a handful of fundamental constants of Nature, one can estimate complex quantities such as cosmological length and time scales, size of the atom, height of Mount Everest, speed of tsunami, energy density of fuels and climate effects. Through these examples students learn the art of deductive thinking, fundamental principles of science and the beautiful unity of nature.

PHYSICS 83N. Physics in the 21st Century. 3 Units.

Preference to freshmen. Current topics at the frontier of modern physics. Topics include subatomic particles and the standard model, symmetries in nature, extra dimensions of space, string theory, supersymmetry, the big bang theory of the origin of the universe, black holes, dark matter, and dark energy of the universe. Why the sun shines. Cosmology and inflation.

PHYSICS 91SI. Practical Computing for Scientists. 2 Units.

Essential computing skills for researchers in the natural sciences. Helping students transition their computing skills from a classroom to a research environment. Topics include the Unix operating system, the Python programming language, and essential tools for data analysis, simulation, and optimization. More advanced topics as time allows. Prerequisite: CS106A or equivalent.

PHYSICS 100. Introduction to Observational and Laboratory Astronomy. 4 Units.

Designed for undergraduate physics majors but open to all students with a calculus-based physics background and some laboratory experience. Students make and analyze observations using telescopes at the Stanford Student Observatory. Topics include navigating the night sky, the physics of stars and galaxies, telescope instrumentation and operation, quantitative error analysis, and effective scientific communication. Limited enrollment. Prerequisites: prior completion of Physics 40 or PHYSICS 60 series.

PHYSICS 105. Intermediate Physics Laboratory I: Analog Electronics. 4 Units.

Analog electronics including Ohm's law, passive circuits and transistor and op amp circuits, emphasizing practical circuit design skills to prepare undergraduates for laboratory research. Short design project. Minimal use of math and physics, no electronics experience assumed beyond introductory physics. Prerequisite: PHYSICS 43 or PHYSICS 63.

PHYSICS 107. Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis. 4 Units.

Experiments on lasers, Gaussian optics, and atom-light interaction, with emphasis on data and error analysis techniques. Students describe a subset of experiments in scientific paper format. Prerequisites: completion of PHYSICS 40 or PHYSICS 60 series, and PHYSICS 70 and PHYSICS 105. Recommended: PHYSICS 130, prior or concurrent enrollment in PHYSICS 120. WIM.

PHYSICS 108. Advanced Physics Laboratory: Project. 4 Units.

Small student groups plan, design, build, and carry out a single experimental project in low-temperature physics. Prerequisites PHYSICS 105, PHYSICS 107.

PHYSICS 110. Advanced Mechanics. 3-4 Units.

Lagrangian and Hamiltonian mechanics. Principle of least action, Euler-Lagrange equations. Small oscillations and beyond. Symmetries, canonical transformations, Hamilton-Jacobi theory, action-angle variables. Introduction to classical field theory. Selected other topics, including nonlinear dynamical systems, attractors, chaotic motion. Undergraduates register for Physics 110 (4 units). Graduates register for Physics 210 (3 units). (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Prerequisites: MATH 131P, and PHYS 112 or MATH elective 104 or higher. Recommended prerequisite: PHYS 130. Same as: PHYSICS 210

PHYSICS 112. Mathematical Methods of Physics. 4 Units.

Theory of complex variables, complex functions, and complex analysis. Fourier series and Fourier transforms. Special functions such as Laguerre, Legendre, and Hermite polynomials, and Bessel functions. The uses of Green's functions. Covers material of MATH 106 and MATH 132 most pertinent to Physics majors. Prerequisites: MATH 50 or 50H series, and MATH 131P or MATH 173.

PHYSICS 113. Computational Physics. 4 Units.

Numerical methods for solving problems in mechanics, electromagnetism, quantum mechanics, and statistical mechanics. Methods include numerical integration; solutions of ordinary and partial differential equations; solutions of the diffusion equation, Laplace's equation and Poisson's equation with relaxation methods; statistical methods including Monte Carlo techniques; matrix methods and eigenvalue problems. Short introduction to MatLab, used for class examples; class projects may be programmed in any language such as C. Prerequisites: MATH 53 and PHYS 120. Previous programming experience not required.

PHYSICS 120. Intermediate Electricity and Magnetism I. 4 Units.

(First in a two-part series: PHYS 120, PHYS 121.) Vector analysis. Electrostatic fields, including boundary-value problems and multipole expansion. Dielectrics, static and variable magnetic fields, magnetic materials. Maxwell's equations. Prerequisites: PHYSICS 43 or PHYS 63; MATH 52 and MATH 53. Pre- or corequisite: MATH 131P or MATH 173. Recommended corequisite: PHYS 112.

PHYSICS 121. Intermediate Electricity and Magnetism II. 4 Units.

(Second in a two-part series: PHYS 120, PHYS 121.) Conservation laws and electromagnetic waves, Poynting's theorem, tensor formulation, potentials and fields. Plane wave problems (free space, conductors and dielectric materials, boundaries). Dipole and quadrupole radiation. Special relativity and transformation between electric and magnetic fields. Prerequisites: PHYS 120 and MATH 131P or MATH 173; Recommended: PHYS 112.

PHYSICS 130. Quantum Mechanics. 4 Units.

The origins of quantum mechanics and wave mechanics. Schrodinger equation and solutions for one-dimensional systems. Commutation relations. Generalized uncertainty principle. Time-energy uncertainty principle. Separation of variables and solutions for three-dimensional systems; application to hydrogen atom. Spherically symmetric potentials and angular momentum eigenstates. Spin angular momentum. Addition of angular momentum. Prerequisites: PHYSICS 65 or PHYSICS 70. Pre- or corequisites: PHYSICS 120 and MATH 131P or MATH 173.

PHYSICS 131. Quantum Mechanics II. 4 Units.

Identical particles; Fermi and Bose statistics. Time-independent perturbation theory. Fine structure, the Zeeman effect and hyperfine splitting in the hydrogen atom. Time-dependent perturbation theory. Variational principle and WKB approximation. Prerequisite: PHYSICS 120, PHYSICS 130, MATH 131P, or MATH 173. Pre- or PHYSICS 121.

PHYSICS 134. Advanced Topics in Quantum Mechanics. 3-4 Units.

Scattering theory, partial wave expansion, Born approximation. Additional topics may include nature of quantum measurement, EPR paradox, Bell's inequality, and topics in quantum information science; path integrals and applications; Berry's phase; structure of multi-electron atoms (Hartree-Fock); relativistic quantum mechanics (Dirac equation). Undergraduates register for PHYSICS 134 (4 units). Graduate students register for PHYSICS 234 (3 units); graduate students required to complete additional assignments in a format determined by the instructor. Prerequisites: PHYSICS 130, PHYSICS 131. Same as: PHYSICS 234

PHYSICS 152. Introduction to Particle Physics I. 3 Units.

Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws. Bound states. Decay rates. Cross sections. Feynman diagrams. Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics and for chromodynamics. Undergraduates register for PHYSICS 152. Graduate students register for PHYSICS 252. (Graduates student enrollees will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 130. Pre- or corequisite: PHYSICS 131. Same as: PHYSICS 252

PHYSICS 160. Introduction to Stellar and Galactic Astrophysics. 3-4 Units.

Observed characteristics of stars and the Milky Way galaxy. Physical processes in stars and matter under extreme conditions. Structure and evolution of stars from birth to death. White dwarfs, planetary nebulae, supernovae, neutron stars, pulsars, binary stars, x-ray stars, and black holes. Galactic structure, interstellar medium, molecular clouds, HI and HII regions, star formation, and element abundances. Undergraduates register for PHYSICS 160. Graduate students register for PHYSICS 260. (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Pre or corequisites: PHYSICS 130. Same as Physics 260. Same as: PHYSICS 260

PHYSICS 161. Introduction to Extragalactic Astrophysics and Cosmology. 3 Units.

Big bang theory, cosmic inflation, expansion of space. Composition of the universe. Origin of matter and the elements. The cosmic distance ladder. Observational evidence for dark matter and dark energy. Geometry of space and the standard model of cosmology. Formation of galaxies and large scale structure. Ultimate fate of the universe. Undergraduates register for Physics 161. Graduates register for Physics 261. (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Pre or corequisites: PHYSICS 121. Same as: PHYSICS 261

PHYSICS 170. Thermodynamics, Kinetic Theory, and Statistical Mechanics I. 3-4 Units.

Foundations of statistical mechanics. Thermodynamic variables and basic thermodynamics. Ideal gases (including Maxwell-Boltzmann distribution). Bose and Fermi gases; examples including blackbody radiation, Debye theory of phonons, Sommerfeld theory of electrons in metals. Thermodynamic functions. Undergraduates register for Physics 170 (4 units). Graduates register for Physics 270 (3 units). (Graduates student enrollees will be required to complete additional assignments in a format determined by the instructor.) Recommended prerequisite: PHYSICS 130. Same as: PHYSICS 270

PHYSICS 171. Thermodynamics, Kinetic Theory, and Statistical Mechanics II. 3-4 Units.

Mean-field theory of phase transitions; critical exponents. Ferromagnetism, the Ising model. The renormalization group. Dynamics near equilibrium: Brownian motion, diffusion, Boltzmann equations. Other topics at discretion of instructor. Prerequisite: PHYS 170/270. Undergraduates register for Physics 171 (4 units). Graduate students register for Physics 271 (3 units). (Graduates student enrollees will be required to complete additional assignments in a format determined by the instructor.) Recommended pre- or corequisite: PHYS 130. Same as Physics 271. Same as: PHYSICS 271

PHYSICS 172. Solid State Physics. 3 Units.

Introduction to the properties of solids. Crystal structures and bonding in materials. Momentum-space analysis and diffraction probes. Lattice dynamics, phonon theory and measurements, thermal properties. Electronic structure theory, classical and quantum; free, nearly-free, and tight-binding limits. Electron dynamics and basic transport properties; quantum oscillations. Properties and applications of semiconductors. Reduced-dimensional systems. (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Undergraduates should register for PHYSICS 172 and graduate students for APPPHYS 272. Prerequisites: PHYSICS 170 and PHYSICS 171, or equivalents. Same as APPPHYS 272. Same as: APPPHYS 272

PHYSICS 190. Independent Research and Study. 1-9 Unit.

Undergraduate research in experimental or theoretical physics under the supervision of a faculty member. Prerequisites: superior work as an undergraduate Physics major and consent of instructor.

PHYSICS 205. Senior Thesis Research. 1-12 Unit.

Long-term experimental or theoretical project and thesis in Physics under supervision of a faculty member. Planning of the thesis project is recommended to begin as early as middle of the junior year. Successful completion of a senior thesis requires a minimum of 3 units for a letter grade completed during the senior year, along with the other formal thesis and physics major requirements. Students doing research for credit prior to senior year should sign up for Physics 190. Prerequisites: superior work as an undergraduate Physics major and approval of the thesis application.

PHYSICS 210. Advanced Mechanics. 3-4 Units.

Lagrangian and Hamiltonian mechanics. Principle of least action, Euler-Lagrange equations. Small oscillations and beyond. Symmetries, canonical transformations, Hamilton-Jacobi theory, action-angle variables. Introduction to classical field theory. Selected other topics, including nonlinear dynamical systems, attractors, chaotic motion. Undergraduates register for Physics 110 (4 units). Graduates register for Physics 210 (3 units). (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Prerequisites: MATH 131P, and PHYS 112 or MATH elective 104 or higher. Recommended prerequisite: PHYS 130. Same as: PHYSICS 110

PHYSICS 211. Continuum Mechanics. 3 Units.

Elasticity, fluids, turbulence, waves, gas dynamics, shocks, and MHD plasmas. Examples from everyday phenomena, geophysics, and astrophysics.

PHYSICS 216. Back of the Envelope Physics. 3 Units.

Techniques such as scaling and dimensional analysis, useful to make order-of-magnitude estimates of physical effects in different settings. Goals are to promote a synthesis of physics through solving problems, including problems that are not usually thought of as physics. Applications include properties of materials, fluid mechanics, geophysics, astrophysics, and cosmology. Prerequisites: undergraduate mechanics, statistical mechanics, electricity and magnetism, and quantum mechanics.

PHYSICS 220. Classical Electrodynamics. 3 Units.

Special relativity: The principles of relativity, Lorentz transformations, four vectors and tensors, relativistic mechanics and the principle of least action. Lagrangian formulation, charges in electromagnetic fields, gauge invariance, the electromagnetic field tensor, covariant equations of electrodynamics and mechanics, four-current and continuity equation. Noether's theorem and conservation laws, Poynting's theorem, stress-energy tensor. Constant electromagnetic fields: conductors and dielectrics, magnetic media, electric and magnetic forces, and energy. Electromagnetic waves: Plane and monochromatic waves, spectral resolution, polarization, electromagnetic properties of matter, dispersion relations, wave guides and cavities. Prerequisites: PHYSICS 121 and PHYSICS 210, or equivalent; MATH 106 or MATH 116, and MATH 132 or equivalent.

PHYSICS 230. Quantum Mechanics. 3 Units.

Fundamental concepts. Introduction to Hilbert spaces and Dirac's notation. Postulates applied to simple systems, including those with periodic structure. Symmetry operations and gauge transformation. The path integral formulation of quantum statistical mechanics. Problems related to measurement theory. The quantum theory of angular momenta and central potential problems. Prerequisite: PHYSICS 131 or equivalent.

PHYSICS 231. Quantum Mechanics. 3 Units.

Basis for higher level courses on atomic solid state and particle physics. Problems related to measurement theory and introduction to quantum computing. Approximation methods for time-independent and time-dependent perturbations. Semiclassical and quantum theory of radiation, second quantization of radiation and matter fields. Systems of identical particles and many electron atoms and molecules. Prerequisite: PHYSICS 230.

PHYSICS 234. Advanced Topics in Quantum Mechanics. 3-4 Units.

Scattering theory, partial wave expansion, Born approximation. Additional topics may include nature of quantum measurement, EPR paradox, Bell's inequality, and topics in quantum information science; path integrals and applications; Berry's phase; structure of multi-electron atoms (Hartree-Fock); relativistic quantum mechanics (Dirac equation). Undergraduates register for PHYSICS 134 (4 units). Graduate students register for PHYSICS 234 (3 units); graduate students required to complete additional assignments in a format determined by the instructor. Prerequisites: PHYSICS 130, PHYSICS 131. Same as: PHYSICS 134

PHYSICS 240. Introduction to the Physics of Energy. 3 Units.

Energy as a consumable. Forms and interconvertability. World joule budget. Equivalents in rivers, oil pipelines and nuclear weapons. Quantum mechanics of fire, batteries and fuel cells. Hydrocarbon and hydrogen synthesis. Fundamental limits to mechanical, electrical and magnetic strengths of materials. Flywheels, capacitors and high pressure tanks. Principles of AC and DC power transmission. Impossibility of pure electricity storage. Surge and peaking. Solar constant. Photovoltaic and thermal solar conversion. Physical limits on agriculture.

PHYSICS 241. Introduction to Nuclear Energy. 3 Units.

Radioactivity. Elementary nuclear processes. Energetics of fission and fusion. Cross-sections and resonances. Fissionable and fertile isotopes. Neutron budgets. Light water, heavy water and graphite reactors. World nuclear energy production. World reserves of uranium and thorium. Plutonium, reprocessing and proliferation. Half lives of fission decay products and actinides made by neutron capture. Nuclear waste. Three Mile Island and Chernobyl. Molten sodium breeders. Generation-IV reactors. Inertial confinement and magnetic fusion. Laser compression. Fast neutron production and fission-fusion hybrids. PREREQUISITES: Strong undergraduate background in elementary chemistry and physics. PHYS 240 and PHYS 252 recommended but not required. Interested undergraduates encouraged to enroll, with permission of instructor.

PHYSICS 252. Introduction to Particle Physics I. 3 Units.

Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws. Bound states. Decay rates. Cross sections. Feynman diagrams. Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics and for chromodynamics. Undergraduates register for PHYSICS 152. Graduate students register for PHYSICS 252. (Graduates student enrollees will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 130. Pre- or corequisite: PHYSICS 131. Same as: PHYSICS 152

PHYSICS 260. Introduction to Stellar and Galactic Astrophysics. 3-4 Units.

Observed characteristics of stars and the Milky Way galaxy. Physical processes in stars and matter under extreme conditions. Structure and evolution of stars from birth to death. White dwarfs, planetary nebulae, supernovae, neutron stars, pulsars, binary stars, x-ray stars, and black holes. Galactic structure, interstellar medium, molecular clouds, HI and HII regions, star formation, and element abundances. Undergraduates register for PHYSICS 160. Graduate students register for PHYSICS 260. (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Pre or corequisites: PHYSICS 130. Same as Physics 260. Same as: PHYSICS 160

PHYSICS 261. Introduction to Extragalactic Astrophysics and Cosmology. 3 Units.

Big bang theory, cosmic inflation, expansion of space. Composition of the universe. Origin of matter and the elements. The cosmic distance ladder. Observational evidence for dark matter and dark energy. Geometry of space and the standard model of cosmology. Formation of galaxies and large scale structure. Ultimate fate of the universe. Undergraduates register for Physics 161. Graduates register for Physics 261. (Graduate student enrollees will be required to complete additional assignments in a format determined by the instructor.) Pre or corequisites: PHYSICS 121. Same as: PHYSICS 161

PHYSICS 262. Introduction to Gravitation. 3 Units.

Introduction to general relativity. Curvature, energy-momentum tensor, Einstein field equations. Weak field limit of general relativity. Black holes, relativistic stars, gravitational waves, cosmology. Prerequisite: PHYSICS 121 or equivalent including special relativity.

PHYSICS 270. Thermodynamics, Kinetic Theory, and Statistical Mechanics I. 3-4 Units.

Foundations of statistical mechanics. Thermodynamic variables and basic thermodynamics. Ideal gases (including Maxwell-Boltzmann distribution). Bose and Fermi gases; examples including blackbody radiation, Debye theory of phonons, Sommerfeld theory of electrons in metals. Thermodynamic functions. Undergraduates register for Physics 170 (4 units). Graduates register for Physics 270 (3 units). (Graduates student enrollees will be required to complete additional assignments in a format determined by the instructor.) Recommended prerequisite: PHYSICS 130. Same as: PHYSICS 170

PHYSICS 271. Thermodynamics, Kinetic Theory, and Statistical Mechanics II. 3-4 Units.

Mean-field theory of phase transitions; critical exponents. Ferromagnetism, the Ising model. The renormalization group. Dynamics near equilibrium: Brownian motion, diffusion, Boltzmann equations. Other topics at discretion of instructor. Prerequisite: PHYS 170/270. Undergraduates register for Physics 171 (4 units). Graduate students register for Physics 271 (3 units). (Graduates student enrollees will be required to complete additional assignments in a format determined by the instructor.) Recommended pre- or corequisite: PHYS 130. Same as Physics 271. Same as: PHYSICS 171

PHYSICS 290. Research Activities at Stanford. 1 Unit.

Required of first-year Physics graduate students; suggested for junior or senior Physics majors for 1 unit. Review of research activities in the department and elsewhere at Stanford at a level suitable for entering graduate students.

PHYSICS 291. Practical Training. 1-3 Unit.

Opportunity for practical training in industrial labs. Arranged by student with the research adviser's approval. A brief summary of activities is required, approved by the research adviser.

PHYSICS 293. Literature of Physics. 1-15 Unit.

Study of the literature of any special topic. Preparation, presentation of reports. If taken under the supervision of a faculty member outside the department, approval of the Physics chair required. Prerequisites: 25 units of college physics, consent of instructor.

PHYSICS 294. Teaching of Physics Seminar. 1 Unit.

Required of all Teaching Assistants prior to the first teaching assignment. Weekly seminar/discussions on interactive techniques for teaching physics. Practicum which includes class observations, grading and student teaching in current courses.

PHYSICS 295. Learning & Teaching of Science. 3 Units.

This course will provide students with a basic knowledge of the relevant research in cognitive psychology and science education and the ability to apply that knowledge to enhance their ability to learn and teach science, particularly at the undergraduate level. Course will involve readings, discussion, and application of the ideas through creation of learning activities. It is suitable for advanced undergraduates and graduate students with some science background.

Same as: EDUC 280X

PHYSICS 301. Astrophysics Laboratory. 3 Units.

Open to all graduate students with a calculus-based physics background and some laboratory experience. Students make and analyze observations using telescopes at the Stanford Student Observatory. Topics include navigating the night sky, the physics of stars and galaxies, telescope instrumentation and operation, quantitative error analysis, and effective scientific communication. The course also introduces a number of hot topics in astrophysics and cosmology. Limited enrollment.

PHYSICS 312. Basic Plasma Physics. 3 Units.

For the nonspecialist who needs a working knowledge of plasma physics for space science, astrophysics, fusion, or laser applications. Topics: orbit theory, the Boltzmann equation, fluid equations, magneto hydrodynamics (MHD) waves and instabilities, electromagnetic (EM) waves, the Vlasov theory of electrostatic (ES) waves and instabilities including Landau damping and quasilinear theory, the Fokker-Planck equation, and relaxation processes. Advanced topics in resistive instabilities and particle acceleration. Prerequisite: PHYSICS 220, or consent of instructor.

PHYSICS 321. Laser Spectroscopy. 3 Units.

Theoretical concepts and experimental techniques. Absorption, dispersion, Kramers-Kronig relations, line-shapes. Classical and laser linear spectroscopy. Semiclassical theory of laser atom interaction: time-dependent perturbation theory, density matrix, optical Bloch equations, coherent pulse propagation, multiphoton transitions. High-resolution nonlinear laser spectroscopy: saturation spectroscopy, polarization spectroscopy, two-photon and multiphoton spectroscopy, optical Ramsey spectroscopy. Phase conjugation. Four-wave mixing, harmonic generation. Coherent Raman spectroscopy, quantum beats, ultra-sensitive detection. Prerequisite: 230. Recommended: 231.

PHYSICS 330. Quantum Field Theory I. 3 Units.

Lorentz Invariance. S-Matrix. Quantization of scalar and Dirac fields. Feynman diagrams. Quantum electrodynamics. Elementary electrodynamic processes: Compton scattering; e⁺e⁻ annihilation. Loop diagrams. Prerequisites: PHYSICS 130, PHYSICS 131, or equivalents. Foundations of Group Theory.

PHYSICS 331. Quantum Field Theory II. 3 Units.

Functional integral methods. Local gauge invariance and Yang-Mills fields. Asymptotic freedom. Spontaneous symmetry breaking and the Higgs mechanism. Unified models of weak and electromagnetic interactions. Prerequisite: PHYSICS 330.

PHYSICS 332. Quantum Field Theory III. 3 Units.

Theory of renormalization. The renormalization group and applications to the theory of phase transitions. Renormalization of Yang-Mills theories. Applications of the renormalization group of quantum chromodynamics. Perturbation theory anomalies. Applications to particle phenomenology. Prerequisite: PHYSICS 330.

PHYSICS 351. Standard Model of Particle Physics. 3 Units.

Symmetries, group theory, gauge invariance, Lagrangian of the Standard Model, flavor group, flavor-changing neutral currents, CKM quark mixing matrix, GIM mechanism, rare processes, neutrino masses, seesaw mechanism, QCD confinement and chiral symmetry breaking, instantons, strong CP problem, QCD axion. Prerequisite: PHYSICS 330; PHYSICS 331 and PHYSICS 332 recommended.

PHYSICS 361. Advanced Topics in Radiative Processes and Stellar Astrophysics. 3 Units.

Astronomical data on stars, star clusters, interstellar medium, and the Milky Way galaxy. Theory of stellar structure; hydrostatic equilibrium, radiation balance, and energy production. Stellar formation, Jean's mass, and protostars. Evolution of stars to the main sequence and beyond to red giants, white dwarfs, neutron stars, and black holes. Supernovae and compact sources. Structure of the Milky Way: disk and spiral arms; dark matter and the halo mass; central bulge or bar; and black hole. Prerequisite: PHYSICS 221 or equivalent. Recommended: PHYSICS 260, PHYSICS 360.

PHYSICS 362. Advanced Extragalactic Astrophysics and Cosmology. 3 Units.

Observational data on the content and activities of galaxies, the content of the Universe, cosmic microwave background radiation, gravitational lensing, and dark matter. Models of the origin, structure, and evolution of the Universe based on the theory of general relativity. Test of the models and the nature of dark matter and dark energy. Physics of the early Universe, inflation, baryosynthesis, nucleosynthesis, and galaxy formation. Prerequisites: PHYSICS 210, PHYSICS 211, and PHYSICS 260 or PHYSICS 360.

PHYSICS 364. Advanced Gravitation. 3 Units.

Classical and quantum gravity in Anti-de Sitter spacetime (AdS). History and uses of AdS. Basic classical physics of AdS: metric, conformal structure, common coordinate systems. Black holes in AdS: thermodynamics, Hawking-Page transition. Classical fields in AdS: action of conformal group, singletons. Stability of AdS and positive energy theorems. Towards the holographic correspondence: geodesics and the UV-IR relation. AdS from supergravity. Recommended: PHYSICS 330, some familiarity with general relativity.

PHYSICS 372. Condensed Matter Theory I. 3 Units.

Fermi liquid theory, many-body perturbation theory, response function, functional integrals, interaction of electrons with impurities. Prerequisite: APPPHYS 273 or equivalent.

PHYSICS 373. Condensed Matter Theory II. 3 Units.

Superfluidity and superconductivity. Quantum magnetism. Prerequisite: PHYSICS 372.

PHYSICS 450. Conformal Field Theory. 3 Units.

This course will be a systematic introduction to two dimensional conformal field theory. Topics to be covered include: conformal symmetry; stress tensor; operator product expansion; Virasoro algebra; unitarity; modular invariance; c-theorem; conformal bootstrap; Kac-Moody algebra; supersymmetry.

PHYSICS 451. TOPICS IN STRING THEORY. 3 Units.

The course will cover several topics in modern string theory including aspects of 2d conformal field theory, mirror symmetry, geometric transitions and large N dualities, and moonshine. Other topics may be discussed as time and interests dictate. Prerequisites: No formal requirements, but a familiarity with quantum field theory at the level of the 330 sequence, and some moderate mathematical maturity, will be useful.

PHYSICS 490. Research. 1-15 Unit.

Open only to Physics graduate students, with consent of instructor. Work is in experimental or theoretical problems in research, as distinguished from independent study of a non-research character in 190 and 293.

PHYSICS 801. TGR Project. 0 Units.**PHYSICS 802. TGR Dissertation. 0 Units.**

Political Economics Courses

POLECON 230. Strategy Beyond Markets. 2 Units.

This course develops techniques and tools to use in firms' strategic interactions beyond the market environment. We'll examine firms' interactions with stakeholders, constituents, and institutions, including interest groups, legislatures, regulatory agencies, courts, international organizations, and the public. Topics covered in the class include: intellectual property, health care reform, carried interest in private equity, strategic corporate social responsibility, and beyond market strategy for start-ups. The goal is to develop integrated strategies for optimal firm performance that combine strategies within and beyond markets.

POLECON 231. Strategy Beyond Markets: Challenges and Opportunities in Developing Economies. 3 Units.

This course shares significant material with POLECON 230 and the goal of developing integrated strategies for optimal firm performance that combine elements within and beyond markets. POLECON 231 diverges from the base course to delve deeper into issues that are particularly salient for entrepreneurs in emerging and frontier markets. Using a combination of cases from developed and developing countries, we will expand the list of topics considered to include managing political risk and protecting the firm in the face of uncertain and discretionary regulatory environments. The objective is to provide a solid grounding in the techniques explored in 230, while refining skill sets and whetting appetites for investment in higher risk environments.

POLECON 232. Law and Economics for Corporate Strategy. 3 Units.

This course introduces students to the core issues of law and economics and their applications to managerial strategy. Markets and the legal environment are increasingly interrelated: issues such as antitrust, intellectual property, privacy rights, product regulation, and torts affect firms' profitability both directly through legal action and indirectly by determining the "rules of the game." Nor are companies simply reactive to legal and political forces; actions taken by managers in firms often propel issues before the public eye. For instance, electronic collection and collation of personal data has stimulated new concerns about privacy, while court decisions, new legislation, and public opinion have all played roles in determining what is acceptable. Such legal and political forces invariably necessitate changes in corporate strategy, and the effectiveness of corporate strategy often rests on managers' ability to anticipate, rather than simply react to, developments in the nonmarket environment. Cases and readings consider specific legal principles and how executives can anticipate, and take effective action with regards to, the threats and opportunities they present. The course will focus on legal doctrine within the United States, but will also consider the legal ramifications of corporate actions with regards to other nations and international law. The course also considers other important nonmarket issues, such as responding to pressure from independent interest groups and understanding how firms may influence the legislative process, though in less depth than Nonmarket Strategy. Students are expected to come to class with a thorough understanding of the both the legal issues involved and the economic considerations of the case under discussion. By the end of the course, students will have acquired a thorough understanding of the legal principles covered, as well as a strategic acuity regarding the appropriate market and nonmarket responses. Grades will be based on student's demonstration of this understanding through class participation and a final exam.

POLECON 239. MSx: Strategy Beyond Markets. 2 Units.

This course addresses managerial issues in the social, political, legal, and ethical environments of business. Cases and readings emphasize strategies to improve the performance of companies in light of their multiple constituencies, in both international and US environments. Most core courses focus on firms' interactions with customers, suppliers, and alliance partners in the form of mutually beneficial voluntary exchange transacted in markets. In contrast, this course considers the strategic interactions of firms with comparably important constituents, organizations, and institutions beyond markets. Issues considered include those involving activist and interest groups, the media, legislatures, regulatory and antitrust agencies, and international organizations such as the WTO. In many of the class sessions, we will draw on theoretical and empirical research in political economy, a field that is particularly relevant for understanding relationships between firms and governments, because (unlike most of economics) political economy focuses on interactions that are neither voluntary nor transacted via money.

POLECON 330. Law and Economics for Corporate Strategy. 3 Units.

This is an advanced version of the GSB's class on Strategy Beyond Markets. It is intended for students who have substantive experience working with/for governments, activist groups, the media, or heavily-regulated industries, and particularly those students with previous legal experience. The class may also be appropriate for students who have academic backgrounds in political science or public policy. Cases and readings consider specific legal principles (e.g., antitrust, fiduciary duty, intellectual property) and how executives can anticipate and take effective action with regards to the threats and opportunities they present. The course will focus on legal doctrine within the United States, but will also consider the legal ramifications of corporate actions with regards to other nations' legal doctrine and international law. By the end of the course, students are expected to acquire not only a thorough understanding of the legal principles covered, but also insight into the appropriate market-based and non-market-based responses.

POLECON 332. Managers and the Legal Environment. 4 Units.

To excel, managers and entrepreneurs must know how to operate successfully in the legal environment in which they must conduct business. This course addresses the legal aspects of business agreements and relationships. The course begins with an overview of the different forms of business organizations available, mergers and acquisitions, public and private offerings of securities, and the fiduciary duties of officers, directors and controlling shareholders. The course covers the US court system and the laws of contracts, torts, antitrust and intellectual property. The legal aspects of the employment relationship as they relate to the liability of corporations and managers for the acts of their employees, wrongful termination, discrimination, and sexual harassment will also be covered. Students who have a JD degree, or will receive a JD degree, from a U.S. university should not take this class. If you cannot attend a class, you must notify instructors before class.

POLECON 349. The Business World: Moral and Spiritual Inquiry through Literature. 3 Units.

This course uses novels and plays as a basis for examining the moral and spiritual aspects of business leadership and of the environment in which business is done. On the one hand literature is used as the basis for examining the character of business people, while on the other hand literature provides illumination of the cultural contexts of values and beliefs within which commercial activities take place in a global economy. The course is organized around the interplay of religious traditions and national identities. Classes are taught in a Socratic, discussion-based style, creating as much of a seminar atmosphere as possible. A two-text method is used, encouraging students to examine their own personal stories with as much care as the stories presented in the literature. This course will be graded on the basis of class participation and a final paper. There will be no exam.

POLECON 528. Measuring Opinion and Sentiment. 2 Units.

Measuring the opinions and sentiments of consumers and employees are important responsibilities of several areas of managerial responsibility including marketing, strategy, business development, and sales. We focus on three main approaches learning the preferences of key stakeholders in the design of products and services: (1) surveys; (2) experiments; and (3) "big data." Topics include sampling, questionnaire design, and experimental design and methodology. The main assignment will be a group project. Students should have either taken Data & Decisions or have some familiarity with statistics.

POLECON 530. Law and Economics for Corporate Strategy. 3 Units.

This is an advanced version of the GSB's class on Strategy Beyond Markets. It is intended for students who have substantive experience working with/for governments, activist groups, the media, or heavily-regulated industries, and particularly those students with previous legal experience. The class may also be appropriate for students who have academic backgrounds in political science or public policy. Cases and readings consider specific legal principles (e.g., antitrust, fiduciary duty, intellectual property) and how executives can anticipate and take effective action with regards to the threats and opportunities they present. The course will focus on legal doctrine within the United States, but will also consider the legal ramifications of corporate actions with regards to other nations' legal doctrine and international law. By the end of the course, students are expected to acquire not only a thorough understanding of the legal principles covered, but also insight into the appropriate market-based and non-market-based responses.

POLECON 538. Disruptive Innovation. 2 Units.

Disruptive innovation is challenging to bring to market because of the power of entrenched incumbents and their political advocates. This course will discuss market and non-market strategies for effectively deploying and scaling up disruptive technologies. We will focus on developed products and initial business/company building. Pedagogical techniques include case studies, historical analysis, strategic frameworks, and interactive group presentations. The course will feature guest speakers as well as the co-instructor's experience as the first business leader (and now CFO) of Dropbox as it grew from an early stage company to a multi-billion dollar enterprise.

POLECON 547. Intellectual Property and Its Effect on Business. 2 Units.

This course explores the impact intellectual property rights have on business decisions. We begin with a general background of intellectual property law including copyright, trademark, patent and trade secret. We will also cover quasi property rights such as database and privacy. Each of these distinct rights will be examined through a case methodology affording students an opportunity to gauge the relative strengths and weaknesses of a particular form of protection. As the value of intellectual property rises, the avenues of economic return increase. We will analyze various methods of maximizing such economic returns. Focus for this course is on the impact both technological innovation and intellectual property law have on business strategies. This is not a class designed to teach students the law of intellectual property. Rather, this course educates business decision makers on the impact intellectual property can have on the bottom line. This course employs a mixed lecture/case discussion format. We will have several sessions with lectures by visiting industry experts.

POLECON 555. New Opportunities in the Changing World of American Health Care. 1 Unit.

In this class, we will visit and analyze two health care organizations that are experimenting with innovative approaches to delivering care. The visits will highlight: the new technologies that clinics and hospitals are using to improve health outcomes, reduce cost, and enhance customer service; how clinics and hospitals are reorganizing the division of labor between physicians, nurses, and support workers to make optimal use of new technology; the challenges of obtaining payment from an insurance system that has historically focused on the volume of services rather than quality or efficiency. In the first session, we will review how health care is financed in the U.S. and how the Affordable Care Act, the country's new health reform law, will change the finance and delivery of care starting in 2014. In the last session, we will discuss the two organizations that we visited, which aspects of their approaches are most (and least) likely to succeed, and which areas of the sector offer the greatest opportunities for the future. Students will be expected to participate in both visits and the discussions before and after them.

POLECON 571. The Future of Growth: Developed and Developing World. 2 Units.

The course deals with the recent (post war) sustained high growth in the developing world and its likely evolution and impact in the future. How are these kinds of growth rates possible? What accounts for the absence of growth in a part of the developing world? What are the key political ingredients? Attention will be given to the evolving global landscape surrounding this growth. What is the impact of this widening pattern of growth and are there natural brakes that may slow the process down or make it difficult for the non-G20 developing countries and their 1/3 of the world's population to start or sustain the high growth process. The class will attempt to identify and assess the impact of important global trends and challenges. Included in the latter will be governance issues. We will spend a little time on the impact of the 2008-2009 crisis, the transmission channels and lessons learned from the vantage point of developing countries.

POLECON 584. Managing Global Political Risk. 1 Unit.

In a globalized world, managers and investors are increasingly realizing that politics matter as much as economic fundamentals. Micro-level decisions made by local politicians in Brazil or India, national-level strategies of countries like China and Russia, and multi-national regimes, policies, and norms are all affecting global businesses in significant and often surprising ways. This course examines the full array of political risks confronting businesses today, from creeping expropriations to sudden shocks like national debt defaults and coups to emerging threats like cyber exploitation. Students will learn about impediments to assessing political risk and how to tackle them; develop strategies for managing political risk in a systematic way; and craft tools for mitigating the downside effects of political risk to business. Each session will include customized case studies and mini-simulations for students to walk in the shoes of senior managers confronting these challenges.

POLECON 670. Advanced Topics in Political Economy. 4 Units.

This is a topics class aimed at advanced students in political economy and related disciplines. It will consist of a combination of lectures and student presentations. Grading will be based on class participation and a research proposal/paper.

POLECON 676. Behavioral Political Economy. 4 Units.

This course examines organizational decision making in ways that depart from the "thin theory" of rationality in one of two respects. (1) The thin theory presumes that decision makers are fully rational, i.e., they are cognitively unconstrained. We will examine a variety of cognitive constraints and their effects on institutional behavior and policy outcomes. (2) The thin theory presumes individualistic preferences: people care only about their own payoffs. There is now substantial evidence that this assumption is sometimes inaccurate. We will study some of this literature. Much of the important work in this area has come not from political economy but from cognitive psychology and behavioral economics. Hence, we will spend between a third and a half of the quarter on micro-foundations. Throughout the course, contrasts will be drawn between models based on the thin theory of rationality and less orthodox ones. Consequently, some familiarity with theories of rational choice is desirable. Any course on game theory or normative decision theory suffices. Although the motivation for relaxing the thin theory has been largely empirical, the orientation of this course is heavily theoretical. Many of the theories that we will study are expressed as mathematical or computational models. Students are expected either to have a taste for formal reasoning or at least to tolerate it.

POLECON 677. Political Economy and Political Behavior. 4 Units.

This seminar will expose students to cutting-edge research in political behavior and political economy published in the leading political science (and other social science) journals. The aim is for students to learn the contemporary literature so that they can be producers of research. To that end, the required assignments in the class will be aimed at professional development: writing an original research note, writing a review, and delivering a scholarly presentation.

POLECON 680. Foundations of Political Economy. 3 Units.

This course provides an introduction to political economy with an emphasis on formal models of collective choice, public institutions, and political competition. Topics considered include voting theory, social choice, institutional equilibria, agenda setting, interest group politics, bureaucratic behavior, and electoral competition. Also listed as Political Science 351A.

POLECON 681. Economic Analysis of Political Institutions. 4 Units.

This course extends the foundations developed in P680 by applying techniques of microeconomic analysis and game theory to the study of political behavior and institutions. The techniques include information economics, games of incomplete information, sequential bargaining theory, repeated games, and rational expectations. The applications considered include agenda formation in legislatures, government formation in parliamentary systems, the implications of legislative structure, elections and information aggregation, lobbying, electoral competition and interest groups, the control of bureaucracies, interest group competition, and collective choice rules. Also listed as Political Science 351B.

POLECON 682. Institutions and Bridge-Building in Political Economy. 4 Units.

This course critically surveys empirical applications of formal models of collective-choice institutions. It is explicitly grounded in philosophy of science (e.g., Popperian positivism and Kuhn's notions of paradigms and normal science). Initial sessions address the meanings and roles of the concept of institutions in social-science research. Historically important works of political science and/or economics are then considered within a framework called Components of Institutional Analysis (or CIA), which provides a fully general way of evaluating research that is jointly empirical and formal theoretical. The course concludes with contemporary instances of such bridge-building. The over-arching objectives are to elevate the explicitness and salience of desirable properties of research and to illustrate the inescapable tradeoffs among the stipulated criteria. Although this is a core course in the GSB Political Economy PhD curriculum, its substantive foci may differ across years depending on the instructor. For Professor Krehbiel's sessions, the emphasis is on legislative behavior, organization, and lawmaking, and on inter-institutional strategic interaction (e.g. between executive, legislative, and judicial branches in various combinations). Students should have taken POLECON 680 and POLECON 681. Also listed as Political Science 351C.

Same as: POLISCI 351C

POLECON 683. Political Development Economics. 4 Units.

This course surveys emerging research in political economics as it applies to developing societies, emphasizing both theoretical and empirical approaches. Topics will include: corruption and "forensic" political economics, institutional reform and democratization, ethnicity, conflict and public goods provision, and the role of trade and financial innovations in political development. The aim of the course is to bring students to the frontier of the field and develop their own research. Graduate level proficiency in microeconomics and empirical methods will be required.

POLECON 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, STRAMGT 691

POLECON 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, STRAMGT 692

POLECON 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, STRAMGT 802

Political Science Courses

POLISCI 1. Introduction to International Relations. 5 Units.

Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth.

Same as: INTNLREL 1

POLISCI 1Z. Introduction to International Relations. 5 Units.

Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth.

POLISCI 2. Introduction to American National Government and Politics. 5 Units.

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. (This course has merged with Political Science 123/PubPol 101).

Same as: AMSTUD 2

POLISCI 3P. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 136S, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

POLISCI 4. Introduction to Comparative Politics. 5 Units.

Why are some countries prone to civil war and violence, while others remain peaceful? Why do some countries maintain democratic systems, while others do not? Why are some countries more prosperous than others? This course will provide an overview of the most basic questions in the comparative study of political systems, and will introduce the analytical tools that can help us answer them.

POLISCI 11N. The Rwandan Genocide. 3 Units.

Preference to freshmen. In 1994, more than 800,000 Tutsi and moderate Hutu Rwandans were killed in the most rapid genocide in history. What could bring humans to carry out such violence? Could it have been prevented? Why did no major power intervene to stop the killing? Should the U.N. be held accountable? What were the consequences for Central Africa? How have international actors respond to the challenges of reconstructing Rwanda? What happened to the perpetrators? Sources include scholarly and journalistic accounts.

POLISCI 12N. Climate Change and Conflict: Will Warming Lead to Warring?. 3 Units.

Policymakers and scholars are increasingly interested in whether climate change and its associated effects could contribute to the risk of violent conflict within and between countries. Will drought and rising temperatures lead to struggles over a dwindling supply of agricultural land? Will shortages of fresh water cause growing tension over access to rivers and lakes? Will rising sea levels cause mass migration from coastal areas, bringing people into conflict? Will social unrest arising from such stresses lead to violent efforts to topple governments or spill over across borders? In this seminar, we explore such questions as: How could the expected effects of climate change make civil or international conflicts more likely? What evidence is there that environmental factors contribute to violent conflicts, historically and today? What regions or countries are most at risk from these challenges, and why? Answering these questions requires that we not only think about the human and social impacts of climate change but also ask basic questions about what causes political violence within and between countries and how we can assess the contribution of different risk factors. Assignments will encourage students to learn more about the conflict risks in countries that interest them and to gain familiarity with some of the methods that political scientists use to explore these issues systematically. The connection between climate and conflict is relatively new area of inquiry, without many settled answers, so this seminar presents an opportunity to explore what we know, what we do not yet know, and what we can do to further our understanding of this issue going forward.

POLISCI 18SC. The Federal Government and the West. 2 Units.

Historical development and current status of the relationship between the U.S. federal government and the American West. Land ownership, natural resource management, agriculture, water, energy, and environmental quality.

POLISCI 19N. Politics of Energy Efficiency. 5 Units.

We will examine the political context of energy efficiency and climate change. Why are some countries, such as Japan and France, able to achieve high levels of energy efficiency, while others, such as the United States and Australia, struggle to do so? What political factors facilitate or impede energy efficiency policies? Why is international cooperation on climate change so difficult?.

POLISCI 22SC. The Face of Battle. 2 Units.

Our understanding of warfare often derives from the lofty perspective of political leaders and generals: what were their objectives and what strategies were developed to meet them? This top-down perspective slights the experience of the actual combatants and non-combatants caught in the crossfire. This course focuses on the complexity of the process by which strategy is translated into tactical decisions by the officers and foot soldiers on the field of battle. We will focus on three battles in American history: Gettysburg (July 1863), the Battle of Little Bighorn (June 1876), and the Korengal Valley campaign in Afghanistan (2006-2010). In addition to reading major works on these battles and the conflicts in which they occurred, we will travel to Gettysburg, Pennsylvania, and the Little Bighorn battlefield in Montana. While at Stanford, students will conduct extensive research on individual participants at Gettysburg and Little Bighorn. When we walk through the battlefield sites, students will brief the group on their subjects' experience of battle and on why they made the decisions they did during the conflict. Why did Lt. General Longstreet oppose the Confederate attack on the Union Army at Gettysburg? What was the experience of a military surgeon on a Civil War battlefield? Why did Custer divide his 7th Cavalry troops as they approached the Little Bighorn River? What was the role of Lakota Sioux women after a battle? Travel will be provided and paid by Sophomore College (except incidentals) and is made possible by the support of the Center for International Security and Cooperation (CISAC). The final part of the class covers contemporary military conflicts discussing what the US public, political leaders, and military commanders have learned (and not learned) from the past. The course is open to students from a range of disciplines; an interest in the topic is the only prerequisite.

POLISCI 24Q. Law and Order. 3 Units.

Preference to sophomores. The role of law in promoting social order. What is the rule of law? How does it differ from the rule of men? What institutions best support the rule of law? Is a state needed to ensure that laws are enforced? Should victims be allowed to avenge wrongs? What is the relationship between justice and mercy?.

POLISCI 24SC. Conservatism and Liberalism in American Politics and Policy. 2 Units.

What influence do political ideologies have in American politics and government? In this course, students will study liberal and conservative ideology in American politics and public policy from the mid-20th century onward. The course begins with an examination of ideology in the American public and then considers ideology among political activists and elected officials, focusing on members of Congress and the president. The course will also cover the ideological polarization of political elites and its impact on the policy-making process. In the final part of the course, through a series of policy case studies, students will also evaluate how well certain public policies have met the ideological goals of their liberal and conservative sponsors. The course will include several lunches and dinners with guest speakers.

POLISCI 25SC. Energy in the Southwest. 2 Units.

We will examine the technical, social, and political issues surrounding energy management and use in the West, using California, Nevada, and Arizona as our field laboratory. Students will explore a number of energy narratives, such as: Who supplies our energy and from what sources? How is it transported? Who distributes to users and how do they do it? Water for energy and energy for water; Meeting carbon emission goals by 2020; Conflicts between desert ecosystems and renewable energy development. We will place particular emphasis on renewable energy sources and the water-energy nexus, a critically important issue for the arid and semi-arid southwest. Central to the course will be field exploration in northern and southern California, as well as neighboring areas in Arizona and Nevada, to tour sites such as wind and solar facilities, geothermal plants, hydropower pumped storage, desalination plants, water pumping stations, a liquid fuels distribution operations center, and California's Independent System Operator. Students will have the opportunity to meet with community members and with national, state, and regional authorities to discuss Western energy challenges and viable solutions. We will also take advantage of Stanford's own energy systems with site visits to the new energy facilities. Woven throughout will be an introduction to the basics of energy and energy politics through discussions, lectures, and with the help of guest speakers. Over the summer, students will be responsible for assigned readings, online interactive materials, and relevant recent news articles. Participants will return to Stanford by September 19. Travel expenses during the course will be provided (except incidentals) by the Bill Lane Center for the American West and Sophomore College.

Same as: CEE 16SC, ENERGY 11SC

POLISCI 27N. Thinking Like a Social Scientist. 3 Units.

Preference to freshman. This seminar will consider how politics and government can be studied systematically: the compound term Political SCIENCE is not an oxymoron. The seminar will introduce core concepts and explore a variety of methodological approaches. Problems of inference from evidence will be a major concern. Classic and contemporary research studies will be the basis of discussion throughout.

POLISCI 28N. The Changing Nature of Racial Identity in American Politics. 3 Units.

Almost one-third of Americans now identify with a racial/ethnic minority group. This seminar examines the relationship between racial identity, group consciousness, and public opinion. Topics include the role of government institutions in shaping identification, challenges in defining and measuring race, attitudes towards race-based policies, and the development of political solidarity within racial groups. Particular attention will be paid to the construction of political identities among the growing mixed-race population.

POLISCI 33S. Religion, Democracy, and Human Rights. 3 Units.

What is the relationship between religion, democracy, and human rights? What is the status of religion within modern human rights regimes? Do religions have "special" rights in democracies? Why did the French outlaw the hijab (Islamic headscarf) and the Swiss the building of mosques and is that good for human and democratic rights? What is (and what should be) the relationship between religious human rights and democratic self-determination? How do we balance between concerns over blasphemy and free speech, in the case of the Danish cartoon depiction of Mohammad, for example? Is the idea of "religion" even useful in human rights or democratic language anymore, as some now claim? These are just some of the questions students will take up as they are introduced to several important areas within the larger field of religion and international relations. Readings are interdisciplinary in nature, and include case studies. No prerequisite. Open to all majors/minors, and will be particularly beneficial to students in International Relations, International Policy Studies, Political Science, and Religious Studies, as well as students with specific regional political interests where the themes of the course are especially relevant (e.g., Middle East, Latin America, Russia and Eastern Europe, Africa, and so on) and Pre-Law students.

Same as: RELIGST 35S

POLISCI 34S. Religion and Politics. 3 Units.

What is the relationship between religion, international conflict and peace? This course takes up this question by examining contemporary thinking in international relations, conflict management, political science, and religious ethics. Topics to be taken up include: whether religion is fundamentally a positive or negative force in conflict management; how do major world religions think about war and peace; the relationship of religion to terrorism; whether thinking about religion in international conflict requires its own categories, distinct from models concerning ethnic or nationalistic communities in conflict; varieties of religious militancy; religion's potential role in conflict resolution; among others. Through these investigations, students will better grasp the contemporary scholarship on the place of religion in international conflict and peace building. Readings are interdisciplinary in nature, and include case studies. No prerequisite. Open to all majors/minors, and will be particularly beneficial to students in International Relations, Religious Studies, International Policy Studies, and Political Science, as well as students with specific regional political interests where the themes of the course are especially relevant (e.g., Middle East, Latin America, Russia and Eastern Europe, Africa, and so on).

POLISCI 42Q. The Rwandan Genocide. 5 Units.

Between April and July of 1994 more than 800,000 Rwandans, mostly Tutsi but also moderate Hutus, were killed in the most rapid genocide the world has ever known. The percentage of Rwandans killed in a single day of the genocide was ten times greater than the percentage of Americans killed in the entire Vietnam war. What could bring humans to plan and carry out such an orgy of violence? Could it have been prevented? Why did the United States or any other major power not intervene to stop the killing? To what extent should the United Nations be held accountable for the failure to end the genocide? What were the consequences of the genocide for the region of Central Africa? How did international actors respond to the challenges of reconstructing Rwanda after the killings? What has happened to the perpetrators of the genocide? This course surveys scholarly and journalistic accounts of the genocide to seek answers to these questions. This seminar will be residence based in Crothers, but will be open to Crothers residents and non-residents.

POLISCI 45N. Civil War Narratives. 3 Units.

Preference to freshmen. Focus is on a new statistics-based theory to account for the susceptibility of countries to civil war. How to write a theory-based historical narrative. Students write and present an original historical narrative focusing on how well the theory explains a particular history and on the importance of factors that are absent from the theory in explaining civil war onsets.

POLISCI 49N. Dictators. 3 Units.

This course explores how dictators perpetuate their rule through the use of ideology, coercion and political institutions. We will examine existing typologies of authoritarian rule and investigate examples of dictatorship from across the world, both contemporary and historical. Using works of fiction in addition to historical and political science texts, we will consider why some people resist authoritarian rule while others do not and the conditions under which dictators are overthrown.

POLISCI 57E. State of the Union 2014. 1 Unit.

This course will examine major themes that contribute to the health, or disease, of the US body politic. Challenges and opportunities abound: we live in an age of rising inequality, dazzling technological innovation, economic volatility, geopolitical uncertainty, and the accumulating impact of climate change. These conditions confront our political leaders and us as citizens of a democracy plagued by dysfunction. What are the implications for the body politic? Led by Rob Reich (Political Science, Stanford), David Kennedy (History, Stanford), and James Steyer (CEO, Common Sense Media), the course will bring together distinguished analysts of American politics. Together, we will examine the following topics: inequality; energy and the environment; media and technology; the economy; and the 2014 midterm elections. The course is designed for the entire Stanford community: jointly offered for undergraduate and graduate students at Stanford (through listings in Political Science and History) and for community members through the Continuing Studies Program. For students, the course is available for 1 credit. This course may not be taken for a Letter Grade.

Same as: HISTORY 57E

POLISCI 72. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.

In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency -- policy formation, communications, grassroots strategy, digital outreach, campaign finance -- and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter.

Same as: PUBLPOL 146, PUBLPOL 246

POLISCI 96X. Activating Democracy: Campaigns, Elections, and Voting. 1 Unit.

Alternative Spring Break: America is often thought of as the archetypal democracy. While most democracies have surprisingly short lifespans, America's has persisted for 238 years. However, in the 21st century, we have grounds to question the quality of our democracy. Turnout of the Voting Age Population hovers around 50 percent and today, we are seeing increasing legal challenges to voting rights. In the backdrop of these statistics, there is an entire industry devoted to campaigns. In the 2012 presidential race alone, almost \$2.5 billion was poured into the campaign-industrial complex. How do politicians engage voters in elections at the various levels of government? Where do they spend their money and why? In the age of big data, how accurately can elections be predicted? How do we maximize participation in elections?.

POLISCI 97X. Bridging the Civil-Military Divide: Military Service as Public Service in the 21st Century. 1 Unit.

Alternative Spring Break: Today, fewer than 0.5 percent of Americans serve in the military, as compared to roughly 12 percent during the second World War. This has led to a widening gap in knowledge about the military, its members and the functions they perform, as well as its basic structure and tradition of service. This course is intended to introduce students to the notion of military service as public service and explore how misperceptions on both sides affect the civil-military divide. We will explore military service from the life of an enlisted soldier deployed to Afghanistan, to an officer working at the Pentagon on broad national security strategy. How does society conceive of a soldier, a sailor, an airman, a marine? How do Americans perceive military service and what role do service members play in our society?.

POLISCI 99Z. Introduction to the Science of Politics. 4 Units.

Why do countries go to war? Why are some countries democratic and others autocratic? How can we improve political representation in the United States and other countries? We will use scientific methods to answer these and other fundamental questions about politics.

POLISCI 110C. America and the World Economy. 5 Units.

Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. Enroll in PoliSci 110C for WIM credit. Same as: INTNLREL 110C, POLISCI 110X

POLISCI 110D. War and Peace in American Foreign Policy. 5 Units.

(Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period.

Same as: INTNLREL 110D, POLISCI 110Y

POLISCI 110G. Governing the Global Economy. 5 Units.

Who governs the world economy? Why do countries succeed or fail to cooperate in setting their economic policies? When and how do international institutions help countries cooperate? When and why do countries adopt good and bad economic policies? This course examines how domestic and international politics determine how the global economy is governed. We will study the politics of monetary, trade, international investment, energy, environmental, and foreign aid policies to answer these questions. The course will approach each topic by examining alternative theoretical approaches and evaluate these theories using historical and contemporary evidence. There will be an emphasis on applying concepts through the analysis of case studies. This course has no prerequisites but introductory courses in economics and statistics are recommended.

POLISCI 110X. America and the World Economy. 5 Units.

Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. Enroll in PoliSci 110C for WIM credit. Same as: INTNLREL 110C, POLISCI 110C

POLISCI 110Y. War and Peace in American Foreign Policy. 5 Units.

(Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period. Same as: INTNLREL 110D, POLISCI 110D

POLISCI 114D. Democracy, Development, and the Rule of Law. 5 Units.

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts. Same as: INTNLREL 114D, IPS 230, POLISCI 314D

POLISCI 114S. International Security in a Changing World. 5 Units.

This class surveys the most pressing international security issues facing the world today and includes an award-winning two-day international crisis simulation led by Stanford faculty and former policymakers. Guest lecturers have included former Secretary of Defense William Perry, former U.S. Ambassador to Afghanistan Gen. Karl Eikenberry, and former Secretary of State Condoleezza Rice. Major topics covered: cyber security, nuclear proliferation, insurgency and intervention, terrorism, the Arab Spring, and the future of U.S. leadership in the world. No prior background in international relations is necessary. Same as: HISTORY 104D, IPS 241

POLISCI 115. Living at the Nuclear Brink: Yesterday and Today. 3 Units.

The development, testing, and proliferation of nuclear weapons will be covered, from World War II through the Cold War to the present. Emphasis will be placed on understanding the evolving role of these weapons, both militarily and politically. It will also examine controversies and opposition movements to nuclear weapons and their use. The course will feature numerous guest speakers from Stanford and beyond. Students will be required to write in-depth analyses of specific nuclear weapons policy questions. Following this course, students are expected to have a deeper understanding of the profound dangers these weapons continue to present to the world today.

Same as: IPS 249, POLISCI 315

POLISCI 115A. The Rise of Asia. 3-5 Units.

We will examine the sources and implications of the rise of Asia in the international system. Topics will include military competition, international cooperation, regional integration, domestic politics, business and investment, legalization, environmental issues, demographics, social issues, and the role of technology.

Same as: POLISCI 315A

POLISCI 116. The International History of Nuclear Weapons. 5 Units.

The development of nuclear weapons and policies. How existing nuclear powers have managed their relations with each other. How nuclear war has been avoided so far and whether it can be avoided in the future.

Same as: HISTORY 103E

POLISCI 118P. U.S. Relations in Iran. 5 Units.

The evolution of relations between the U.S. and Iran. The years after WW II when the U.S. became more involved in Iran. Relations after the victory of the Islamic republic. The current state of affairs and the prospects for the future. Emphasis is on original documents of U.S. diplomacy (White House, State Department, and the U.S. Embassy in Iran). Research paper.

POLISCI 120B. Campaigns, Voting, Media, and Elections. 4-5 Units.

This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players -- candidates, parties, journalists, and voters -- in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as "laboratories" for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process.

Same as: COMM 162, COMM 262

POLISCI 120C. What's Wrong with American Government? An Institutional Approach. 5 Units.

How politicians, once elected, work together to govern America. The roles of the President, Congress, and Courts in making and enforcing laws. Focus is on the impact of constitutional rules on the incentives of each branch, and on how they influence law. Fulfills the Writing in the Major Requirement for Political Science majors.

Same as: PUBLPOL 124

POLISCI 120Z. What's Wrong with American Government? An Institutional Approach. 4 Units.

How politicians, once elected, work together to govern America. The roles of the President, Congress, and Courts in making and enforcing laws. Focus is on the impact of constitutional rules on the incentives of each branch, and on how they influence law. Fulfills the Writing in the Major Requirement for Political Science majors.

POLISCI 121. Political Power in American Cities. 5 Units.

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

Same as: AMSTUD 121Z, PUBLPOL 133, URBANST 111

POLISCI 121L. Racial-Ethnic Politics in US. 5 Units.

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. Stats 60 or Econ 1 is strongly recommended.

Same as: AMSTUD 121L, CSRE 121L, PUBLPOL 121L

POLISCI 122. Introduction to American Law. 3-5 Units.

For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general.

Same as: AMSTUD 179, PUBLPOL 302A

POLISCI 123. Politics and Public Policy. 4-5 Units.

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. (This course has merged with Political Science 2.).

Same as: PUBLPOL 101, PUBLPOL 201

POLISCI 124A. The American West. 5 Units.

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ARTHIST 152, ENGLISH 124, HISTORY 151

POLISCI 124R. The Federal System: Judicial Politics and Constitutional Law. 5 Units.

Does the constitution matter? And if so, how exactly does it shape our daily lives? In this course, we will examine the impact of structural features, such as the separation of powers and federalism. While these features often seem boring and unimportant, they are not. As we will see, arguments over structure were at the heart of the debates over slavery, the incarceration of the Japanese during WWII, the drug war and gay marriage. Prerequisites: 2 or equivalent, and sophomore standing. Fulfills Writing in the Major requirement for PoliSci majors.

POLISCI 124S. Civil Liberties: Judicial Politics and Constitutional Law. 5 Units.

The role and participation of courts, primarily the U.S. Supreme Court, in public policy making and the political system. Judicial activity in civil liberty areas (religious liberty, free expression, race and sex discrimination, political participation, and rights of persons accused of crime). Prerequisites: 2 or equivalent, and sophomore standing.

POLISCI 125P. The First Amendment: Freedom of Speech and Press. 4-5 Units.

Introduction to the constitutional protections for freedom of speech, press, and expressive association. All the major Supreme Court cases dealing with issues such as incitement, libel, hate speech, obscenity, commercial speech, and campaign finance. There are no prerequisites, but a basic understanding of American government would be useful. In addition to a final and midterm exam, students participate in a moot court on a hypothetical case. (Grad students register for COMM 251).

Same as: COMM 151, COMM 251

POLISCI 125S. Chicano/Latino Politics. 5 Units.

The political position of Latinos and Latinas in the U.S.. Focus is on Mexican Americans, with attention to Cuban Americans, Puerto Ricans, and other groups. The history of each group in the American polity; their political circumstances with respect to the electoral process, the policy process, and government; the extent to which the demographic category Latino is meaningful; and group identity and solidarity among Americans of Latin American ancestry. Topics include immigration, education, affirmative action, language policy, and environmental justice.

Same as: CHILATST 125S

POLISCI 125V. The Voting Rights Act. 5 Units.

Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena.

Same as: AFRICAAM 125V, CSRE 125V

POLISCI 127P. Economic Inequality and Political Dysfunction. 5 Units.

This course will examine how two of the defining features of contemporary U.S. politics, economic inequality and political polarization, relate to each other and to Congressional gridlock. The reading list will focus on several books recently authored by preeminent political scientists on this important topic. The course will cover a range of topics, including the disparity in political representation of the preferences of the affluent over those of the poor, the origins of Congressional polarization, the influence of money in politics, budgetary politics, immigration policy, and electoral and institutional barriers to reform.

POLISCI 128S. The Constitution: A Brief History. 5 Units.

A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime.

Same as: AMSTUD 157, HISTORY 157

POLISCI 131A. Collective Action Problems: Ethics, Politics, & Culture. 3-4 Units.

When acting on one's own, it is often easy to know what the morally right action is. But many moral problems arise from the fact that many individuals act together leading to dilemmas, in which what is individually rational is collectively irrational. For example, the collective result of our consumption decisions is to warm the planet. But individual decisions seem to have no effect on climate change. Such collective action situations give rise to moral questions: Are individuals required to take their contributions to wider systemic effects into account? Does it make a difference whether or not others are doing their share, for example with regard to fighting global poverty? In many cases, the best solution for collective action problems are institutions. But when these are deficient or non-existing, what should individuals do? Do they have a duty to assist in building institutions, and what would this duty imply in practical terms? Interdisciplinary perspective, reading authors from philosophy, politics, economics and sociology such as Elinor Ostrom, Peter Singer or Liam Murphy, relating to current questions such as global poverty and climate change. No background assumed; no mathematical work required.

Same as: ETHICSOC 180M, PHIL 73, PUBLPOL 304A

POLISCI 131L. Modern Political Thought: Machiavelli to Marx and Mill. 5 Units.

This course offers an introduction to the history of Western political thought from the late fifteenth through the nineteenth centuries. We will consider the development of ideas like individual rights, government by consent, and the protection of private property. We will also explore the ways in which these ideas continue to animate contemporary political debates. Thinkers covered will include: Niccolò Machiavelli, Thomas Hobbes, John Locke, Jean-Jacques Rousseau, Edmund Burke, John Stuart Mill, and Karl Marx.

Same as: ETHICSOC 131S

POLISCI 132C. Family, Friends, and Groups: The Ethics of Association. 4 Units.

The practice of associating with others is a fundamental part of human existence. We cultivate friendships, we grow up in families, we work for nonprofit associations or businesses, we join social movements and sport clubs, and we participate in political associations with our fellow citizens. This seminar explores the ethical dimensions of association. What grounds a right to freedom of association? Do we have, beyond a right, also a duty to participate in associational life? Do we have special obligations towards our friends, family members, or fellow-citizens that we do not have toward strangers? To what extent should the internal life of private associations, such as families or churches, be regulated by the state? Should the state support, through tax-exemptions and subsidies, the nonprofit associations of civil society? Can a state exclude non-citizens, such as immigrants, in the same way in which a private club excludes non-members? These questions have wide-ranging implications for contemporary political and legal debates.

Same as: ETHICSOC 183M

POLISCI 133. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.]

Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, PUBLPOL 103D, URBANST 122

POLISCI 133D. The Paradigm Shift. 1 Unit.

Examination of the idea of 'paradigm shift' by considering paradigm shifts in different academic fields of inquiry. Serial accumulation of guest lectures by distinguished faculty representing the University's many and varied departments, each asking and answering the question 'What is the most important paradigm shift in the history of my field? Are paradigm shifts revolution or evolution? Do they move us closer to truth? How frequently do they occur? Can humans plan for, cause, or resist them?'

Same as: MUSIC 150D

POLISCI 134L. Introduction to Environmental Ethics. 4-5 Units.

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 178M, ETHICSOC 278M, PHIL 178M, PHIL 278M

POLISCI 134P. Contemporary Moral Problems. 4-5 Units.

This course addresses a range of important moral issues from a philosophical perspective. The primary aims of the course are to encourage students to think about difficult moral questions in the careful and systematic way characteristic of philosophical inquiry, and to help students develop the analytical skills necessary to do this. Questions to be covered include: What, and how much, are we obligated to do in order to aid the global poor? What are our obligations in cases such as the causation of climate change, in which our individual contributions (e.g. our personal greenhouse gas emissions) appear to make no difference to the badness of the outcome? How can we owe obligations to future people who do not yet exist, and what are our obligations to them? Is abortion morally wrong or morally permissible? Could it even be morally required? Can we be obligated to procreate? Or, might procreation be seriously morally problematic? What is racism, and what makes it wrong? What does it mean to be tolerant, and why might we think that tolerance is a good thing? Is there a deep tension between a commitment to feminist ideals and a commitment to multiculturalism?.

Same as: ETHICSOC 185M, PHIL 72

POLISCI 135P. Moral Limits of the Market. 4 Units.

Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases.

Same as: ETHICSOC 174A, PHIL 174A, PHIL 274A

POLISCI 136R. Introduction to Global Justice. 4 Units.

Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

Same as: ETHICSOC 136R, INTNLREL 136R, PHIL 76, POLISCI 336

POLISCI 136S. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

POLISCI 137A. Political Philosophy: The Social Contract Tradition. 4 Units.

(Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Study of the answers given to such questions by major political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant.

Same as: PHIL 176, PHIL 276, POLISCI 337A

POLISCI 140L. China in World Politics. 5 Units.

The implications of the rise of China in contemporary world politics and for American foreign policy, including issues such as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions.

Same as: POLISCI 340L

POLISCI 141S. Politics of India. 5 Units.

This course provides an overview of the political institutions, processes, and issues in post-independence India. The purpose is not merely to familiarize students to the politics of India, but also to facilitate a good understanding of, and stimulate keen interest in, the subject. The course hopes to build a strong foundation for acquiring a deeper understanding of Indian politics. The subject-matter will be approached from a comparative perspective, and students are encouraged to think about the topics covered with a view on cases beyond India.

POLISCI 142B. British Politics. 5 Units.

The impact on the world's oldest democracy of major changes in policies, politics, and the institution of government made over the last two decades by Margaret Thatcher and Tony Blair.

POLISCI 143S. Comparative Corruption. 4 Units.

Causes, effects, and solutions to various forms of corruption in business and politics in both developing regions (e.g. Asia, E. Europe) and developed ones (the US and the EU).

Same as: SOC 113

POLISCI 146A. African Politics. 4-5 Units.

Africa has lagged the rest of the developing world in terms of economic development, the establishment of social order, and the consolidation of democracy. This course seeks to identify the historical and political sources accounting for this lag, and to provide extensive case study and statistical material to understand what sustains it, and how it might be overcome.

Same as: AFRICAAM 146A

POLISCI 147. Comparative Democratic Development. 5 Units.

Social, cultural, political, economic, and international factors affecting the development and consolidation of democracy in historical and comparative perspective. Individual country experiences with democracy, democratization, and regime performance. Emphasis is on the third wave of democratization over the past three decades and contemporary possibilities for democratic change. (Diamond).

Same as: SOC 112

POLISCI 147P. The Politics of Inequality. 5 Units.

This course is about the distribution of power in contemporary democratic societies, and especially in the US: who governs? Is there a "power elite"? Or, does public policy making accommodate a wide range of interests? What is the relationship between income and power? What are the political consequences of increasing income inequality? What are the implications of racial and ethnic inequities for the quality of democratic representation? Which policies increase political inequities? What are effective remedies for unequal influence? Finally, which institutions move democratic practice furthest towards full democratic equality? This course will address these questions, focusing first on the local distribution of power, and then in state and national levels of government, in a broadly comparative context. Students will have the opportunity to work with income and labor force surveys in a mid-term assignment, and in a final paper, to examine different dimensions of American inequality and their implications for the quality of American democracy.

POLISCI 148. Chinese Politics: The Transformation and the Era of Reform. 3-5 Units.

Overview of the reforms in China since 1978 that have made its economy one of the fastest growing in the world yet it still has the Chinese Communist Party at the helm wielding one party rule. Key questions addressed include the following: What has been the process and challenges of reform that have reshaped China's economic landscape? What are the political consequences of these dramatic economic changes? Why has the CCP remained strong while other communist regimes have failed? Markets have spread but what is the role of the state? What are the opportunities for political participation and prospects for political change? Materials will include readings, lectures, and selected films. This course has no prerequisites. (Graduate students register for 348.) This fulfills the Writing in the Major requirement for PoliSci majors.

Same as: POLISCI 348

POLISCI 149S. Islam, Iran, and the West. 5 Units.

Changes in relative power and vitality of each side. The relationship in the Middle Ages revolved around power and domination, and since the Renaissance around modernity. Focus is on Muslims of the Middle East.

POLISCI 149T. Middle Eastern Politics. 5 Units.

Topics in contemporary Middle Eastern politics including institutional sources of underdevelopment, political Islam, electoral authoritarianism, and the political economy of oil.

POLISCI 152. Introduction to Game Theoretic Methods in Political Science. 3-5 Units.

Concepts and tools of non-cooperative game theory developed using political science questions and applications. Formal treatment of Hobbes' theory of the state and major criticisms of it; examples from international politics. Primarily for graduate students; undergraduates admitted with consent of instructor.

Same as: POLISCI 352

POLISCI 153. Strategy: An Introduction to Game Theory. 5 Units.

This course provides an introduction to basic concepts in game theory and strategic reasoning. We discuss ideas such as commitment, credibility, adverse selection, signaling and reputation. Concepts are developed through games played in class, and applied to politics, economics, business and everyday life.

POLISCI 155. Political Data Science. 5 Units.

Introduction to methods of research design and data analysis used in quantitative political research. Topics covered include hypothesis testing, linear regression, experimental and observational approaches to causal inference, effective data visualization, and working with big data. These topics will be introduced using data sets from American politics, international relations, and comparative politics. The course begins with an intensive introduction to the R programming language used throughout the course. Satisfies quantitative methods requirement for the Political Science Research Honors Track. Prerequisites: Stat 60 or instructor consent.

Same as: PUBLPOL 157

POLISCI 203. U.S. Human Rights NGOs and International Human Rights. 1 Unit.

(Same as LAW 782) Many US human rights non-government organizations, including the US philanthropic sector, work on international human rights. The US government also engages with the private sector in "partnerships" that twins US foreign aid human rights action with corporate expertise. This weekly series will feature speakers who lead these human rights NGOs, philanthropic enterprises, and corporate partnerships, and also policy experts and scholars, to explore the pro's and con's of this scenario.

Same as: ETHICSOC 15R, IPS 271A, MED 225

POLISCI 210G. Global Supply Chains and the Future of Global Governance. 5 Units.

What explains a government's decision to block a trade deal, prevent foreign investors from gaining control of a local factory, or ban the export of rare earth minerals? This course develops theory and evidence that these decisions are political. Applications include the trade in environmental goods, global supply chains, and intellectual property protections. We will discuss these topics in the context of the legal disputes at the World Trade Organization and recent debates about the rise of China and the development of Mega-regional agreements across the Pacific and the Atlantic.

POLISCI 211. Political Economy of East Asia. 3-5 Units.

(Formerly 117.) Comparative and international political economy of E. and S.E. Asia. Industrial development and the Asian miracle, economic integration, regional cooperation, the Asian financial crisis, and contemporary challenges.

Same as: INTNLREL 159

POLISCI 211P. International Security in South Asia: Pakistan, India and the United States.. 5 Units.

This course critically examines the dynamics of continuity and change in American interactions with nuclear armed adversaries, India and Pakistan. It also aims to sensitize the students to Indian and Pakistani perspectives on regional security and the mainsprings of their interactions with United States. There will be an in-depth exploration of the impact of the Indo-US strategic partnership for evolving balance of power in South Asia.

POLISCI 212C. Civil War and International Politics: Syria in Context. 5 Units.

The Syrian civil war is both a humanitarian disaster and a focal point for a set of interlocking regional and international political struggles. This course uses the Syrian case as an entry for exploring broader questions, such as why do civil wars begin, how do they end, and what are the international politics of civil war. Please enroll in 212C for WIM credit.

Same as: POLISCI 212X

POLISCI 212X. Civil War and International Politics: Syria in Context. 5 Units.

The Syrian civil war is both a humanitarian disaster and a focal point for a set of interlocking regional and international political struggles. This course uses the Syrian case as an entry for exploring broader questions, such as why do civil wars begin, how do they end, and what are the international politics of civil war. Please enroll in 212C for WIM credit.

Same as: POLISCI 212C

POLISCI 213E. Introduction to European Studies. 5 Units.

This course offers an introduction to major topics in the study of historical and contemporary Europe. We focus on European politics, economics and culture. First, we study what makes Europe special, and how its distinct identity has been influenced by its history. Next, we analyze Europe's politics. We study parliamentary government and proportional representation electoral systems, and how they affect policy. Subsequently, we examine the challenges the European economy faces. We further study the European Union and transatlantic relations.

Same as: INTNLREL 122

POLISCI 213S. A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World. 5 Units.

This seminar examines recent policy from Bush to Obama in the context of two classic traditions: Wilsonianism vs. Realism. What is the role of the international system, what is the weight of domestic forces like ideology, history and identity? Prerequisite: junior or senior standing.

POLISCI 214R. Challenges and Dilemmas in American Foreign Policy. 5 Units.

This seminar will examine the complexities and trade offs involved in foreign policy decision-making at the end of the twentieth century and the dawn of the post-9/11 era. Students will analyze dilemmas confronting policymakers through case studies including post-conflict reconstruction and state-building, nuclear proliferation, democratization and peace negotiation. The seminar will conclude with a 48-hour crisis simulation. For advanced undergraduates and graduate students. Application for enrollment required. Pick up application in Political Science Department (Encina West 100).

Same as: POLISCI 314R

POLISCI 215. Explaining Ethnic Violence. 5 Units.

What is ethnic violence and why does it occur? Should elite machinations, the psychology of crowds, or historical hatreds be blamed? Case studies and theoretical work on the sources and nature of ethnic violence. Counts as Writing in the Major for PoliSci majors.

POLISCI 215F. Nuclear Weapons and International Politics. 5 Units.

Why do states develop nuclear weapons and why do some states, that have the technological capacity to build nuclear weapons, refrain from doing so? What are the strategic consequences of new states deploying nuclear weapons? What is the relationship between the spread of nuclear energy and the spread of nuclear weapons? We will study the political science and history literature on these topics. Research paper required.

Same as: POLISCI 315F

POLISCI 216. State Building. 5 Units.

How and when can external actors (others states, aid agencies, NGOs?) promote institutional change in weak and badly governed states?.

POLISCI 216E. International History and International Relations Theory. 5 Units.

The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system.

Same as: HISTORY 202, HISTORY 306E, POLISCI 316

POLISCI 216G. International Organizations and Institutions. 5 Units.

What is the appropriate balance between government regulation and market freedom? Introduction to important theoretical and policy debates in international political economy. Topics include: political economy of trade; exchange rate policy; the liberalization of trade and finance; the global move to openness; development, debt and aid; and the role of international organizations. Discussion of application of academic insights to key policy debates, including whether governments should offset the welfare costs of globalization, whether the IMF and World Bank should be reformed to meet the needs of the 21st century, and how the international community should respond to financial crises. Students will research, write and orally present policy briefs on specific policy questions.

POLISCI 217A. American Foreign Policy: Interests, Values, and Process. 5 Units.

This seminar will examine the tension in American foreign policy between pursuing U.S. security and economic interests and promoting American values abroad. The course will retrace the theoretical and ideological debates about values versus interests, with a particular focus on realism versus liberalism. The course will examine the evolution of these debates over time, starting with the French revolution, but with special attention given to the Cold War, American foreign policy after September 11th, and the Obama administration. The course also will examine how these contending theories and ideologies are mediated through the U.S. bureaucracy that shapes the making of foreign policy. ** NOTE: Initial registration for this course does not guarantee enrollment. All interested students should attend the first class. Final enrollment criteria will be detailed on the first day of class. There will be 10 seats for graduate students and 10 seats for undergraduate students.

Same as: GLOBAL 220, IPS 242

POLISCI 218J. Japanese Politics and International Relations. 5 Units.

The domestic politics, political economy, and international relations of contemporary Japan. The role of political parties, the bureaucracy, and private actors. Economic development and challenges. Relations with the United States and East Asia.

Same as: POLISCI 318J

POLISCI 218S. Political Economy of International Trade and Investment. 5 Units.

How domestic and international politics influence the economic relations between countries. Why do governments promote or oppose globalization? Why do countries cooperate economically in some situations but not others? Why do countries adopt bad economic policies? Focus on the politics of international trade and investment. Course approaches each topic by examining alternative theoretical approaches and evaluate these theories using historical and contemporary evidence from many geographical regions around the world. Prerequisites: ECON 1A, ECON 1B, and a statistics course.

Same as: INTNLREL 118S

POLISCI 218T. Terrorism. 5 Units.

The course is primarily concerned with variation in terrorist group behavior and therefore concentrates on issues on the organizational level of analysis. We address questions such as: Why and how do terrorist groups emerge? Who joins terrorist groups? Which organizational challenges do terrorists face and how do they solve them? Why are some groups more lethal than others? Why has suicide terrorism increased in the 2000s? How and why do groups decline? Topics such as counterterrorism, macrostructural determinants of terrorism, or the effects of terrorism will be treated only peripherally.

POLISCI 219. Directed Reading and Research in International Relations. 1-10 Unit.

May be repeated for credit.

POLISCI 223. The Politics of Gender in the United States. 5 Units.

Gender is one of the most recognizable and important identities in daily life. Yet it has been paid scant attention by political scientists in terms of its role on access to political power, opinion formation, group identity politics, election outcomes, and political representation. This class provides a survey of the literature on gender in American politics. We begin with the interdisciplinary research on the social construction of gender to understand what gender is and is not. Throughout the course we will use these theories to analyze and critique the approaches of quantitative research on gender politics.

Same as: FEMGEN 223X

POLISCI 223F. Ethics and Politics. 5 Units.

A discussion of critical ethical issues faced by American and other national leaders. Case studies of 20th- and 21st-century decisions, including those involved with violence (e.g., the use of drone missiles or torture to extract information from enemies), whistle-blowing in government (e.g., decisions to expose what was known about 9/11 in advance), disobedience of those in authority (e.g., Daniel Ellsberg's release of the Pentagon Papers), policies on distributing scarce goods in society (e.g. rationing health care), policies involving justice and equal treatment (e.g. affirmative action or gay marriage), policies regarding life and death (e.g., abortion and euthanasia laws), and others. Students will debate some of the key issues, relying on ethical principles that will be discussed each week, and develop their own case studies.

Same as: ETHICSOC 202R

POLISCI 223R. Pivotal Moments in American Institutions and Public Law, 1781-Present. 5 Units.

American lawyers and policymakers work today in a system of institutions that are strikingly unique in comparative and historical terms. With some exceptions, that system is characterized by relatively stable political and legal institutions, low levels of explicit corruption, high bureaucratic capacity in public organizations, and relatively open, impersonal access to political, policymaking, and legal institutions. Although these characteristics are now too often taken for granted, the process through which they emerged remains remarkably opaque. In the 1780s under the Articles of Confederation, the United States was a poor developing country on the fringe of the Atlantic community with limited capacity and a striking inability to provide basic public goods, such as security. One hundred years later, it well along the way to becoming the richest nation in the world. How did this transformation occur? Drawing on judicial opinions, legal scholarship, political science, economics, and history, this course explores how institutions evolved to create such a system. It traces the problem of institutional development through several critical periods in the history of American public law, including the emergence of the Constitution, the events leading up to and following the Civil War, the Progressive era, World War II, 1964-75, and the emergence of the modern administrative state. Although the primary focus is on the American experience, we place these developments in comparative context as well.

POLISCI 224L. The Psychology of Communication About Politics in America. 4-5 Units.

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Same as: COMM 164, COMM 264, PSYCH 170

POLISCI 225C. Fixing US Politics: Political Reform in Principle and Practice. 5 Units.

Americans have been trying to perfect their system of government since its founding. Despite some notable achievements, there is a pervasive sense of frustration with political reform. This course will examine the goals and political consequences of American political regulation. Topics will vary by year to some degree but examples include campaign finance, lobbying, term limits, conflict of interest regulation, direct democracy, citizen commissions and assemblies, vote administration problems, transparency, and open meeting laws. Political Science 2 required or by special permission of the instructor.

POLISCI 226. Race and Racism in American Politics. 5 Units.

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

Same as: AMSTUD 226, CSRE 226, POLISCI 326

POLISCI 226T. The Politics of Education. 5 Units.

America's public schools are government agencies, and virtually everything about them is subject to political authority--and thus to decision through the political process. This seminar is an effort to understand the politics of education and its impacts on the nation's schools. Our focus is on the modern era of reform, with special attention to the most prominent efforts to bring about fundamental change through accountability (including No Child Left Behind), school choice (charter schools, vouchers), pay for performance, and more and more to the politics of blocking that has made genuine reform so difficult to achieve.

Same as: POLISCI 326T

POLISCI 227. U.S. Immigration Politics. 5 Units.

This course presents an overview of immigration in the United States. We will focus on current policies, U.S. immigration history, individual immigrant groups, economic causes and consequences of immigration, attitudes toward immigrants, U.S. national identity, immigrant political behavior, undocumented immigration, immigrants and public education, language barriers and policies, and immigration reform. Although the course is crafted with a focus on the U.S. as a whole, we will also spend a little time at the end of the quarter narrowing in on the California context, before taking a broader look at immigration in Western Europe to gain a comparative perspective on immigration. Finally, while we will discuss immigrant groups beyond Latinos, the course will disproportionately focus on Latino immigrants, as this is by far the largest immigrant group in the United States.

POLISCI 228. The Democratic Faith: An Empirical Analysis of Citizenship. 5 Units.

Political scientists have now accumulated evidence over more than fifty years documenting the limits of ordinary citizens' request; their minimal levels of information about public affairs; their minimal capacity for thinking coherently about political choices; their limited understanding of and commitment to core democratic values; their susceptibility to racism and intolerance of many forms. These findings, taken all in all, seem to add up to a conclusion that citizens are incapable of discharging the duties of democratic citizenship. It seems, these results suggest, that the best contribution that they can make to a democratic politics is to stay out of the way. The aim of this course to examine a paradox: how can it simultaneously be true that findings of citizen incompetence and intolerance are valid and that citizens nonetheless can be capable of discharging the duties of democratic citizenship. In particular, this course will concentrate on three main topics: racism in contemporary politics; commitment to civil liberties and civil rights, and multiculturalism. The course will require intensive reading and analysis of quantitative research on public opinion surveys and experiments.

POLISCI 229. Directed Reading and Research in American Politics. 1-10 Unit.

May be repeated for credit.

POLISCI 229R. Running Time: Running and Winning Elections. 5 Units.

This course aims to teach you the nuts-n-bolts of political campaigning. How do campaign consultants organize a campaign, draft a strategy, come up with a theme, target voters, raise money, write and produce ads and get voters to the ballot? Drawing upon academic writings in the fields of political science and communication, articles by campaign consultants, TV ads, and documentaries, you will learn all about how elections are won and lost. You will master, and yet learn to be critical of, current electoral politics with their emphasis on money, polls, and sound bites. Finally, you will harness this new knowledge to do some good, by promoting a worthy cause.

Same as: COMM 163

POLISCI 230A. Classical Seminar: Origins of Political Thought. 4-5 Units.

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, CLASSICS 381, PHIL 176A, PHIL 276A, POLISCI 330A

POLISCI 231. High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests. 3-5 Units.

Normative political theory combined with positive political theory to better explain how major texts may have responded to and influenced changes in formal and informal institutions. Emphasis is on historical periods in which catastrophic institutional failure was a recent memory or a realistic possibility. Case studies include Greek city-states in the classical period and the northern Atlantic community of the 17th and 18th centuries including upheavals in England and the American Revolutionary era.

Same as: CLASSICS 382

POLISCI 231D. Science, Power and Democracy. 5 Units.

This course investigates the relationship between science and democracy, and between knowledge and power, in the modern world. Topics covered include the epistemic properties of democratic institutions; the question of expertise in democratic politics; the role of values in science and public policy; the relationship between democracy and technology; and the relationship between democracy and the social sciences. We also analyze a number of concrete issues at the intersection of politics and science, including climate change and biomedical research. The course is interdisciplinary in method and content, with readings ranging across political theory, philosophy, history, and the social sciences.

Same as: ETHICSOC 206R

POLISCI 231T. Democratic Accountability and Transparency. 5 Units.

This course critically examines two related democratic values, accountability and transparency. We begin with historical perspectives on accountability, tracing its centrality to democratic politics to ancient Athens and early modern debates about the nature and function of political representation. But the bulk of the course deals with contemporary issues and problems: how should we conceive of accountability, both conceptually and normatively, and what is its relationship to other values such as transparency and publicity? What forms of accountability are appropriate for modern democratic politics? Is accountability only for elites, or should ordinary citizens be accountable to one another? In what contexts are transparency and publicity valuable, and when might we instead find their operation counter-productive and troubling? Readings draw from canonical texts as well as contemporary political theory, philosophy, and political science.

Same as: ETHICSOC 207R

POLISCI 231Z. Topics in Democratic Theory. 5 Units.

Democratic rule is rule of the people. But what does that mean? This course explores democracy's roots in ancient Athens to its modern incarnation. The course aims to familiarize students with the various strands of democratic theory as well as the way democratic theory responds to hot political issues such as immigration and freedom of speech. The goal of the course is to equip students to think critically about democracy in the modern world and the different interpretation democratic rule can have. The questions we will investigate include: What does democracy require? What is the relationship between democracy and human rights or social justice? Can democracy justify border control? What restrictions, if any, does democracy place on hate speech? What is the role of courts in a democracy? The course provides tools to answer these questions by surveying different approaches to democracy in contemporary literature, as well surveying the history of democratic theory from ancient Athenian democracy to the modern age, with a look to the future of democracy in a globalized era.

POLISCI 232T. The Dialogue of Democracy. 4-5 Units.

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized. Same as: AMSTUD 137, COMM 137W, COMM 237, POLISCI 332T

POLISCI 233F. Science, Technology, and Society in the Face of the Looming Disaster. 3-5 Units.

The major topic will be the indeterminacy regarding the survival of humankind. With the advent of the atomic bomb humankind became potentially the maker of its own demise. Will combine a number of significant case studies (environmental disasters, industrial catastrophes, threat of nuclear devastation, technological risks) with the lessons drawn from a form of literature that is at the intersection of STS and the Humanities, in particular the early warnings made by such thinkers as Ivan Illich, Martin Heidegger, Hans Jonas, Guuml;nther Anders, and Hannah Arendt.

Same as: FRENCH 228, ITALIAN 228

POLISCI 234P. Deliberative Democracy and its Critics. 3-5 Units.

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. In spring quarter 2015, this course will have a special focus on deliberative democracy in the the Greater China region. The course will discuss whether a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age. What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Case studies from the Deliberative Polling method and other deliberation methods, its applications, defenders and critics, both normative and empirical, will provide a cases studies for discussion. Some course sessions will utilize the case method to examine public consultations, the media, and civil society. Throughout the course, students will address how public participation is currently conducted around the world. As we have all seen successful, but more likely unsuccessful attempts to consult the public and this course will examine the various ways of consulting the public and how governments, media, and the public have responded and used the results.

Same as: AMSTUD 135, COMM 135, COMM 235, COMM 335, POLISCI 334P

POLISCI 235J. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolo Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources.

Same as: HISTORY 205G, HISTORY 305G, POLISCI 335J

POLISCI 236. Theories of Civil Society, Philanthropy, and the Nonprofit Sector. 5 Units.

What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? How do nongovernmental organizations operate domestically and globally? The historical development and modern structure of civil society emphasizing philanthropy and the nonprofit sector. Readings in political philosophy, political sociology, and public policy. WIM for PoliSci students who enroll in PoliSci 236S.

Same as: ETHICSOC 232T, POLISCI 236S

POLISCI 236S. Theories of Civil Society, Philanthropy, and the Nonprofit Sector. 5 Units.

What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? How do nongovernmental organizations operate domestically and globally? The historical development and modern structure of civil society emphasizing philanthropy and the nonprofit sector. Readings in political philosophy, political sociology, and public policy. WIM for PoliSci students who enroll in PoliSci 236S.

Same as: ETHICSOC 232T, POLISCI 236

POLISCI 237M. Politics and Evil. 5 Units.

In the aftermath of the Second World War, the political theorist Hannah Arendt wrote that the problem of evil will be the fundamental question of postwar intellectual life in Europe. This question remains fundamental today. The acts to which the word evil might apply: genocide, terrorism, torture, human trafficking, etc. The rhetoric of evil also remains central to American political discourse, both as a means of condemning such acts and of justifying preventive and punitive measures intended to combat them. In this advanced undergraduate seminar, we will examine the intersection of politics and evil by considering works by philosophers and political theorists, with occasional forays into film and media. The thinkers covered will include: Hannah Arendt, Immanuel Kant, Niccolograve; Machiavelli, Friedrich Nietzsche, and Michael Walzer.

Same as: ETHICSOC 237M

POLISCI 237S. Civil Society and Democracy in Comparative Perspective. 5 Units.

A cross-national approach to the study of civil societies and their role in democracy. The concept of civil society--historical, normative, and empirical. Is civil society a universal or culturally relative concept? Does civil society provide a supportive platform for democracy or defend a protected realm of private action against the state? How are the norms of individual rights, the common good, and tolerance balanced in diverse civil societies? Results of theoretical exploration applied to student-conducted empirical research projects on civil societies in eight countries. Summary comparative discussions. Prerequisite: a course on civil society or political theory. Students will conduct original research in teams of two on the selected nations. Enrollment limited to 18. Enrollment preference given to students who have taken PoliSci 236S/EthicSoc 232T.

Same as: ETHICSOC 237

POLISCI 238. Political Disagreement. 5 Units.

Disagreement is a permanent and ubiquitous feature of political life. Furthermore, political disagreement can stem from a wide range of sources. Perhaps most importantly, democratic citizens disagree at the level of values: they disagree about the proper form of the good life as well as the human interests that political laws and institutions ought to serve. This course will focus primary attention on the implications of such value-based disagreement for how we should think about political justice.

POLISCI 238C. Governing the 21st Century World. 5 Units.

How is our world governed, and by whom? How are decisions made on the most important issues of our time, including climate change, global inequality, and protection of human rights? A traditional answer to these questions is that only official governments have the power to govern - to set and enforce rules on these and other issues. In contrast, this class explores the emerging roles of non-state actors, including NGOs, for-profit corporations, informal social movements, and international institutions, in governing our world and making decisions on these and other key issues. We will also study the ways that the governance by non-state actors challenges our ideas of democracy, legitimacy, and justice. The class thus seeks to bring together perspectives and tools from both empirical social science and political theory in order to better understand this important phenomenon.

POLISCI 238T. History of International Relations Thought. 5 Units.

In this course, we will examine the intellectual origins of contemporary theories and approaches to international politics. In particular, we will trace the classical and early modern roots of contemporary realism, idealism, and cosmopolitanism. We will also address some of the enduring normative and empirical questions about international politics: (1) What is the basis of political power and authority? (2) What rights and obligations do individuals have? (3) What rights and obligations do states have? (4) What are the causes of conflict? (5) What are the prospects for enduring peace? Thinkers covered may include: Thucydides, Cicero, Augustine, Aquinas, Grotius, Hobbes, Kant, Morgenthau, and Waltz.
Same as: INTNLREL 136

POLISCI 239. Directed Reading and Research in Political Theory. 1-10 Unit.

May be repeated for credit.

POLISCI 240C. The Comparative Political Economy of Post-Communist Transitions. 3-4 Units.

Dominant theoretical perspectives of comparative democratization and marketization; focus is on the political economy of transition in Eastern Europe and Eurasia while comparing similar processes in Latin America and Asia. Topics include: meanings of democracy, synergy between democracies and markets, causes of the collapse of communism, paths to political liberalization and democracy, civil society, constitutions, parliaments, presidents, the rule of law, electoral systems, market requirements, strategies of reform, the Russian experience of market building, exporting democracy and the market, and foreign aid and assistance.

POLISCI 240T. Democracy, Promotion, and American Foreign Policy. 5 Units.

Theoretical and intellectual debates about democracy promotion with focus on realism versus liberalism. The evolution of these debates with attention to the Cold War, the 90s, and American foreign policy after 9/11. Tools for and bureaucratic struggles over how to promote democracy. Contemporary case studies.

POLISCI 241A. An Introduction to Political Economy of Development. 5 Units.

This course is an upper-level undergraduate seminar providing an introduction to the political economy of development. This course explores sources of economic growth, inequality, poverty, and other aspects of development with a particular focus on political institutions. We first explore the patterns of development in the world and then overview basic theories of development. Second, we review the key areas of debate within the study of development, including the role of the state, the consequences of corruption, the effects of natural resources, and gender. The course consists of lectures on theoretical and empirical approaches and the discussion on the literature and cases.

POLISCI 241C. Campaigns and Elections in Israel. 5 Units.

Employing a theoretical and comparative framework, this seminar focuses on campaigns and elections in Israel. The seminar is divided into two interrelated sections. In the first section, we will cover voting behavior. Here we will look at Israeli election laws, its political culture, socialization and cleavages, turnout, political sophistication, ideology, partisanship and issue voting. In the second half of the semester we will examine elections from the perspective of candidates and campaign strategists. The topics we will focus on include election laws, public and private campaign finance, campaign strategy, media, polling, and advertising. In examining these topics, we will cover a variety of elections campaigns since Israel's birth, with an emphasis on the most recent ones.

Same as: JEWISHST 271C

POLISCI 241S. Spatial Approaches to Social Science. 5 Units.

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.
Same as: ANTHRO 130D, ANTHRO 230D, URBANST 124

POLISCI 242A. Why is Africa Poor?. 5 Units.

Living standards around the world have increased, in many cases exponentially, throughout the previous century. Yet Sub-Saharan Africa remains, by a considerable margin, the poorest region on Earth. This course asks three questions: Why is Africa poor? When did it become so? And will it remain so for the foreseeable future? The course draws on a range of social science disciplines - anthropology, economics, history, political science, and sociology - to offer tentative answers.

POLISCI 242C. Corruption, Conflict and Financial Crisis: Contemporary Global Politics and Journalism. 5 Units.

This course offers students interested in contemporary global politics a unique introduction to the critical analysis of current events through the lens of award-winning non-fiction writing. Each week, we will explore a new political issue crucial to understanding today's world by reading some of the most gripping (and best written!) first- and second-hand narratives of these events, as recounted by journalists, academics and documentarians working in the field. Topics will include: global poverty, the overthrow of authoritarian regimes, terrorism, genocide and crimes against humanity, the Israel-Palestinian conflict, financial crises, and political corruption. In class, students will discuss the readings and learn to apply major social scientific theories to systematically analyze these complex political issues. Through this course, students will not only gain exposure to some exemplary writing on topics of current importance, but also acquire the skills and tools necessary to understand some of the most intractable and interesting problems in the world today.

POLISCI 243C. The Political Economy of Development. 5 Units.

Why are some countries rich and others poor? What explains the economic policies that governments adopt, and how do those policies affect economic performance? Why some policies persist over time while other don't? We will use tools from political science and economics to explore these important questions. The readings for this course will include conceptual and historical material from many geographic regions. As we explore the fascinating relationship between politics and economics, we will evaluate hypotheses according to robust and sound empirical evidence.

POLISCI 243E. Political Economy of Development in Rural India. 5 Units.

When and why do farmers accept, manipulate, or overthrow the pre-existing distribution of political, economic and social power? This course will help students utilize political economy theories and methods of analysis to understand the institutional dynamics of change in rural India. First, it will provide students with a deeper understanding of the nature of change in a particularly dynamic, varied and influential state with a mainly-rural population: India. Second, it will focus on three major topics in political economy: control over land; taxation and investment; and anti-state resistance. The course will draw from political science; examinations of how and why states succeed, fail, and conduct major reforms by examining these questions in the context of rural India; small farmers. Indian political institutions are simultaneously lauded as extremely stable, highly-prone to decentralized rebellion, and models for voice and innovation from which the rest of the world has much to learn. Overall, this course will expect students to engage with the political economy literature; both historical and contemporary; in order to develop two short research papers and present well-argued positions in class-wide debates on the nature of political, economic and social change driven by and for small farmers in rural India.

POLISCI 243L. Politics of Economic Reform. 5 Units.

Description to come.

POLISCI 244. An Introduction to Political Development. 5 Units.

Political development concerns the evolution of three categories of institutions: (1) the state itself; (2) the rule of law; and (3) accountable government. Focus on many of the major theories of political development, beginning with some classic social theorists and continuing up through the present.

POLISCI 244A. Authoritarian Politics. 3-5 Units.

Examination of how authoritarian regimes govern. Topics include: historical determinants of authoritarian government, typologies of authoritarian rule and impact of authoritarian governance on economic growth.

Same as: POLISCI 344A

POLISCI 244C. Political Change in Latin America: The contemporary challenge to democracy. 5 Units.

The purpose is to present the contemporary tendencies that characterize the mutation of democracy in Latin America. Along with a general conceptualization, focus will be given to specific cases that illustrate concepts. Three axes constitute the frame of the course: the background, the new trends of democracy on the eve of the 21st century, and the emergence of "refoundational" government and movements.

POLISCI 244P. Religion and Politics in Latin America. 5 Units.

The purpose of this seminar is to introduce students to the complexities of Politics and Religion in Latin America from a historical and sociological perspective. The seminar will examine the evolution of Church-State-Society-Community-Individual relations in Latin America, from Independence to present day. Topics will include new definitions of religious freedom, debates concerning the so called lay State; (Estado laico), secularization, and the role of the lay or secular state and religious groups in the development of democratic or authoritarian regimes, as well as civil and religious freedoms, particularly sexual and reproductive rights and bioethical issues (contraception, abortion euthanasia, stem cell research, homosexual rights and homophobia). The course will combine a series of reading tests designed to introduce central questions of the texts with a critical discussion of the assigned source material, in order to develop a knowledgeable approach and research interest in the student.

POLISCI 244T. Organized Crime and Democracy in Latin America. 5 Units.

Scholars and policy analysts have long emphasized the strength of the rule of law as a key determinant of economic development and social opportunity. They also agree that the rule of law requires an effective and accountable legal system. The growth of transnational organized crime is a major impediment, however, to the creation of effective and accountable legal systems. This seminar examines how and why transnational criminal organizations have developed in Latin America, explores why they constitute a major challenge to the consolidation of democratic societies, economic development and individual rights. It also examines the efforts of governments to combat them, with a focus on the experiences of Mexico, Colombia, and Brazil. The course examines these cases in order to draw lessons; by pointing to both successes and failures; of use to policy analysts, legal scholars, and practitioners.

Same as: INTNLREL 152, IPS 247

POLISCI 244U. Political Culture. 5 Units.

Implications of cultural coordination and cultural difference for political processes and institutions. Prerequisite: 4 or equivalent.

Same as: POLISCI 344U

POLISCI 245A. Politics and Public Finance. 5 Units.

The main related but different questions addressed by course are: how states have, through history, financed their expenditures, e.g. by taxing people or issuing public debt; how different political and fiscal institutions have been shaped by the varying need of the state to collect revenues (such as war, revolution threats, increasing demand of redistribution by the median voter); We will focus mainly, but not only, on the historical experience of the Western World (e.g. Europe and the US), and pay special attention to the nature of political institutions in place (e.g. absolutist regimes, constitutional monarchies, different forms of democracy), over a relatively long period of time (i.e. beginning with the). The exposition will not necessarily follow a chronological order, but rather a logical one (in some sense).

POLISCI 245E. Middle East Politics. 5 Units.

This course offers a thematic approach to the study of Middle Eastern politics. We will overview the major areas of political science research on the contemporary Middle East while simultaneously building empirical knowledge about the politics of individual countries in the region. Topics to be covered include: state capacity and democracy; economic development and mineral resources; the politics of religion and gender; international relations and civil conflict; terrorism and revolution.

POLISCI 245R. Politics in Modern Iran. 5 Units.

Modern Iran has been a smithy for political movements, ideologies, and types of states. Movements include nationalism, constitutionalism, Marxism, Islamic fundamentalism, social democracy, Islamic liberalism, and fascism. Forms of government include Oriental despotism, authoritarianism, Islamic theocracy, and liberal democracy. These varieties have appeared in Iran in an iteration shaped by history, geography, proximity to oil and the Soviet Union, and the hegemony of Islamic culture.

POLISCI 246P. The Dynamics of Change in Africa. 4-5 Units.

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: AFRICAST 301A, HISTORY 346, POLISCI 346P

POLISCI 247G. Governance and Poverty. 5 Units.

Poverty relief requires active government involvement in the provision of public services such as drinking water, healthcare, sanitation, education, roads, electricity and public safety. Failure to deliver public services is a major impediment to the alleviation of poverty in the developing world. This course will use an interdisciplinary approach to examining these issues, bringing together readings from across the disciplines of political science, economics, law, medicine and education to increase understanding of the complex causal linkages between political institutions, the quality of governance, and the capacity of developing societies to meet basic human needs. Conceived in a broadly comparative international perspective, the course will examine cross-national and field-based research projects, with a particular focus on Latin America and Mexico.

POLISCI 248L. Political-Economy of Crime and Violence in Latin America. 5 Units.

Latin America has experienced a significant wave of crime and violence in the past two decades. Criminal organizations have penetrated State organizations and are increasingly embedded in society. These organizations have created wide and solid networks all over the region, including the United States. The activities of criminal organizations in Latin America have eroded the social fabric, weakened State institutions, have caused a significant number of deaths, and have created strong disincentives for productive investment. The course aims at acquainting students with the political-economy of crime and violence. It focuses on understanding the incentives that individuals face for engaging in criminal activities; the incentives that criminal organizations have to use violence against each other, against citizens, and against State forces; the incentives that citizens face to side, or not, with criminal organizations; and the responses that States have structured against crime and violence. The course focuses on Latin America, but also learns from the case of the United States for which there is a relatively more extensive literature. The course makes extensive use of available data on the topic and emphasizes the learning of adequate methods for measuring these phenomena.
Same as: POLISCI 348L

POLISCI 248S. Latin American Politics. 5 Units.

Fundamental transformations in Latin America in the last two decades: why most governments are now democratic or semidemocratic; and economic transformation as countries abandoned import substitution industrialization policies led by state intervention for neoliberal economic policies. The nature of this dual transformation.
Same as: POLISCI 348S

POLISCI 249. Directed Reading and Research in Comparative Politics. 1-10 Unit.

May be repeated for credit.

POLISCI 249P. Introduction to Israeli Politics. 5 Units.

This course aims to introduce students to Israel's political system and its major actors. We will survey Israel's political landscape, both chronologically and thematically, covering the major issues and conflicts which have dominated Israeli politics since its inception.
Same as: INTNLREL 163, JEWISHST 279P

POLISCI 259. Directed Reading and Research in Political Methodology. 1-10 Unit.

May be repeated for credit.

POLISCI 291. Political Institutions. 5 Units.

This course focuses on the role of political institutions in shaping policy outcomes around the world, with special attention to the United States. Students will become familiar with a wide range of theoretical approaches to the study of institutions, and they will learn the basics of applied quantitative empirical analysis. Enrollment is restricted to Political Science Research Honors Track students.

POLISCI 292. Political Behavior. 5 Units.

This research seminar will survey important topics in the study of mass political behavior including public opinion, political participation, partisanship and voting. Open only to students in the Political Science Research Honors Track.

POLISCI 293. Research Design. 5 Units.

This course is designed to teach students how to design a research project. The course emphasizes the specification of testable hypotheses, the building of data sets, and the inferences from that may be drawn from that evidence. It is only open to students in the PS Research Honors Track.

POLISCI 299A. Honors Thesis. 1-5 Unit.

Students conduct independent research work towards a senior honors thesis. Restricted to students in the Research Track Honors Program in Political Science.

POLISCI 299B. Honors Thesis. 1-5 Unit.

Students conduct independent research work towards a senior honors thesis.

POLISCI 299C. Honors Thesis. 1-5 Unit.

Students conduct independent research work towards a senior honors thesis.

POLISCI 299Q. Honors Thesis Seminar. 3-5 Units.

Restricted to Research Honors Track students who have completed PoliSci 291, 292, and 293.

POLISCI 314D. Democracy, Development, and the Rule of Law. 5 Units.

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts. Same as: INTNLREL 114D, IPS 230, POLISCI 114D

POLISCI 314R. Challenges and Dilemmas in American Foreign Policy. 5 Units.

This seminar will examine the complexities and trade offs involved in foreign policy decision-making at the end of the twentieth century and the dawn of the post-9/11 era. Students will analyze dilemmas confronting policymakers through case studies including post-conflict reconstruction and state-building, nuclear proliferation, democratization and peace negotiation. The seminar will conclude with a 48-hour crisis simulation. For advanced undergraduates and graduate students. Application for enrollment required. Pick up application in Political Science Department (Encina West 100).
Same as: POLISCI 214R

POLISCI 315. Living at the Nuclear Brink: Yesterday and Today. 3 Units.

The development, testing, and proliferation of nuclear weapons will be covered, from World War II through the Cold War to the present. Emphasis will be placed on understanding the evolving role of these weapons, both militarily and politically. It will also examine controversies and opposition movements to nuclear weapons and their use. The course will feature numerous guest speakers from Stanford and beyond. Students will be required to write in-depth analyses of specific nuclear weapons policy questions. Following this course, students are expected to have a deeper understanding of the profound dangers these weapons continue to present to the world today.
Same as: IPS 249, POLISCI 115

POLISCI 315A. The Rise of Asia. 3-5 Units.

We will examine the sources and implications of the rise of Asia in the international system. Topics will include military competition, international cooperation, regional integration, domestic politics, business and investment, legalization, environmental issues, demographics, social issues, and the role of technology.
Same as: POLISCI 115A

POLISCI 315F. Nuclear Weapons and International Politics. 5 Units.

Why do states develop nuclear weapons and why do some states, that have the technological capacity to build nuclear weapons, refrain from doing so? What are the strategic consequences of new states deploying nuclear weapons? What is the relationship between the spread of nuclear energy and the spread of nuclear weapons? We will study the political science and history literature on these topics. Research paper required.
Same as: POLISCI 215F

POLISCI 316. International History and International Relations Theory. 5 Units.

The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system.
Same as: HISTORY 202, HISTORY 306E, POLISCI 216E

POLISCI 316S. Decision Making in U.S. Foreign Policy. 5 Units.

Formal and informal processes involved in U.S. foreign policy decision making. The formation, conduct, and implementation of policy, emphasizing the role of the President and executive branch agencies. Theoretical and analytical perspectives; case studies. Interested students should attend the first day of class. Admission will be by permission of the instructor. Priority to IPS students.
Same as: IPS 316S

POLISCI 318J. Japanese Politics and International Relations. 5 Units.

The domestic politics, political economy, and international relations of contemporary Japan. The role of political parties, the bureaucracy, and private actors. Economic development and challenges. Relations with the United States and East Asia.
Same as: POLISCI 218J

POLISCI 319. Directed Reading in International Relations. 1-10 Unit.

May be repeated for credit.

POLISCI 321. Law and Politics Workshop. 2-3 Units.

This workshop will feature guest speakers who are political scientists or law professors specializing in the legal regulation of politics. Students will be responsible for response papers to each scholarly paper presented. On weeks without guest speakers, topics to be covered will include election law, administrative law, legislation, judicial behavior and public opinion, as well as the political science relevant to those areas of law. The final grade will be determined by class participation (10%), response papers (30%) and final research paper (60%). Students can take the course for R credit for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation (10%), Response papers (30%) and final paper of no less than 18 pages for 2 units of credit and 26 pages for 3 units of credit (60%). (Cross-listed as POLISCI 321).

POLISCI 322S. Topics in Constitutional History. 5 Units.

Originalism has become the dominant topic in contemporary constitutional interpretation. Is it possible to interpret the Constitution according to its original, meaning, intentions, and understandings? Should we think of the Constitution as a fixed set of rules laid down linguistically, or a set of understandings shaped by the nation's history? How should modern interpreters assess the legacy of major epochs of constitutional change, from the founding era through Reconstruction and on to the great disputes over the New Deal and civil rights? These are the questions this course will entertain.

POLISCI 323. Pivotal Moments in American Institutions and Public Law, 1781-Present. 5 Units.

(Same as Law 680) American lawyers and policymakers work today in a system of institutions that are strikingly unique in comparative and historical terms. With some exceptions, that system is characterized by relatively stable political and legal institutions, low levels of explicit corruption, high bureaucratic capacity in public organizations, and relatively open, impersonal access to political, policymaking, and legal institutions. Although these characteristics are now too often taken for granted, the process through which they emerged remains remarkably opaque. In the 1780s under the Articles of Confederation, the United States was a poor developing country on the fringe of the Atlantic community with limited capacity and a striking inability to provide basic public goods, such as security. One hundred years later, it well along the way to becoming the richest nation in the world. How did this transformation occur? Drawing on judicial opinions, legal scholarship, political science, economics, and history, this course explores how institutions evolved to create such a system. It traces the problem of institutional development through several critical periods in the history of American public law, including the emergence of the Constitution, the events leading up to and following the Civil War, the Progressive era, World War II, 1964-75, and the emergence of the modern administrative state. Although the primary focus is on the American experience, we place these developments in comparative context as well.

POLISCI 323R. The Press and the Political Process. 4-5 Units.

(Graduate students register for COMM 260.) The role of mass media and other channels of communication in political and electoral processes.
Same as: COMM 160, COMM 260

POLISCI 324. Graduate Seminar in Political Psychology. 1-3 Unit.

For students interested in research in political science, psychology, or communication. Methodological techniques for studying political attitudes and behaviors. May be repeated for credit.
Same as: COMM 308

POLISCI 326. Race and Racism in American Politics. 5 Units.

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.
Same as: AMSTUD 226, CSRE 226, POLISCI 226

POLISCI 326T. The Politics of Education. 5 Units.

America's public schools are government agencies, and virtually everything about them is subject to political authority--and thus to decision through the political process. This seminar is an effort to understand the politics of education and its impacts on the nation's schools. Our focus is on the modern era of reform, with special attention to the most prominent efforts to bring about fundamental change through accountability (including No Child Left Behind), school choice (charter schools, vouchers), pay for performance, and more and more to the politics of blocking that has made genuine reform so difficult to achieve.
Same as: POLISCI 226T

POLISCI 327. Minority Behavior and Representation. 5 Units.

Politics of minorities in the U.S. Topics include: historic and contemporary struggles of Latinos, African Americans, and gays and lesbians for political power and social acceptance; group-level public opinion and electoral behavior; scholarship on group influence in the policy making process and policy issues of importance; and the jurisprudence shaping minority political access and civil rights.

POLISCI 327C. Regulation of the Political Process. 3-5 Units.

Combined with LAW 577. This course is intended to give students a basic understanding of the themes in the legal regulation of elections and politics. We will cover all the major Supreme Court cases on topics of voting rights, reapportionment/redistricting, ballot access, regulation of political parties, campaign finance, and the 2000 presidential election controversy. The course pays particular attention to competing political philosophies and empirical assumptions that underlie the Court's reasoning while still focusing on the cases as litigation tools used to serve political ends. Elements used in grading: Class participation and one day take home final exam. (POLISCI 327C; LAW 577).

Same as: COMM 361

POLISCI 329. Directed Reading and Research in American Politics. 1-10 Unit.

May be repeated for credit.

POLISCI 330. Social and Political Philosophy of Hegel and Marx. 4 Units.

Same as: ETHICSOC 330R, PHIL 330

POLISCI 330A. Classical Seminar: Origins of Political Thought. 4-5 Units.

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, CLASSICS 381, PHIL 176A, PHIL 276A, POLISCI 230A

POLISCI 332. Topics in Political Philosophy. 5 Units.

Leading ideas in *A Theory of Justice*, *Political Liberalism*, and *The Law of Peoples*.

Same as: PHIL 372D

POLISCI 332T. The Dialogue of Democracy. 4-5 Units.

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

Same as: AMSTUD 137, COMM 137W, COMM 237, POLISCI 232T

POLISCI 333. Rational and Social Agency. 2-5 Units.

Contemporary discussions of practical reason, individual rational agency, planning agency, diachronic agency, intention, belief, intentional action, shared agency, identification and self-governance. Tentative list of authors whose work will be studied includes: Michael Bratman, Margaret Gilbert, Richard Holton, Christine Korsgaard, Alfred Mele, Kieran Setiya, Scott Shapiro, Michael Smith, David Velleman, Jay Wallace, and Gary Watson.

Same as: PHIL 377

POLISCI 333S. Marx. 2-4 Units.

This course examines the works of a thinker who radically transformed the ways that we think about modern society. Marx saw fundamental problems with capitalist societies, including: un-freedom, alienation, inequality, and bureaucratization. He developed a theory to account for these problems. Our task will be to read his works critically and to evaluate their contributions to our understanding the relationship between politics, social structure, knowledge and human agency. We will also be especially interested in comparing his view with alternative diagnoses of the problems of modern capitalist societies, especially those of Max Weber and John Rawls.

Same as: PHIL 339

POLISCI 334. Philanthropy and Civil Society. 1-3 Unit.

Cross-listed with Law (LAW 781), Political Science (POLISCI 334) and Sociology (SOC 374). Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

Same as: EDUC 374, SOC 374

POLISCI 334P. Deliberative Democracy and its Critics. 3-5 Units.

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. In spring quarter 2015, this course will have a special focus on deliberative democracy in the Greater China region. The course will discuss whether a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age. What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Case studies from the Deliberative Polling method and other deliberation methods, its applications, defenders and critics, both normative and empirical, will provide a cases studies for discussion. Some course sessions will utilize the case method to examine public consultations, the media, and civil society. Throughout the course, students will address how public participation is currently conducted around the world. As we have all seen successful, but more likely unsuccessful attempts to consult the public and this course will examine the various ways of consulting the public and how governments, media, and the public have responded and used the results.

Same as: AMSTUD 135, COMM 135, COMM 235, COMM 335, POLISCI 234P

POLISCI 335A. Adam Smith: From Moral Philosophy to Political Economy. 3-5 Units.

This course is designed for graduate students and advanced undergraduates interested in moral philosophy or modern political economy. The course blends two approaches to Adam Smith. We use political thought and intellectual history to introduce students to the intellectual roots of iquest;classical Liberalismiqwest;; asking: What are the moral psychological foundations of justice?, Does the free market make everyone, including the least advantaged, better off? How do we sustain a good society? We use social science to study Smithiqwest;s integrated approach to human cooperation in three realms, society, politics, and markets; asking: iquest;Why isniqwest;t the entire world developed? How did Europe develop out of feudalism? How does a community sustain moral behavior? The two perspectives allow us to discover that Smith has ideas on these subjects that expand todayiqwest;s frontiers of both positive and normative social science.

POLISCI 335J. Creative Political Thinking: Three Cases. 5 Units.

Same as: POLISCI 235J

POLISCI 335L. Roads Not Taken, 1880-1960. 4 Units.

This course is intended to illuminate ideas about justice, freedom, equality, democracy, peace, and social conflict, and to raise persisting questions about such topics as the role of violence in politics through looking at the ideas of America writers such as Edward Bellamy, W.E.B. DuBois, Eugene Debs, Jane Addams, Emma Goldman, John Dewey and Reinhold Niebuhr. Same as: AMSTUD 275R, ETHICSOC 275R, PHIL 275R

POLISCI 336. Introduction to Global Justice. 4 Units.

Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls. Same as: ETHICSOC 136R, INTNLREL 136R, PHIL 76, POLISCI 136R

POLISCI 336C. French Political Thought From Rousseau to the Present. 3-5 Units.

An overview of the current awakening of French political thought as it is grounded in a new reading of the great classics of French social thought, from Rousseau to Tocqueville and Benjamin Constant. Readings of Lefort, Castoriadis, Louis Dumont, Ricoeur, Furet, Manent, Ferry, Renaut, Gauchet, Raynaud, etc. Readings in French. (Translations in English will be made available whenever possible.) Discussions in French and in English. Same as: FRENCH 245

POLISCI 336S. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors. Same as: ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S, PUBLPOL 103C, PUBLPOL 307

POLISCI 337A. Political Philosophy: The Social Contract Tradition. 4 Units.

(Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Study of the answers given to such questions by major political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant. Same as: PHIL 176, PHIL 276, POLISCI 137A

POLISCI 337S. Seminar on Liberation Technologies. 1 Unit.

This one-unit seminar will present speakers relevant in a variety of ways to how various forms of information technology are being used to defend human rights, improve governance, deepen democracy, empower the poor, promote economic development, protect the environment, enhance public health, and pursue a variety of other social goods. Same as: CS 546

POLISCI 337T. Designing Liberation Technology. 3-4 Units.

Small project teams work with NGOs to design new technologies for promoting development and democracy. Students conduct observations to identify needs, generate concepts, create prototypes, and test their appropriateness. Some projects may continue past the quarter toward full-scale implementation. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s). Design Institute class; see <http://dschool.stanford.edu>. Same as: CS 379L

POLISCI 338E. The Problem of Evil in Literature, Film, and Philosophy. 3-5 Units.

Conceptions of evil and its nature and source, distinctions between natural and moral evil, and what belongs to God versus to the human race have undergone transformations reflected in literature and film. Sources include Rousseau's response to the 1755 Lisbon earthquake; Hannah Arendt's interpretation of Auschwitz; Guenter Anders' reading of Hiroshima; and current reflections on looming climatic and nuclear disasters. Readings from Rousseau, Kant, Dostoevsky, Arendt, Anders, Jonas, Camus, Ricoeur, Houellebecq, Girard. Films by Lang, Bergman, Losey, Hitchcock. Same as: FRENCH 265

POLISCI 339. Directed Reading and Research in Political Theory. 1-5 Unit.

May be repeated for credit.

POLISCI 340L. China in World Politics. 5 Units.

The implications of the rise of China in contemporary world politics and for American foreign policy, including issues such as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions. Same as: POLISCI 140L

POLISCI 344. Politics and Geography. 3-5 Units.

The role of geography in topics in political economy, including development, political representation, voting, redistribution, regional autonomy movements, fiscal competition, and federalism.

POLISCI 344A. Authoritarian Politics. 3-5 Units.

Examination of how authoritarian regimes govern. Topics include: historical determinants of authoritarian government, typologies of authoritarian rule and impact of authoritarian governance on economic growth. Same as: POLISCI 244A

POLISCI 344U. Political Culture. 5 Units.

Implications of cultural coordination and cultural difference for political processes and institutions. Prerequisite: 4 or equivalent. Same as: POLISCI 244U

POLISCI 346P. The Dynamics of Change in Africa. 4-5 Units.

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization. Same as: AFRICAST 301A, HISTORY 346, POLISCI 246P

POLISCI 347D. Rebooting Government with Design Thinking. 3-4 Units.

Students apply tools of human-centered design to issues of government performance. Small project teams work with NGO and government partners (in the U.S. and abroad) on concrete design challenges focused on issues such as how to deliver services more effectively and ensure that citizens' voices are heard. Students identify needs, generate concepts, create prototypes, and test their appropriateness. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s). Same as: PUBLPOL 347D

POLISCI 348. Chinese Politics: The Transformation and the Era of Reform. 3-5 Units.

Overview of the reforms in China since 1978 that have made its economy one of the fastest growing in the world yet it still has the Chinese Communist Party at the helm wielding one party rule. Key questions addressed include the following: What has been the process and challenges of reform that have reshaped China's economic landscape? What are the political consequences of these dramatic economic changes? Why has the CCP remained strong while other communist regimes have failed? Markets have spread but what is the role of the state? What are the opportunities for political participation and prospects for political change? Materials will include readings, lectures, and selected films. This course has no prerequisites. (Graduate students register for 348.) This fulfills the Writing in the Major requirement for PoliSci majors.
Same as: POLISCI 148

POLISCI 348L. Political-Economy of Crime and Violence in Latin America. 5 Units.

Latin America has experienced a significant wave of crime and violence in the past two decades. Criminal organizations have penetrated State organizations and are increasingly embedded in society. These organizations have created wide and solid networks all over the region, including the United States. The activities of criminal organizations in Latin America have eroded the social fabric, weakened State institutions, have caused a significant number of deaths, and have created strong disincentives for productive investment. The course aims at acquainting students with the political-economy of crime and violence. It focuses on understanding the incentives that individuals face for engaging in criminal activities; the incentives that criminal organizations have to use violence against each other, against citizens, and against State forces; the incentives that citizens face to side, or not, with criminal organizations; and the responses that States have structured against crime and violence. The course focuses on Latin America, but also learns from the case of the United States for which there is a relatively more extensive literature. The course makes extensive use of available data on the topic and emphasizes the learning of adequate methods for measuring these phenomena.
Same as: POLISCI 248L

POLISCI 348S. Latin American Politics. 5 Units.

Fundamental transformations in Latin America in the last two decades: why most governments are now democratic or semidemocratic; and economic transformation as countries abandoned import substitution industrialization policies led by state intervention for neoliberal economic policies. The nature of this dual transformation.
Same as: POLISCI 248S

POLISCI 349. Directed Reading and Research in Comparative Politics. 1-10 Unit.

May be repeated for credit.

POLISCI 350A. Political Methodology I: Regression. 5 Units.

Introduction to statistical research in political science, with a focus on linear regression. Teaches students how to apply multiple regression models as used in much of political science research. Also covers elements of probability and sampling theory.

POLISCI 350B. Political Methodology II: Causal Inference. 5 Units.

Survey of statistical methods for causal inference in political science research. Covers a variety of causal inference designs, including experiments, matching, regression, panel methods, difference-in-differences, synthetic control methods, instrumental variables, regression discontinuity designs, quantile regression, and bounds. Students should have already taken 350A. Please contact the instructor if you have not and would still like to enroll.
Same as: PUBLPOL 303B

POLISCI 350C. Political Methodology III: Model-Based Inference. 3-5 Units.

Provides a survey of statistical tools for model-based inference in political science. Topics include generalized linear models for various data types and their extensions, such as discrete choice models, survival outcome models, mixed effects and multilevel models.

POLISCI 350D. Political Methodology IV: Advanced Topics. 5 Units.

Covers advanced statistical tools that are useful for empirical research in political science. Possible topics include missing data, survey sampling and experimental designs for field research, machine learning, text mining, clustering, Bayesian methods, spatial statistics, and web scraping.

POLISCI 351A. Foundations of Political Economy. 3 Units.

Introduction to political economy with an emphasis on formal models of collective choice, public institutions, and political competition. Topics include voting theory, social choice, institutional equilibria, agenda setting, interest group politics, bureaucratic behavior, and electoral competition.

POLISCI 351B. Economic Analysis of Political Institutions. 4 Units.

Applying techniques such as information economics, games of incomplete information, sequential bargaining theory, repeated games, and rational expectations of microeconomic analysis and game theory to political behavior and institutions. Applications include agenda formation in legislatures, government formation in parliamentary systems, the implications of legislative structure, elections and information aggregation, lobbying, electoral competition and interest groups, the control of bureaucracies, interest group competition, and collective choice rules.

POLISCI 351C. Institutions and Bridge-Building in Political Economy. 4 Units.

This course critically surveys empirical applications of formal models of collective-choice institutions. It is explicitly grounded in philosophy of science (e.g., Popperian positivism and Kuhn's notions of paradigms and normal science). Initial sessions address the meanings and roles of the concept of institutions in social-science research. Historically important works of political science and/or economics are then considered within a framework called Components of Institutional Analysis (or CIA), which provides a fully general way of evaluating research that is jointly empirical and formal theoretical. The course concludes with contemporary instances of such bridge-building. The over-arching objectives are to elevate the explicitness and salience of desirable properties of research and to illustrate the inescapable tradeoffs among the stipulated criteria. Although this is a core course in the GSB Political Economy PhD curriculum, its substantive foci may differ across years depending on the instructor. For Professor Krehbiel's sessions, the emphasis is on legislative behavior, organization, and lawmaking, and on inter-institutional strategic interaction (e.g. between executive, legislative, and judicial branches in various combinations). Students should have taken POLECON 680 and POLECON 681. Also listed as Political Science 351C.

Same as: POLECON 682

POLISCI 352. Introduction to Game Theoretic Methods in Political Science. 3-5 Units.

Concepts and tools of non-cooperative game theory developed using political science questions and applications. Formal treatment of Hobbes' theory of the state and major criticisms of it; examples from international politics. Primarily for graduate students; undergraduates admitted with consent of instructor.

Same as: POLISCI 152

POLISCI 353A. Workshop in Statistical Modeling. 1 Unit.

Theoretical aspects and empirical applications of statistical modeling in the social sciences. Guest speakers. Students present a research paper. Prerequisite: 350B or equivalent.

POLISCI 353C. Workshop in Statistical Modeling. 1-2 Unit.

Continuation of 353A. May be repeated for credit. Prerequisite: 353A and B.

POLISCI 356A. Formal Theory I: An Introduction to Game Theory. 3-5 Units.

An introduction to noncooperative game theory through applications in political science. Topics will include the Hotelling-Downs model, the probabilistic voting model, political bargaining models and political agency models, among others.

POLISCI 356B. Formal Theory II: Models of Politics. 3-5 Units.

A continuation of Formal Theory I covering advanced topics, including classical political economy, comparative institutions, theories of conflict and cooperation, dynamic political economy, and the new behavioral political economy.

POLISCI 357. Sampling and Surveys. 5 Units.

The importance of sample surveys as a source of social science data including public opinion, voting, welfare programs, health, employment, and consumer behavior. Survey design, sampling theory, and estimation. Nonresponse, self-selection, measurement error, and web survey methods. Prerequisite: 350B or equivalent.

POLISCI 359. Advanced Individual Study in Political Methodology. 1-10 Unit.

May be repeated for credit.

POLISCI 362. New Economics of Organization. 5 Units.

Survey of economic approaches to organization, emphasizing theory and application, with attention to politics.

POLISCI 400. Dissertation. 1-10 Unit.

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POLISCI 404. Dispute Resolution in International Economic Law. 1 Unit.

(Same as LAW 356.) Topics include: theoretical work on international trade and investment disputes; empirical work on WTO dispute resolution and the efficacy of developing country participation; and legal analysis of current, prominent disputes in the WTO and under international investment treaties. Substantial paper required. May be repeated for credit.

POLISCI 410A. International Relations Theory, Part I. 3-5 Units.

First of a three-part graduate sequence. History of international relations, current debates, and applications to problems of international security and political economy.

POLISCI 410B. International Relations Theory, Part II. 3-5 Units.

Second of a three-part graduate sequence. History of international relations theory, current debates, and applications to problems of international security and political economy. Prerequisite: 410A.

POLISCI 410C. Research in International Relations. 5 Units.

Third of a three-part graduate sequence. Focus is on developing research papers begun in 410A or B, and exploring active areas of research in the field. Prerequisite: 410B.

POLISCI 411A. Workshop in International Relations. 1 Unit.

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

POLISCI 411B. Workshop in International Relations. 1-2 Unit.

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

POLISCI 411C. Workshop in International Relations. 1 Unit.

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

POLISCI 412. The Politics and Economics of Modern Europe. 3-5 Units.

What are the implications of European integration for social and economic policy and outcomes? In this course, we will examine how EU membership has altered the democratic politics of Europe, with a special focus on policymaking during Europe's most recent financial crisis.

POLISCI 420A. American Political Institutions. 3-5 Units.

Theories of American politics, focusing on Congress, the presidency, the bureaucracy, and the courts.

POLISCI 420B. Topics in American Political Behavior. 3-5 Units.

For graduate students with background in American politics embarking on their own research. Current research in American politics, emphasizing political behavior and public opinion. Possible topics: uncertainty and ambivalence in political attitudes, heterogeneity in public opinion, the structure of American political ideology, political learning, the media as a determinant of public opinion, and links between public opinion and public policy.

POLISCI 420C. Discovery in American Politics. 5 Units.

What are the "novel facts" being generated in the study of American politics, and how are these discoveries being made? Emphasis on strengths and limitations of emerging methodologies and review of the substantive contributions they yield. Student-led replication of extant research and development of original research ideas a key component of the course. Prerequisites: 420A,B.

POLISCI 421K. Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives. 4 Units.

The social and psychological processes involved in asking and answering questions via questionnaires for the social sciences; optimizing questionnaire design; open versus closed questions; rating versus ranking; rating scale length and point labeling; acquiescence response bias; don't-know response options; response choice order effects; question order effects; social desirability response bias; attitude and behavior recall; and introspective accounts of the causes of thoughts and actions. Same as: COMM 339, PSYCH 231

POLISCI 421R. American Political Development, 1865-present. 3-5 Units.

In this reading-intensive course, we will conduct a wide-ranging survey of major transformations in the American political system in the post-Civil War period. Our inquiries about these transformations will focus on the origins of the modern administrative state, the interactive role of the state and social movements, and changes in the party system. We will examine these developments not only to understand institutional change, but to learn how changing institutions have shaped the behavior of the American electorate.

POLISCI 422. Workshop in American Politics. 1 Unit.

Research seminar. Frontiers in mass political behavior. Sources include data sets from the 2004 election cycle. Prerequisite: 420B or equivalent. Course may be repeated for credit.

POLISCI 423A. The Laboratory of the Study of American Values I. 1-5 Unit.

Designed for graduate students who are writing dissertations about American public opinion. Students participate in all phases of the research process and include questions on nationally representative surveys. Enrollment is limited to members of the Laboratory for the Study of American Values.

POLISCI 423B. The Laboratory of the Study of American Values II. 1-5 Unit.

Designed for graduate students who are writing dissertations about American public opinion. Students participate in all phases of the research process and include questions on nationally representative surveys. Enrollment is limited to members of the Laboratory for the Study of American Values.

POLISCI 423C. The Laboratory of the Study of American Values III. 1-5 Unit.

Designed for graduate students who are writing dissertations about American public opinion. Students participate in all phases of the research process and include questions on nationally representative surveys. Enrollment is limited to members of the Laboratory for the Study of American Values.

POLISCI 425. Political Communication. 1-5 Unit.

An overview of research in political communication with particular reference to work on the impact of the mass media on public opinion and voting behavior. Limited to Ph.D. students. Prerequisite: 260 or consent of instructor.

Same as: COMM 360G

POLISCI 425S. Topics in Political Communication: Media Bias, Selective Exposure, and Political Polarization. 1-5 Unit.

This course surveys theories of media bias, biased processing of information, and the empirical challenges facing researchers attempting to link changes in the composition of audiences to attitudinal and behavioral outcomes. (Limited to PhD students).

Same as: COMM 362

POLISCI 426S. Theories of Racism in American Politics: A Critique. 0 Units.**POLISCI 427R. Race and Racism in American Politics. 5 Units.**

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

POLISCI 428. Political Economy and Political Behavior. 4 Units.

[Same as POLECON 677] This seminar will expose students to cutting-edge research in political behavior and political economy published in the leading political science (and other social science) journals. The aim is for students to learn the contemporary literature so that they can be producers of research. To that end, the required assignments in the class will be aimed at professional development: writing an original research note, writing a review, and delivering a scholarly presentation.

POLISCI 430A. Ancient Greek Economic Development. 4-5 Units.

(Formerly CLASSHIS 330A.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: CLASSICS 384A

POLISCI 430B. Ancient Greek Economic Development. 1-5 Unit.

(Formerly CLASSHIS 330B.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: CLASSICS 384B

POLISCI 432R. Selections in Modern Political Thought. 5 Units.

This graduate-level seminar will explore selections from the canon of Western political thought from the late fifteenth through nineteenth centuries. Throughout the course, we will engage in close textual readings of individual thinkers and consider some of the larger questions raised by political modernity. The readings will expose students to the republican, liberal, conservative, and democratic traditions that had a formative influence on the United States. The thinkers covered will include: Niccolò Machiavelli, John Locke, Jean-Jacques Rousseau, Edmund Burke, Publius (Alexander Hamilton, James Madison, and John Jay), and Alexis de Tocqueville.

POLISCI 433. Workshop in Political Theory. 1-2 Unit.

For graduate students. May be repeated for credit.

POLISCI 434. Egalitarianism. 5 Units.

This seminar will explore different theories of equality in contemporary political philosophy. Topics include: the currency of equality (equality of what?); equality versus sufficiency or prioritarianism; the relationship between equality and responsibility; the value of equality; and different interpretations of equality of opportunity. Readings will be drawn from the work of Elizabeth Anderson, G.A. Cohen, Ronald Dworkin, Thomas Nagel, Derek Parfit, John Rawls, Thomas Scanlon, Amartya Sen, and others.

POLISCI 434A. Ethics, Economics and the Market. 4 Units.

Economic analysis inevitably raises moral questions. Getting clear on those moral questions, and the competing answers to them, can help improve both economic analysis and our understanding of the values involved in alternative social policies. This course focuses on a central economic institution: the market. How have the benefits and costs of using markets been understood? For example, it is often claimed that markets are good for welfare, but how is welfare to be understood? What is the connection between markets and different values such as equality and autonomy? What, if anything is wrong with markets in everything? Are there moral considerations that allow us to, distinguish different markets? This course examines competing answers to these questions, drawing on historical and contemporary literature. Readings include Adam Smith, JS Mill, Karl Marx, Michael Walzer, Dan Hausman and Michael McPherson and Debra Satz among others. For graduate students only.

Same as: ETHICSOC 303R, PHIL 375

POLISCI 435R. Political Realism. 3-5 Units.

This seminar will explore various articulations of political realism in their historical contexts. Realism is generally taken to be a pragmatic approach to a political world marked by the competition for material interests and the struggle for power. Yet beyond a shared critique of idealism and an insistence on the priority and autonomy of the political, realists tend to have very different normative visions and political projects. We will consider the works of several political realists from the history of political and international relations thought, including: Thucydides, Machiavelli, Hobbes, Carr, Niebuhr, and Morgenthau.

Same as: PHIL 372R

POLISCI 436R. Amartya Sen's capability theory. 2-4 Units.

Amartya Sen's pioneering work attempts to open up economics to missing informational and evaluative dimensions. This seminar will explore Sen's "capability approach" and its implications for the study of economics, gender, and justice. It will look at different ways that the capability approach has been developed, in particular, by Martha Nussbaum, but also by other political philosophers.

Same as: PHIL 378

POLISCI 437. Autonomy. 5 Units.**POLISCI 438. Democracy and the Constitution. 5 Units.**

(Same as LAW 268) Connections between democratic theory and constitutional theory. Sources include literature from political philosophy, constitutional law, and jurisprudence, and arguments about freedom of expression, campaign finance, legislative apportionment, federalism, and separation of powers. Readings from Scalia, Breyer, Ely, Ackerman, Dahl, Rawls, Habermas, Dworkin, Riker, and Schumpeter, as well as constitutional cases.

Same as: PHIL 374C

POLISCI 440A. Theories in Comparative Politics. 3-5 Units.

Required of Political Science Ph.D. students with comparative politics as first or second concentration; others by consent of instructor. Theories addressing major concerns in the comparative field including democracy, regime change, the state, revolutions, national heterogeneity, and economic performance.

POLISCI 440B. Comparative Political Economy. 5 Units.

Required of Political Science Ph.D. students with comparative politics as a first or second concentration; others by consent of the instructor. The origins of political and economic institutions and their impact on long run outcomes for growth and democracy. Emphasis is on the analysis of causal models, hypothesis testing, and the quality of evidence.

POLISCI 440C. Methods in Comparative Politics. 5 Units.

Required of Political Science Ph.D. candidates with comparative politics as a first or second concentration; others by consent of instructor. Current methodological standards in comparative politics. Students develop their own research design that meets these standards.

POLISCI 440D. Workshop in Comparative Politics. 1-2 Unit.

Faculty, guest speakers, and graduate students conducting research in comparative politics present work-in-progress. Graduate students may enroll for up to 5 total units apportioned by quarter. Auditors welcome. Graduate students whose major or minor field is comparative politics must make at least one presentation to the seminar. Course may be repeated for credit.

POLISCI 441L. Grad Seminar on Middle Eastern Politics. 5 Units.

Survey of major topics in the study of Middle Eastern politics including state formation, authoritarian resilience and political Islam.

POLISCI 443S. Political Economy of Reform in China. 5 Units.

Content, process, and problems of China's post-Mao reforms. Changes in property rights, markets, credit, and the role of the state in economic development. Comparative insights about reform in the Chinese communist system that distinguishes it from the experience of regimes in E. Europe and the former Soviet Union.

POLISCI 443T. Approaches to Chinese Politics. 3-5 Units.

Major secondary literature on Chinese politics, involving the evolution of theoretical concepts and social scientific approaches characterizing the field. Subjects include changes made to defining fundamental issues of Chinese political theory, and the implications of shifts in research methods and analytical tools. Prerequisite: basic knowledge of politics of post-1949 China.

POLISCI 444. Comparative Political Economy: Advanced Industrial Societies. 3-5 Units.

Political economy approaches to key policy outcomes including redistribution, the size of government, fiscal behavior, and pork-barrel politics. Theories related to institutions, interest groups, and geography, focusing on middle- and upper-income countries.

POLISCI 446. Models and Empirical Methods in Political Economy. 5 Units.

This course surveys the use and empirical evaluation of formal models in political economy to explain policy outcomes, the determinants of political regimes, the sources of institutional persistence, and the causes and consequences of electoral rules. The course has two main goals. The first is to become better consumers and producers of formal work through the study of leading applications in political economy. The second is to introduce innovative approaches to research design and measurement for evaluating formal theories in political economy.

POLISCI 448R. Workshop: China Social Science. 1 Unit.

For Ph.D. students in the social sciences and history. Research on contemporary society and politics in the People's Republic of China. May be repeated for credit. Prerequisite: consent of instructor. Same as: SOC 368W

POLISCI 451. Design and Analysis of Experiments. 3-5 Units.

Political scientists increasingly rely on experimental methods. This course covers the principles and logic of experimental design as applied to laboratory, field and survey experiments. We discuss the strengths and limitations of experiments in relation to observational methods. Design considerations include randomization, the construction of treatments, the use of deception, the ethical implications of deception, and new developments in subject recruitment. Turning to the analysis of experimental data, we describe the methods for estimating treatment effects, interactions, and more complex indirect effects stemming from either mediator or moderator variables. We also cover appropriate data analytic strategies for quasi-experimental designs including interrupted time series, matching and propensity scores.

POLISCI 452. Text as Data. 3-5 Units.

Topics covered will include preprocessing texts (unigrams, bigrams, and a brief introduction to natural language processing), unsupervised learning (clustering, topic models, and computer-assisted methods), supervised learning (including SVM, lasso, naive Bayes, and a matrix smoothing method), and methods for evaluation (cross-validation, model based, expert based). The class is ideal for students in the dissertation phase of research who have texts they would like to analyze, but aren't quite sure what to do with them. Prerequisites are at least 350a and 350b and an willingness to learn programming skills (including Python and R).

POLISCI 474. Design and Analysis of Surveys. 1-5 Unit.

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POLISCI 801. TGR Project. 0 Units.

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POLISCI 802. TGR Dissertation. 0 Units.

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Portuguese Language Courses

PORTLANG 1A. Accelerated First-Year Portuguese, Part 1. 4-5 Units.

For students with two years of college level study of a Romance language, preferably Spanish. Goal is to use socially and culturally appropriate forms in conversations, providing and obtaining information, and expressing feelings, emotions, and opinions. Students learn the language as they contrast Brazilian culture with their own. Lab. Completion of PORTLANG 2A fulfills the University's foreign language requirement.

PORTLANG 1F. Accelerated First-Year Business Portuguese, Part I: Focus on Business and Economics. 4-5 Units.

For GSB students and business/economics-oriented majors with two years of formal study of a Romance language, preferably Spanish. Goal is to use socially and culturally appropriate forms in Portuguese-speaking work environments, establishing relationships, providing and obtaining information, and expressing feelings, emotions, and opinions. Written and spoken language; social and cultural influences; and how to present information, concepts, and ideas related to business and organizational contexts. Completion of PORTLANG 2F fulfills the University foreign language requirement.

PORTLANG 2A. Accelerated First-Year Portuguese, Part 2. 4-5 Units.

Continuation of PORTLANG 1A. For students with two years of college level study of a Romance language, preferably Spanish. Goal is to use socially and culturally appropriate forms in conversations, providing and obtaining information, describing and narrating, and expressing feelings, emotions, and opinions. Students learn the language as they contrast Brazilian culture with their own. Lab. Completion of PORTLANG 2A fulfills the University's foreign language requirement. Prerequisite: Placement Test, or PORTLANG 1A.

PORTLANG 2F. Accelerated First-Year Business Portuguese, Part 2: Focus on Business and Economics.. 4-5 Units.

Continuation of PORTLANG 1F. For GSB students and business/economics-oriented majors with two years of formal study of a Romance language, preferably Spanish. Goal is to use socially and culturally appropriate forms in Portuguese-speaking work environments, establishing relationships, providing and obtaining information, and expressing feelings, emotions, and opinions. Written and spoken language; social and cultural influences; and how to present information, concepts, and ideas related to business and organizational contexts. Completion of PORTLANG 2F fulfills the University foreign language requirement. Prerequisite: Placement Test, or completion of PORTLANG 1A or 1F. Fulfill the University Foreign Language Requirement.

PORTLANG 11A. Accelerated Second-Year Portuguese, Part 1. 4-5 Units.

Continuation of PORTLANG 2A. Goal is to use linguistically and culturally appropriate forms in oral narrations, descriptions, and expression of ideas and opinions. Emphasis is on expository speech. Prerequisite: Placement Test, PORTLANG 2A or PORTLANG 3.

PORTLANG 12A. Accelerated Second-Year Portuguese, Part 2. 4-5 Units.

Continuation of PORTLANG 11A. Goal is to use linguistically and culturally appropriate forms in narrations, descriptions, and expression of ideas and opinions. Emphasis on expository writing. Prerequisite: Placement Test or PORTLANG 11A.

PORTLANG 99. Language Specials. 1-5 Unit.

Prerequisite: consent of instructor.nn (Staff).

PORTLANG 101. Reading Brazil. 3-5 Units.

Short expository readings, guest lectures, discussions, compositions on Brazilian issues. Review of grammatical structures. Vocabulary building with emphasis on common idiomatic expressions and troublesome lexical distinctions. Prerequisite: PORTLANG 12A or equivalent.

PORTLANG 102. Brazil in Text: Advanced Grammar and Composition. 3-5 Units.

3rd year course. Further development of academic writing. Short fictional and expository readings, guest lectures, discussions, compositions on Brazilian issues. Emphasis is on building paragraphs, organizing arguments, and justifying positions. May be used as workshop to write papers in Portuguese for another course. May be repeated once for credit. Prerequisite: PORTLANG 12A or equivalent.

PORTLANG 103. Advanced Conversation: Brazil Today. 3-5 Units.

3rd year course. Reading and discussions on issues from current newspapers and magazines, reading comprehension strategies with online news updates, and vocabulary building with emphasis on formal expository writing. Writing practice if desired. Students prepare short presentations and lead subsequent discussions. May be repeated once for credit. Prerequisite: PORTLANG 12A.

PORTLANG 161. Advanced Reading in Portuguese, Fourth-year Portuguese. 3-5 Units.

The course emphasizes high-level reading comprehension and leads to advanced development of communication skills for extended formal and informal discourse in Portuguese. Prerequisite: Placement Test or PORTLANG 101.

PORTLANG 162. Advanced Writing in Portuguese, Fourth-year Portuguese. 3-5 Units.

The course has two tracks, depending on the interest of the student: a) technical writing (business letters, technical reports, expressing/supporting opinions, etc.) and b) creative writing ('cronicas' short stories, poems, etc.). Prerequisite: Placement Test or PORTLANG 102.

PORTLANG 163. Contemporary Issues in the Lusophone World. Fourth-Year Portuguese. 3-5 Units.

The class emphasizes formal presentations/discussions in Portuguese, based on contemporary issues in the lusophone world. Students use as linguistic models newspaper and magazine articles, TV news broadcasts, online news services, films, art exhibits, news on scientific advances, etc. Focus is on mastering high-level vocabulary/structures, as well as reading and rhetorical strategies, for appropriate use in professional settings. Prerequisite: Placement Test or PORTLANG 103.

PORTLANG 164. Translating the Lusophone world, Fourth-Year Portuguese. 3-5 Units.

For advanced students. Literary and technical translation. Readings on theoretical topics on translation; discussion, analysis and comparison of existing translations (literary and technical); individual translation projects according to students field of study, and discussion and analysis of those projects in class. Final translation project to be undertaken individually. Prerequisite: PORTLANG 250 or completion of 3rd year sequence.

PORTLANG 193Q. Spaces and Voices of Brazil through Film. 3-4 Units.

The manners in which a country is perceived and defines itself is a result of many complex forces, and involves the reproduction of social relations and complex social constructions both on the part of those who live there and those who see it from a distance. The perceptions of what Brazil is and what defines the country has changed throughout times, but has conserved some clear pervasive defining traits. This course is an introduction to the history, culture, politics and artistic production of Brazil as seen through feature films, documentaries and some complementary readings. Movies include, among others, Banana is my Business, Black Orpheus, Olga, They Don't Use Black-Tie, City of God, Central Station, Gaijin, and Four Days in September-among others. In English.

Same as: ILAC 193Q

PORTLANG 250. Reading in Portuguese. 4 Units.

Introductory class for students with superior reading proficiency in Spanish or another Romance language. Reading competence for research and courses in Luso-Brazilian studies. Literary, journalistic, and academic readings. Fulfills University reading requirement for advanced degrees. May be offered alternate years.

PORTLANG 297. Directed Reading. 1-4 Unit.

Prerequisite: consent of instructor.nn (Staff).

PORTLANG 394. Graduate Studies in Portuguese Conversation. 1-3 Unit.

Prerequisite: consent of instructor.nn (Staff).

PORTLANG 395. Graduate Studies in Portuguese. 1-5 Unit.

Prerequisite: consent of instructor.n (Staff).

Psychiatry Courses

PSYC 29SI. ASB: Illuminating Multidisciplinary Perspectives on Mental Health in the Bay Area and Beyond. 1 Unit.

Sheds light on campus mental health resource availability, different types of mental health disorders, root causes of mental health disorders, current care and treatment methods. Topics include the impacts of mental health issues on larger communities and how students can serve as allies to those seeking to make mental health a priority in personal lives, government policy, education and medical research. Includes service trip during spring recess.

PSYC 35SI. Clinical and Societal Issues of Neurological Disorders. 2 Units.

Provides introductory exposure to some of the most common neurological disorders currently diagnosed in the U.S. Looks at clinical and societal aspects of such neurological disorders.

PSYC 50Q. Brain Training: Hype or Help?. 3 Units.

Focuses on primary literature to evaluate evidence supporting claims that concerted practice can lead to improvements in capacities such as working memory, speed of processing and IQ. Looks across lifespan from childhood and remediation of learning disabilities to elderly individuals and the potential for brain training to delay onset of dementia. Examines new research into brain training as treatment for psychiatric disorders, as well as neuroscience behind learning and memory. Considers ethical implications of these programs. Students participate in brain training and track and analyze progress.

PSYC 51Q. Culture, Psychology, and Mental Health Treatment. 2 Units.

Focuses on a critical analysis of Western approach to psychology and psychiatric terms of understanding mental illness, psychiatric phenomena, and treatment of mental health disorders. Includes an orientation to and critique of western clinical psychology/psychiatry and an inquiry as to its relevance outside Western settings. Includes guest speakers representing cross-cultural providers of mental health services as well as medical anthropologists and critics of the Western generalizations in psychiatry. Special attention place on cross-cultural psychiatry and international mental health efforts.

PSYC 52Q. Public Mental Health and Community Psychiatry. 2 Units.

Focuses on mental health systems of care in the United States with special attention to community Psychiatry and mental health for the underserved. Emphasizes understanding issues involved with providing mental health treatment in a public health setting as well as to special populations. Guest speakers include policy makers and local providers. Students introduced to possibilities for Stanford-supported local public service opportunities.

PSYC 53Q. Secret Mind: Getting to Know and Living with your Unconscious. 3 Units.

Focuses on the motivational unconscious. Topics include the science of the unconscious mind and the techniques used to gain conscious access to these psychological process, as well as methods of exploring students' own unconscious for creative purposes and to understand personal habits, reactions, motives, emotions and thoughts. Case-based, problem-oriented format utilized to develop foundational understanding of the science of the unconscious mind. Emphasis on student study of self and own unconscious as case for the class. Student privacy will be protected.

PSYC 54N. Genes, Memes and Behavior. 3 Units.

Examines how natural selection operates to shape successful genes in the gene pool, how cultural selection operates to shape successful "memes" in the pool of cultural ideas, and how selection by consequences operates to shape successful behaviors in our repertoires. Topics include cases in which selection produces undesirable consequences (e.g. genetic mutations, cultural problems, and aberrant behaviors in children). Emphasis on understanding the role of modern natural science in complex behaviors and why study of human life from an interdisciplinary perspective is important.

PSYC 70N. Mind-Body Medicine: A Global Perspective. 3 Units.

Explores ways in which the powerful connection between the brain and the body can be harnessed to maintain health or fight disease. Intended for students who have a general interest in matters of mind and health, and students who are specifically interested in the psychological/biological/medical sciences. Course begins with a historical perspective on how diverse cultures and medical systems from around the world grapple with the concept of the mind-body connection, then goes through a clear and accessible overview of the nervous, endocrine, and immune systems, and then explores mind-body techniques used in modern societies. Investigates the mind-body connection in the context of: western medicine, traditional medical systems of different cultures, health effects of "good" versus "bad" stress, meditation and other stress reduction techniques, positive and negative emotions, medical applications of hypnosis, the placebo and nocebo effects, and disorders such as anxiety and depression.

PSYC 76Q. Temperament and Creativity in Mood Disorders. 2 Units.

Preference to sophomores. Western cultural notions of mad geniuses and artistic temperaments. How many individuals who suffer from depression, bipolar disorder, and related problems are nonetheless productively creative. Current psychological and neurobiological research, and assessment of mood, temperament, and creativity. Emphasis is on written and oral communications and multimedia presentations.

PSYC 77N. Deviants in Literature. 3 Units.

Many literary works are enhanced by, in fact demand, a psychological perspective to achieve a fully informed reading. In *The Devils* Dostoevsky uses the issues and process of anarchy as a platform on which to develop some of the most unforgettable characters in literary history. Death in Venice contains among its many themes the darker dynamic of paraphilia. Guilt searches for a validating crime in Kafka's *The Penal Colony*. Capote uses a journalistic style to manage horrible fact during *In Cold Blood*. Conrad shows that telling a story of the journey outward is more nearly an analysis of the journey inward in *Heart of Darkness*. Albee's *Zoo Story* asks whether the man on the street is prepared to confront his own worst nightmare. Close reading of works such as these presents opportunities to learn about character pathology and to expand traditional approaches to literary criticism by applying a psychological perspective.

PSYC 78Q. Mental Health in Collegiate Athletes. 3 Units.

Developmental, psychological, social, and performance issues in collegiate sports. Topics include transition to Stanford, time management, optimizing mental fitness, coping with injuries.

PSYC 79Q. Family Dynamics in Literature. 3 Units.

Preference to sophomores. Using a psychological approach, explores relationships between and among the characters of well-known literary works. Primary readings include: Freud's *Dora: An Analysis of a Case of Hysteria*; Shakespeare's *Henry IV, Part 1*, which anticipates what Freud later calls "the unconscious,"; Kafka's *Metamorphosis*, the "identified patient" in family of seemingly unconventional make-up; and Flaubert's *Madame Bovary*.

PSYC 81Q. Fate of Orphans and Vulnerable Children in Sub Saharan Africa. 2 Units.

The complicated forces, shaped by geopolitical history and current events, that frame all social programs, the care of orphans in the context of the AIDS pandemic in particular; history of the care of orphans; developmental effects of deprivation of care and nurturing. Guest speakers.

PSYC 111Q. Madness and the Womb: Medical and Artistic Approaches to Mental Illness in Women Through the Ages. 3 Units.

Historical and current concepts of mental illness in women. Premenstrual dysphoric disorder (PMS), postpartum depression, menopausal mood disorders, and eating disorders. Historical biopsychosocial approach. Readings include women's diaries and advice books, physicians' casebooks, and 19th- and 20th-century medical texts. Guest speakers from art and literature departments. Literary and artistic images, and the social and cultural contexts of these disorders during the last 300 years.

PSYC 135. Sleep and Dreams. 3 Units.

This uniquely Stanford science course, that has been taught for over 40 years, will cover how sleep affects our daily lives-- both physical and mental functions of our well being. Focuses on the physiology of non-REM and REM sleep as well as the pathophysiology of highly prevalent sleep disorders. Includes outreach projects and guest lectures by established experts in their fields. Students monitor and analyze their own sleep patterns. At the conclusion of this course students are expected to appreciate the importance of sleep as a cornerstone of their health.

Same as: PSYC 235

PSYC 136A. Valuescience: Shedding Illusion to Live Better. 3-4 Units.

Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience; strategies for overcoming these; and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise). Students may enroll in PSYC 136A or PSYC 136B or both. Either may be taken first. Same as: PSYC 236A

PSYC 136B. Valuescience: Shedding Illusion to Live Better. 3-4 Units.

Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience, strategies for overcoming these, and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise). Students may enroll in PSYC 136A or PSYC 136B or both. Either may be taken first. Same as: PSYC 236B

PSYC 139. Understanding Relationships: A Couples and Family Therapy Perspective. 4 Units.

Considers the premises of the family-systems approach to intimate and family relationships, drawing on concepts from psychology, psychiatry, neurobiology, anthropology, and organizational behavior. Examines relationship formation and commitment, intimacy and sexuality, family development and structure, interpersonal conflict and communication, historical patterns and legacies, gender and power, and the cultural and larger systemic contexts of close relationships. Frameworks for assessing relationships and tools for changing romantic, family, and social relationships are examined in detail, and case examples illustrate the relationship change strategies of major contributors to the field. Highlights practical applications of the family-systems approach in educational, medical, business, and community settings. Students do not need to have a background in Psychology or Human Biology, and all student levels are welcome (including GSB, Law, Medicine, GSE for PSYC 239). Same as: PSYC 239

PSYC 195. Special Laboratory Projects. 1-3 Unit.

Assist Behavioral Neuroendocrinology Program with data entry, library organization, and study-related projects.

PSYC 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

PSYC 211. Child and Adolescent Psychopathology. 1 Unit.

Common syndromes in child psychiatry. Topics include diagnosis, epidemiology, etiology, course, outcome and therapeutic interventions. Prerequisite: familiarity with the basics of psychiatric and psychological discourse; psychiatry clerkship or course in psychology.

PSYC 212. Pediatric Psychosomatic Medicine: Psychological Issues in the Physically Ill Child. 1 Unit.

Open to MD and graduate students; qualified undergraduates by consent of instructor. Diagnosis and management of emotional disorders and difficulties in physically ill children and adolescents. Topics include psychotherapeutic and psychopharmacologic approaches to psychiatric disorders encountered in the pediatric medical health care setting. Oral and multimedia presentations. Prerequisite: familiarity with basic principles of psychopathology.

PSYC 213. Policy Practicum: Designing a Social Impact Bond for Santa Clara County Mental Health. 3 Units.

(Same as LAW 413X) Students in this Policy Lab practicum will work with Dr. Humphreys, the Santa Clara County Counsel's Office, and Third Sector to develop the scheme, including designing clear metrics for success and undertaking a cost-benefit analysis of the de-institutionalization of mental health patients. It is likely that we will collaborate with faculty and students from other schools and departments having particular expertise in cost-benefit analysis and evaluation. Special Instructions: Total enrollment in this course will be limited to 12 (4 SLS students, 4 Medical School students & 4 other). A preference will be given to students who can enroll for both the Autumn and Winter quarters. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

PSYC 225. Stanford Klingenstein Fellowship Program. 1 Unit.

A mentoring program designed to expose first and second year medical students to the rewarding field of child and adolescent psychiatry, and to increase awareness and education about child and adolescent mental health issues. Offers a year-long program wherein medical students are paired with child and adolescent psychiatrists, meeting bimonthly for clinical experiences and mentoring. Also provides opportunities for the students to get involved in cutting-edge scientific research, networking opportunities, and opportunities to attend professional conferences.

PSYC 233. Mindfulness: An Awareness-Based Stress Reduction Program in Medicine. 3 Units.

An experiential program in which the participants learn the techniques of mindfulness meditation and its application in the management of stress and in healthcare. Modeled after the MBSR, Mindfulness Based Stress Reduction, started by Jon Kabat-Zinn at UMASS Medical Center. Designed to work with the mind/body relationship to stress and chronic illness teaching open sensitive awareness without judgement of mental or physical reactivity. Requirement for the course is the daily practice of mindfulness meditation, attendance at weekly class meetings and the all day retreat, home reading, and a final paper covering the student's observations.

PSYC 235. Sleep and Dreams. 3 Units.

This uniquely Stanford science course, that has been taught for over 40 years, will cover how sleep affects our daily lives-- both physical and mental functions of our well being. Focuses on the physiology of non-REM and REM sleep as well as the pathophysiology of highly prevalent sleep disorders. Includes outreach projects and guest lectures by established experts in their fields. Students monitor and analyze their own sleep patterns. At the conclusion of this course students are expected to appreciate the importance of sleep as a cornerstone of their health. Same as: PSYC 135

PSYC 236A. Valuescience: Shedding Illusion to Live Better. 3-4 Units.

Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience; strategies for overcoming these; and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise). Students may enroll in PSYC 136A or PSYC 136B or both. Either may be taken first. Same as: PSYC 136A

PSYC 236B. Valuescience: Shedding Illusion to Live Better. 3-4 Units.

Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience, strategies for overcoming these, and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise). Students may enroll in PSYC 136A or PSYC 136B or both. Either may be taken first. Same as: PSYC 136B

PSYC 239. Understanding Relationships: A Couples and Family Therapy Perspective. 4 Units.

Considers the premises of the family-systems approach to intimate and family relationships, drawing on concepts from psychology, psychiatry, neurobiology, anthropology, and organizational behavior. Examines relationship formation and commitment, intimacy and sexuality, family development and structure, interpersonal conflict and communication, historical patterns and legacies, gender and power, and the cultural and larger systemic contexts of close relationships. Frameworks for assessing relationships and tools for changing romantic, family, and social relationships are examined in detail, and case examples illustrate the relationship change strategies of major contributors to the field. Highlights practical applications of the family-systems approach in educational, medical, business, and community settings. Students do not need to have a background in Psychology or Human Biology, and all student levels are welcome (including GSB, Law, Medicine, GSE for PSYC 239). Same as: PSYC 139

PSYC 247. Principles and Practices in Care of the Dying. 1 Unit.

Detailed, systematic survey of a generalized terminal illness and elaboration of the basic principles underlying approaches to the care of the dying. Particular attention is paid to problem areas involving medical ethics and multi-culture. Practical strategies for managing the special medical and emotional problems that arise in the care of the dying patient. There may be guest speakers and patient interviews. No final examination. (Minimum: 4 students).

PSYC 250. Methodology of Research in Behavioral Sciences. 1-3 Unit.

Statistical and methodological issues in twomajor psychiatric research themes: clinical psychiatric research (Aut), neuroimaging research (Win), and statistical genetics and general statistical modeling (Spr). Autumn series includes: basics of inferential statistics, group comparison, analysis of variance, regression analysis, multivariate analysis, and longitudinal analysis in the context of psychiatric and behavioral research. Also included are conceptual topics such as risk factors, mediation, moderation, and causal inference. Winter series includes: functional and structural neuroimaging research methods (e.g. functional magnetic resonance imaging (fMRI), structural MRI (sMRI), diffusion tensor imaging (DTI), transcranial magnetic stimulation (TMS), near-infrared spectroscopy (NIRS), electroencephalogram (EEG)). Basic principles, statistical analysis methods, advantages and limitations, and applications are discussed. Spring series includes: tests and effect estimation for multiple SNPs, genes or pathways in genetic association studies, gene-gene interactions, twins and heritability estimates, Hardy-Weinberg and linkage equilibrium, interpretation and presentation of results for a range of statistical models for different types of data. Practical examples from recent research within the Department of Psychiatry will be used throughout the course. Prerequisite: Some exposure to statistical methods, either from course work or from participation in research having some behavioral aspects, or consent of instructor. 1 unit for class participation only, 2 units includes weekly assignments, 3 units includes a final project.

PSYC 290. Teaching in Psychiatry. 1-10 Unit.

Practical experience in teaching by serving as a teaching assistant in a psychiatry course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student.

PSYC 299. Directed Reading in Psychiatry. 1-18 Unit.

Prerequisite: consent of instructor.

PSYC 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

PSYC 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Psychology Courses

PSYCH 1. Introduction to Psychology. 5 Units.

Human behavior and mental processes including the nervous system, consciousness, learning, memory, development, emotion, psychopathology, interpersonal process, society, and culture. Current research.

PSYCH 7Q. Language Understanding by Children and Adults. 3 Units.

How do we first learn to find meaning in strings of speech sounds? Understanding spoken language requires the rapid integration of acoustic information with linguistic knowledge and with conceptual knowledge based on experience with how things happen in the world. Topics include research on early development of language understanding and laboratory methods of how young children make sense of speech. Observations of preschool children and visits to Stanford laboratories. Might be repeatable for credit.

PSYCH 8N. The New Longevity. 3 Units.

Adult development from the perspective of life-span theory -- a conceptual framework that views development as a series of adaptations to physical, societal and individual resources and constraints. Students will learn about demographic and medical changes, ways that individuals typically change socially, emotionally and cognitively as they move through adulthood. An understanding of the conceptual foundations of the life-span approach and place aging of young people today in historical context.

PSYCH 9N. Reading the Brain: the Scientific, Ethical, and Legal Implications of Brain Imaging. 3 Units.

It's hard to pick up a newspaper without seeing a story that involves brain imaging, from research on psychological disorders to its use for lie detection or "neuromarketing". The methods are indeed very powerful, but many of the claims seen in the press are results of overly strong interpretations. In this course, you will learn to evaluate claims based on brain imaging research. We will also explore the deeper ethical and philosophical issues that arise from our ability to peer into our own brains in action. The course will start by discussing how to understand and interpret the findings of brain imaging research. We will discuss how new statistical methods provide the ability to accurately predict thoughts and behaviors from brain images. We will explore how this research has the potential to change our concepts of the self, personal responsibility and free will. We will also discuss the ethics of brain imaging, such as how the ability to detect thoughts relates to personal privacy and mental illness. Finally, we will discuss the legal implications of these techniques, such as their use in lie detection or as evidence against legal culpability.

PSYCH 10. Introduction to Statistical Methods: Precalculus. 5 Units.

Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages.

Same as: STATS 60, STATS 160

PSYCH 11N. Origin of Mental Life. 3 Units.

Preference to freshmen. Mental life in infancy; how thinking originates. How do babies construe the objects, events, people, and language that surround them? Recent advances in psychological theory, hypotheses, and evidence about how the infant human mind develops.

PSYCH 12N. Self Theories. 3 Units.

Preference to freshmen. The impact of people's belief in a growing versus fixed self on their motivation and performance in school, business, sports, and relationships. How such theories develop and can be changed.

PSYCH 13N. Emotion Regulation. 3 Units.

This seminar provides a selective overview of the scientific study of emotion regulation. Topics include: theoretical foundations, cognitive consequences, developmental approaches, personality processes and individual differences, and clinical and treatment implications. Our focus is on interesting, experimentally tractable ideas. Meetings will be discussion based.

PSYCH 13S. Dynamical models of mental processes: Development, analysis, and simulation. 2 Units.

Mathematical modeling has been a critical component in modern psychological and cognitive neuroscience research on the dynamics of mental processes. This course is designed to equip the new generation of such scientists with tailored mathematical knowledge to develop models of their own. I will use classical models and my own experience in modeling decision making as examples to demonstrate the process from vague ideas to the development, refinement, analysis and simulation of dynamical models. Along the way, systematic knowledge in differential equations, numerical methods, principle component analysis etc will be provided to facilitate the general ground for future models of students' interest; choosing. Open to graduate students and advanced undergraduates.

PSYCH 15N. Interpersonal Influence. 3 Units.

This course will examine how individuals influence each other, both intentionally as well as nonconsciously. The focus will be on individuals in dyads rather than in groups. We will examine a) subtle interpersonal influence processes such as nonverbal communication, b) structural sources of interpersonal influence such as gender, race, social class, and culture, and c) interpersonal influence within different relationships such as organizational and romantic relationships. Familiarity with technology and video editing is useful. Students will have the opportunity to make brief podcasts and iMovie videos, as weekly responses to readings, as well as for the final class project.

PSYCH 16N. Amines and Affect. 3 Units.

Preference to freshmen. How serotonin, dopamine, and norepinephrine influence people's emotional lives. This course is ideal for students that would like to get deeper exposure to cutting edge concepts and methods at the intersection of psychology and biology, and who plan to apply their knowledge to future research.

PSYCH 17N. Language and Society: How Languages Shape Lives. 3 Units.

Do people who speak different languages think differently? What role does language play in politics, law, and religion? The role of language in individual cognition and in society. Breaking news about language and society; the scientific basis for thinking about these broad issues.

PSYCH 20N. Self-Fulfilling Prophecies, Placebo Effects, and the Social-Psychological Creation of Reality. 3 Units.

This seminar will take an interdisciplinary approach to exploring how subjective aspects of the mind (e.g., thoughts, beliefs, and expectations) can fundamentally change objective reality. Over the course of the semester, students will be challenged to think critically about research from psychology, sociology, and medicine, which suggests that what we think, believe and expect plays a significant role in determining our physical health, performance and well-being. Students will explore research on how mindsets about nutrition, exercise, and stress can alter the body; response to those phenomena. Students will also uncover how social interactions with friends, family, colleagues and the media influence the perceived quality and impact of cultural products such as art, music, and fashion. And students will learn about the neurological and physiological underpinnings of the placebo effect, a powerful demonstration of expectation that produces real, healing changes in the body. Finally, students will have the opportunity to consider real world applications in disciplines including policy, business, medicine, academics, athletics and public health and consider the ethical implications of those applications. Throughout the class active participation and an open mind will be critical to success. The final weeks of class will be dedicated to student designed studies or interventions aimed to further explore the power of self-fulfilling prophecies, placebo effects, and the social-psychological creation of reality.

PSYCH 25N. Psychology, Inequality, and the American Dream. 3 Units.

Despite legal prohibitions against discrimination and the fact that many people endorse egalitarian values, inequality persists in America. What role do psychological factors play in perpetuating inequality? How can psychologically "wise" reforms promote equal opportunity? Topics include prejudice and discrimination, school achievement, social class, and race/ethnicity.

PSYCH 26N. Language Acquisition: Exploring the Minds of Children. 3 Units.

Language is an extraordinary competence distinguishing humans from other species, yet there is debate about the role of biology in guiding language acquisition. Does language development follow an innate program; or does it build on more general cognitive abilities, influenced by early experience? Topics include biological and experiential influences on the emergence of linguistic ability as children learn a first language. Discussions of theory and research, visits to Stanford laboratories and observations of very young language learners.

PSYCH 27N. The Psychology of Prejudice. 3 Units.

Preference to freshmen. Social psychological theories and research on stereotypes, prejudice, discrimination, and racism. Psychological perspectives include those emphasizing personologic, cognitive, motivational, and sociocultural contributions to prejudice. Emphasis is on applying each approach to understanding real-world contexts such as educational and occupational contexts, and to the implications of this research for efforts to reduce prejudice and discrimination.

PSYCH 29N. Growing Up in America. 3 Units.

Preference to freshmen. To what extent is it possible to describe an "American" experience? How are different people included in or excluded from the imagined community that is America? How do a person's race, class, gender and sexuality affect his or her experience of belonging to this country? These are just some of the questions we will consider as we familiarize ourselves with the great diversity of childhood and young adult experiences of people who have grown up in America. We will read and discuss narratives written by men and women, by urban, suburban, and rural Americans, and by Asian Americans, African Americans, Native Americans, Latina/os, and European Americans.

PSYCH 30. Introduction to Perception. 3 Units.

Behavioral and neural aspects of perception focusing on visual and auditory perception. Topics include: scientific methods for studying perception, anatomy and physiology of the visual and auditory systems, color vision, depth perception, motion perception, stereopsis, visual recognition, pitch and loudness perception, speech perception, and reorganization of the visual system in the blind.

PSYCH 35. Minds and Machines. 4 Units.

An overview of the interdisciplinary study of cognition, information, communication, and language, with an emphasis on foundational issues: What are minds? What is computation? What are rationality and intelligence? Can we predict human behavior? Can computers be truly intelligent? How do people and technology interact, and how might they do so in the future? Lectures focus on how the methods of philosophy, mathematics, empirical research, and computational modeling are used to study minds and machines. Undergraduates considering a major in symbolic systems should take this course as early as possible in their program of study.

Same as: LINGUIST 144, PHIL 99, SYMSYS 100

PSYCH 45. Introduction to Learning and Memory. 3 Units.

The literature on learning and memory including cognitive and neural organization of memory, mechanisms of remembering and forgetting, and why people sometimes falsely remember events that never happened. Cognitive theory and behavioral evidence integrated with data from patient studies and functional brain imaging. Recommended: 1.

PSYCH 50. Introduction to Cognitive Neuroscience. 4 Units.

Survey of topics relating brain activity to cognitive processes and behavior. The course begins with an overview of neurophysiology and techniques to measure brain activity. We then discuss perceptual and motor processes before investigating neural responses related to attention, memory, and cognitive control. The course concludes with a discussion of brain processes related to reward, decision making, and social cognition.

PSYCH 60. Introduction to Developmental Psychology. 4 Units.

Psychological development from birth to adulthood, emphasizing infancy and the early and middle childhood years. The nature of change during childhood and theories of development. Recommended: PSYCH 1.

PSYCH 60A. Introduction to Developmental Psychology Section. 2 Units.

Guided observation of children age 2-5 at Bing Nursery School. Corequisite: 60.

PSYCH 60B. Introduction to Developmental Psychology. 3 Units.

Psychological development from birth to adulthood, emphasizing infancy and the early and middle childhood years. The nature of change during childhood and theories of development. This course is not a Writing in the Major course. Please register for Psych 60 which satisfies the WIM requirement. Recommended: PSYCH 1.

PSYCH 70. Introduction to Social Psychology. 4 Units.

Topics related to the influence of other people on individuals' thoughts, emotions, and behaviors. Factors that affect the way that we perceive ourselves and others; how people influence others; how persuasion happens; what causes us to like, love, help, or hurt others; and how social psychology helps to understand questions about law, business, and health. Fulfills WIM requirement.

PSYCH 75. Introduction to Cultural Psychology. 5 Units.

The cultural sources of diversity in thinking, emotion, motivation, self, personality, morality, development, and psychopathology.

PSYCH 80. Introduction to Personality and Affective Science. 3 Units.

How do we measure personality and emotion? What parts of your personality and emotions are set at birth? What parts of your personality and emotions are shaped by your sociocultural context? Can your personality and emotions make you sick? Can you change yours personality and emotions? There are questions we begin to address in this introductory course on personality and emotion. Prerequisite: Psych 1.

PSYCH 90. Introduction to Clinical Psychology. 3 Units.

History of clinical psychology, models and assessment of personality, behavior, cognition, psychopathology, and approaches to the treatment of abnormal behavior. Emphasis is on current theory, research, issues in, and the role of clinical psychology in contemporary society. Recommended: 1.

PSYCH 95. Introduction to Abnormal Psychology. 3 Units.

Theories of and approaches to understanding the phenomenology, etiology, and treatment of psychological disorders among adults and children. Research findings and diagnostic issues. Recommended: PSYCH 1.

PSYCH 101. Community Health Psychology. 4 Units.

Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent. Same as: HUMBIO 128

PSYCH 101S. Introduction to Neuroscience. 4 Units.

Introduction to structure and function of the nervous system. The course first surveys neuroscience research methods, physiology, and gross anatomy. We then study the brain systems which produce basic functions such as perception and motion, as well as complex processes like sleep, memory, and emotion. Finally, we examine these principles in cases of neurological and psychiatric disorders.

PSYCH 102. Longevity. 4 Units.

Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.

Same as: HUMBIO 149L, NENS 202

PSYCH 103. Intergroup Communication. 3 Units.

In an increasingly globalized world, our ability to connect and engage with new audiences is directly correlated with our competence and success in any field. How do our intergroup perceptions and reactions influence our skills as communicators? This course uses experiential activities and discussion sections to explore the role of social identity in effective communication. The objective of the course is to examine and challenge our explicit and implicit assumptions about various groups to enhance our ability to successfully communicate across the complex web of identity.

PSYCH 104. Uniquely Human. 3 Units.

Are humans the only species that displays altruism, experiences uncertainty, and is capable of language and deception? Sources include empirical and theoretical papers in comparative psychology. Prerequisite: 1.

PSYCH 104S. Affective Science. 3 Units.

This course will provide an introduction to a growing field known as affective science, which focuses on the study of emotion and other related phenomena (i.e., motivation, pain, etc.). We will explore core questions in affective science, including: 1) What is emotion and why is it useful? 2) How do emotions influence the way we perceive, attend to, and understand the world? 3) How do emotions become dysfunctional, and how can individuals control them? We will attempt to approach these questions from multiple perspectives, including i) neurobiological ii) behavioral, and iii) sociocultural perspectives.

PSYCH 105. Social Neuroscience. 4 Units.

Over the last 20 years, neuroscientists have become increasingly interested in studying topics that were previously the purview of social psychologists. In this seminar, we will survey neuroimaging research on topics such as self perception, person perception, empathy, and social influence. More broadly, we will consider the contributions that neuroscience can (and cannot) make to social psychological theory. Students will be responsible for leading discussions and producing one in-depth review or research paper at the end of the quarter.

PSYCH 105S. General Psychology. 3 Units.

In what ways does the scientific study of psychology increase our understanding of the thoughts, feelings, and behaviors we observe and experience in everyday life? What are the main areas of psychology and the different questions they seek to answer? This course will give you an introduction to the field of psychology and its many different areas. You will learn about the central methods, findings, and unanswered questions of these areas, as well as how to interpret and critically evaluate research findings.

PSYCH 106. Seminar on Visual Development. 3 Units.

Describe basic development of visual system, introduce research methods/experimental designs, and present pathologies of visual development.

PSYCH 107. Visual Processing of Faces. 2-3 Units.

How do we perceive a face, recognize its identity or judge its subtle communicative cues (e.g. emotion or intention)? How does our ability to visually process faces develop with age and change throughout our life span? What is the role of nature vs. nurture in this development? How do social attitudes, culture and face perception interact? In addressing these questions, we will learn about behavioral, electrophysiological and neuroimaging approaches to understanding face processing and critically examine the theories and original research that have defined the field. The course is designed to give you an in depth understanding of face processing while exposing you to methods and ideas that are useful in evaluating a wide range of cognitive neuroscience research.

PSYCH 107S. Introduction to Social Psychology. 3 Units.

A comprehensive overview of social psychology with in-depth lectures exploring the history of the field, reviewing major findings and highlighting areas of current research. Focus is on classic studies that have profoundly changed our understanding of human nature and social interaction, and, in turn, have triggered significant paradigm shifts within the field. Topics include: individuals and groups, conformity and obedience, attraction, intergroup relations, and judgment and decision-making.

PSYCH 108. Longevity through Film. 3 Units.

The media informs the understanding of life stages and shapes expectations about our futures. This course will explore the realities and fictions about life-span development through film. This course will revolve around selected films compared with the literature on life stages. Guest filmmakers, psychologists, sociologists and thought leaders will join the class to discuss human development.

PSYCH 108S. Introduction to Social Psychology. 3 Units.

This course aims to blend a comprehensive overview of social psychology with in-depth lectures exploring the history of the field, reviewing major findings and highlighting areas of current research. The course will focus on classic studies that have profoundly changed our understanding of human nature and social interaction, and, in turn, have triggered significant paradigm shifts within the field. Some of the topics covered in this class will include: individuals and groups, conformity and obedience, attraction, intergroup relations, and judgment and decision-making. The course, overall, will attempt to foster interest in social psychology as well as scientific curiosity in a fun, supportive and intellectually stimulating environment.

PSYCH 109S. Introduction to Cognitive Neuroscience. 3 Units.

3)Introduction of the neurobiology of behavior including the biology of nervous system, the neural basis for perception, learning, memory, decision making and neurological disorders. Introduction to different research techniques that are prevalent in current neuroscience studies including fMRI, EEG, TMS and single unit recording.

PSYCH 110. Research Methods and Experimental Design. 5 Units.

Structured research exercises and design of an individual research project. Prerequisite: consent of instructor.

PSYCH 111S. Abnormal Psychology. 3 Units.

This course will provide an introduction to abnormal psychology. It will be targeted towards students who have had little or no exposure to coursework on mental disorders. The course will have three core aims: 1) Explore the nature of mental disorders, including the phenomenology, signs/symptoms, and causal factors underlying various forms of mental illness, 2) Explore conventional and novel treatments for various mental disorders, 3) Develop critical thinking skills in the theory and empirical research into mental disorders. The course will explore a wide range of mental disorders, including depression, anxiety, schizophrenia, addiction, eating disorders, and personality disorders.

PSYCH 113S. Developmental Psychology. 3 Units.

This class will introduce students to the basic principles of developmental psychology. As well as providing a more classic general overview, we will also look towards current methods and findings. Students will gain an appreciation of how developmental psychology as a science can be applied to their general understanding of children and the complicated process of growing into adults.

PSYCH 115S. Personality Psychology. 3 Units.

This course will focus on current empirical and theoretical approaches to personality. Lectures will be organized around the following questions central to personality research: How and why do people differ? How do we measure individual differences? Does personality change over time? How does personality interact with sociocultural factors to influence behavior? What makes people happy? What are the physical, mental, and social consequences of personalities?

PSYCH 118F. Literature and the Brain. 5 Units.

Recent developments in and neuroscience and experimental psychology have transformed the way we think about the operations of the brain. What can we learn from this about the nature and function of literary texts? Can innovative ways of speaking affect ways of thinking? Do creative metaphors draw on embodied cognition? Can fictions strengthen our "theory of mind" capabilities? What role does mental imagery play in the appreciation of descriptions? Does (weak) modularity help explain the mechanism and purpose of self-reflexivity? Can the distinctions among types of memory shed light on what narrative works have to offer?. Same as: ENGLISH 118, ENGLISH 218, FRENCH 118, FRENCH 318

PSYCH 119. Psychology and Public Policy. 5 Units.

Applications of psychology to public and social policy. Factors that affect the influence of psychological research and individual psychology on the creation of policy, and the influence of policy on attitudes and behavior at the personal and societal levels. Topics include education, health care, and criminal justice.

PSYCH 119S. The Psychology of Stigma. 3 Units.

What obese people, African Americans, people with physical disabilities, lesbians, and Muslims have in common: social stigma. The social and psychological experiences of individuals living with social stigmas. Classic and current theory and research. Topics include: function, nature, and types of stigma; how stigmatized individuals view their identities and cope; mental and cognitive consequences; and interactions between stigmatized and non-stigmatized. Literature employing research methods including neuroimaging and social interaction studies.

PSYCH 120. Cellular Neuroscience: Cell Signaling and Behavior. 4 Units.

Neural interactions underlying behavior. Prerequisites: PSYCH 1 or basic biology. Same as: BIO 153

PSYCH 121. Ion Transport and Intracellular Messengers. 1-3 Unit.

(Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Recommended: 120, introductory course in biology or human biology. Same as: PSYCH 228

PSYCH 124S. Applying Psychology to Modern Life. 3 Units.

A scientific examination of everyday modern life. Topics include: how research on attention and memory can be applied to improve study strategies; how advertisers persuade and how their techniques can be resisted; how interpersonal conflicts can be avoided through knowledge of common errors in judging other people; and how studies on attraction and love can improve close relationships.

PSYCH 125S. Language and Thought. 3 Units.

How are we able to produce and comprehend language in all its complexity? How does language processing interact with other parts of cognition? In this course, we will focus on several main themes: language production and comprehension, discourse, language acquisition, bilingualism, and linguistic relativity. We will explore these themes through lecture, demonstrations, analysis of empirical work, and student-led discussion. Special attention will also be given to the various experimental methods we use to conduct psycholinguistic and developmental research (e.g., self-paced reading, eye-tracking, cross-modal priming, and neural imaging).

PSYCH 129. Happiness, Well-Being, Gender. 1-3 Unit.

Exploring the meaning and attainment of psychological well-being and happiness, this course will address gender differences in well-being and approaches that can be used by all individuals to improve their state of happiness and well-being. Course literature will be drawn primarily from social, clinical, and positive psychology, but will be drawn from other disciplines as well. Students will actively engage with course material by critiquing studies, discussing research, and applying methods for improving well-being to their daily lives.

Same as: FEMGEN 156

PSYCH 130. Experimental Pragmatics. 3 Units.

How do we understand language as it is used in context? Pragmatic reasoning allows us to go beyond the literal semantics of what someone says to infer what they actually meant. This course will be an in-depth investigation of recent experimental work on pragmatics. Students will read the primary research literature as they learn the skills necessary to develop and run an original experiment investigating our pragmatic inference abilities. Required: Psych 131, Linguist 130A, Linguist 188, or permission of instructor.

PSYCH 130A. NARRATIVE PSYCHOLOGY. 3 Units.

This is an exploration of how human experience is remembered, organized, and transformed through stories people tell about their lives. Through a multicultural perspective we examine how narrative approaches in human development and health care offer promising ways to psychological and social wellness. We integrate transdisciplinary scholarship, traditional cultural wisdom, and self-reflective, experiential learning to connect our academic work with our personal lives.

PSYCH 130S. Positive Psychology: Happiness & Well-Being. 3 Units.

Exploring the meaning and attainment of psychological well-being and happiness, this course investigates approaches that can be used by all individuals to improve their state of happiness and well-being. Course literature is drawn primarily from social, clinical, and positive psychology, but is also drawn from other disciplines as appropriate. In this course, students will actively engage with course material by critiquing studies, discussing research, and applying methods for improving well-being to their daily lives.

PSYCH 131. Language and Thought. 4 Units.

The psychology of language including: production and understanding in utterances; from speech sounds to speaker's meaning; children's acquisition of the first language; and the psychological basis for language systems. Language functions in natural contexts and their relation to the processes by which language is produced, understood, and acquired. Prerequisite: 1 or LINGUIST 1.

Same as: PSYCH 262

PSYCH 132S. The Neglected Senses: Hearing, Touch, Smell and Taste. 3 Units.

Whereas psychology and neuroscience have made great strides in understanding how we perceive the world through all five of our senses, most undergraduate courses focus primarily on vision. The most popular undergraduate perception textbooks devote less than half of their pages to all four other senses. This course will be devoted to these neglected senses: hearing, taste, olfaction and touch. The course will provide answers for the following questions: What stimuli activate the senses of hearing, taste, olfaction and touch? How do we detect that these stimuli are there? How does the brain process information from the senses? How do the senses affect each other? And what can we learn from studying people's behavior alone (using psychological methods)?

PSYCH 134. Seminar on Language and Deception. 3 Units.

Deceptive, exploitative, and other noncooperative uses of language. How is language used to deceive or exploit? Where are these techniques practiced and why? What are the personal, ethical, and social consequences of these practices? Prerequisite: 131, LINGUIST 1, or PHIL 181.

PSYCH 134S. The Art and Science of Emotional Intelligence. 3 Units.

Emotional intelligence has been promoted as essential in finding meaning and fulfillment in our work and relationships. This course is designed to provide an introduction to research and theory on emotional intelligence as a relatively new concept in psychology that has profound influence in education, health, and business. We will critically review it as a scientific concept, looking at the research and the biological bases for emotional intelligence. We will then explore its four basic areas of self understanding, self management, social understanding, and social management. For each area we will engage in self reflection and learn and practice ways of enhancing our emotional intelligence.

PSYCH 136S. Learning and Memory: Theory and Applications. 3 Units.

Introduction to learning and memory, including the ways that our past influences our present through multiple memory systems, the ways in which memory not only can succeed but also can fail, and how memory integrity changes across the lifespan and across clinical populations. Special emphasis on applications of theoretical content to the real world technologies, policies, and diseases that touch our everyday lives.

PSYCH 138. Wise Interventions. 4 Units.

Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy.

Same as: PSYCH 238

PSYCH 138S. Motivation to Learn. 3 Units.

Why do some students delight at the thought of challenging tasks while others only care about getting the grade? Why do some seek out opportunities to learn in and out of school while others feel anxious just showing up to class? Why do our failures sometimes debilitate and other times invigorate? How do we turn our desires to achieve into concrete action? Where do these motivational processes come from and how might we use our understanding of motivation to improve educational systems? This course will address these and other fascinating questions as we consider theory and research on motivation, primarily as it applies to educational contexts. The course will be based largely around interactive discussions of primary source articles, with some lecture in order to provide you with important background information and a framework for discussing the readings.

PSYCH 140S. Sport Psychology. 3 Units.

Focus is on research methods and findings and how to apply these findings to students' own performance. Topics include methods of performance enhancement, psychological characteristics of top performers, group dynamics and processes, effective leadership practices, the effects of stereotyping on sport participation and performance, and debates in the field. Emphasis will be on sports, although most topics can be applied to performance in general.

PSYCH 141. Cognitive Development. 3 Units.

How children's thinking and mental abilities change from infancy on. The major theories and explanations of intellectual growth. Sources include classic findings and state-of-the-art research on cognitive development. Prerequisite: 1.

PSYCH 141S. Health Psychology. 3 Units.

Why is it so difficult for people to stick to an exercise plan? Why don't people take their doctor's advice? Why aren't public health announcements more effective? This course addresses these questions by providing an overview of health psychology: the scientific study of behaviors and cognitive processes related to health states. In this course, we will discuss the mind/body connection, the influence of social/cultural and physical environments on our health, cognitive processing of health information, health belief models, and the link between emotion and health. Understanding the interactions between these biological, psychological, and social influences on individuals' health states is crucial for developing effective health communication and intervention programs. We will approach all course topics from both theory-driven and applied perspectives.

PSYCH 142S. The Psychology of Social Media. 3 Units.

People interact with the world around them largely through mediated means: internet, television, radio, etc. This course will survey current social media: e.g. Facebook, Twitter, YouTube, etc. and popular culture in order to highlight the psychological processes at play. Topics will include: social belonging, interpersonal attraction, identity, bias, and cyberbullying. Students will be expected to learn how to study social media and popular culture using psychological methods.

PSYCH 143. Developmental Anomalies. 3 Units.

For advanced students. Developmental disorders and impairments. What the sparing of mental abilities in otherwise devastating disorders (or vice versa) tells about the mind and its development in the normal case. Examples of disorders and impairments: autism, congenital blindness, deafness, mental retardation, attachment disorder, and Williams syndrome. Limited enrollment. Prerequisite: consent of instructor.

PSYCH 143S. The Psychology of Mean Girls. 3 Units.

This course examines the phenomenon of relational aggression and its implications on girls' lives and relationships. Using the theoretical lenses of moral and social psychology, we will consider how girls experience relational aggression and how it affects their friendships and other social negotiations. While adolescents will be the main focus group, examples from college-age and older girls will also be considered. Classwork will include case studies, reflection papers, and a final research paper on a related topic of the students' choice.

PSYCH 145. Seminar on Infant Development. 1-2 Unit.

For students preparing honors research. Conceptual and methodological issues related to research on developmental psycholinguistics; training in experimental design; and collection, analysis, and interpretation of data.

PSYCH 146. Observation of Children. 3-5 Units.

Learning about children through guided observations at Bing Nursery School, Psychology's lab for research and training in child development. Physical, emotional, social, cognitive, and language development. Recommended: 60.

PSYCH 147. Development in Early Childhood. 3-5 Units.

Supervised experience with young children at Bing Nursery School. 3 units require 4 hours per week in Bing classrooms throughout the quarter; 4 units require 7 hours per week; 5 units require 10.5 hours per week. Seminar on developmental issues in the Bing teaching/learning environment. Recommended: 60 or 146, or consent of instructor.

PSYCH 148. Introduction to Counseling. 3 Units.

The goal of counseling is to help others to create more satisfying lives for themselves. Clients learn to create and capitalize on unexpected events to open up new opportunities. The success of counseling is judged, not by the words and actions of the counselor, but by the progress that the client makes in the real world after counseling itself is ended. Students are encouraged to exert their full efforts within reasonable time limits to improve their competence.

Same as: EDUC 130

PSYCH 149. The Infant Mind: Cognitive Development over the First Year. 3 Units.

How do babies learn so much in so little time? Emphasis is on cognitive and perceptual development, and the relationship between brain and behavior in infancy. Prerequisite: 1. Recommended: 60 or 141.

PSYCH 150. Race and Crime. 3 Units.

The goal of this course is to examine social psychological perspectives on race, crime, and punishment in the United States. Readings will be drawn not only from psychology, but also from sociology, criminology, economics, and legal studies. We will consider the manner in which social psychological variables may operate at various points in the criminal justice system- from policing, to sentencing, to imprisonment, to re-entry. Conducted as a seminar.

PSYCH 150B. RACE AND CRIME PRACTICUM. 2-4 Units.

This practicum is designed to build on the lessons learned in Psych 150. Students will be assigned to internships relevant to race and crime. Prerequisite: Psych 150.

PSYCH 151. Emotion Regulation and Psychopathology. 3 Units.

A broad overview of specific emotion regulation impairments in various psychopathologies and discussion of how current treatment protocols are likely to aid recovery by forming more adaptive emotion regulation ability. Topics include: Foundations and Emotion regulation models, Emotion regulation impairments in Mood disorders (Unipolar Depression and Bipolar Disorder), Anxiety disorders (Social Phobia, Post Traumatic Stress Disorder, General Anxiety Disorder), Eating disorders (Anorexia and Bulimia Nervosa), and Personality Disorders (Narcissistic Personality Disorder, Borderline Personality Disorder).

PSYCH 152. Mediation for Dispute Resolution. 3 Units.

Mediation as more effective and less expensive than other forms of settling disputes such as violence, lawsuits, or arbitration. How mediation can be structured to maximize the chances for success. Simulated mediation sessions.

Same as: EDUC 131

PSYCH 152F. Doing Race and Ethnicity: How and Why it Matters. 3 Units.

Going to school and work, renting an apartment, going to the doctor, watching television, voting, reading, and attending religious services are all activities that involve doing race and ethnicity. In this course, we draw from history, psychology, genetics, and literary studies to understand contemporary racial formations and cultural representations. Course will include two 50-minute lectures with a required online discussion section. Enrollment capped at 20 students.

PSYCH 154. Judgment and Decision-Making. 3 Units.

Survey of research on how we make assessments and decisions particularly in situations involving uncertainty. Emphasis will be on instances where behavior deviates from optimality. Overview of recent works examining the neural basis of judgment and decision-making.

PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: CSRE 196C, ENGLISH 172D, SOC 146, TAPS 165

PSYCH 157. Social Foundations of Expertise and Intelligence. 3 Units.

Psychological conceptions of expertise, ability, and intelligence and the research methods used to study these attributes. Topics include: research on how expertise in a diverse set of disciplines is developed; the role of practice in nurturing expertise; whether intelligence predicts life outcomes; the genetic and environmental determinants of intelligence; whether genes or environment explain racial differences such as the Black-White performance gap and the East Asian achievement advantage; and the Flynn effect.

PSYCH 158. Emotions: History, Theories, and Research. 1-3 Unit.

Graduate students register for 259. Theoretical and empirical issues in the domain of emotions. The history of emotion theories, current approaches, and the interaction between emotion and cognition.

Same as: PSYCH 259

PSYCH 159. Psychology of Attitude Change and Social Influence. 3 Units.

Review of classic and current research on attitudes, attitude change and persuasion. Increase appreciation for the ways that our thoughts, actions, and feelings are shaped and manipulated by social influences.

PSYCH 161. Emotion. 3 Units.

(Graduate students register for 261.) The scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas.

Same as: PSYCH 261

PSYCH 164. Perceptual Cognition. 3 Units.

While we are typically unaware of it, sensory perception continually solves immensely complex problems. Sensory information is noisy, comes through different modalities and neural resources for processing are limited. Through a combination of lectures and in-depth reading of primary literature the course explores advanced contemporary issues in perception such as the role of attention, bayesian sensory inference, cue combination, crowding, and how environmental statistics may shape encoding and decoding of sensory responses. Prerequisite: Psych 30.

PSYCH 167. Seminar on Aggression. 3 Units.

The causes and modification of individual and collective aggression. Major issues in aggression: social labeling of injurious conduct, social determinants of aggression, effects of the mass media, institutionally sanctioned violence, terrorism, psychological mechanisms of moral disengagement, modification of aggressive styles of behavior, and legal sanctions and deterrence doctrines.

PSYCH 169. Advanced Seminar on Memory. 3 Units.

Memory and human cognition. Memory is not a unitary faculty but consists of multiple systems that support learning and remembering, each with its own processing characteristics and neurobiological substrates. This advanced undergraduate seminar will consider recent discoveries about the cognitive and neural architectures of working, declarative, and nondeclarative memory. Required: 45.

PSYCH 170. The Psychology of Communication About Politics in America. 4-5 Units.

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Same as: COMM 164, COMM 264, POLISCI 224L

PSYCH 171. Research Seminar on Aging. 4 Units.

Two quarter practicum exposes students to multiple phases of research by participating in a laboratory focusing on social behavior in adulthood and old age. Review of current research; participation in ongoing data collection, analysis, and interpretation. Prerequisites: 1, research experience, and consent of instructor. May be repeated for credit.

PSYCH 175. Early Learning and Social Cognition. 3 Units.

Social cognition, the ability to perceive others, understand their behaviors, and reason about their thoughts, is a critical component of what makes us human. In what ways does this ability help young children learn about the world, and what can science tell us about the representations and the inferential processes that underlie early learning? This course will explore various topics on social cognition with an emphasis on (but not limited to) developmental perspectives, including face perception, action understanding, and Theory of Mind, and encourage students to think about how these abilities might be linked to the developmental changes in children's understanding of the world. Another goal of the course is to offer an insight into the fundamental questions that have motivated psychological research on social cognition, and the value of developmental methods in addressing these questions. Students should expect to read, present, and discuss theoretical and empirical research articles and to develop original research proposals as a final project. Prerequisites: Psych60 or Psych141.

PSYCH 179. The Psychology of Everyday Morality. 4 Units.

(Graduate students register for 270.) For graduate students, coterns, and senior Psychology majors. Traditional approaches focusing on how morality colors mundane human activities such as eating and on morality as defined by actors themselves rather than social scientists. Moral hypocrisy, food and disgust, taboo trade-offs, moral reproach, and prejudice with compunction. Limited enrollment. Prerequisite: 70 and consent of instructor. Same as: PSYCH 270

PSYCH 180. Social Psychological Perspectives on Stereotyping and Prejudice. 4 Units.

The seminar will review classic and current literature from social psychology on stereotyping and prejudice. We will cover the perceiver's perspective including the formation and maintenance of stereotypes, the functions and costs of stereotyping, and stereotype change. We will also explore how targets are affected by stereotypes and prejudice, as well as intergroup relations. Recent research concerning the role of cognitive, affective, motivational and behavioral processes will be emphasized.

PSYCH 182. Seminar in Applied Cognitive Development. 3 Units.

Much is known about how children learn. But how can this knowledge be used to create effective, age-appropriate health and educational interventions for children? This course surveys research in basic and applied cognitive development. Students will then have the opportunity to design an intervention for young children based on what they've learned. Recommended: Psych 60 or Psych 141.

PSYCH 183. Mind, Culture, and Society Research Core. 2-3 Units.

Required of students in the mind, culture, and society specialization track. Research training on a variety of projects that explore how social identities such as race, class, gender, and culture affect psychological experiences across domains including education, law, business and health. Must participate for two consecutive quarters. Permission of instructor required. May be repeated for credit.

PSYCH 186. The Psychology of Everyday Morality. 3 Units.

Recent literature on morality from a social psychological perspective. Topics include moral judgment, moral intuitions, moral hypocrisy, moral identity, moralization, moral reproach, shame and guilt, temptations, and self-regulation. Contemporary psychological research emphasizing descriptive approaches (what people actually do) rather than normative ones (what one should do). Same as: PSYCH 286

PSYCH 189. Stanford Center on Longevity Practicum. 3 Units.

Student involvement in an interdisciplinary center aimed at changing the culture of human aging using science and technology. May be repeated for credit.

PSYCH 190. Special Research Projects. 1-6 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

PSYCH 191. Special Research Projects in the Mind & Body Lab. 1-6 Unit.

May be repeated for credit or for grade. Prerequisites: consent of instructor.

PSYCH 192. Career and Personal Counseling. 3 Units.

Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences. Same as: EDUC 134, EDUC 234

PSYCH 193. Special Laboratory Research. 1-6 Unit.

May be repeated for credit. Prerequisites: 1, 10, and consent of instructor.

PSYCH 194. Reading and Special Work. 1-3 Unit.

Independent study. May be repeated for credit. Prerequisite: consent of instructor.

PSYCH 195. Special Laboratory Projects. 1-6 Unit.

Independent study. May be repeated for credit. Prerequisites: 1, 10, and consent of instructor.

PSYCH 196. Contemporary Psychology: Overview of Theory, Research, Applications. 3 Units.

Capstone experience for juniors and seniors that bridges course work with research opportunities. Lectures representing the department's areas: social, personality, developmental, neuroscience, and cognitive psychology. Faculty present current research. Discussions led by advanced graduate students in the field represented by that week's guest. Students write research proposals. Small grants available to students to conduct a pilot study of their proposed research. Limited enrollment. Prerequisite: consent of instructor.

PSYCH 196A. Advanced Psychology Research Methods. 3 Units.

This course is designed for advanced psychology students familiar with basic research methods (Honors and Coterms) who wish to build on and develop more sophisticated, independent research skills. Topics will include research design and evaluation, introductory statistics and basic programming in R, logistics of running a study at Stanford (including online studies with Qualtrics and Amazoniquest;s Mechanical Turk), interpreting and writing up the results of statistical analyses, giving an academic presentation, and more. Students will gain hands on, pragmatic skills in each of these areas through individual and group projects and presentations, problem sets, and instructor and peer feedback. By the end of the course, students will have the knowledge and skills they need to develop and execute their own independent research project (e.g., their honors or coterm thesis project).

PSYCH 197. Advanced Research. 1-4 Unit.

Limited to students in senior honors program. Weekly research seminar, independent research project under the supervision of an appropriate faculty member. A detailed proposal is submitted at the end of Autumn Quarter. Research continues during Winter and Spring quarters as 198. A report demonstrating sufficient progress is required at the end of Winter Quarter.

PSYCH 198. Senior Honors Research. 1-4 Unit.

Limited to students in the senior honors program. Finishing the research and data analysis, written thesis, and presentation at the Senior Honors Convention. May be repeated for credit.

PSYCH 199. Temptations and Self Control. 2 Units.

(Graduate students register for 299.) Why do people do things that that they come to regret? How can people minimize behavior such as exercise avoidance, angry words, overeating, unsafe sex, and dangerous driving? Sources include classical and current research from experimental psychology, neuroscience, behavioral economics, and neuroeconomics. Real-world applications. Same as: PSYCH 299

PSYCH 201. Social Psychology Lecture Series. 3 Units.

Required of social psychology graduate students. Guest lecturers from Stanford and other institutions. May be repeated for credit. (Miller).

PSYCH 202. Cognitive Neuroscience. 3 Units.

Graduate core course. The anatomy and physiology of the brain. Methods: electrical stimulation of the brain, neuroimaging, neuropsychology, psychophysics, single-cell neurophysiology, theory and computation. Neuronal pathways and mechanisms of attention, consciousness, emotion, language, memory, motor control, and vision. Prerequisite: 207 or consent of instructor.

PSYCH 203. MODELS OF LANGUAGE ACQUISITION. 3 Units.

How do children learn to understand and produce their native language? Language acquisition is a core topic in cognitive science and has been a key test case for formal approaches. Topics include: learnability theory, grammatical approaches, connectionist models, and probabilistic models.

PSYCH 204. Computation and cognition: the probabilistic approach. 3-4 Units.

This course will introduce the probabilistic approach to cognitive science, in which learning and reasoning are understood as inference in complex probabilistic models. Examples will be drawn from areas including concept learning, causal reasoning, social cognition, and language understanding. Formal modeling ideas and techniques will be discussed in concert with relevant empirical phenomena.

PSYCH 204A. Human Neuroimaging Methods. 3 Units.

This course introduces the student to human neuroimaging using magnetic resonance scanners. The course is a mixture of lectures and hands-on software tutorials. The course begins by introducing basic MR principles. Then various MR measurement modalities are described, including several types of structural and functional imaging methods. Finally algorithms for analyzing and visualizing the various types of neuroimaging data are explained, including anatomical images, functional data, diffusion imaging (e.g., DTI) and magnetization transfer. Emphasis is on explaining software methods used for interpreting these types of data.

PSYCH 204B. Computational Neuroimaging: Analysis Methods. 1-3 Unit.

Neuroimaging methods with focus on data analysis techniques. Basic MR physics and BOLD signals. Methods for neuroimaging data using real and simulated data sets. Topics include: linearity of the fmri signal; time versus space resolution tradeoffs; noise in neuroimaging; correlation analysis; visualization methods; cortical reconstruction, inflation, and flattening; reverse engineering; can cognitive states be predicted from brain activation? Prerequisite: consent of instructor.

PSYCH 205. Foundations of Cognition. 1-3 Unit.

Topics: attention, memory, language, similarity and analogy, categories and concepts, learning, reasoning, and decision making. Emphasis is on processes that underlie the capacity to think and how these are implemented in the brain and modeled computationally. The nature of mental representations, language and thought, modular versus general purpose design, learning versus nativism. Prerequisite: 207 or consent of instructor. nOpen to Psychology PhD students only.

PSYCH 206. Cortical Plasticity: Perception and Memory. 1-3 Unit.

Seminar. Topics related to cortical plasticity in perceptual and memory systems including neural bases of implicit memory, recognition memory, visual priming, and perceptual learning. Emphasis is on recent research with an interdisciplinary scope, including theory, behavioral findings, neural mechanisms, and computational models. May be repeated for credit. Recommended: 30, 45.

PSYCH 207. Professional Seminar for First-Year Ph.D. Graduate Students. 2-3 Units.

Required of and limited to first-year Ph.D. students in Psychology. Major issues in contemporary psychology with historical backgrounds.

PSYCH 207B. Professional Development Seminar in Psychology. 0-1 Units.

For graduate students who wish to gain professional development skills to pursue an academic career. May be repeated for credit. Course is intended for second year Ph.D. student in Psychology but open to all years.

PSYCH 208. Advanced Topics in Self-Defense. 1-3 Unit.

Seminar. Threat to the self and how people deal with them. Readings from social psychological areas including social comparison, self-affirmation, self-completion, self-discrepancy, shame and guilt, terror management, dimensions of self-worth, self-regulation, self-presentation, psychophysiology, and moral identity. Enrollment limited to 15.

PSYCH 209. Neural network and deep learning models for cognition and cognitive neuroscience. 4 Units.

Models of cognitive and developmental processes and the brain basis of such processes, including perception, attention, memory, decision making, language processing, acting and thinking. Models considered will include neural network models including contemporary deep learning models, as well as other process models spanning a spectrum from abstract to neurally realistic. Relationships between such models and more abstract models of cognitive processes including probabilistic models will be explored. Students learn about classic models and carry out exercises in the first six weeks and will undertake projects and learn about recent developments during the last four weeks of the quarter. For advanced undergraduates and graduate students. Recommended: some familiarity with computer programming, differential equations, linear algebra, and/or probability theory, and courses in cognitive psychology and/or cognitive neuroscience.

PSYCH 211. Developmental Psychology. 1-3 Unit.

Prerequisite: 207 or consent of instructor.

PSYCH 212. Social Psychology. 1-3 Unit.

Classic studies in experimental social psychology. Group and group dynamics; compliance and social pressure; conformity, cooperation, conflict, and social dilemmas; attraction and preference; attitudes and attitude change; social comparison, emotion, and affiliation; dissonance, consistency, and self-justification; attribution and self-perception; judgment and decision making, motivation, automaticity, and culture.

PSYCH 213. Affective Science. 3 Units.

This seminar is the core graduate course on affective science. We consider definitional issues, such as differences between emotion and mood, as well as issues related to the function of affect, such as the role affect plays in daily life. We review autonomic, neural, genetic, and expressive aspects of affective responding. Later in the course we discuss the role of affect in cognitive processing, specifically how affective states direct attention and influence memory, as well as the role of affect in decision making. We will also discuss emotion regulation and the strategic control of emotion; the cultural shaping of emotional experience and regulation; disorders of emotion; and developmental trajectories of experience and control from early to very late life. Meetings are discussion based. Attendance and active participation are required. Prerequisite: 207 or consent of instructor.

PSYCH 215. Mind, Culture, and Society. 3 Units.

Social psychology from the context of society and culture. The interdependence of psychological and sociocultural processes: how sociocultural factors shape psychological processes, and how psychological systems shape sociocultural systems. Theoretical developments to understand social issues, problems, and polity. Works of Baldwin, Mead, Asch, Lewin, Burner, and contemporary theory and empirical work on the interdependence of psychology and social context as constituted by gender, ethnicity, race, religion, and region of the country and the world. Prerequisite: 207 or consent of instructor.

PSYCH 216. Public Policy and Social Psychology: Implications and Applications. 4 Units.

Theories, insights, and concerns of social psychology relevant to how people perceive issues, events, and each other, and links between beliefs and individual and collective behavior will be discussed with reference to a range of public policy issues including education, public health, income and wealth inequalities, and climate change. Specific topics include: situationist and subjectivist traditions of applied and theoretical social psychology; social comparison, dissonance, and attribution theories; stereotyping and stereotype threat, and sources of intergroup conflict and misunderstanding; challenges to universality assumptions regarding human motivation, emotion, and perception of self and others; also the general problem of producing individual and collective changes in norms and behavior. Same as: IPS 207B, PUBLPOL 305B

PSYCH 216A. Statistics and data analysis in MATLAB. 1-3 Unit.

This course will cover basic statistical principles that are widely used for the analysis of neuroscience and behavioral data, such as error bars and confidence intervals, multivariate probability distributions, regression and classification, linear and nonlinear models, cross-validation, bootstrapping, and model selection. In each class, we will cover the theory behind a statistical principle and learn how to implement the principle efficiently in MATLAB. Example material can be found at <http://randomanalyses.blogspot.com>. Prerequisites: Familiarity with basic statistics and programming in MATLAB.

PSYCH 217. Topics and Methods Related to Culture and Emotion. 1-3 Unit.

Preference to graduate students. How cultural factors shape emotion and other feeling states. Empirical and ethnographic literature, theories, and research on culture and emotion. Applications to clinical, educational, and occupational settings. Research in psychology, anthropology, and sociology. May be repeated for credit.

PSYCH 218. Early Social Cognitive Development. 1-3 Unit.

Current literature on social and cognitive development in infancy emphasizing the interface between the two domains. May be repeated for credit. Prerequisite: consent of instructor.

PSYCH 220. Special Topics in Cognitive Development. 1-3 Unit.

In the last few years, research at the intersection of cognitive and social development has burgeoned, yielding unprecedented knowledge about the roots of the human (social) mind in infants and children. In this course, using an outstanding new volume edited by Susan Gelman and Mahzarin Banaji, we will discuss work that highlights the social nature of cognitive development (e.g., the degree to which social learning may account for uniquely human cognitive abilities) and that explores the early emergence of social knowledge and understanding (e.g., mental models of relationships, knowledge of good and bad, beliefs about ingroups and outgroups, and knowledge of other people's minds). Prerequisites: Psychology 207 or permission of instructor.

PSYCH 220S. Temptations and Self Control. 3 Units.

Why do people do things they come to regret, such as lack of exercise, angry words, overeating, unsafe sex, or dangerous driving? How can they minimize such behaviors? Sources include classical and current research from experimental psychology, neuroscience, behavioral economics, and neuroeconomics. Emphasis is on real-world applications.

PSYCH 221. Applied Vision and Image Systems. 1-3 Unit.

This course is an introduction to imaging technologies including hardware and the image processing pipeline. There is an emphasis on how these technologies accommodate the requirements of the human visual system. The course is intended for students interested in various aspects of imaging technologies, including digital cameras and displays. Image processing and compression. Image quality analysis. Human color, pattern and motion vision. The course consists of lectures, tutorials and a project. Lectures cover the tools used in digital imaging and image quality measurement. Tutorials and projects include extensive software simulations of the digital imaging pipeline. Some background in mathematics (linear algebra) and programming (Matlab) is valuable.

PSYCH 222. From Classic Experiments to Cutting Edge Neuroimaging: The Functional Neuroanatomy of Visual Cortex. 1-3 Unit.

We will discuss the fundamental organizational principles of the visual system starting by discussing classic papers in non-human primates and proceeding to discuss recent neuroimaging studies in humans. We will then examine how understanding these organizational principles has influenced mapping the functional organization of visual system. Finally, we will analyze neuroimaging datasets and examine how well one can evaluate and define visual areas in the human brains by understanding these principles.

PSYCH 223. Social Norms. 3 Units.

This course covers research and theory on the origins and function of social norms. Topics include the estimation of public opinion, the function of norms as ideals and standards of judgment, and the impact of norms on collective and individual behavior. In addition to acquainting students with the various forms and functions of social norms the course will provide students with experience in identifying and formulating tractable research questions.

Same as: OB 630

PSYCH 224. Research Topics in Emotion Regulation. 1 Unit.

Current research findings and methods, ongoing student research, and presentations by visiting students and faculty. May be repeated for credit. Prerequisite: consent of instructor.

PSYCH 225. Special Neuroscience Seminar with Dr. Shinobu Kitayama. 1-2 Unit.

How will culture influence the human mind? Is culture a superficial overlay on the basic, universal computational machine called the mind? Alternatively, is culture a crucial constitutive element of the mind? If so, what are specific mechanisms underlying this constitution process? And what theoretical framework do we need to make a visible progress on these questions? More generally, how can we start discussing meaningfully and productively about various problematic dichotomies such as mind versus body, culture versus biology, and nurture versus nature? An emerging field of cultural neuroscience has the potential of addressing these and other important questions and thus bridging natural, behavioral, and social sciences of the human mind. This seminar reviews the field of cultural neuroscience. It starts with a discussion of some theoretical foundations of the field, including cultural psychology, cognitive and social neuroscience, evolutionary psychology, and population genetics (PART 1). We will then discuss several specific content domains with a focus on cross-cultural variations in brain responses (PART 2). The seminar will conclude with a discussion on gene x environment interaction in varying cultural contexts (PART 3). Students can take the seminar for credit. One unit for attending all five sessions, two units for all five sessions and a short paper.

PSYCH 226. Models and Mechanisms of Memory. 1-3 Unit.

Current topics in memory as explored through computational models addressing experimental findings and physiological and behavioral investigations. Topics include: explicit and implicit learning; role of MTL structures in learning and memory; and single versus dual processes approaches to recognition. May be repeated for credit.

PSYCH 228. Ion Transport and Intracellular Messengers. 1-3 Unit.

(Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Recommended: 120, introductory course in biology or human biology. Same as: PSYCH 121

PSYCH 231. Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives. 4 Units.

The social and psychological processes involved in asking and answering questions via questionnaires for the social sciences; optimizing questionnaire design; open versus closed questions; rating versus ranking; rating scale length and point labeling; acquiescence response bias; don't-know response options; response choice order effects; question order effects; social desirability response bias; attitude and behavior recall; and introspective accounts of the causes of thoughts and actions. Same as: COMM 339, POLISCI 421K

PSYCH 232. Brain and Decision Making. 3 Units.

Neuroeconomics combines experimental techniques from neuroscience, psychology, and experimental economics, such as electrophysiology, fMRI, eye tracking, and behavioral studies, and models from computational neuroscience and economics. May be repeated for credit. Prerequisite: consent of instructor.

PSYCH 233. MATLAB and PsycToolbox for the Behavioral Sciences. 1-3 Unit.

Topics such as experiment design, stimulus presentation, counterbalancing, response collection, data analysis, and plotting. Programming experiments. Final project programming a complete behavioral experiment relevant to student's research.

PSYCH 234. Topics in Depression. 1-3 Unit.

Current research topics including epidemiology and phenomenology of affective disorders, psychological theories of depression, gender differences in affective disorders, cognitive and social functioning of depressed persons, psychobiology of affective disorders, depression in children, postpartum depression, suicide issues in the treatment of depression, and cultural aspects of affective disorders. Prerequisite: graduate standing in Psychology or consent of instructor. May be repeated for credit.

PSYCH 235. Motivation and Emotion. 3 Units.

This graduate seminar will take a social-cognitive perspective on motivation and emotion. Meetings will be discussion oriented, and each meeting will focus on a different question of theoretical and applied significance. Prerequisite: 207 or consent of instructor.

PSYCH 236C. SEM IN SEMANTICS: Reasoning with Quantifiers. 4 Units.

Description: Team project-oriented class exploring linguistic, psychological, and computational models of how people reason about statements involving quantifiers and related devices, including negation and negative polarity items, superlatives, and definite descriptions. One-third of the class time will be devoted to covering core material and recent papers; the remaining two-thirds will be for project development with guidance from the instructors. Prerequisite: Linguist 230B or permission from the instructors.

Same as: LINGUIST 236

PSYCH 237. Mathematical Cognition. 2-4 Units.

The course will examine the basis of numerical and mathematical abilities, and the acquisition and learning of mathematical skills, drawing on experimental and modeling studies. Topics will include numerosity, counting, basic arithmetic, and fractions, as well as algebraic and geometric reasoning as well as insight into mathematical and scientific problems. Roles of rules, procedures and symbolic, spatial, and sensory-motor representations; relationship between skill and understanding; nature of discovery and insight in mathematical reasoning; the relationship between insight and proof. Open to PhD and Masters students and to Juniors and Seniors who have completed an introductory level course in cognitive or developmental psychology.

PSYCH 238. Wise Interventions. 4 Units.

Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy.
Same as: PSYCH 138

PSYCH 239. Formal and Computational Approaches in Psychology and Cognitive Science. 3 Units.

Do psychology and cognitive science need formal theories and/or explicit computational models? What insights should such things provide? What is the proper relationship between different theoretical and modeling approaches? Between different levels or kinds of analysis? Where do informally stated theories fit in and what are the roles of formal and computational modeling approaches in relation to other less explicitly specified forms of theorizing? This seminar will explore these issues and compare different formal and computational model variants, especially connectionist and probabilistic models, within 3-4 different target domains. Possible target domains include categorization, property induction, causal learning, perceptual decision making, language acquisition, semantics and pragmatics, and mid-level vision.

PSYCH 241. Probabilistic Models of Social Behavior and Affect. 4 Units.

How do we reason about other people and ourselves? Is human behavior in social situations a set of ad-hoc and irrational responses--or can we understand humans as making rational inferences under uncertainty about the people they are interacting with? This project-based seminar will re-examine classic findings from social psychology and affective science through the lens of rational analysis and probabilistic models. In collaboration with instructors, students will develop projects focused on making testable theoretical models of classic tasks and literatures with the goal of creating a publishable end product. Phenomena under consideration include but are not limited to: cognitive dissonance, attribution theory, mindset theory, stereotyping, and emotion perception.

PSYCH 243. General Development Seminar. 1-2 Unit.

May be repeated for credit. Prerequisite: consent of instructors. Restricted to Developmental graduate students.

PSYCH 244. Psychology of Aging. 1-3 Unit.

Theory and research in gerontology. Normal and abnormal changes that occur in biological, cognitive, and psychological aging. Emphasis is on the environmental factors that influence the aging process. Prerequisite: graduate standing in Psychology or consent of instructor.

PSYCH 245. Social Psychological Perspectives on Stereotyping and Prejudice. 3 Units.

Classic and contemporary social psychological approaches to prejudice and stereotyping. Emphasis is on how stereotypes are employed and maintained, and the influence of stereotyping and prejudice on behavior in domains including education, employment, politics, and law. Limited enrollment.

PSYCH 246. Cognitive and Neuroscience Friday Seminar. 1 Unit.

Participant presentations. May be repeated for credit. Prerequisite: graduate standing in psychology or neuroscience program.

PSYCH 247. Fundamentals of Neuroscience for Non-Life-Scientists. 2 Units.

Human behavior and the human brain and how it enables perception, learning, decision making, planning, and action with a focus on how neuroscience may be presented or used in law, business, or education contexts. Neurotechnology and experimental methods used to conduct research.

PSYCH 248. Reproducibility in Scientific Research. 3 Units.

This seminar will discuss the ongoing reproducibility crisis in science and explore computational approaches to help enhance reproducibility. Topics will include null-hypothesis testing versus Bayesian approaches, statistical power, replication, cross-validation, and reproducible coding practices. In-class exercises will focus on computing practices such as version control, unit testing and validation, literate programming, and code reviews.

PSYCH 249. Human Motivation. 1-3 Unit.

Current research and theory including questions concerning the nature of human motives, intrinsic motivation, self-regulation, the roles of affect and cognition, and lifespan and cultural influences on motivation. Prerequisite: 207 or consent of instructors.

PSYCH 250. High-Level Vision: Object Representation. 3 Units.

(Formerly CS423 High-Level Vision: Behaviors, Neurons, and Computational Models) Interdisciplinary seminar focusing on understanding how computations in the brain enable rapid and efficient object perception. Covers topics from multiple perspectives drawing on recent research in Psychology, Neuroscience, Computer Science and Applied Statistics. Emphasis on discussing recent empirical findings, methods and theoretical debates in the field. Topics include: theories of object perception, neural computations underlying invariant object perception, how visual exemplars and categories are represented in the brain, what information is present in distributed activations across neural populations and how it relates to object perception, what modern statistical and analytical tools there are for multi-variate analysis of brain activations. Same as: CS 431

PSYCH 251. Affective Neuroscience. 3 Units.

Theory and research. Comparative and human research approaches map affective function to neuroanatomical and neurochemical substrates. Prerequisite: consent of instructor.

PSYCH 252. Statistical Methods for Behavioral and Social Sciences. 1-6 Unit.

For students who seek experience and advanced training in empirical research. Analysis of data from experimental through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through two-way tables. Integrated with the use of statistical computing packages. Prerequisite: 10 or equivalent.

PSYCH 253. Statistical Theory, Models, and Methodology. 3 Units.

Practical and theoretical advanced data analytic techniques such as loglinear models, signal detection, meta-analysis, logistic regression, reliability theory, and factor analysis. Prerequisite: 252 or EDUC 257.

PSYCH 254. Lab in Experimental Methods. 3 Units.

Laboratory class in experimental methods for psychology, with a focus on technical/computer-based methods. Programming experience helpful although not required. Topics include data collection on the web, data management and data analysis.

PSYCH 257. Individually Supervised Practicum. 3-5 Units.

Satisfies INS requirements for curricular practical training. Relevant experience for graduate students as part of their program of study. May be repeated for credit. Prerequisites: graduate standing in Psychology, consent of adviser.nn (Staff).

PSYCH 258. Graduate Seminar in Social Psychology Research. 1-3 Unit.

For students who are already or are planning to become involved in research on social construal and the role that it plays in a variety of phenomena, notably the origin and escalation of conflict.

PSYCH 259. Emotions: History, Theories, and Research. 1-3 Unit.

Graduate students register for 259. Theoretical and empirical issues in the domain of emotions. The history of emotion theories, current approaches, and the interaction between emotion and cognition.
Same as: PSYCH 158

PSYCH 261. Emotion. 3 Units.

(Graduate students register for 261.) The scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas. Same as: PSYCH 161

PSYCH 261A. Learning and Cognition in Activity. 3 Units.

Methods and results of research on learning, understanding, reasoning, problem solving, and remembering, as aspects of participation in social organized activity. Principles of coordination that support cognitive achievements and learning in activity settings in work and school environments. Same as: EDUC 295

PSYCH 262. Language and Thought. 4 Units.

The psychology of language including: production and understanding in utterances; from speech sounds to speaker's meaning; children's acquisition of the first language; and the psychological basis for language systems. Language functions in natural contexts and their relation to the processes by which language is produced, understood, and acquired. Prerequisite: 1 or LINGUIST 1. Same as: PSYCH 131

PSYCH 263. Computational Tools for Brain and Behavior Research. 1-3 Unit.

Rapid developments in experimental techniques from behavioral measurements, calcium imaging, multielectrode recordings, ECoG, EEG and fMRI have led to an explosion of data for understanding the brain and behavior. This course explores computational tools that can make sense of these data from dimensionality reduction, classification analyses to model fitting, as well as techniques for validating results such as permutation analyses, cross-validation, model selection and bootstrapping. The emphasis will be on developing a practical understanding of computational methods as well as intuition about what these methods can tell us about brain and behavior. The course is a mixture of lectures, reading and discussion of examples of uses of computational tools from recent primary behavioral and neuroscience literature as well as hands-on computer tutorials.

PSYCH 264. Moral Minds: What Can Moral Psychology Tell Us About Ethics. 2 Units.

SAME AS LAW744. Recent psychological advances in our understanding of the cognitive and social origins of morality cast a new light on age-old questions about ethics, such as: How did our moral sense evolve in our species? How does it develop over our lifetime? How much does our culture, religion, or politics determine our moral values? What is the role of intuition and emotion in moral judgment? How "logical" is moral judgment? How do other people's moral choices affect us? Does character matter or is behavior entirely dictated by the situations we find ourselves in? If it is purely situational, are we morally responsible for anything? How far will we go to convince ourselves that we are good and moral? Barbara Fried and Benoit Monin will review empirical answers to these questions suggested by behavioral research, and lead discussions on their implications for ethics. Students enrolled in the course will be selected through an application process. The application can be found at <http://web.stanford.edu/~arnewman/MoralMinds.fb>, and is due at 11:59 p.m. on November 14, 2014. Same as: ETHICSOC 304

PSYCH 265. Social Psychology and Social Change. 2-3 Units.

The course is intended an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome. Interested students should contact Shannon Brady (sbrady@stanford.edu). Same as: EDUC 371X

PSYCH 266. Current Debates in Learning and Memory. 1-3 Unit.

Memory is not a unitary faculty, but consists of multiple forms of learning and remembering. The cognitive and neural architectures of memory, focusing on the application of functional brain imaging (primarily fMRI and ERP). Recommended: 45.

PSYCH 267. Human Memory: Facts, Fallacies, and Fragile Powers. 1-3 Unit.

Seminar. Applications of memory concepts in everyday life and in social and clinical settings. Topics include personal identity, childhood amnesia, autobiographic memory, emotions and memory, memory distortions, illusions, self-serving biases, recovery of repressed memories, false memories, implicit memories, and unconscious influences on social behavior, with applications to psychopathology.

PSYCH 269. Graduate Seminar in Affective Science. 1 Unit.

May be repeated for credit. Prerequisite: graduate standing in Psychology. (Gotlib).

PSYCH 270. The Psychology of Everyday Morality. 4 Units.

(Graduate students register for 270.) For graduate students, coterminals, and senior Psychology majors. Traditional approaches focusing on how morality colors mundane human activities such as eating and on morality as defined by actors themselves rather than social scientists. Moral hypocrisy, food and disgust, taboo trade-offs, moral reproach, and prejudice with compunction. Limited enrollment. Prerequisite: 70 and consent of instructor. Same as: PSYCH 179

PSYCH 271. Writing About Psychology. 3 Units.

Writing clear and compelling prose is a vital skill for any psychologist, but one that is often not formally taught. This graduate seminar will provide a chance for students to think systematically about writing for audiences within and outside of psychology, and to concretely improve pieces of writing that matter to them. The course will take the form of a "writer's workshop", in which each student will bring two pieces of writing; one empirical, and one intended for a popular audience, to be discussed by the class. All class members will discuss each piece of writing twice, providing constructive feedback for the target student to revise her or his work. The workshop will be supplemented by general discussions of writing principles and examples of good writing in psychology.

PSYCH 272. Special Topics in Psycholinguistics. 1-3 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

PSYCH 273. Graduate Seminar on Language, Cognition, and Perception. 3 Units.

Current topics and debates. Readings from psychology, linguistics, neuroscience, ethology, anthropology, and philosophy. May be repeated for credit.

PSYCH 274. Graduate Research Workshop on Psychological Interventions. 3 Units.

Psychological research has the potential to create novel interventions that promote the public good. This workshop will expose students to psychologically 'wise' intervention research and to support their efforts to conduct such interventions, especially in the context of education, broadly conceived, as well as other areas. The first part of the class will address classic interventions and important topics in intervention research, including effective delivery mechanisms, sensitive behavioral outcomes, the role of theory and psychological process, and considerations of the role of time and of mechanisms that can sustain treatment effects over time. In the second part of the class, students will present and receive feedback on their own ongoing and/or future intervention research. Prerequisite: Graduate standing in Psychology or Education, or consent of instructor. Same as: EDUC 287X

PSYCH 275. Graduate Research. 1-15 Unit.

Intermediate-level research undertaken with members of departmental faculty. Prerequisite: consent of instructor.nn (Staff).

PSYCH 277. Psychology of Pedagogy. 1-3 Unit.

How can methods and insights from psychology inform education practice, particularly in a higher education context? This course aims to develop your skills as critical consumers and producers of empirical findings on teaching and learning. Course involves a quarter-long project to develop a pedagogical research proposal, supplemented and informed by readings, guided discussions, and group workshops.

Same as: EDUC 248X

PSYCH 278. Social Cognitive Development: New Methods for Answering Old Questions. 1-2 Unit.

Novel technology can fuel new discoveries and generate new questions for future research, for instance, the use of video cameras has transformed the field of developmental psychology. More recently, the use of neuroimaging techniques (such as fMRI) to study the developing brain has been gaining lots of interest among developmental psychologists. What are the promises and challenges of using these neuroimaging methods to study cognitive development? This course will be a discussion-based seminar class (with some lectures from the instructor and from students) aimed for graduate students who are interested in learning more about how these methods can help address questions about cognitive development, with a particular focus on children's developing understanding of their social world.

PSYCH 279. Topics in Cognitive Control. 1-3 Unit.

The processes that enable flexible behavior by biasing contextually relevant perceptual, mnemonic, and response representations or processing pathways. Cognitive control is central to volitional action, allowing work with memory, task/goal states, and overriding inappropriate responses. Current models of cognitive control, functional neuroimaging, and neuropsychological evidence. Recommended: 45. May be repeated for credit.

PSYCH 280. Foundations and Contemporary Topics in Social-Educational Psychology. 2-4 Units.

At its core, social psychology is concerned with educational problems because it addresses the problem of how to change hearts and minds in lasting ways. This course explores the major ideas, theories, and findings of social psychology, their educational implications, and the insights they shed into how and when people change. There will be a focus on educational issues. Intersections with other disciplines, in particular social development and biology, will be addressed. Historical tensions and traditions, as well as classic studies and theories, will be covered. Graduate students from other disciplines, and advanced undergraduates, are welcome (class size permitting).

Same as: EDUC 304

PSYCH 281. Practicum in Teaching. 1-5 Unit.

Enrollment limited to teaching assistants in selected Psychology courses. May be repeated for credit.

PSYCH 282. Practicum in Teaching PSYCH 1. 1-2 Unit.

Logistical TA training including: preparing for sections; creating, correcting exams; grading an iterative writing assignment; office hours; review sessions; developing audiovisual expertise; communicating via coursework. Review of student evaluations with instructor to set goals and strategies. Second quarter focuses on pedagogical improvement. Limited to current PSYCH 1 TAs. May be repeated for credit.

PSYCH 283. International Conflict Resolution Colloquium. 1 Unit.

(Same as LAW 611.) Sponsored by the Stanford Center on International Conflict and Negotiation (SCICN). Conflict, negotiation, and dispute resolution with emphasis on conflicts and disputes with an international dimension, including conflicts involving states, peoples, and political factions such as the Middle East and Northern Ireland. Guest speakers. Issues including international law, psychology, and political science, economics, anthropology, and criminology.

Same as: IPS 250A

PSYCH 284. Computational Modeling of a Range of Neural Circuits. 1-3 Unit.

Lectures, student presentations, and extensive software exercises. Focus on quantifiable models of neural signaling, starting with physical specification of input signals, sensory transductions, spiking, and mean electrical field potentials, and the inter-relation to BOLD signals (fMRI). Applications will be drawn from many examples, but there will be a particular focus on the visual pathways and how measurements and models relate to visual perception.

PSYCH 286. The Psychology of Everyday Morality. 3 Units.

Recent literature on morality from a social psychological perspective. Topics include moral judgment, moral intuitions, moral hypocrisy, moral identity, moralization, moral reproach, shame and guilt, temptations, and self-regulation. Contemporary psychological research emphasizing descriptive approaches (what people actually do) rather than normative ones (what one should do).

Same as: PSYCH 186

PSYCH 287. Brain Machine Interfaces - Theory and Technology Course Information. 1-3 Unit.

(Same as MCP 287) There is a growing number of methods to interact with the living nervous system. This seminar will review methods, principal results, and ideas for designing devices that either act on or read out data from the nervous system. A principal objective of designing these devices is to use them for sensory prosthetics (retinal implants and motor control units), and also for reducing the symptoms of different diseases (Parkinsons, Depression, Epilepsy). We will consider a wide variety of applications, but our emphasis will be on electronic devices that either stimulate or read-out from the human brain.

Same as: NSUR 287

PSYCH 288. Hierarchical Linear Modeling for Psychological Sciences. 1-3 Unit.

HLM is a statistical theory and a computer program used to analyze multi-level data, such as trials within participants or students within classrooms. HLM allows researchers to analyze data at each level of analysis separately, to partition the total variance across different levels, to explain variance at each level separately using level-appropriate predictors, and to model cross-level interactions. How to use the HLM program and to model various types of multi-level data using it. May be repeated for credit.

PSYCH 289. Sensory Representations in Language and Memory. 1-3 Unit.

Is recollecting an experience similar to re-experiencing it? How closely tied is our knowledge to the perceptual representations and processes that may have given rise to it? What role do perceptuo-motor representations play in understanding language? We will review the recent literature on perceptual re-activation in episodic memory, perceptual grounding in semantic representations, and neural reuse of perceptual mechanisms for abstract thought. Emphasis will be placed on recent research with an interdisciplinary scope, including discussion of theory, behavioral findings, neural mechanisms, and computational models. Prerequisite: Psych 207 or consent of instructor.

PSYCH 290. Graduate Research Methods. 2 Units.

Primary tool use for psychologists: basics of experiment design; computer-based experiments; web-based experiments; data analysis packages and data presentation; exploratory statistics; eye-tracking methods; psychophysiology methods; survey construction; corpus and discourse analysis; and perhaps hypnosis. Prerequisite: Ph.D. student in Psychology.

PSYCH 291. Psychology Teaching Methods. 1-2 Unit.

Open to graduate students and advanced undergraduates. Principles of good teaching. Students practice teaching skills.

PSYCH 292. Special Topics in Emotion Regulation. 1 Unit.

This seminar will consider special topics in emotion regulation. Admission is by invitation only.

PSYCH 293. Communication, Intentionality, and the Origins of Language. 3 Units.

How did language evolve to become a ubiquitous, definitional part of human life? What relationship does children's early language have to their understanding of intentionality and other methods of non-verbal communication? This seminar will survey theoretical and experimental work on the foundations of human language, communication, and intentionality, with the goal of understanding what we know and what questions are still open. Areas of focus include developmental work on communication; whether early language use is referential/intentional and whether early words are general or particular; and research on language evolution and animal communication.

PSYCH 294. Human Prosociality. 3 Units.

Human beings engage in a vast amount of prosocial behaviors (including altruism and cooperation) that critically support our success as a social species. That said, the psychological underpinnings of prosociality remain surprisingly enigmatic. This seminar will survey classic and modern theories of prosocial behavior from evolutionary biology, economics, psychology, and neuroscience, with an emphasis on common ideas about the cognitive and affective mechanisms supporting such behaviors. Students will be responsible for leading discussions and producing one in-depth review or research paper at the end of the quarter.

PSYCH 295. Cognitive Modeling using Bayesian Statistics. 2-3 Units.

This course introduces the student to cognitive modeling from a Bayesian statistical approach. The goal of the course is to facilitate and promote Bayesian fitting for a large variety of latent cognitive models to data through the use of accessible computer software. Within particular cognitive models, students will learn how to first construct a basic model, and then add various effects such as individual or group differences, substantive prior information, covariates, and contaminant processes. Along the way, students will gain a better understanding of the many advantages of Bayesian statistics over frequentist-type analyses. A strong statistical or computer science background is not required.

PSYCH 297. Seminar for Coterminal Master of Arts. 1-2 Unit.

Contemporary issues and student research. Student and faculty presentations.

PSYCH 299. Temptations and Self Control. 2 Units.

(Graduate students register for 299.) Why do people do things that that they come to regret? How can people minimize behavior such as exercise avoidance, angry words, overeating, unsafe sex, and dangerous driving? Sources include classical and current research from experimental psychology, neuroscience, behavioral economics, and neuroeconomics. Real-world applications.

Same as: PSYCH 199

PSYCH 303. Human and Machine Hearing. 3 Units.

Topics: Linear and nonlinear system theory applied to sound and hearing; understanding how to model human hearing in the form of algorithms that can process general sounds efficiently; how to construct, display, and interpret "auditory images"; how to extract features compatible with machine-learning systems; how to build systems that extract information from sound to do a job; and example applications of machine hearing to speech, music, security and surveillance, personal sound diaries, smart house, etc. Prerequisites: basic calculus and algorithms.

PSYCH 373. Research Seminar: Mind, Brain, and Computation. 1 Unit.

Faculty and student research presentations focusing on work linking cellular, systems, cognitive, behavioral, and computational neuroscience. Limited to affiliates of the Center for Mind, Brain and Computation. May be repeated for credit.

PSYCH 383. International Conflict Resolution. 3 Units.

(Same as LAW 656) This seminar examines the challenges of managing and resolving violent inter-group and international conflicts. Employing an interdisciplinary approach drawing on social psychology, political science, game theory, and international law, the course identifies various tactical, psychological, and structural barriers that can impede the achievement of efficient solutions to conflicts. We will explore a conceptual framework for conflict management and resolution that draws not only on theoretical insights, but also builds on historical examples and practical experience in the realm of conflict resolution. This approach focuses on the following questions: (1) how can the parties to conflict develop a vision of a mutually bearable shared future; (2) how can parties develop trust in the enemy; (3) how can each side be persuaded, as part of a negotiated settlement, to accept losses that it will find very painful; and (4) how do we overcome the perceptions of injustice that each side are likely to have towards any compromise solution? Among the conceptual issues we will examine include the problem of spoilers who seek to sabotage agreements, the role of mediators, the role international legal rules can play in facilitating or impeding conflict resolution, and the advantages and disadvantages of unilateral versus and reciprocal measures in advancing conflict resolution efforts. Particular conflicts we will explore include the Northern Ireland conflict, the Israeli-Palestinian conflict, and the U.S.-Soviet Cold War rivalry. Prerequisite for undergraduates: consent of instructor. Same as: IPS 250

PSYCH 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOC 459, BIOE 459, CHEM 459, CHEMENG 459

PSYCH 801. Master's TGR Project. 0 Units.

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PSYCH 802. PhD TGR Dissertation. 0 Units.

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Public Policy Courses

PUBLPOL 55N. Public Policy and Personal Finance. 3 Units.

The seminar will provide an introduction and discussion of the impact of public policy on personal finance. Voters regularly rate the economy as one of the most important factors shaping their political views and most of those opinions are focused on their individual bottom lines. In this course we will discuss the rationale for different public policies and how they affect personal financial situations. We will explore personal finance issues such as taxes, loans, charity, insurance, and pensions. Using the context of (hypothetical) personal finance positions, we will discuss the public policy implications of various proposals and how they affect different groups of people, for example: the implications of differential tax rates for different types of income, the promotion of home ownership in the U.S., and policies to care for our aging population. While economic policy will be the focus of much of the course, we will also examine some of the implications of social policies on personal finance as well. There will be weekly readings and several short policy-related writing assignments.

Same as: ECON 25N

PUBLPOL 101. Politics and Public Policy. 4-5 Units.

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. (This course has merged with Political Science 2.).

Same as: POLISCI 123, PUBLPOL 201

PUBLPOL 102. Organizations and Public Policy. 4-5 Units.

Analysis of organizational processes emphasizing organizations that operate in a non-market environment. Prerequisite: ECON 1.

Same as: PUBLPOL 202

PUBLPOL 103C. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S, POLISCI 336S, PUBLPOL 307

PUBLPOL 103D. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.].

Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, URBANST 122

PUBLPOL 103E. Ethics on the Edge Public Policy Core Seminar. 2 Units.

[Note: This two-credit seminar accompanies Ethics on the Edge (Public Policy 134) and gives enrollment preference to Public Policy majors seeking to fulfill the core requirement (and are required to do so) or upon permission of instructor. (The required course, Public Policy 103C, can be fulfilled by taking Ethics on the Edge (Public Policy 134, 3 units) and this Ethics on the Edge Public Policy Core Seminar (Public Policy 103E, 2 units) for a total of 5 units.) It is not required for Ways of Thinking credit or to gain credit towards Ethics in Society, Science, Technology and Society, or general course credit. It may not be taken as a stand-alone class except in exceptional circumstances on permission from the instructor.] The seminar-style course will explore additional foundational readings on organizational ethics and policy ethics. Organizing themes include, among others: ethics of leadership; ethics of persuasion; the influence of bias in organizational and policy ethics; discrepancies between discourse and action; and interpreting and explaining ethics. In addition, the course will offer training in a wide variety of skills for effective communication of ethics for policy purposes (presentations, website discourse, commenting in meetings and conferences, interviews, statement of personal views, interacting with the media, prioritizing arguments, and mapping complex ethical analysis). Most of the assignments allow students flexibility to explore topics of their choice. The objective is to engage actively and improve skills in a supportive environment. A short but analytically rigorous final paper in lieu of final exam. Attendance required. Grading will be based on short assignments, class participation, and the short final paper.

PUBLPOL 104. Economic Policy Analysis. 4-5 Units.

The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and ECON 102B.

Same as: ECON 150, PUBLPOL 204

PUBLPOL 105. Empirical Methods in Public Policy. 5 Units.

Methods of empirical analysis and applications in public policy. Emphasis on causal inference and program evaluation. Public policy applications include health, education, and labor. Assignments include hands-on data analysis, evaluation of existing literature, and a final research project. Objective is to obtain tools to 1) critically evaluate evidence used to make policy decisions and 2) perform empirical analysis to answer questions in public policy. Prerequisites: ECON 102B.

Same as: PUBLPOL 205

PUBLPOL 106. Law and Economics. 4-5 Units.

This course explores the role of law in promoting economic welfare. Law has many meanings and many aspects, but some version of it is essential to cooperative human interaction and thus to civilization itself. Cooperation often is a positive-sum or welfare-enhancing activity, while competition among individuals, in contrast, is often zero- or negative-sum. Law, among its other functions, can serve as a mechanism to harmonize private incentives to achieve cooperative gains, to maintain an equitable division of those gains, and to deter "cheating." Economic analysis of law focuses on the welfare-enhancing incentive effects of law and law enforcement and on law's role in reducing the risks of cooperation by setting expectations of "what courts or the state will do" in various contingencies. Prerequisite: Econ 50.

Same as: ECON 154, PUBLPOL 206

PUBLPOL 107. Public Finance and Fiscal Policy. 5 Units.

What role should and does government play in the economy? What are the effects of government spending, borrowing, and taxation on efficiency, equity and economic stability and growth? The course covers economic analysis, statistical evidence and historical and current fiscal policy debates in the U.S. and around the world. Policy topics: Fiscal crises, budget surpluses/deficits; tax reform; social security, public goods, and externalities; fiscal federalism; public investment; and cost-benefit analysis. Prerequisites: ECON 51, ECON 52 (can be taken concurrently). Same as: ECON 141

PUBLPOL 115. Practical Training. 1-5 Unit.

Qualified Public Policy students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. Prior to enrolling students must get internship approved by the Public Policy Program. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. May be repeated for credit.

PUBLPOL 120. Social Science Field Research Methods and Applications. 5 Units.

This course teaches the basics of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course first introduces observational field research and compares it with experimental field research. Significant attention will be devoted to explaining what can and cannot be learned each type of field research. The details of designing both types of field research projects will then be discussed. The basics theory of the design of statistical experiments will be introduced and applied. Topics covered include sample size selection, power and size of statistical hypothesis tests, sample selection bias and methods for accounting for it. Examples of best practice field research studies will be presented as well as examples of commonly committed errors. Practical aspects of field work will also be covered, including efficient and cost-effective data collection, data analysis, teamwork, and common ethical considerations. Students can apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 or 1A or 1V and either STATS 60 or Econ 102A or equivalent. Same as: ECON 121, PUBLPOL 220

PUBLPOL 121. Policy and Climate Change. 4-5 Units.

Science and economics, including recent findings. History and evolution of local, state, regional, national, and international policy. California's recent landmark climate change bill. Future policy prospects, emphasizing national and international levels.

PUBLPOL 121L. Racial-Ethnic Politics in US. 5 Units.

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. Stats 60 or Econ 1 is strongly recommended. Same as: AMSTUD 121L, CSRE 121L, POLISCI 121L

PUBLPOL 122. Biosecurity and Bioterrorism Response. 4-5 Units.

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. This course satisfies the TiS requirement for Engineering students; please check with your major advisor to verify this. 4 units for twice weekly attendance (Mon. and Wed.); additional 1 unit for writing a research paper for 5 units total maximum. PLEASE NOTE: This class will meet for the first time on Wednesday, April 1.

Same as: BIOE 122, SURG 122

PUBLPOL 124. What's Wrong with American Government? An Institutional Approach. 5 Units.

How politicians, once elected, work together to govern America. The roles of the President, Congress, and Courts in making and enforcing laws. Focus is on the impact of constitutional rules on the incentives of each branch, and on how they influence law. Fulfills the Writing in the Major Requirement for Political Science majors.

Same as: POLISCI 120C

PUBLPOL 125. Law and Public Policy. 5 Units.

Do iquest;Super PACs;quest; and corporate lobbying corrupt democratic elections? Do Democratic and Republican economic proposals hold up to scrutiny? Can a state prevent you from buying and carrying a gun? How would Martin Luther King analyze American society, public policy and racial discourse had he lived to celebrate the 50th anniversary of his iquest;.I Have A Dream;quest; speech this year? This seminar investigates the relationship between law and public policy on issues related to economic regulation, electoral politics and finance, civil rights, sexuality and culture. We will explore how law both facilitates and constrains public policy reforms in historical context and our own era of challenging budgetary pressures, intensive political division, and increasing socio-economic inequality. Class discussion will involve the close reading and interpretation of judicial opinions, legislation and other legal texts, interdisciplinary scholarship, and film.

PUBLPOL 126B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: AFRICAAM 126B, CSRE 126B, EDUC 136B, EDUC 236B

PUBLPOL 128. International Problem-Solving Through NGOs: Policy, Players, Strategies, and Ethics. 2 Units.

This course will focus on advanced international problem-solving through the lens of international NGOs, while integrating other relevant players that address global issues within a lens of ethics and accountability. Particular aspects of NGOs that will be assessed are: policy, business, strategy, and engagement with other players. Students will consider the major issues that international NGOs face in their effort to effect positive change in an increasingly complex global environment. The course draws heavily on a series of sophisticated case studies involving a variety of NGOs, areas of specialization, and geographic regions. Topics may include: poverty and famine; the natural resources curse; terrorism; HIV/Aids and other epidemics and neglected diseases; natural disasters and emergencies; climate change; and contagion of unethical behavior. A final project tailored to each student's interest will be in lieu of a final exam. Students will have the opportunity to work with several internationally prominent guests.

Same as: INTNLREL 128B, PUBLPOL 228

PUBLPOL 132. The Politics of Policy Making. 3 Units.

Public policymaking in the United States is part of a political process that can take years or even decades to play out. A familiarity with the politics of policymaking is key to understanding why some reform attempts are successful while others are not. This course will give students a behind-the-scenes look at how policy actually gets made. Students will gain exposure to the theory and literature behind policy formulation, and engage in debates over historical and contemporary efforts at reform.

Same as: PUBLPOL 232

PUBLPOL 133. Political Power in American Cities. 5 Units.

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

Same as: AMSTUD 121Z, POLISCI 121, URBANST 111

PUBLPOL 134. Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals. 3 Units.

The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, and the law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: Ebola; Facebook's mood manipulation research and teen suicides from social media bullying; Google's European "right to be forgotten" and driverless cars; Space X (Elon Musk's voyages to Mars); ISIS' interaction with international NGOs; sexual assault on U.S. university campuses and in the U.S. military; the ethics of corporate social responsibility (through companies such as L'Oreal, Whole Foods and Walmart); corporate and financial sector scandals; and non-profit sector ethics challenges. Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities beyond speaking in class). Strong emphasis on critical thinking and testing ideas in real-world contexts. There will be a limited number of openings above the set enrollment limit of 40 students. If the enrollment limit is reached, students wishing to take the course should contact Dr. Susan Liataud at susan11@stanford.edu. The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with Public Policy 103E), and Science, Technology and Society and satisfies the Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. *Public Policy majors taking the course to complete the core requirements must obtain a letter grade. Other students may take the course for a letter grade or C/NC. Same as: ETHICSOC 234R, PUBLPOL 234

PUBLPOL 135. Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area. 3 Units.

Dynamics of regional leadership and decision making in Silicon Valley, a complex region composed of 40 cities and four counties without any overarching framework for governance. Formal and informal institutions shaping outcomes in the region. Case studies include transportation, workforce development, housing and land use, and climate change.

PUBLPOL 137. Innovations in Microcredit and Development Finance. 3 Units.

The role of innovative financial institutions in supporting economic development, the alleviation of rural and urban poverty, and gender equity. Analysis of the strengths and limits of commercial banks, public development banks, credit unions, and microcredit organizations both in the U.S. and internationally. Readings include academic journal articles, formal case studies, evaluations, and annual reports. Priority to students who have taken any portion of the social innovation series: URBANST 131, 132, or 133. Recommended: ECON 1A or 1B.

Same as: URBANST 137

PUBLPOL 143. Finance and Society for non-MBAs. 4 Units.

This interdisciplinary course will discuss the role of the financial system in the economy and its interactions with different parts of society. The course will introduce basic finance concepts, cover the basic economic principles essential for understanding the role of finance in the economy, provide an overview of the different institutions in the system, and discuss of policy issues around financial regulation. Topics to be discussed include: the basics of financial decisions and markets; from micro finance to global mega-banks: how and why finance can benefit society as well as endanger and harm; financial regulation: why and how; other people's money: the challenge of effective control, governance, and trust; the politics of banking and finance. Prerequisite: Econ 1.
Same as: ECON 143

PUBLPOL 144. Giving 2.0: Philanthropy by Design. 4 Units.

Seminar and practicum. Students drive an actual \$10,000 philanthropic process and design their own social change strategy. Topics: strategic planning, nonprofit assessment and site visits, innovative social change models, and leadership development. Speakers include philanthropic leaders and social entrepreneurs. Class activities: group grant assessments and selection, creative problem solving, and decision-making simulations. Individual project: Social Impact Strategic Plan. Must attend first class; limited enrollment. Recommended: PUBPOL 183.

PUBLPOL 146. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.

In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency -- policy formation, communications, grassroots strategy, digital outreach, campaign finance -- and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter.

Same as: POLISCI 72, PUBLPOL 246

PUBLPOL 154. Politics and Policy in California. 3 Units.

State politics and policy making, including the roles of the legislature, legislative leadership, governor, special interests, campaign finance, advocacy groups, ballot initiatives, state and federal laws, media, and research organizations. Case studies involving budgets, education, pensions, health care, political reform, environmental reforms, water, transportation and more. Evaluation of political actions, both inside and outside of government, that can affect outcomes. Enrollment limited to 20 students. One day trip to Sacramento.

PUBLPOL 155. Disruption for Good- Technology, Innovation and Philanthropy. 2 Units.

A new breed of technologies and nonprofits are driving unprecedented innovation in how we create, deliver and measure social change. Innovative models and technology's extraordinary potential to transform billions of individual lives. Topics: social network campaigns, mobile platforms and international development, apps for good, crowdsourcing, crowdfunding, creative swarms, nonprofit evaluators, and new generation corporate philanthropy. Readings: articles, blogs, studies, book chapters and websites. Guest speakers include technology, nonprofit and philanthropic leaders. Individual Project: "Unusual Suspects" Technology Innovators interviews and paper. Must attend first class; limited enrollment.

PUBLPOL 156. Health Care Policy and Reform. 4 Units.

Focuses on healthcare policy at the national, state, and local levels. Includes sessions on international models, health insurance, the evolution of healthcare policy in the U.S., key U.S. healthcare topics (Patient Protection and Affordable Care Act [PPACA], Medicare, Medicaid, public employee retiree health care), the role of technology, reform proposals (single payer, national health care, market-based systems, regulated markets, state and local reform efforts), efficiency/cost drivers and prospects for future policy. We expect to spend at least two sessions on recent developments surrounding PPACA (aka Obamacare) and its implementation.

PUBLPOL 157. Political Data Science. 5 Units.

Introduction to methods of research design and data analysis used in quantitative political research. Topics covered include hypothesis testing, linear regression, experimental and observational approaches to causal inference, effective data visualization, and working with big data. These topics will be introduced using data sets from American politics, international relations, and comparative politics. The course begins with an intensive introduction to the R programming language used throughout the course. Satisfies quantitative methods requirement for the Political Science Research Honors Track. Prerequisites: Stat 60 or instructor consent.
Same as: POLISCI 155

PUBLPOL 168. Global Organizations: Managing Diversity. 4 Units.

Analytical tools derived from the social sciences to analyze global organizations, strategies, and the tradeoffs between different designs of organizations. Focus is on tribal mentality and how to design effective organizations for policy implementation within and across institutional settings. Recommended: PUBLPOL 102, MS&E 180, SOC 160, ECON 149, or MGTECON 330.

Same as: PUBLPOL 268, SOC 168, SOC 268

PUBLPOL 170. Political Corruption. 2 Units.

Sources and effects of political corruption in the United States, with focus on potential solutions. Perspectives include political contribution and lobbying laws, rational and passionate collective action incentives, welfare effects of congressional control of the administrative state, voter behavior, agency theory, and the role of competition among politicians and interest groups. Grading based on participation and term paper. Enrollment is limited to 15 students and permission of the instructor required. Email bruceowen@stanford.edu.

Same as: PUBLPOL 270

PUBLPOL 174. The Urban Economy. 4 Units.

Applies the principles of economic analysis to historical and contemporary urban and regional development issues and policies. Explores themes of urban economic geography, location decision-making by firms and individuals, urban land and housing markets, and local government finance. Critically evaluates historical and contemporary government policies regulating urban land use, housing, employment development, and transportation. Prerequisite: Econ 1A or permission of instructor.

Same as: URBANST 173

PUBLPOL 183. Philanthropy and Social Innovation. 4 Units.

Philanthropic innovation, action and social transformation in the 21st century. Topics: individual giving; philanthropic landscape and models; foundation mission and infrastructure; philanthropic strategy and grantmaking; accountability and knowledge management; global, venture and corporate philanthropy; public policy and advocacy. Readings: business school cases and industry articles. Guest speakers include individual donors and foundation presidents. Class activities: case discussions, role-plays, breakouts, and debates. Individual project: \$10 million Foundation Business Plan. Must attend first class; limited enrollment.

PUBLPOL 184. Poverty and Policies in Developing Economies. 5 Units.

Economic models of growth and poverty, differences in growth rates among countries, and the persistence of poverty. Models of physical and human capital accumulation, and recent theories of the importance of institutions, social capital, and political factors. The effectiveness of social policies in developing countries, emphasizing India, in the light of theories of growth and poverty, and in terms of immediate goals and long-term consequences. Policies include schooling and health, anti-poverty, banking, and political decentralization. Limited Enrollment. Prerequisites: ECON 1 and ECON 50.

PUBLPOL 194. Technology Policy. 3-4 Units.

How the U.S. federal government promotes, uses, and regulates new technologies; tensions between representative governance and the need for elite expertise in policymaking; contemporary debates over international security, energy, health, information technology, and economic competitiveness. Recommended: POLISCI 2.

Same as: PUBLPOL 294

PUBLPOL 197. Junior Honors Seminar. 5 Units.

Primarily for students who expect to write an honors thesis. Weekly sessions discuss writing an honors thesis proposal (prospectus), submitting grant applications, and completing the honors thesis. Readings focus on writing skills and research design. Students select an adviser, outline a program of study for their senior year, and complete a prospectus by the end of the quarter. Enrollment limited to 12.

Same as: ECON 198

PUBLPOL 198. Directed Readings in Public Policy. 1-5 Unit.

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PUBLPOL 199. Senior Research. 1-15 Unit.

May be repeated for credit.

PUBLPOL 200A. Senior Practicum. 5 Units.

Small student teams conduct policy analyses requested by government and nonprofit organizations. With guidance from the instructor and client organization, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the client organization. Prerequisites: core courses in Public Policy or consent of instructor.

PUBLPOL 200B. Senior Practicum. 5 Units.

Small student teams conduct policy analyses requested by government and nonprofit organizations. With guidance from the instructor and client organization, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the client organization. Prerequisites: core courses in Public Policy or consent of instructor.

PUBLPOL 200C. Senior Practicum. 5 Units.

Small student teams conduct policy analyses requested by government and nonprofit organizations. With guidance from the instructor and client organization, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the client organization. Prerequisites: core courses in Public Policy or consent of instructor.

PUBLPOL 200H. Senior Honors Seminar. 3 Units.

Students conduct original research for oral presentations and a paper on a policy-related topic. Topic and methods of analysis determined by student in consultation with instructor. Goal is to improve analytical, research, writing, and communication skills. Prerequisites: core courses in Public Policy or consent of instructor.

PUBLPOL 201. Politics and Public Policy. 4-5 Units.

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. (This course has merged with Political Science 2.).

Same as: POLISCI 123, PUBLPOL 101

PUBLPOL 202. Organizations and Public Policy. 4-5 Units.

Analysis of organizational processes emphasizing organizations that operate in a non-market environment. Prerequisite: ECON 1.

Same as: PUBLPOL 102

PUBLPOL 204. Economic Policy Analysis. 4-5 Units.

The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and ECON 102B.

Same as: ECON 150, PUBLPOL 104

PUBLPOL 205. Empirical Methods in Public Policy. 5 Units.

Methods of empirical analysis and applications in public policy. Emphasis on causal inference and program evaluation. Public policy applications include health, education, and labor. Assignments include hands-on data analysis, evaluation of existing literature, and a final research project. Objective is to obtain tools to 1) critically evaluate evidence used to make policy decisions and 2) perform empirical analysis to answer questions in public policy. Prerequisites: ECON 102B.

Same as: PUBLPOL 105

PUBLPOL 206. Law and Economics. 4-5 Units.

This course explores the role of law in promoting economic welfare. Law has many meanings and many aspects, but some version of it is essential to cooperative human interaction and thus to civilization itself. Cooperation often is a positive-sum or welfare-enhancing activity, while competition among individuals, in contrast, is often zero- or negative-sum. Law, among its other functions, can serve as a mechanism to harmonize private incentives to achieve cooperative gains, to maintain an equitable division of those gains, and to deter "cheating." Economic analysis of law focuses on the welfare-enhancing incentive effects of law and law enforcement and on law's role in reducing the risks of cooperation by setting expectations of "what courts or the state will do" in various contingencies. Prerequisite: Econ 50.

Same as: ECON 154, PUBLPOL 106

PUBLPOL 220. Social Science Field Research Methods and Applications. 5 Units.

This course teaches the basics of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course first introduces observational field research and compares it with experimental field research. Significant attention will be devoted to explaining what can and cannot be learned each type of field research. The details of designing both types of field research projects will then be discussed. The basics theory of the design of statistical experiments will be introduced and applied. Topics covered include sample size selection, power and size of statistical hypothesis tests, sample selection bias and methods for accounting for it. Examples of best practice field research studies will be presented as well as examples of commonly committed errors. Practical aspects of field work will also be covered, including efficient and cost-effective data collection, data analysis, teamwork, and common ethical considerations. Students can apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 or 1A or 1V and either STATS 60 or Econ 102A or equivalent.

Same as: ECON 121, PUBLPOL 120

PUBLPOL 222. Biosecurity and Bioterrorism Response. 2-5 Units.

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. 2 unit option for once weekly attendance (Wed only); 4 unit option for twice weekly attendance (Mon and Wed); 1 additional units (for a maximum of 5 units total) for a research paper.

Same as: SURG 122, SURG 222

PUBLPOL 228. International Problem-Solving Through NGOs: Policy, Players, Strategies, and Ethics. 2 Units.

This course will focus on advanced international problem-solving through the lens of international NGOs, while integrating other relevant players that address global issues within a lens of ethics and accountability. Particular aspects of NGOs that will be assessed are: policy, business, strategy, and engagement with other players. Students will consider the major issues that international NGOs face in their effort to effect positive change in an increasingly complex global environment. The course draws heavily on a series of sophisticated case studies involving a variety of NGOs, areas of specialization, and geographic regions. Topics may include: poverty and famine; the natural resources curse; terrorism; HIV/Aids and other epidemics and neglected diseases; natural disasters and emergencies; climate change; and contagion of unethical behavior. A final project tailored to each student's interest will be in lieu of a final exam. Students will have the opportunity to work with several internationally prominent guests.

Same as: INTNLREL 128B, PUBLPOL 128

PUBLPOL 231. Health Law: Finance and Insurance. 3 Units.

(SAME AS LAW 348, MGTECON 331) Provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. Potential topics include: health reform, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), medical malpractice and quality regulation, pharmaceuticals, the corporate practice of medicine, regulation of fraud and abuse, and international comparisons.

Same as: HRP 391

PUBLPOL 232. The Politics of Policy Making. 3 Units.

Public policymaking in the United States is part of a political process that can take years or even decades to play out. A familiarity with the politics of policymaking is key to understanding why some reform attempts are successful while others are not. This course will give students a behind-the-scenes look at how policy actually gets made. Students will gain exposure to the theory and literature behind policy formulation, and engage in debates over historical and contemporary efforts at reform.

Same as: PUBLPOL 132

PUBLPOL 234. Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals. 3 Units.

The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, and the law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: Ebola; Facebook's mood manipulation research and teen suicides from social media bullying; Google's European "right to be forgotten" and driverless cars; Space X (Elon Musk's voyages to Mars); ISIS' interaction with international NGOs; sexual assault on U.S. university campuses and in the U.S. military; the ethics of corporate social responsibility (through companies such as L'Oreal, Whole Foods and Walmart); corporate and financial sector scandals; and non-profit sector ethics challenges. Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities beyond speaking in class). Strong emphasis on critical thinking and testing ideas in real-world contexts. There will be a limited numbers of openings above the set enrollment limit of 40 students. If the enrollment limit is reached, students wishing to take the course should contact Dr. Susan Liautaud at susanl1@stanford.edu. The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with Public Policy 103E), and Science, Technology and Society and satisfies the Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. *Public Policy majors taking the course to complete the core requirements must obtain a letter grade. Other students may take the course for a letter grade or C/NC. Same as: ETHICSOC 234R, PUBLPOL 134

PUBLPOL 236. Law and Public Policy: Issues in Implementation. 3 Units.

(Same as LAW 636). This seminar will focus on issues related to achieving successful implementation of the goals of legislation. It is widely recognized that the goals of legislation often are not realized and that the failure frequently rests in breakdowns in the implementation process by the agencies and organizations charged with implementing the legislation. In response to problems in implementation, the institutional context of public policy implementation is changing. One category of innovations, known by names such as "management-based regulation" and "evidence-based" social service delivery, gives broad discretion to street-level service providers but subjects them to intensive monitoring and disciplined performance comparison. Another category applies market concepts to regulation or social services, for example, by creating tradeable rights (e.g., pollution allowances) or vouchers (for schools, housing, or healthcare). These, and other, new approaches are affecting both the contours of public law doctrine and the nature of lawyering in the public sector. Lawyers in the public sector are increasingly drawing on skills of institutional design and monitoring of the kind associated with private sector transactional practice. The seminar will examine some of the emerging general themes of innovative policy implementation and look at a range of case studies. Topics will include the conditions under which financial and other rewards and sanctions are useful in bringing about desired behaviors, the pluses and minuses of the creation of markets as alternatives to government run programs, and efforts at improving implementation by improving management activities. Examples will be taken from both regulation and social services, and are likely to include environmental protection, education, child protective services, healthcare, food and workplace safety, nuclear power safety, and regulation of financial institutions.

PUBLPOL 242. Design Thinking for Public Policy Innovators. 3-4 Units.

This class will explore how the methods and mindsets of design thinking - in particular its emphasis on a human-centered approach - can offer new insights that help lead to policy innovations. You will investigate the origins and impact of local policies, diagnose where opportunity for innovation and improvement lies, and redesign one facet of a recent and real policy currently being implemented. Your goal will be to design and test interactions that aim to fundamentally improve the way key public services or policies are being administered. Throughout the class you will tackle two design challenges, requiring collaboration with other students from across the university. You must be able to commit to team collaboration that happens outside of class while the design projects are in full swing, including trips off-campus. Be prepared to get beyond Stanford and engage people in surrounding communities to understand recent policy changes through their perspective. The topics for the projects in this class will be driven by student interest; you will be pushed to pursue and frame challenges that are meaningful to you and your team. Given what's going on in the world today, we imagine that topics might range from immigration to marriage equality to zoning and property policies that affect gentrification and development... and beyond. This class is for you if you like to have a high degree of ownership and accountability for the projects you work on. Limited enrollment. Admission by application. See <http://dschool.stanford.edu/classes>.

PUBLPOL 246. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.

In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency -- policy formation, communications, grassroots strategy, digital outreach, campaign finance -- and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter.

Same as: POLISCI 72, PUBLPOL 146

PUBLPOL 268. Global Organizations: Managing Diversity. 4 Units.

Analytical tools derived from the social sciences to analyze global organizations, strategies, and the tradeoffs between different designs of organizations. Focus is on tribal mentality and how to design effective organizations for policy implementation within and across institutional settings. Recommended: PUBLPOL 102, MS&E 180, SOC 160, ECON 149, or MGTECON 330.

Same as: PUBLPOL 168, SOC 168, SOC 268

PUBLPOL 270. Political Corruption. 2 Units.

Sources and effects of political corruption in the United States, with focus on potential solutions. Perspectives include political contribution and lobbying laws, rational and passionate collective action incentives, welfare effects of congressional control of the administrative state, voter behavior, agency theory, and the role of competition among politicians and interest groups. Grading based on participation and term paper. Enrollment is limited to 15 students and permission of the instructor required. Email bruceowen@stanford.edu.

Same as: PUBLPOL 170

PUBLPOL 294. Technology Policy. 3-4 Units.

How the U.S. federal government promotes, uses, and regulates new technologies; tensions between representative governance and the need for elite expertise in policymaking; contemporary debates over international security, energy, health, information technology, and economic competitiveness. Recommended: POLISCI 2.

Same as: PUBLPOL 194

PUBLPOL 298. Directed Readings in Public Policy. 1-5 Unit.**PUBLPOL 301A. Microeconomics. 4 Units.**

Microeconomic concepts relevant to decision making. Topics include: competitive market clearing, price discrimination; general equilibrium; risk aversion and sharing, capital market theory, Nash equilibrium; welfare analysis; public choice; externalities and public goods; hidden information and market signaling; moral hazard and incentives; auction theory; game theory; oligopoly; reputation and credibility. Prerequisites: ECON 50 and MATH 51 or equiv.

Same as: IPS 204A

PUBLPOL 301B. Cost-Benefit Analysis and Evaluation. 4-5 Units.

This class provides the economic and institutional background necessary to use "cost-benefit analysis" or CBA to evaluate public policy. We will examine the economic justification for government intervention and apply these concepts in different policy contexts. We will also examine the theoretical foundations and the practical challenges of implementing CBA. The goal of the course is to provide you with the conceptual foundations and practical skills you will need to be thoughtful consumers or producers of CBA. Prerequisites: ECON 102B or PUBLPOL 303D.

Same as: IPS 204B

PUBLPOL 302A. Introduction to American Law. 3-5 Units.

For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general.

Same as: AMSTUD 179, POLISCI 122

PUBLPOL 302B. Economic Analysis of Law. 4 Units.

(Same as LAW 528.) This course will provide a broad overview of the scholarly field known as "law and economics." The focus will be on how legal rules and institutions can correct market failures. We will discuss the economic function of contracts and, when contracts fail or are not feasible, the role of legal remedies to resolve disputes. We will also discuss at some length the choice between encouraging private parties to initiate legal actions to correct externalities and governmental actors, such as regulatory authorities. Extensive attention will be given to the economics of litigation, and to how private incentives to bring lawsuits differs from the social value of litigation. The economic motive to commit crimes, and the optimal governmental response to crime, will be studied in depth. Specific topics within the preceding broad themes include: the Coase Theorem; the tradeoff between the certainty and severity of punishment; the choice between ex ante and ex post sanctions; negligence versus strict liability; property rules; remedies for breach of contract; and the American rule versus the English rule for allocating litigation costs. Because this course is taught jointly with Law 528 in the Law School, it will not be mathematically oriented; there are no prerequisites to take the course.

PUBLPOL 303B. Political Methodology II: Causal Inference. 5 Units.

Survey of statistical methods for causal inference in political science research. Covers a variety of causal inference designs, including experiments, matching, regression, panel methods, difference-in-differences, synthetic control methods, instrumental variables, regression discontinuity designs, quantile regression, and bounds. Students should have already taken 350A. Please contact the instructor if you have not and would still like to enroll.

Same as: POLISCI 350B

PUBLPOL 303C. Bayesian Statistics and Econometrics. 5 Units.

(Same as LAW 243.) Linear and nonlinear regression, covariance structures, panel data, qualitative variable models, nonparametric and semiparametric methods, time series, Bayesian model averaging and variable selection. It explores Bayesian methodology including Markov Chain Monte Carlo methods, hierarchical models, model checking, mixture models, empirical Bayes approaches, approximations, and computational issues and gives some attention to foundations. Prerequisite: graduate-level econometrics or equivalent.

PUBLPOL 303D. Applied Econometrics for Public Policy. 4-5 Units.

This course aims to present the theory and practice of empirical research in economics with particular emphasis on topics relating to public policy questions. We will start with basic regression analysis and introduce the statistical software STATA. The course will put a substantial amount of effort on work with STATA in analyzing actual data sets, reproducing and criticizing results in scientific research and learning the actual practice of econometrics. We will focus on the identification of causal effects and the various econometric techniques available to learn about causality. While this is primarily a methodology module, most examples and applications will be drawn from the area of public policy. Prerequisite: Econ 102A.

PUBLPOL 304A. Collective Action Problems: Ethics, Politics, & Culture. 3-4 Units.

When acting on one's own, it is often easy to know what the morally right action is. But many moral problems arise from the fact that many individuals act together leading to dilemmas, in which what is individually rational is collectively irrational. For example, the collective result of our consumption decisions is to warm the planet. But individual decisions seem to have no effect on climate change. Such collective action situations give rise to moral questions: Are individuals required to take their contributions to wider systemic effects into account? Does it make a difference whether or not others are doing their share, for example with regard to fighting global poverty? In many cases, the best solution for collective action problems are institutions. But when these are deficient or non-existing, what should individuals do? Do they have a duty to assist in building institutions, and what would this duty imply in practical terms? Interdisciplinary perspective, reading authors from philosophy, politics, economics and sociology such as Elinor Ostrom, Peter Singer or Liam Murphy, relating to current questions such as global poverty and climate change. No background assumed; no mathematical work required.

Same as: ETHICSOC 180M, PHIL 73, POLISCI 131A

PUBLPOL 305A. Problem Solving and Decision Making for Public Policy and Social Change. 4-5 Units.

This course introduces skills and bodies of knowledge useful for careers in law, public policy, and achieving social change at scale. These include framing problems; designing, implementing and evaluating strategies; systems design; cost-benefit analysis; decision making under uncertainty; heuristics and biases that affect empirical judgments and decision making; methods for influencing people's behavior ranging from incentives and penalties to "nudges"; and human-centered design. The course will be taught through problems, cases, and a field project to solve real-world problems on or near the Stanford campus, with the goal of integrating strategic thinking and behavioral insights with human-centered design and systems design. Enrollment: Limited to 30 students, with priority given to students in the Law School, the MPP program, and the IPS program, in that order. This course is cross-listed with the Law School (LAW 333) and International Policy Studies (IPS 207A).

Same as: IPS 207A

PUBLPOL 305B. Public Policy and Social Psychology: Implications and Applications. 4 Units.

Theories, insights, and concerns of social psychology relevant to how people perceive issues, events, and each other, and links between beliefs and individual and collective behavior will be discussed with reference to a range of public policy issues including education, public health, income and wealth inequalities, and climate change. Specific topics include: situationist and subjectivist traditions of applied and theoretical social psychology; social comparison, dissonance, and attribution theories; stereotyping and stereotype threat, and sources of intergroup conflict and misunderstanding; challenges to universality assumptions regarding human motivation, emotion, and perception of self and others; also the general problem of producing individual and collective changes in norms and behavior.

Same as: IPS 207B, PSYCH 216

PUBLPOL 306. Writing and Rhetoric for Policy Audiences. 4 Units.

This course offers hands-on learning of effective writing and presentation techniques for audiences that include policy makers, decision stakeholders, interest groups, the media, and the public. Class time will be spent learning lessons in rhetoric, analyzing multiple written genres (memo, op-ed, report, media communications), participating in peer review, and practicing presentation strategies (elevator pitch, press conference, media interview, board meeting, formal presentation). Course texts include sample memos, op-eds, and white papers, as well as rhetoric handouts and videos. Students will draft, revise, and submit writing for policy audiences in the compilation of a final portfolio. Students will also produce oral and multimedia arguments, individually and in teams. Students will be responsible for timely peer review and short presentations on course materials. Enrollment limited. Prerequisite: consent of instructor.

PUBLPOL 307. Justice. 4-5 Units.

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S, POLISCI 336S, PUBLPOL 103C

PUBLPOL 308. Political Analysis for Public Policymakers. 4 Units.

Policymakers in the United States, whether elected or unelected, operate in a governmental system where politics pervades nearly every element of their daily activity. This course provides students with both the theory and real-world examples they need to understand and evaluate the impact of politics, political institutions, and the political process on policymaking. Readings will include selections from the public policy, political science, legal, and economics literatures.

PUBLPOL 309. Practicum. 1-10 Unit.

Applied policy exercises in various fields. Multidisciplinary student teams apply skills to a contemporary problem in a major policy exercise with a public sector client such as a government agency. Problem analysis, interaction with the client and experts, and presentations. Emphasis is on effective written and oral communication to lay audiences of recommendations based on policy analysis.

PUBLPOL 309X. Public Policy Research Project. 1-10 Unit.

Supervised research internship. Individual students perform policy research for outside client, applying analytical skills from core curriculum. Requires permission of program director.

PUBLPOL 310. Master of Arts Thesis. 1-5 Unit.

Restricted to students writing a master's thesis in Public Policy. May be repeated for credit.

PUBLPOL 311. Public Policy Colloquium. 1 Unit.

Weekly colloquia speaker series required for M.P.P. and M.A. in Public Policy students. Themes vary each quarter.

PUBLPOL 313. Issues in Science Policy. 1 Unit.

Lecture series on significant issues in science and technology policy. Guest speakers will discuss issues including but not limited to: who should make science policy, educational dimension of science policy, manufacturing and science policy, California's stem cell policy, immigration and science policy, and the role of industry in science policy.

PUBLPOL 315. Practical Training. 1-5 Unit.

Qualified Public Policy students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. Prior to enrolling students must get internship approved by the Public Policy Program. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. May be repeated for credit.

PUBLPOL 317. Comparing Institutional Forms: Public, Private, and Nonprofit. 4 Units.

For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials.

Same as: EDUC 377, GSBGEN 346, SOC 377

PUBLPOL 319. Legislation. 3 Units.

(Same as LAW 319) Lawyers work in a legal system largely defined by statutes, and constantly shaped by the application of legislative power. This course is about statutes and the legislative institutions that create them. It discusses some of the key laws governing access to legislative power and the procedures that culminate in the production of statutes in the legislature. The course is divided into two parts. The first part will focus on the acquisition of legislative power. Key topics include bribery laws, lobbying and indirect influence on legislative activity, and campaign finance regulations. The second part will focus on the exercise of legislative power. Through a number of public policy case studies, students will better understand the organization of the U.S. Congress, the ways in which power is exercised in that institution, and the intersection between politics, the law, and policymaking. Elements used in grading: Class participation and final exam.

PUBLPOL 347D. Rebooting Government with Design Thinking. 3-4 Units.

Students apply tools of human-centered design to issues of government performance. Small project teams work with NGO and government partners (in the U.S. and abroad) on concrete design challenges focused on issues such as how to deliver services more effectively and ensure that citizens' voices are heard. Students identify needs, generate concepts, create prototypes, and test their appropriateness. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s).

Same as: POLISCI 347D

PUBLPOL 353. Science and Technology Policy. 3-4 Units.

How U.S. and international political institutions and processes govern science and technology; the roles of scientists, engineers, and physicians in creating and implementing policies; introduction to analytical techniques that are common to research and policy analysis in technology and public policy; and examples from specific mission areas (e.g., economic growth, health, climate, energy and the environment, information technology, international security). Assignments: analyzing the politics of particular legislative outcomes, assessing options for trying to reach a policy objective, and preparing a mock policy memo and congressional testimony. Same as: BIOE 253

PUBLPOL 354. Economics of Innovation. 5 Units.

The modern, knowledge-based economy characterized by: rapid innovation; a dramatic increase in the rate of production of information and decline in the cost of producing it; and pervasive network externalities or increasing returns to scale. Emphasis is on the role of patents and alternative mechanisms for creating incentives for firms to innovate. Topics include: why there may be too much innovative activity; how patent laws may slow rather than help innovation; and the interaction between public and private sector innovation. Prerequisites: 51,102B.

PUBLPOL 364. The Future of Finance. 2 Units.

If you are interested in a career in finance or that touches finance (legal, regulatory, corporate, public policy), this course will give you a useful perspective. We will survey the players and current landscape of the global markets as the world continues to evolve from the financial crisis. We will discuss the sweeping change underway at the policy level by regulators and legislators around the world and this will include guest-lecturer perspectives on where the greatest opportunities exist for students entering or touching the world of finance today. The course will also review, in a non-technical way, the basics of the financial derivatives and other quantitative techniques that are a core part of the global capital markets. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application found on the Public Policy website to the instructor at tbeder@stanford.edu. Please visit <https://publicpolicy.stanford.edu/academics/undergraduate/> forms to locate the Consent Application Form for this class. The form is located on the Public Policy website under "Academics" and "Forms." See Consent Application Form for submission deadline. Same as: ECON 152, ECON 252, STATS 238

PUBLPOL 413R. The National Environmental Policy Act: Pushing the Reset Button. 2 Units.

(Same as LAW 413R). This policy lab will focus on recommendations for the reform and modernization of the National Environmental Policy Act (NEPA) -- the granddaddy of our environmental laws. NEPA is a disclosure statute which requires that before federal officials can issue a permit, commit federal funds, or otherwise take an action that may have a significant impact on the environment, decision-makers must have the opportunity to review an Environmental Impact Statement (EIS) that analyzes the potential environmental consequences of the proposed action and its alternatives. Many critics from both the right and left are dissatisfied with the way that NEPA and its state analogues are being implemented, prompting some legislators to advocate statutory overrides and agency officials to expand the use of categorical exemptions. Meanwhile, NEPA proponents are interested in making the environmental review process more user-friendly and efficient, while preserving its core disclosure requirements. In this policy lab, students will review, analyze, and develop positions on potential NEPA reform options. Students will interact with NEPA experts at the White House; Council on Environmental Quality (CEQ) and produce work product that CEQ can use as it responds to Congressional and outside pressure to reform the NEPA process. Students may normally receive no more than four units for a Policy Lab practicum and no more than a total of eight units of Policy Lab practicums and Directed Research projects combined may be counted toward graduation unless additional units for graduation are approved in advanced by the Petitions Committee. A student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students) to the instructors. See Consent Application Form for submission deadline.

PUBLPOL 801. TGR Project. 0 Units.

Instructor and program consent required prior to enrollment.

ROTC Air Force Courses

ROTCAF 1. Air Force ROTC Lab. 1 Unit.

Practical leadership exercises including physical fitness training. May be repeated for credit.

ROTCAF 11. The Foundation of the United States Air Force. 1 Unit.

Introduces students to the Air Force and AFROTC with an overview of basic characteristics, missions, and organization of the Air Force; additional topics include officership and professionalism, career opportunities, military customs and courtesies, and an introduction to communications skills. May be repeat for credit.

ROTCAF 21. The Evolution of USAF Air and Space Power. 2 Units.

Examines general aspects of air and space power through historical study and analysis and provides the student with a knowledge level understanding of the capabilities, function and doctrinal employment of aerospace forces; emphasizes development of oral and written communication skills. May be repeat for credit.

ROTCAF 131. Air Force Leadership Studies. 2 Units.

Study of leadership, management fundamentals, professional knowledge, Air Force personnel system, ethics, and communication skills; develops application level knowledge of skills required of junior Air Force officer through case studies, practical exercises, and seminar discussion. May be repeat for credit.

ROTCAF 141. National Security Affairs. 2 Units.

Examines the national security process, international and regional relations, advanced leadership ethics, and Air Force doctrine with focus on the military as a profession, officership, military justice, civilian control of the military and current issues affecting military professionalism.

ROTCAF 142. PREPARATION FOR ACTIVE DUTY. 2 Units.

An examination of the role of the Air Force officer in contemporary society with emphasis on knowledge, comprehension, and application of skills needed to facilitate a smooth transition from civilian to military life. May be repeated for credit.

ROTC Army Courses

ROTCARMY 1. ARMY ROTC LAB. 1 Unit.

Leadership laboratories, held weekly for three hours, are required of all students. Performance during lab periods is reflected in the student's course grade. Labs include activities such as rappelling, terrain navigation, marksmanship, drill and ceremonies, and tactical field training exercises.

ROTCARMY 11. Leadership and Personal Development. 1 Unit.

Introduces students to the personal challenges and competencies that are critical for effective leadership. Students learn how the personal development of life skills such as goal setting, time management, physical fitness, and stress management relate to leadership and officership. Students develop their own personal fitness program under the guidance of an Army master fitness trainer.

ROTCARMY 12. Foundations in Leadership I. 1 Unit.

An overview of leadership fundamentals such as setting direction, problem solving, listening, presenting briefs, providing feedback and using effective writing skills. Students begin to explore leadership dimensions and values.

ROTCARMY 13. Foundations in Leadership II. 1 Unit.

An overview of the leadership framework with practical applications in fundamentals such as problem solving, listening, presenting briefs, and using effective writing skills. Students explore dimensions of leadership, values, attributes, skills, and actions in the context of practical, hands-on, and interactive exercises.

ROTCARMY 21. Innovative Leadership. 2 Units.

Explores the dimensions of creative leadership strategies and styles by studying historical cases and engaging in interactive exercises. Students practice aspects of personal motivation and team building within the context of planning, executing and assessing team exercises. Focus will be on the continued development of the knowledge of leadership values and attributes through an understanding of organizational customs and courtesies. Leadership case studies provide tangible context for learning Individual Creeds and Organizational Ethos.

ROTCARMY 22. Leadership in Changing Environments I. 2 Units.

Examines the challenges of leadership in complex contemporary operational environments. Dimensions of the cross-cultural challenges of leadership in a constantly changing world and their application to leadership tasks and situations. Case studies stressing importance of teamwork and tactics in real-world settings.

ROTCARMY 23. Leadership in Changing Environments II. 2 Units.

Examines the decision-making process and plans/orders that enable small units to complete assigned tasks. Planning techniques used to develop orders and briefing plans and decisions.

ROTCARMY 131. Adaptive Team Leadership. 2 Units.

Challenges students to study, practice, and evaluate adaptive leadership skills as they are presented with the demands of the ROTC Leader Development Assessment Course. Challenging scenarios related to small unit tactical operations are used to develop self-awareness and critical thinking skills. Students receive systematic and specific feedback on their leadership abilities.

ROTCARMY 132. Situational Leadership I. 2 Units.

Study of intense situational leadership challenges to build student awareness and skills in leading small units. Skills in decision-making, persuading, and motivating team members when "under fire" are explored, evaluated, and developed.

ROTCARMY 133. Situational Leadership II. 2 Units.

Practical applications of intense situational leadership challenges that will provide awareness and specific feedback on leadership abilities. Student skills are evaluated using practical applications in decision making, persuading, and motivating team members when under fire. Aspects of military operations are reviewed as a means of preparing for the ROTC Leader Development Assessment Course (LDAC).

ROTCARMY 141. Developing Adaptive Leaders. 2 Units.

Students develop proficiency in planning, executing, and assessing complex operations; in functioning as a member of a staff; and in providing leadership performance feedback to subordinates. Students are given situational opportunities to assess risk, make ethical decisions, and provide coaching to fellow ROTC students. Students are challenged to instruct younger students. Students identify responsibilities of key staff roles and use situational opportunities to develop subordinates.

ROTCARMY 142. Leadership in a Complex World I. 2 Units.

Explores the dynamics of leadership in the complexity of current military operations. Students examine customs and courtesies, military law, principles of war and rules of engagement in the face of international terrorism. Aspects of interacting with nongovernmental organizations, civilians on the battlefield, and host nation support are examined and evaluated.

ROTCARMY 143. Leadership in a Complex World II. 2 Units.

Significant emphasis is placed on preparing students for their first unit of assignment and transition to lieutenant. Case studies, scenarios, and exercises are used to prepare students to face the complex ethical and practical demands of leading as commissioned officers in the U.S. Army.

ROTCARMY 176. Military History. 2 Units.

A survey of the military and diplomatic aspects of American involvement in conflicts from the Anglo-Indian Wars to the present.

ROTC Navy Courses

ROTCNAVY 1. Naval ROTC Lab. 1 Unit.

Activities consist of drill, athletics, and professional information events. Students gain experience in actual leadership situations and learn the fundamentals of seamanship, military formations, movements, commands, discipline, courtesies, and honors. During information briefings, special emphasis is given to applied leadership as it relates to the administrative and managerial aspects of a Navy or Marine Corps officer's duties.

ROTCNAVY 11. Introduction to Naval Science. 1 Unit.

An introduction to the naval profession and to the concepts of seapower. The mission, organization, and warfare components of the Navy and Marine Corps, including an overview of officer and enlisted ranks, rates, and career patterns; naval courtesy and customs, military justice, leadership, and nomenclature are discussed.

ROTCNAVY 12. Sea Power. 2 Units.

Provides an understanding of the role that the United States Navy has played in its nation's history, both in times of peace and in times of war, from 1775 to present day. Covers the early development of sea power and its effect on world events. Examines the continued importance of sea power and the many roles of the United States Navy from war fighting entity to international maritime peacekeeper to foreign policy instrument.

ROTCNAVY 21. Leadership and Management. 2 Units.

Introduces basic management, decision making, and moral leadership. The student will learn to establish meaningful goals, prioritize among competing demands, and plan and forecast in a task-centered organization. The course includes exposure to measures of organizational effectiveness, methods to overcome resistance to change, effective communications, and techniques to aid in counseling, team building, and resolution of disciplinary and personnel matters.

ROTCNAVY 22. Naval Ship Systems - Engineering. 2 Units.

Introduces the principles of the design, construction, and propulsion of ships. Includes the analysis of ship stability and thermodynamic cycles, and provides an introduction to ship main propulsion and auxiliary systems.

ROTCNAVY 131. Navigation. 2 Units.

Introduces the fundamentals of marine navigation emphasizing piloting and electronic navigation procedures. Covers coordinate systems, chart projections, navigational aids, instruments, compass observations, time, and study of tides and currents.

ROTCNAVY 132. Naval Operations & Seamanship. 2 Units.

Application of the nautical rules and maneuvering board in order to avoid collisions at sea. Other aspects of naval surface ship operations that are introduced include visual and electronic communications methods, tactical disposition of forces, ship handling theory, and deck seamanship topics.

ROTCNAVY 141. Naval Ship Systems - Weapons. 2 Units.

Examines the principles and theories used in the development of naval weapons systems. Extensive study is made of detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, stabilizing, tracking, and weapons control and delivery.

ROTCNAVY 142. Leadership and Ethics. 2 Units.

Integrates an intellectual exploration of Western moral traditions and ethical philosophy with a variety of topics, such as military leadership, core values, and professional ethics; the Uniform Code of Military Justice and Navy regulations; and discussions relating to the roles of enlisted members, junior and senior officers, command relationships and the conduct of warfare. The course provides midshipmen with a foundation of moral traditions, combined with a discussion of actual and historical events in the United States Navy and Marine Corps to prepare them for the roles and responsibilities of Naval leadership.

Radiation Oncology Courses

RADO 101. Readings in Radiation Biology. 1-18 Unit.

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RADO 121. Imaging Anatomy in Animal Models. 3 Units.

Introduces engineering and physical science majors to the basic laboratory animal anatomy visualized and targeted with biomedical imaging. Topics include: various imaging modalities (PET, CT, Radiology, MRI, and other optical imaging) and associated depiction of normal organs and skeletal structures in pigs, dogs, rabbits and rodents. Course includes didactic lectures, discussion, imaging labs and gross cadaver examination.

RADO 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

RADO 202. The Basic Science of Radiation and Cancer Biology. 1 Unit.

For residents or fellows in the training program in the Division of Radiation Therapy, and for interested medical students. Basic processes of radiation biology that underly the treatment of malignant diseases by radiation. Carcinogenesis and mutagenesis by radiation are also covered. Prerequisite: familiarity with cell biology and physiology; consent of instructor.

RADO 244. Program in Radiation Biology Seminar Series. 1 Unit.

Open to graduate and undergraduate students. Current research in radiation and cancer biology summarized by two laboratories.

RADO 280. Early Clinical Experience in Radiation Oncology. 1-2 Unit.

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

RADO 299. Directed Reading in Radiation Oncology. 1-18 Unit.

Prerequisite: consent of instructor.

RADO 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

RADO 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Radiology Courses

RAD 101. Readings in Radiology Research. 1-18 Unit.

Prerequisite: consent of instructor.

RAD 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

RAD 220. Introduction to Imaging and Image-based Human Anatomy. 3 Units.

Focus on learning the fundamentals of each imaging modality including X-ray Imaging, Ultrasound, CT, and MRI, to learn normal human anatomy and how it appears on medical images, to learn the relative strengths of the modalities, and to answer, "What am I looking at?" Course website: <http://rad220.stanford.edu>.

Same as: BIOE 220

RAD 221. Physics and Engineering of Radionuclide Imaging. 3 Units.

Physics, instrumentation, and algorithms for positron emission tomography (PET) and single photon emission computed tomography (SPECT). Topics include basic physics of photon emission and detection, electronics, system design, strategies for tomographic image reconstruction, data correction algorithms, methods of image quantification, and image quality assessment, and current developments in the field. Prerequisites: Completion of university level mathematics and physics.

Same as: BIOE 221

RAD 222. Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects. 4 Units.

Focuses on instruments, algorithms and other technologies for imaging of cellular and molecular processes in living subjects. Introduces preclinical and clinical molecular imaging modalities, including strategies for molecular imaging using PET, SPECT, MRI, Ultrasound, Optics, and Photoacoustics. Covers basics of instrumentation physics, the origin and properties of the signal generation, and image data quantification.

Same as: BIOE 222

RAD 222C. Advanced Research Topics in Multi-modality Molecular Imaging of Living Subjects. 4 Units.

Covers advanced topics and controversies in molecular imaging in the understanding of biology and disease. Lectures will include discussion on instrumentation, probes and bioassays. Topics will address unmet needs for visualization and quantification of molecular pathways in biology as well as for diagnosis and disease management. Areas of unmet clinical needs include those in oncology, neurology, cardiovascular medicine and musculoskeletal diseases. The aim is to identify important problems and controversies in a field and address them by providing background and relevance through review of the relevant primary literature, and then proposing and evaluating innovative imaging strategies that are designed to address the problem. The organization of lectures is similar to the thought process that is necessary for writing an NIH grant proposal in which aims are proposed and supported by background and relevance. The innovation of proposed approaches will be highlighted. An aim of the course is to inform students on how to creatively think about a problem and propose a solution focusing on the key elements of writing a successful grant proposal. Prerequisites: none.

Same as: BIOE 229

RAD 223. Physics and Engineering of X-Ray Computed Tomography. 3 Units.

CT scanning geometries, production of x-rays, interactions of x-rays with matter, 2D and 3D CT reconstruction, image presentation, image quality performance parameters, system components, image artifacts, radiation dose. Prerequisites: differential and integral calculus. Knowledge of Fourier transforms (EE261) recommended.

Same as: BIOE 223

RAD 224. Probes and Applications for Multi-modality Molecular Imaging of Living Subjects. 4 Units.

Focuses on molecular contrast agents (a.k.a. "probes") that interrogate and target specific cellular and molecular disease mechanisms. Covers the ideal characteristics of molecular probes and how to optimize their design for use as effective imaging reagents that enables readout of specific steps in biological pathways and reveal the nature of disease through noninvasive imaging assays. Prerequisites: none.

Same as: BIOE 224

RAD 225. Ultrasound Imaging and Therapeutic Applications. 3 Units.

Covers the basic concepts of ultrasound imaging including acoustic properties of biological tissues, transducer hardware, beam formation, and clinical imaging. Also includes the therapeutic applications of ultrasound including thermal and mechanical effects, visualization of the temperature and radiation force with MRI, tissue assessment with MRI and ultrasound, and ultrasound-enhanced drug delivery. Course website: <http://bioe325.stanford.edu>.

Same as: BIOE 225

RAD 226. In Vivo Magnetic Resonance Spectroscopy and Imaging. 3 Units.

Collections of identical independent nuclear spins are described by the classical vector model of magnetic resonance imaging (MRI); however, interactions among spins, as occur in many in vivo processes, require a more complete description. Physics and engineering principles of these in vivo magnetic resonance phenomena with emphasis on current research questions and clinical applications. Topics: quantum mechanical description of magnetic resonance, density matrix theory, product operator formalism, relaxation theory and contrast mechanisms, spectroscopic imaging, spectral editing, and multinuclear studies. Prerequisites: EE 369B or familiarity with magnetic resonance, working knowledge of linear algebra.

Same as: BIOE 226

RAD 226B. In Vivo MR: Relaxation Theory and Contrast Mechanisms. 3 Units.

Principles of nuclear magnetic resonance relaxation theory as applicable to in vivo processes with an emphasis on medical imaging. Topics: physics and mathematics of relaxation, relaxation times in normal and diseased tissues, magnetization transfer contrast, chemical exchange saturation transfer, MRI contrast agents, and hyperpolarized ^{13}C . Prerequisites: RAD 226.

Same as: BIOE 326B

RAD 227. Functional MRI Methods. 3 Units.

Basics of functional magnetic resonance neuroimaging, including data acquisition, analysis, and experimental design. Journal club sections. Cognitive neuroscience and clinical applications. Prerequisites: basic physics, mathematics; neuroscience recommended.

Same as: BIOPHYS 227

RAD 228. Magnetic Resonance Imaging Programming Topics. 3 Units.

Primarily for students working on research projects involving MRI pulse sequence programming. Introductory and student-initiated topics in seminars and hands-on labs. Image contrast mechanisms achieved by pulse sequences that control radiofrequency and gradient magnetic fields in real time, while acquiring data in an organized manner for image reconstruction. Prerequisites: EE 369B and consent of instructor.

RAD 229. MRI Sequences and Signals. 3 Units.

Magnetic Resonance Imaging (MRI) uses sequences of radiofrequency excitation and magnetic field gradients to generate a signal and form images. Numerous common and advanced sequences will be studied, including analysis techniques to predict signal and contrast levels, and to measure and reduce unwanted image artifacts. Prerequisite: EE 369B.

RAD 260. Computational Methods for Biomedical Image Analysis and Interpretation. 3-4 Units.

The latest biological and medical imaging modalities and their applications in research and medicine. Focus is on computational analytic and interpretive approaches to optimize extraction and use of biological and clinical imaging data for diagnostic and therapeutic translational medical applications. Topics include major image databases, fundamental methods in image processing and quantitative extraction of image features, structured recording of image information including semantic features and ontologies, indexing, search and content-based image retrieval. Case studies include linking image data to genomic, phenotypic and clinical data, developing representations of image phenotypes for use in medical decision support and research applications and the role that biomedical imaging informatics plays in new questions in biomedical science. Includes a project. Enrollment for 3 units with reduced project requirements requires instructor consent. Prerequisites: programming ability at the level of CS 106A, familiarity with statistics, basic biology. Knowledge of Matlab highly recommended.

Same as: BIOMEDIN 260

RAD 280. Early Clinical Experience in Radiology. 1-2 Unit.

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

RAD 299. Directed Reading in Radiology. 1-18 Unit.

Prerequisite: consent of instructor.

RAD 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

RAD 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Religious Studies Courses

RELIGST 1. Religion Around the Globe. 4 Units.

A survey of significant religious traditions of the world with emphasis on contemporary manifestations. We will address aspects of Buddhism, Christianity, Hinduism, Islam, Judaism, and Sikhism. In addition, we will discuss interaction between individuals and communities in diverse and complex religious settings such as East Asia, the Middle East, and North America.

RELIGST 2. Is Stanford a Religion?. 4 Units.

This course seeks to introduce students to the study of religion by posing a two-part question: What is a religion, and does Stanford qualify as one? Scientific, pragmatic, seemingly secular, Stanford may not seem at all similar to religions like Christianity, Judaism or Buddhism, but a deeper look reveals that it has many of the qualities of religion--origin stories, rituals and ceremonies, sacred spaces and times, visions of the future, even some spirits. By learning some of the theories and methods of the field of religious studies, students will gain a better understanding not just of Stanford culture but of what motivates people to be religious, the roles religion plays in people's lives, and the similarities and differences between religious and secular culture.

RELIGST 11N. The Meaning of Life: Philosophical, Aesthetic, and Religious Perspectives. 5 Units.

Raise ultimate questions about life. Yes, the unexamined life is not worth living, but also the un-lived life is not worth examining. Students and professor examine their own lives in the light of questions that the readings and lectures bring up: 1. The big picture: Is there such a thing as "the" meaning of life? 2. What is entailed in making personal-existential sense of one's own life? 3. What constitutes the good life, lived in society? 4. How can a university education bear upon the search for a meaningful life? 5. What "methods" for or approaches to life can one learn from studies in the humanities? After introductory lectures, the seminar studies a series of artworks, poems, diverse texts, and a film, all of which bear on the questions mentioned above -- works such: 1. Plato's Allegory of the Cave, from "The Republic" 2. Manet's "A bar at the Folies Bergere" 3. A comparison/contrast of Monet's early (1862) "Still Life" and van Gogh's late (1889) "Irises" 4. Lyric poetry T.S. Eliot: "The Love Song of J. Alfred Prufrock," "The Waste Land," and "East Coker"; Edwin Muir: "The Heart Could Never Speak"; Philip Larkin: "Days" 5. Martin Heidegger's "What Is Metaphysics?" 6. Jean-Paul Sartre's novel "Nausea" 7. Marx's Paris Manuscripts of 1844 8. Bergman's "The Seventh Seal".

RELIGST 12N. Perspectives on the Good Life. 3-4 Units.

The question is how to approach and evaluate different perspectives on the good life, especially when those perspectives are beautifully, and elusively, presented to us as texts. We will consider both classic and modern writers, from the West and from China; some are explicitly religious, some explicitly secular; some literary, some philosophical. Most of the class will revolve around our talk with each other, interpreting and questioning relatively short texts. The works we will read - by Dante, Dickenson, Zhuangzi, Shklar, and others - are not intended to be representative of traditions, of eras, or of disciplines. They do, however, present a range of viewpoint and of style that will help frame and re-frame our views on the good life. They will illustrate and question the role that great texts can play in a modern 'art of living.' Perhaps most important, they will develop and reward the skills of careful reading, attentive listening, and thoughtful discussion. (Note: preparation and participation in discussion are the primary course requirement. Enrollment at 3 units requires a short final paper; a more substantial paper is required for the 4-unit option.

RELIGST 13Q. Mystical Journeys: Beyond Knowing and Reason. 3 Units.

What makes a mystic a mystic? This question has many sides. Why do we call someone a mystic? Is there such a thing as mystical experience? Do experiences make a mystic? Do beliefs? Practices? Many religious traditions have records of visionaries whose lives and writings open windows on the more hidden and aspirational aspects of belief and practice. These writings also take many forms: poems, letters, teachings, and accounts of visions, which we will encounter in the course of the quarter. Readings for the course will cover a cross-section of texts taken from Christian, Jewish, Muslim, Buddhist, and Native American sources.

RELIGST 14N. Demons, Death, and the Damned: The 'Other' and the Otherworldly in America. 3 Units.

This course will examine how beliefs about the "other world" actually shape and are shaped by Americans' this-worldly actions and interactions (i.e. in the demonization of the "other," whether defined religiously, racially, ethnically, or in gendered terms). Students will ask how ideas about demons and death, heaven and hell have reflected the concerns, values, and identities of Americans over time. Students will learn how to read primary sources against secondary literature.

RELIGST 17N. Love, Power, and Justice: Ethics in Christian Perspective. 3 Units.

From its inception, the Christian faith has, like all religions, implied an ethos as well as a worldview, a morality and way of life as well as a system of beliefs, an ethics as well as a metaphysics. Throughout history, Christian thinkers have offered reasoned accounts of the moral values, principles, and virtues that ought to animate the adherents of what eventually became the world's largest religion. We will explore a variety of controversial issues, theological orientations, and types of ethical reasoning in the Christian tradition, treating the latter as one 'comprehensive doctrine' (John Rawls) among many; a normative framework (actually a variety of contested religious premises, moral teachings, and philosophical arguments) formally on par with the religious ethics of other major faiths as well as with the various secular moral theories typically discussed in the modern university. We will learn to interpret, reconstruct, criticize, and think intelligently about the coherence and persuasiveness of moral arguments offered by a diverse handful of this religious tradition's best thinkers and critics, past and present.

RELIGST 18N. Religion and Politics: Comparing Europe to the U.S.. 3-4 Units.

Interdisciplinary and comparative. Historical, political, sociological, and religious studies approaches. The relationship between religion and politics as understood in the U.S. and Europe. How this relationship has become tense both because of the rise of Islam as a public religion in Europe and the rising influence of religious groups in public culture. Different understandings and definitions of the separation of church and state in Western democratic cultures, and differing notions of the public sphere. Case studies to investigate the nature of public conflicts, what issues lead to conflict, and why. Why has the head covering of Muslim women become politicized in Europe? What are the arguments surrounding the Cordoba House, known as the Ground Zero Mosque, and how does this conflict compare to controversies about recent constructions of mosques in Europe? Resources include media, documentaries, and scholarly literature. Same as: JEWISHST 18N

RELIGST 19N. "Land of Milk and Honey": Food, Justice, and Ethnic Identity in Jewish Culture. 3 Units.

Food is an essential aspect of the human experience. The decisions and choices we make about food define who we have been, who we are now, and who we want to become. This seminar examines Jewish culture and the food practices and traditions that have shaped and continue to shape it. Why has Jewish culture been centered around food practices? How have religious laws and rituals about food and food production shaped Jewish culture and vice versa? Dietary laws prescribe which animals are and are not "kosher" and what can be eaten with them, holidays are celebrated with traditional foods, and regional foods contribute to the formation of distinct Jewish ethnic identities. More recently, American Jews have begun to organize around issues of food justice, and joined the sustainability movement, adapting Jewish traditions about food production into their cause. What is the significance of animal welfare, environmental issues, and labor practices in Jewish culture? This multi-disciplinary seminar explores the connection between food practices and ethnic and religious identity(ies), the history of the dietary laws and their multiple interpretations, the cultural significance of the phenomenal success of kosher certification in the U.S. food market, and the rise of the Jewish food justice movement. These issues raise a multitude of comparative questions, and you are encouraged to engage in research into other religious and ethnic food cultures. Course materials include: biblical and later religious, legal, and philosophical texts; cook-books (as cultural and historical sources); literature (both fiction and academic); films; news media, and food experts. We will visit an urban farming community (Urban Adamah) to learn from those involved in the Jewish sustainability movement.

Same as: CSRE 19N, JEWISHST 19N

RELIGST 20A. The Sun Also Shines on the Wicked: The Problem of Evil in Religious Thought. 3 Units.

The problem of Evil has plagued religious thinkers and philosophers for centuries. If God is omnipotent, omniscient, and omnibenevolent, then why is there Evil in the world? We will read and discuss the key thinkers and foundational texts from Plato and the Book of Job to Fyodor Dostoevsky, Friedrich Nietzsche and Sigmund Freud in order to appreciate the diverse responses to this most vexed of questions. We will survey some of the major approaches to the problem of Evil such as skepticism and theodicy in the works of the Classical authors and in those of the Christian, Jewish, and Islamic thinkers like Augustine, Maimonides, and al-Ghazali. We will also engage with dualist traditions such as Zoroastrianism and Manicheism, and with the ethics of the major figures of the Enlightenment such as Leibniz, Hume, and Kant. We will end the quarter by reading the most strident atheistic responses from contemporary scientists and philosophers such as Richard Dawkins and Sam Harris.

RELIGST 21. Religion in Science Fiction and Fantasy. 5 Units.

Science fiction and fantasy create alternate worlds that incorporate religious institutions and beliefs that illuminate how we think about religion now and for the future. Texts work off diverse religious traditions: Islam, Buddhism, Catholic and Protestant forms of Christianity, Mayan religion, and Vodou are some that appear. Themes of free will and determinism, immortality, apocalypse and redemption. Myth, ritual, prophecy, the messianic hero, monasticism and mysticism. Texts like *Dune*, *Count Zero*, *Sandman*, *Grass* and the like explore religion in the contemporary imagination. Main assignment: write a short story.

RELIGST 22. Method in the Sciences of Nature and Society. 4 Units.

This course considers whether there are any fundamental differences between natural science and social science. Students are introduced to the philosophy of science, social theory, evolutionary epistemology, and debates about the influence of ideologies on the contents of science and scholarship.

RELIGST 24. Sexuality, Gender, and Religion. 2 Units.

From ancient times to the present, religious texts, authority figures, adherents, and critics have had a great deal to say about sexuality and gender, with powerful impacts in personal, social and political spheres. Today these debates are more wide ranging and public than ever. In this lecture and discussion series, distinguished scholars from within and beyond Stanford will consider how sexuality and gender become iquest;religiousquest; in Judaism, Islam, Christianity, Hinduism, and Buddhism.

Same as: FEMGEN 24

RELIGST 25SI. Contemporary German Jewish Encounters: the Holocaust in Historical Memory. 1 Unit.

This one-unit course, open to all students, will focus on the history and contemporary experience of Jewish life and memory in Berlin in the decades following the Holocaust. Topics range from artistic expression and storytelling, to theodicy and forgiveness, to public historical memory and memorials. Each week students will meet with professors from various departments with different fields of expertise. This is a readings and discussion based course that encourages group discussion and empowers students to learn from each other as well as from the speaking professors.

RELIGST 26. The Bible and its Interpreters. 4 Units.

Introduction to major stories, figures, and themes of the Christian Bible and their retellings in theological writing, art, literature, film, and music throughout the ages.

RELIGST 28. Religion and Science in Dialogue: Possibilities and Future Directions. 1-2 Unit.

Religion and science are widely seen to be in conflict with each other, particularly in the West where science was under the aegis of the Church for centuries, until the advent of an independent scientific community and the tragedy of the Galileo affair. This course explores the historical and philosophical grounds for the conflictual view, areas where the two domains remain distinct, and contemporary and future strategies for dialogue on the basis of overlapping understandings of how we go about knowing anything at all. Features guest speakers from Stanford and elsewhere in the scientific, philosophical, historical and theological fields.

RELIGST 28SI. Interfaith@Noon. 1 Unit.

This student-initiated course explores the intersections of faith, compassion, and happiness. Faculty speakers from across the campus provide theoretical perspectives from a range of disciplines and share personal insights about the nature of faith, compassion, and happiness and their relationship to one another and role in a meaningful life. Student organizers provide a forum for participant discussion and reflection on these important topics. As part of Stanford's response to President Obama's Interfaith and Community Service Campus Challenge, the course is a collaboration between the Office for Religious Life, the Department of Religious Studies, the Haas Center for Public Service, the McCoy Family Center for Ethics in Society, and the Center for Compassion and Altruism Research and Education. Class meets on Tuesdays starting March 31, 12:00 pm. Location TBD. Open to the public.

RELIGST 31. The Religious Life of Things. 3-5 Units.

Temples, prayer beads, icons, robes, books, relics, candles and incense, scarves and hats, sacred food and holy water; objects of all sorts play a prominent role in all religions, evoking a wide range of emotional responses, from reverence, solace and even ecstasy, to fear, hostility and violence. What is it about these things that makes them so powerful? Is it beliefs and doctrines that inspire particular attitudes towards certain objects, or is it the other way around? Many see a tension or even contradiction between religion and material pursuits and argue that the true religious life is a life without things. But is such a life even possible? This course adopts a comparative approach, drawing on a variety of traditions to examine the place of images, food, clothing, ritual objects, architecture and relics in religious thought and practice. Materials for the course include scholarship, scripture, images and at least one museum visit.

RELIGST 35S. Religion, Democracy, and Human Rights. 3 Units.

What is the relationship between religion, democracy, and human rights? What is the status of religion within modern human rights regimes? Do religions have "special" rights in democracies? Why did the French outlaw the hijab (Islamic headscarf) and the Swiss the building of mosques and is that good for human and democratic rights? What is (and what should be) the relationship between religious human rights and democratic self-determination? How do we balance between concerns over blasphemy and free speech, in the case of the Danish cartoon depiction of Mohammad, for example? Is the idea of "religion" even useful in human rights or democratic language anymore, as some now claim? These are just some of the questions students will take up as they are introduced to several important areas within the larger field of religion and international relations. Readings are interdisciplinary in nature, and include case studies. No prerequisite. Open to all majors/minors, and will be particularly beneficial to students in International Relations, International Policy Studies, Political Science, and Religious Studies, as well as students with specific regional political interests where the themes of the course are especially relevant (e.g., Middle East, Latin America, Russia and Eastern Europe, Africa, and so on) and Pre-Law students.

Same as: POLISCI 33S

RELIGST 36. Philosophy of Religion. 3 Units.

(Formerly RELIGST 62S) Explores fundamental questions about the existence of God, free will and determinism, faith and reason, through traditional philosophical texts. Course is divided into four sections: first asks what is religion; second surveys the western philosophical tradition from Boethius through Descartes, Hume, Kant, and Kierkegaard regarding the foundation for theist beliefs; third investigates questions mystical experience raises through both western and Buddhist materials; and fourth takes up the ethics of belief, what we have a right to believe, through the Clifford and James debate and the opposing stances of Camus and Pascal.

Same as: PHIL 77S

RELIGST 36S. Saints, Hermits and Epic Journeys in East Asia. 3 Units.

We will be reading Buddhist literary classics from China and Japan. This course introduces traditions of East Asian Buddhism and other religious traditions of China. Two major themes emerge in Buddhist literature: tales of great persons and grueling journeys of spiritual consequence. This course explores the themes of saints and their journeys, in the Buddhist traditions and the literature of East Asia. Students will develop critical skills for reading religious literature and will practice articulating religious themes. The course begins with introductions to the three great traditions of Confucianism, Daoism and Buddhism. Through reading saintly stories and Chan lore, students will learn to identify genres, themes, and religious ideals in ancient religious texts. Then the course will turn to modern versions of the lives of saints, analyzing the bestquest;selling manga Buddha. Next, our class will read the medieval Chinese poetry of the hermit known as Cold Mountain and learn to discern his Buddhist, Daoist, and Confucian impulses. We will examine poetic techniques as preparation for turning to the literary devices and Buddhist themes in a record left by a Japanese recluse. Our readings will conclude with Chinaquest;s epic Journey to the West and a harrowing poetic record of a famous journey through the Japanese Alps. We will attend to these textsquest; use of plot and narrative technique as we consider `the journeyquest; as metaphor for the spiritual path.

RELIGST 37S. Religion in the Information Age: The Modern Religious Experience in New Media and Cyberspace. 3 Units.

In today's high-tech world, information is everywhere. We live in an age where all the knowledge ever produced, anything you could ever want to know, see, or hear, is available within a matter of seconds. Yet for all this instantly accessible information, it seems there remain questions that cannot be solved by a simple search on Wikipedia or Google. What is life? Why are we here? Is there a higher being? What is the best way to live? These are questions that have traditionally been associated with religion; with philosophy rather than science, with faith rather than fact. In a time when everything is immediately knowable, how does religion retain any sense of mystery? Do the ways of talking and thinking about God handed down to us from the ancient world still have any of their power, or have they grown stale, ossified and ineffective as we transform the universe into easily searchable data, into friendly sound bites and viral memes? What has become of religion in the age of information? This course focuses on the concept of information as a way to examine the broader question of the role of religion in the modern world. How is religion affected by the exponential advancement of technology? How are traditional concepts like God, belief, or prayer impacted by the discoveries of science? What is the modern religious experience in this new digital age? In particular this course asks whether or not religious discourse; the language of poetry, scripture, and everyday speech; faces new challenges in the modern age.

RELIGST 38S. Who Am I? The Question of the Self in Art, Literature, Religion, and Philosophy. 3 Units.

This course engages the question of the self through the exploration of art, literature, religion, philosophy, and pop culture. Through close, guided readings and analysis of classic, contemporary, as well as popular materials, we will attempt to both understand and complicate the notion of the self and inquire into the personal, social, and political relationships that define its contours and boundaries. Course content will be drawn from a diverse but complementary range of thinkers including: Plato, Plotinus, Ibn al-Arabi, Jean-Paul Sartre, Martin Heidegger, William Blake, Guy Debord, Cormac McCarthy, and Friedrich Nietzsche. We will also interrogate what films such as Christopher Nolan's *Memento*, images such as Manet's *Bar at the Folies Bergere*, and countercultural musical movements such as punk rock and black metal have to add to our inquiry. Short lectures will contextualize the topics treated, but the main focus will be on fostering robust and substantive discussion and developing the philosophical skills needed to think through and debate the notion of the self and its attendant issues in a reflective and nuanced manner. By drawing from different eras and cultural contexts, we will gain a new appreciation for the historical background of the existential questions that concern us today, while confronting the radical diversity of possible responses. The seminar's ultimate aim is to engage with multimedia materials that help you develop, articulate, and ultimately, live out your own personal response to a very pressing question: Who am I?

RELIGST 50. Exploring Buddhism. 5 Units.

From its beginnings to the 21st century. Principal teachings and practices, institutional and social forms, and artistic and iconographical expressions. (Formerly RELIGST 14.)

RELIGST 55. Exploring Zen. 4 Units.

Reading and discussion of Zen texts in English translation.

RELIGST 56. Exploring Chinese Religions. 4 Units.

An overview of major themes and historical developments in 5000 years of Chinese religion. In this course, we will try as much as possible to appreciate Chinese religion from the Chinese perspective, paying particular attention to original texts in translation in an attempt to discern the logic of Chinese religion and the role it has played in the course of Chinese history. To a greater extent perhaps than any other civilization, Chinese have left behind a continuous body of written documents and other artifacts relating to religion stretching over thousands of years, providing a wealth of material for studying the place of religion in history and society.

RELIGST 61. Exploring Islam. 4 Units.

This course introduces some of the most important features of the Islamic religious tradition. It explores the different ways in which Muslims have interpreted and practiced their religion. The main subjects of discussion include; including the life of the Prophet Muhammad, the Quran, Law, Ritual, Mysticism, Theology, Politics, and Art; - will be considered with reference to their proper historical contexts. Some of the topics covered include abortion, gender, rebellion and violence, and the visual vocabulary of paintings. Students will be exposed to important theories and methods in the academic study of religion. No prior knowledge is required.

RELIGST 61S. Islamic Encounters. 4 Units.

No religious tradition forms or exists in a vacuum and throughout history Muslims have lived and interacted with non-Muslims, whether Christian, Jews, or Hindus. This course will explore those encounters by looking at the social and political effects of five encounters between Muslims and non-Muslims across the world. The class will begin with two examples from the contemporary period: political debates over Islamic clothing in Europe and shared devotion between Muslims and Hindus in modern India as the class examines how politics and cultural affect and are affected by religious identity. We will then turn to the example of Muslims living under non-Muslim rule in eighteenth- and nineteenth-century West Africa. As we examine how these communities decided to shift from religious accommodation to religious warfare and Muslim statehood we will question the role of religious conflict in driving large historical changes. In the fourth section of this class will examine the relationship between racial and religious identity by looking at Muslims in the Americas, and specifically at the participation of Muslims in the 1835 slave uprising in Brazil. Finally, the last section of the class will focus on the development of the first Muslim community in the Arabian peninsula as we look at the relationship between the formation of religious identity and the formation of a religion itself. While historically and geographically distinct, all these moments bring to light the fundamental issue of contact and encounter and examine how those encounters shape religious traditions and identity.

RELIGST 62. Philosophy of Religion. 4 Units.

Classic and modern questions in the philosophy of religion traced through Western and Eastern traditions: the coherence of theism, relativism, verification and ethics of belief, and mystical experience. Readings from traditional and modern texts.

RELIGST 65. Exploring Global Christianity. 4 Units.

Explore the world's largest religion as a multicultural, global faith, with attention to Christianity's origins, spread and impact around the world up to the present. Special attention to recent shifting demographics leading to declining numbers in mainline Christian denominations in North America and Europe and the rapid expansion of Christianity in Africa, Asia, and South America; the explosion of international Pentecostalism and other new Christianities; Christianity, global politics, and the global economy; Christian-Muslim relations and conflicts.

RELIGST 71. Jews and Christians: Conflict and Coexistence. 3 Units.

The relationship between Judaism and Christianity has had a long a controversial history. Christianity originated as a dissident Jewish sect but eventually evolved into an independent religion, with only tenuous ties to its Jewish past and present. At the same time, Judaism has at times considered Christianity a form of idolatry. It seems that only since the catastrophe of the Holocaust, Jews and Christians (Catholics and Protestants) have begun the serious work of forging more meaningful relationships with each other. This course explores the most significant moments, both difficult and conciliatory ones, that have shaped the relationship between Judaism and Christianity, and introduces students to some of the most important literature, art, and music that are part of it. Selected literature: Gospel according Matthew, the letters of St. Paul, St. Augustine, the Talmud (selections), Maimonides, Martin Luther's sermons on the Jews, *Nostra Aetate* (Vatican II) Art and Music: Medieval art and sculpture, Haendel's *Messiah*. Same as: JEWISHST 71

RELIGST 81. Exploring Indian Religions. 4 Units.

This course provides an overview of Indian religious traditions, including Hinduism, Buddhism, Jainism, Islam, and Sikhism. We will spend approximately half the course on Hindu thought and traditions from the Vedic period until the present day, emphasizing the diverse forms of this religion in different times and places. The second half of the course will be devoted to religions that emerged in South Asia (e.g., Jainism) and those that came to find a home and particular forms of expression on the subcontinent (e.g., Islam). Throughout students will read selections from a range of theological texts, epics, and literature that have permeated many aspects of daily religious life in India. We will also emphasize ritual activities, visual experiences in temples, and networks of pilgrimage places that dot the subcontinent. We will often pair primary sources (in translation) with later interpretations and impacts of those texts in modern South Asia. We will also survey the modern incarnations of particular Indian religious traditions throughout South Asia and the diaspora. By the conclusion of this course, students will be conversant with the texts, beliefs, and practices of the major Indian religions in their cultural and historical contexts and also have a working knowledge of basic categories important for the study of religion more broadly.

RELIGST 82. Approaches to the Study of Religion: Exploring Christianity. 4 Units.

Historical and contemporary Christianity from four viewpoints: ritual and prayer; sacred texts and creeds; ethics and life; and community governance.

RELIGST 91. Exploring American Religious History. 4 Units.

This course will trace how contemporary beliefs and practices connect to historical trends in the American religious landscape.
Same as: AMSTUD 91

RELIGST 93. Exploring Zoroastrianism. 4 Units.

Zoroastrianism was once considered one of the great religions of antiquity. It was the state religion of the Persian Empire and its theological influence has been traced in Graeco-Roman mystery cults, Judaism, Christianity, Islam, Hinduism and Buddhism. Yet, today it is one of the least understood of living religions. This introductory class will introduce and analyze Zoroastrianism through some of its defining themes, including an examination of the figure of the prophet Zoroaster, modes of transmitting sacred knowledge, the nature of good and evil, and the importance of ritual practice and practitioners. We will also discuss how Zoroastrianism views the individual with respect to the body, the life cycle, and issues of gender and sexuality. Finally, this course will also examine the intersection of religion and ethnicity that has defined Zoroastrianism from its origins in the 2nd millennium BCE up to the present.

RELIGST 95. How to Read the Bible. 4 Units.

What does the Bible mean? Seeks to help students answer this question for themselves by introducing some of the many ways in which the Bible has been read over the ages. The focus will be the book of Genesis, but the real subject is the history of biblical interpretation; how Genesis has been understood by theologians, writers, artists, scholars and others; and the ultimate goal is not merely to engage the Bible itself but to gain a better appreciation of the act of reading, why people read differently and the consequences of that difference for religious history.

RELIGST 105. Religion and War in America. 4 Units.

Scholars have devoted much attention to wars in American history, but have not agreed as to whether religion was a major cause or simply a cover for political, economic, and other motives. We will compare interpretations that leave religion out, with those that take it into account. We will also look at the impact of war on the religious lives of ordinary Americans. We will examine both secondary as well as primary sources, beginning with King Philip's War in the 17th century, and ending with the "War on Terror" in the present day.
Same as: HISTORY 154D

RELIGST 106. Religion and the Environment: The Moral Meanings of Nature. 3 Units.

What does it mean to live in "harmony" with nature? What do humans seek and find in nature and our relationship to it? How have understandings of nature oriented human actions and values and given "place" to humanity in the cosmos? From religious texts to Deep Ecology, American conservationism to Buddhist and Romantic nature poetry, naturalist critics of religion to religious naturalists, and finally debates over the role of religion in dealing with environmental crisis, this course is designed as a general introductory survey of the topic of religion and the environment. It will be guided by the question of how conceptions of nature have been a source of reflection on the goals of life and the ways in which humans are to understand their existential "lot". Readings will include primary texts from major religious traditions, poetry, and scholarly and philosophical texts from figures including, among others, Descartes, Goethe, Nietzsche, J.S. Mill, Thoreau, Aldo Leopold, John Muir, Gary Snyder, and Peter Singer.

RELIGST 107. Hindus and Muslims in South Asia. 4 Units.

Hindus and Muslims have lived together in the subcontinent for over 1000 years, joined by Sikhs in the last 500. Contrasting narratives may emphasize composite cultures and interdependent societies, or separation and conflict. In the first half we will introduce these traditions and communities and highlight composite cultures in religion, literature, and music. In the second half we will examine key moments of conflict: the 11th-century invasions of Mahmud of Ghazni and narratives about them in Hindu and Muslim sources; the 1947 Partition of India and Pakistan; the Khalistan movement and the 1984 massacre of Sikhs after Indira Gandhi's assassination; the 2002 Gujarat riots. Learning goals: critically examine the categories 'Hindu,' 'Muslim,' 'Sikh,' 'religion'; analyze differing narratives of the same events; clarify the complex factors involved in violent 'religious' conflict.

RELIGST 108. Indian Epics: Past and Present. 4 Units.

The Mahabharata and the Ramayana, the two great epics of India, have been crucial texts in South Asian literature and culture for millennia. In this course, we will explore the diverse forms and impacts of both epics from their Sanskrit versions, first composed more than 2,000 years ago, into retellings through newer media forms well into the twenty-first century. We begin with abridged translations of both the Mahabharata (including the Bhagavadgita) and the Ramayana. We will discuss the major literary, religious, and social themes of each text as well as subsequent retellings in Sanskrit and vernacular languages. Throughout the course we will also investigate the modern lives of the Indian epics, including their transformations into Indian television serials, film versions of both narratives (from India and America), and invocations of the epic stories in contemporary political disputes. In addition to gaining exposure to some of the foundational texts for the study of South Asia, students will cultivate the ability to fruitfully analyze texts and stories from different cultures.
Same as: COMPLIT 148B

RELIGST 109. Emperor, Explorer, and God: Alexander the Great in the Global Imagination. 3 Units.

(Formerly CLASSGEN 109.) This course will survey the changing image of Alexander the Great from the Hellenistic world to the contemporary. We shall study the appropriation of his life and legend in a variety of cultures both East and West and discuss his reception as both a divine and a secular figure by examining a variety of media including texts (primary and secondary) and images (statues, coins, mosaics, illuminated manuscripts, film, and TV) in the Hellenistic, Roman, Byzantine, Jewish, Islamic, Medieval, Renaissance, and Early Modern contexts. In concluding the quarter, students will evaluate contemporary representations in film and popular culture, such as Alexander directed by Oliver Stone and Pop Art in order to better appreciate his enduring legacy.
Same as: CLASSICS 142

RELIGST 110. Islam, Art, Modernity. 3-5 Units.

Taught in conjunction with a major exhibition of modern Islamic art at the Cantor Museum. We will consider theoretical discussions regarding art and modern Muslim identities and examine the use of Islamic motifs in art and architecture in detail.

Same as: RELIGST 310

RELIGST 111. Islam in India: Conflict and Accommodation. 4 Units.

This course will investigate the history of Islam in South Asia, particularly interactions between Muslims and Hindus, through the lenses of conflict and accommodation. This topic has become increasingly important in modern times as India and neighboring nations experience sectarian violence and simultaneously strive to engender the peaceful coexistence of multiple religious communities. In many ways the debate over South Asia's present and future is being played out in regards to interpretations of its past. In this course, students will gain a solid overview of the chronological development of Islam in India and its negotiations with other religious traditions on the subcontinent. We will think critically about the relevance of South Asia's past to its present and the crucial role of forms of Indian Islam in the broader context of Islamic cultures across the globe.

Same as: HISTORY 195X

RELIGST 113B. Japanese Religion Through Film. 4 Units.

Themes in premodern and modern Japanese religion through animations, movies and documentaries.

RELIGST 113C. Asceticism: The Discipline of Desire. 3 Units.

Asceticism is an intense negotiation of the self with its desires, usually taking the form of the attempt to repress or curtail desire. Asceticism is often understood as a radical response to the problem of obsessive desire. Excessive attachments to food, money, and sex are among the most common of these concerns; today we refer to these as addictions; both in the contemporary world and to those living in a pre-modern context. In this course, we will discuss the experiences of ascetic figures throughout history not as relics of history but as intelligible responses to the problem of obsessive desire common to all ages. We will comparatively examine case studies from the ancient Christian world and the modern Indian world. The first part of the course will be devoted to understanding some of the most notable theoretical approaches to ascetic behavior in the field of religious studies while the second part of the course will be devoted to close readings of the cases in light of these theoretical approaches. Cross-cultural comparison and contrast will also be stressed. In the final part of the course, we will turn to modern philosophical reflections on ascetic behavior, attempting to answer the question, does the ascetic response to obsessive desire make sense in the world we live in today?.

RELIGST 114. Yoga Ancient and Modern. 4 Units.

Originating in ancient India, yoga went through many developments over more than 4000 years in India and other parts of Asia. Having migrated to Euro-America in the late nineteenth century, today yoga is everywhere--studios, schools, gyms, malls, resorts, ashrams, retreat centers. It comes in many flavors; austere, with meditative instructors and Sanskrit chants; stylish, in 105-degree heat, with portable-miked instructors loudly motivating students to go through poses with speed and intensity; niche-crafted to meet the needs of busy professionals, pregnant women, senior citizens, or people with back problems. It may appear as a spiritual path or as a heavily marketed commodity. It generates lawsuits as teachers dispute ownership of certain styles, or as some Americans oppose its teaching yoga in public schools. In the first half of the course we will study the history of yoga in India, reading primary texts composed between about 500 BCE and 1600 CE. In the second half we will learn about yoga's globalization in the last century. Participating in a yoga class is recommended. 2 units of independent study (S-NC) are offered for those who participate in a weekly yoga class and write short reflections on the experience.

RELIGST 115. Women and Pilgrimage in Japan. 4 Units.

Pilgrimage, travel to a religious center or along a religious circuit, has been an integral part of Japanese religion since at least the Heian era. However, pilgrimage in Japan has changed dramatically since its early inception as an elite pursuit of the aristocracy, becoming practiced by an increasingly broad spectrum of society. We will examine the historical exclusion of women from some pilgrimage sites, and explore the ways in which contemporary pilgrimage may be a gendered experience. This course will also investigate specific Japanese pilgrimage sites in order to understand the broader phenomenon of Japanese pilgrimage and Japanese religious history.

RELIGST 116. Who Speaks for Religion? Scholars Versus Believers. 4 Units.

This course introduces students to the Insider /Outsider problem in the study of Religion focusing on questions of location, position, relation and boundaries. Who possesses the authority to decide on which people are inside/outside a religion, religious group or tradition? How do we conceive of the participant observer relationship and the speaking and writing about religion? How should we think about the scientific pretensions of religious studies as a reductionist approach? How do we meaningfully engage with questions of faith, theology, and the beliefs of others as part of a historical narrative of religious studies that both privileges lived experience of believers and extols the need for critical distance on the part of scholars?.

RELIGST 117. Christianity in 21st-century America. 4 Units.

As the largest religion practiced in the United States, Christianity not only shapes the lives of a large number of its citizens but also impinges on public discourse, policies, and debates. This course investigates the ways in which Christianity in America is changing and what these changes bode for its role in the public and private spheres. Issues include shifting demographics lead to declining numbers in 'mainline' denominations; the polarization of Christian conservatives and religious 'nones'; interfaith toleration and cooperation alongside interreligious conflict; the rise of 'spiritual, not religious' young adults; the effects of immigration; religion and science.

RELIGST 118. Gandhi, Nonviolence, Religion. 4 Units.

We will study Gandhi and his era, focusing on sources that relate Gandhi's theory and practice of nonviolence to religion and ethics. Topics include Gandhi's biography and personal influences; his construction of Hinduism and inclination to asceticism; his encounters with Jainism and Christianity; his attempts to negotiate the increasingly intractable and violent issues between Hindus and Muslims leading up to independence/partition; and the religious arguments involved in his bitter break with the leader of the anti-caste and untouchable; liberation movement, B.R. Ambedkar. We will locate discussions of religion within larger political and social circumstances. Readings include *The Story of My Experiments with Truth*, *Hind Swaraj*, and other writings by Gandhi; the *Bhagavad Gita*; Erik Erikson's psychoanalytic study, *Gandhi's Truth*; and recent critical works on Gandhi and religion.

RELIGST 119. Gandhi and His Legacy: Violence and Nonviolence in the World and in Ourselves. 4-5 Units.

Gandhi, the pioneer of nonviolent political struggle in the first half of the 20th century, is used as a springboard to study violence more broadly; what it is, what it does to individuals and societies, how it can be addressed and transformed. Special attention to connections between (non)violence on an individual/personal level and in the larger world. New format includes both academic study and experiential workshops.

RELIGST 119X. Spirits, Selves, and the Social: Histories of Thinking about Religion. 5 Units.

Why do humans worship gods, spirits, and ancestors? What roles do religion, witchcraft, and magic play in everyday life? How does religious action become meaningful in a particular context? In what sense can we know about the religious experiences of others? Focus is on approaches to religion throughout anthropology's history. Each student will carry out a mini-ethnography on a religious community of their choice. Students will not be required to have any previous knowledge in anthropology or the study of religion.

Same as: ANTHRO 119A

RELIGST 124. Sufi Islam. 4 Units.

The complex of Islamic intellectual and social perspectives subsumed under the term Sufism. Sufi mystical philosophies and historical and social evolution. Major examples include: Qushayricirc;, Racirc;bi'a, Junayd, Hallacirc;j, Sulamicirc;; Ibn al-'Arabicirc;; Racirc;micirc;; Nizacirc;m al-Dicirc;n Awliyacirc;'. Social and political roles of Sufi saints and communities. Readings include original prose and poetry in translation, secondary discussions, and ethnography.

RELIGST 126. Protestant Reformation. 4 Units.

The emergence of Protestant Christianity in 16th-century Europe. Analysis of writings by evangelical reformers (Luther, Calvin, Zwingli, Sattler, Hubmeier, Muuml;ntzer) and study of reform movements (Lutheran, Reformed, Anabaptist, Spiritualist) in their medieval context and as expressions of new and influential visions of Christian belief, life, social order.

Same as: HISTORY 126B

RELIGST 128. The Five Books of Moses. 4 Units.

A survey of the first five books of the Hebrew Bible/Old Testament--Genesis, Exodus, Leviticus, Numbers and Deuteronomy;that will explore their authorship, form and meaning.

RELIGST 129. Modern Jewish Thought. 4 Units.

From 1870 to the late twentieth century, Jewish thought and philosophy attempted to understand Judaism in response to the developments and crises of Jewish life in the modern world. In this course we shall explore the responses of figures such as Martin Buber, Franz Rosenzweig, Hermann Cohen, Abraham Joshua Heschel, Joseph Soloveitchik, Emil Fackenheim, and Emmanuel Levinas. Central topics will concern ethics and politics, faith and revelation, redemption and messianism, and the religious responses to catastrophe and atrocity. We shall discuss Judaism in European culture before and after World War I and in North America in the postwar period and after the Six Day War. A central theme will be the ways in which attempts to understand Jewish experience are related to history.

Same as: JEWISHST 129

RELIGST 130. Sex and Gender in Judaism and Christianity. 3 Units.

What role do Jewish and Christian traditions play in shaping understandings of gender differences? Is gender always imagined as dual, male and female? This course explores the variety of ways in which Jewish and Christian traditions - often in conversation with and against each other - have shaped gender identities and sexual politics. We will explore the central role that issues around marriage and reproduction played in this conversation. Perhaps surprisingly, early Jews and Christian also espoused deep interest in writing about 'eunuchs' and 'androgynes,' as they thought about Jewish and Christian ways of being a man or a woman. We will examine the variety of these early conversations, and the contemporary Jewish and Christian discussions of feminist, queer, trans- and intersex based on them. Same as: FEMGEN 130, JEWISHST 120

RELIGST 132. Jesus the Christ. 4 Units.

How did Jesus of Nazareth, who never claimed to be Christ or divine, become the son of God after his death? Sources include the history of first-century Judaism and Christianity.

RELIGST 132C. How Jesus the Jew became God. 4 Units.

Contemporary historical-critical methods in investigating how one might study Jewish and Christian texts of the 1st century CE. Social contexts including economic realities and elite ideological views. What can be known historically about 1st-century Judaism and Jesus' part in it. How Jewish apocalyptic messianism shaped the birth of Christianity and its trajectory through the 1st century.

RELIGST 132D. Early Christian Gospels. 4 Units.

An exploration of Christian gospels of the first and second century. Emphasis on the variety of images and interpretations of Jesus and the good news, the broader Hellenistic and Jewish contexts of the gospels, the processes of developing and transmitting gospels, and the creation of the canon. Readings include the Gospel of John, the Gospel of Mark, the Gospel of Thomas, the Gospel of Mary and other canonical and non-canonical gospels.

Same as: CLASSICS 145

RELIGST 133. Inventing Christianity in Late Antiquity. 4 Units.

The transformation of an apocalyptic sect into an imperial religion from 200 to 600 C.E. Shifts in structures of authority, worship, and belief mapped against shifts in politics, economics and religion in the larger Roman empire. Cultural visions of this history including Edward Gibbon's *Decline and Fall of the Roman Empire*, Dan Brown's conspiracy theory in *The Da Vinci Code*, and Elaine Pagels' *The Secret Gospel of Thomas*.

RELIGST 134. Sacred Space. 4 Units.

Religions throughout history have marked certain spaces as out-of-the-ordinary, as places where the gods reveal themselves, where special events have taken place, where one can see and experience things not possible in ordinary space. Individuals and groups who enter and create these sacred spaces create the opportunity to transcend the everyday world. Some of these spaces are natural--mountains, rivers, deserts. Others are constructed--temples, churches, tombs. This course will explore such sacred spaces: how they come to be, what distinguishes them from ordinary space, what happens in them. Part of the course will be theoretical, looking at different approaches to sacred spaces developed by recent scholars of religion; part of it will be focused on specific sacred spaces, especially in Israel and America, and the course will conclude with a chance for students to explore the variety of sacred spaces found in our own community.

RELIGST 136. Buddhist Yoga. 4 Units.

Buddhist models of spiritual practice emphasizing issues in the interpretation of the contemplative path.

RELIGST 140. RELIGION AND ETHICS: The Limits of Dialogue. 3 Units.

How do religious traditions address ethical problems? Although iquest;the goodquest; seems like a universal goal, religious traditions force us to consider non-universal ways of defining it. From marriage to genetic engineering, from abortion to organ donation, issues of community, faith, and practice continue to complicate our ethical thinking. Exploration of case-studies and concepts, with readings from Kant, Foucault, Butler and others, as well as Jewish and Christian interpretations of the Bible.

RELIGST 143. Empathy. 3 Units.

Empathy is fashionable these days - whether in Silicon Valley or the latest neuroscience. There is a deep sense that we need to learn how to walk in the shoes of another. This course will trace the meaning and practice of empathy through Buddhist compassion; Christianity's commandments to love our neighbor; Enlightenment moral philosophy; nineteenth-century aesthetics; and twenty-first century neuroscience. We will also explore how the arts - drama, novels, poetry, and the visual arts - especially enable us to understand and empathize with the other.

RELIGST 144. John Calvin and Christian Faith. 5 Units.

Close reading and analysis of Calvin's *Institutes of the Christian Religion* as a classic expression of Christian belief.

RELIGST 146. Religious Mystery and Rational Reflection. 4 Units.

Explores the boundaries of rational knowledge about Christian faith through a careful reading of the transcendental project of Jesuit theologian Karl Rahner. Rahneriquest;s thought, informed by various sources (e.g., the mystics, Aquinas, Kant, Hegel and Ignatius Loyola), results in an interpretation of Christian faith that strives for intellectual honesty in the face of challenges from science, atheism and post-modern culture. Yet it leaves room for a fundamental human openness to the source and goal of self-transcendence, what Rahner calls Holy Mystery. Weekly short position papers will be required to stir both reflection and discussion.

RELIGST 148. From Jesus to Paul. 4 Units.

Jesus considered himself God's definitive prophet, but he did not think he was God, and had no intention of founding a new religion. How did this Jewish prophet become the gentile God and the founder of Christianity? The role of Paul.

RELIGST 148A. St. Paul and the Politics of Religion. 4 Units.

The major letters written by Paul, the Apostle, and his biography, Acts of the Apostles. Historical context in first century Jewish cultural politics. Origins of Christianity, and the split into Judaism and Christianity. The relationship between Jews and non-Jews. The juxtaposition of law and faith. Origins of cultural universalism. Paul as Jewish radical versus Paul, the first Christian thinker and theologian. Recent philosophical readings of Paul (Taubes, Badiou, and Agamben).

RELIGST 150. The Lotus Sutra: Story of a Buddhist Book. 4 Units.

The Lotus school of Mahayana, and its Indian sources, Chinese formulation, and Japanese developments.

RELIGST 156. Music and Religious Experience in the Contemporary World. 3-5 Units.

Explores the central role of music in the performance and experience of religion, positioning music not as an adjunct to silent rituals and liturgy, but as the catalyst and carrier of religious experience, indeed as religious experience itself. Topics include: trance, spirit possession, heightened religious experience, sacred sound and chant, shamanism, politics, and identity. Musical traditions include: Zimbabwean mbira music, African-American church music, Southeast Asian Buddhist ritual music, South Asian Hindu and Islamic devotional music, shamanistic music of Southeast Asia.

Same as: MUSIC 186A, MUSIC 286A, RELIGST 256

RELIGST 160. Religion in Modern African Literature. 4 Units.**RELIGST 161. Modern Religious Thought: From Galileo to Freud. 4-5 Units.**

The three centuries following the Protestant Reformation led to a gradual clarification of the notions of the religious and secular and gave rise to a new genre of religious thought, ideally freed from theology, church or synagogue—a secular philosophy of religion, or in some cases a religiously-imbued philosophy. We will examine some of the foundations of religious thought in modernity, including Galileo, Spinoza, Diderot, Kant, Hegel, Schleiermacher, Kierkegaard, Feuerbach, Marx, Nietzsche and Freud.

RELIGST 162. Spirituality and Nonviolent Urban and Social Transformation. 3 Units.

A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, Cesar Chavez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center).

Same as: CSRE 162A, URBANST 126

RELIGST 168. Philosophy of Religion. 3 Units.

Course traces efforts within the Western tradition from Boethius through Anselm, Aquinas, Descartes, Hume, Kant, and Kierkegaard to Camus to establish a rational foundation for their belief and its consistency or coherence with everyday experience. We will deal extensively with the criticisms that that effort has cast up and then turn to investigate issues that extraordinary or mystical experience raises. We will incorporate a look at Buddhist traditions as well as those in the west to gain insight into these questions. And finally, we will look at the ethics of belief, at our responsibility toward our commitments, and some of the varying positions available to us.

RELIGST 170A. Biblical Hebrew, First Quarter. 2 Units.

Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. Students that are enrolled in this course must also enroll in Beginning Hebrew. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the year, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or on their own. Same as: AMELANG 170A, JEWISHST 107A

RELIGST 170C. Reading in Biblical Hebrew. 4 Units.

Third of a three quarter sequence. Readings and translation of biblical narratives emphasizing grammar and literary techniques. Prerequisite: AMELANG 170B.

RELIGST 170D. Readings in Talmudic Literature. 1 Unit.

Readings of the talmudic texts. Some knowledge of Hebrew is preferred. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Class meets on Fridays, from 12:00-1:15 pm in Hillel (Koret Pavilion Taube Hillel House; Ziff Center for Jewish Life). May be repeat for credit.

Same as: JEWISHST 127D, JEWISHST 227D

RELIGST 171A. Biblical Greek. 3-5 Units.

(Formerly CLASSGRK 5.) This is a one term intensive class in Biblical Greek. After quickly learning the basics of the language, we will then dive right into readings from the New Testament and the Septuagint, which is the ancient Greek translation of the Hebrew Bible. No previous knowledge of Greek required. If demand is high for a second term, an additional quarter will be offered in the Spring.

Same as: CLASSICS 6G, JEWISHST 5

RELIGST 171X. Intensive Biblical Greek. 8 Units.

Equivalent to two quarters of Biblical Greek (CLASSICS 6G, 7G). Students will learn the core of New Testament Greek with the goal of learning to accurately translate and read the New Testament. Students will read one-third of the Gospel of John during the course and will be well-prepared to read the Greek New Testament independently after the course. Focus on knowledge of key vocabulary and grammar needed to read the Greek Bible with ease. No previous knowledge of Greek required. Course does not fulfill the Stanford language requirement.

Same as: CLASSICS 9G, JEWISHST 5G

RELIGST 173. What is Enlightenment? Religion in the Age of Reason. 4 Units.

Many contemporary attitudes towards religion were forged in 17th- and 18th-century Europe in the midst of heated debates over the meaning and value of Christianity in a world 'come of age': Liberal calls for justice, toleration, and pluralism in matters religious; secular suspicions about religious superstition, fanaticism, and ideology; skepticism regarding the solubility of ultimate questions of meaning and metaphysics. Seminal readings on religion from Descartes, Pascal, Leibniz, Voltaire, Hume, Mendelssohn and Kant.

RELIGST 173X. Latin 500-1600 CE. 5 Units.

The aim of the course is to familiarize students with medieval Latin and neo-Latin through a reading of various short texts drawn from philosophical, religious, political, historical, and literary works. Students will devote most of their efforts to preparing translations for class. We shall also discuss some peculiarities of post-classical Latin grammar. Prerequisite: CLASSLAT 1, 2 & 3, or equivalent.

Same as: CLASSICS 6L, ENGLISH 113L, PHIL 113L, PHIL 213L

RELIGST 174. Religious Existentialism-Kierkegaard. 4 Units.

Existentialism is often understood to be a secular or anti-religious philosophy of life, a substitute for Christian ethics in a post-theistic world come of age. Yet this twentieth-century philosophical movement owes many of its concerns and much of its vocabulary to the hyper-Protestant Danish thinker Soren Kierkegaard, and much of the best Christian and Jewish thought in the 20th-century (Bultmann, Buber, Tillich) adopted existentialism as the best philosophy for making sense of these traditions in a secular age. This course will examine the origins of existentialist thought in the writings of Kierkegaard and its appropriation by a handful of influential 20th-century religious thinkers.

RELIGST 176. Religious Diversity: Theoretical and Practical Issues. 4 Units.

What does it mean for a religion to be true? If one religion is true, what about the truth of other religious possibilities? How, and why, should religious traditions be compared? Readings address tolerance and pluralism, relativism, comparative theory, and new religious virtues.

RELIGST 179. Doing the Sacred: Religion and Performance. 4 Units.

This course investigates religion as practice and performance, rather than as belief and doctrine. A performance-centered emphasis helps us understand how domination and authority, as well as creativity and individual resistance, underlie culture. From initiatory rites to cyber sermons, human action offers raw, physical data that unveils the mechanisms of social control, ideology, and individual resistance. Reorienting religion from the perspective of religious acts / actors -- those who are doing something they consider sacred -- evokes many interpretive possibilities: How do these performances create and maintain communities? How do they resolve conflicts that arise within everyday affairs? In what ways do they generate meaning and shape identity? What can these enactments reveal about the constructions of power, gender, and race? This course explores such issues, probing the complicated relationship between human intention and social reality. Ultimately, a study of religion and performance seeks to understand how performance and transcendence interact to make participants into who they are. The readings cover an array of religious traditions -- medieval and evangelical Christian, Hindu, Native American, Jewish, Buddhist, African and Haitian Vodou -- all of which present a rich repertoire of sacred drama, dance, and music. We will discuss performances that make modern readers uncomfortable, such as sacrifice and flagellation, and examine why they are meaningful within their specific cultural context. Finally, we will consider how secular practices and the internet mimic religious behavior. However divergent, all of these examples demonstrate how religious performance is no mere artifice, but a vehicle for the practitioner's own pious posturing -- one that is spiritually innovative and self-affirming -- yet shaped by hierarchical regimes.

RELIGST 183. Atheism: Hegel to Heidegger. 5 Units.

The radical changes in ideas of God between Hegel and Heidegger, arguing that their questions about theism and atheism are still pertinent today. Texts from Hegel, Feuerbach, Marx, Nietzsche, and Heidegger: on God, history, and the social dimensions of human nature. N.B.: Class size limited. Apply early at tsheehan@stanford.edu.

Same as: PHIL 183T

RELIGST 185. Prophetic Voices of Social Critique. 4 Units.

Judges, Samuel, Amos, and Isaiah depict and question power, strong leaders who inevitably fail, the societal inequities and corruption inevitable in prosperity, and the interplay between prophet as representative of God and the human king. How these texts succeed in their scrutiny of human power and societal arrangements through attention to narrative artistry and poetic force, and condemnation of injustice. Includes service-learning component in conjunction with the Haas Center.

RELIGST 188A. Issues in Liberation: El Salvador. 4 Units.

Within the context of US intervention in Central America the course investigates the history of liberation movements in El Salvador (including liberation theology), as well as ethical questions relating economic, social, and political issues in that country. This class will likely include immersion travel to El Salvador over spring break and consequently the size of this course is limited. Students will be given an application by email. All applications will be reviewed to determine final class enrollment.

RELIGST 199. Individual Work. 1-15 Unit.

Prerequisite: consent of instructor and department. May be repeated for credit.

RELIGST 201. Islamic Law. 3-5 Units.

(This course is combined with LAW 586) Topics include marriage, divorce, inheritance, ritual, war, rebellion, abortion, and relations with non-Muslims. The course begins with the premodern period, in which jurists were organized in legal traditions called schools of law; after examining the nature and functions of these institutions, we turn to the present era to study the relationship between customary law, state law, and the Islamic legal heritage in Egypt and Indonesia. The course explores Muslim laws and legal institutions and the factors that have shaped them, including social values and customs, politics, legal precedents, and textual interpretation.

Same as: RELIGST 301

RELIGST 201A. Gender in Classical Islamic Law. 3-5 Units.

The course examines classical Islamic society and law. It covers historical development, the unity and diversity of Muslim legal traditions, and the relationship between laws and values. Constructions of gender in law are examined through rituals, marriage, divorce, birth control, child custody, and sexuality.

Same as: RELIGST 301A

RELIGST 203. Myth, Place, and Ritual in the Study of Religion. 3-5 Units.

Sources include: ethnographic texts and theoretical writings; the approaches of Charles Long, Jonathan Z. Smith, Victor Turner, Michael D. Jackson, and Wendy Doniger; and lived experiences as recounted in Judith Sherman's *Say the Name: A Survivor's Tale in Prose and Poetry*, Jackson's *At Home in the World*, Marie Cardinal's *The Words to Say It*, and John Phillip Santos's *Places Left Unfinished at the Time of Creation*.

Same as: RELIGST 303

RELIGST 204. Paleography of Medieval and Early Modern Manuscripts. 3-5 Units.

Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.

Same as: CLASSICS 215, DLCL 209, HISTORY 309G

RELIGST 205. Religious Poetry. 4 Units.

Religious poetry drawn from the Islamic, Christian, Confucian and Daoist traditions. Limited enrollment or consent of the instructor required.

RELIGST 208A. Ex Oriente Lux: Orientalism and the Study of Religion. 3-5 Units.

This seminar is designed to expose students to issues relating to discourse and subjectivity within the textual constructions of Oriental religions in the colonial era. We will begin with Edward W. Said's provocative work on notions of representation and power embedded in the discourse on the Orient that established, produced, and, ultimately, perpetuated western knowledge about the Other. We will then discuss the impact of the Oriental Renaissance and the vital role that Eastern wisdom played in constructing the field of Comparative Religious Studies. In addition, students will also read ethnographies, fables, and travelogues that both support and undermine Said's thesis of an active West constructing a largely passive East. Same as: RELIGST 308A

RELIGST 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field. Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 308C

RELIGST 209A. Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity. 4-5 Units.

Modern Zoroastrian experience; as race, religion, and ethnic identity. Some 60,000 Zoroastrians now live in India and have resided there for a millennium. In the 19th century, these peoples from Persia; became colonial elites yet were acutely aware that they were not quite Indian, British, or Persian. Diverse ways this experience of dislocation has served as a defining characteristic in Parsi communal identity and contrast these South Asian experiences with the minority socio-politics of those who remained in Iran. Survey the colonial and post-colonial communities in England, East Africa, Hong Kong, Australia, and North America and examine the expression of these global diasporic experiences in literature and the arts. Same as: RELIGST 309A

RELIGST 209D. 'Crow Eaters' & 'Fire Worshippers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit. 3-5 Units.

In the past three decades Parsi fiction has rapidly emerged as a unique and creative voice in modern Anglophone literature from South Asia. From Bapsi Sidhwa to Thrity Umrigar to Rohinton Mistry, Parsi novelists address the most poignant concerns of Zoroastrians living in an era of rapid social, political, and religious transformation. The erosion of tradition; the breakdown of the Parsi family; the demise of religion among the young; and the cultural losses and gains of living in diaspora are common themes in their works. The unique vantage point of the Parsis; neither Hindu nor Muslim, neither quite Indian nor quite British; will serve as a lens for examining the inherent tensions in multicultural societies both East and West.

Same as: RELIGST 309D

RELIGST 209E. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the Book of Kings of Ferdowsi.

Same as: CLASSICS 148, CLASSICS 248, RELIGST 309E

RELIGST 212. Chuang Tzu. 5 Units.

The *Chuang Tzu* (Zhuangzi) in its original setting and as understood by its spiritual progeny. Limited enrollment.

RELIGST 216. Japanese Buddhism. 4 Units.

Focus on the religious lives of lay people in medieval Japan, as evidenced in collections of Buddhist stories (setsuwashu), narrative picture scrolls (emaki), and related historical materials. All readings are in English, but the instructor will also work with students interested in reading the original Japanese.

RELIGST 217. Japanese Studies of Religion in China. 3 Units.

(Graduate students register for 317.) Readings in Japanese secondary sources on Chinese religions.

Same as: RELIGST 317

RELIGST 217X. Minorities In Medieval Europe. 5 Units.

This course examines attitudes towards outsider groups within medieval society and the treatment of these groups by medieval Christians. Heretics, Jews, Muslims, homosexuals, prostitutes and users occupied ambivalent and at times dangerous positions within a society that increasingly defined itself as Christian. Differences in the treatment of these various 'outcast' groups, their depiction in art, their legal segregation, and their presumed association with demonic activity are addressed through discussion, and readings from primary and secondary source material.

Same as: HISTORY 217S

RELIGST 221. The Talmud. 4 Units.

Strategies of interpretation, debate, and law making. Historical contexts. Prerequisite: Hebrew.

Same as: RELIGST 321

RELIGST 221B. What is Talmud?. 5 Units.

In what sense can Talmud be studied as literature? Which voices can be identified? Concepts of author, editor, or redactor. The basic textual units of Talmud: sugya, chapter, and tractate. The sugya as literary genre. The aesthetic of talmudic dialectics. Prerequisite: reading Hebrew with some understanding of biblical Hebrew.

Same as: RELIGST 321B

RELIGST 222B. Sufism Seminar. 3-5 Units.

Sufism through original texts and specialized scholarship. Prerequisite: ability to read at least one major language of Islamic religious literature (Arabic, Persian, Turkish, Urdu).

Same as: RELIGST 322B

RELIGST 223. Studying Islam: History, Methods, Debates. 4 Units.

Islam as a subject of academic inquiry since the 19th century. Origins and critiques of major methodological perspectives in Islamic studies such as philology, religious studies, history, art history, and anthropology. Landmarks in the development of the field and the work of major scholars. Academic debates regarding unity versus diversity, orientalism, fundamentalism and Islamism, Sufism, and gender. Current trends in scholarship on medieval and modern Muslim societies. Prerequisite: course work in Islamic studies or methodology in religious studies.

RELIGST 224. Classical Islamic Texts. 3 Units.

The course is based on readings in primary Arabic sources in the key fields of pre-modern Islamic scholarship. The list of readings and topics will depend on the interests of the students. In addition to focusing on the language, contents, and context of the texts covered, the course introduces genre-specific historical research methods. The reading selections may be derived from Qur'anic interpretation (tafsir), the hadith literature, adab, biographical dictionaries, fiqh, ta'rikh, kalam, or Sufism. Reading knowledge of Arabic is required.

Same as: RELIGST 324

RELIGST 224B. Unveiling the Sacred: Explorations in Islamic Religious Imagination. 3-5 Units.

Poetry and prose in translation as well as historical studies. Islamic movements invested in the idea that the sensory world has a hidden or esoteric counterpart that can be understood or experienced through following particular religious programs. Various forms of Shi'ism and Sufism, millenarian and apocalyptic movements, the Nation of Islam and its offshoots. Philosophical propositions, historical contexts, and the role of ritual in the construction of religious systems.

Same as: RELIGST 324B

RELIGST 226A. Judaism and Hellenism. 3-5 Units.

interactions and conflicts between Jews and Greeks in the centuries following the conquests of Alexander the Great and the cultural/religious repercussions of their encounter. In what ways were Jews influenced by Greek culture? In what ways, and for what reasons, did they resist it? And how the interaction of these cultures shape the subsequent development of Judaism and Christianity? Jewish texts in the Greco-Roman period, including Jewish-Greek writers like Philo of Alexandria, the Apocrypha, the Dead Sea Scrolls, selected writings from the New Testament, and the Passover Haggadah.

Same as: RELIGST 326A

RELIGST 226D. Jewish-Christian Relations in Antiquity. 1-2 Unit.

Constructions of identity, community, ethnicity: these nnconsiderations frame the investigation of ancient Christian rhetoric nand theology contra Iudaeos. This historical project will be set nnwithin the larger intellectual and cultural context of a) learned nnGraeco-Roman traditions of ethnic stereotyping; b) forensic nnrhetoric; and c) philosophical paideia; and these nntraditions will be considered within their larger social context of the Mediterranean nncity (I-III). Specifically, various Christian, and especially Latin nntraditions contra Iudaeos (IV-VI) will be studied.

Same as: CLASSGEN 126B

RELIGST 227. The Qur'an. 5 Units.

Early history, themes, structure, chronology, and premodern interpretation. Relative chronology of passages.

Same as: RELIGST 327

RELIGST 229. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.

Stretching from India to Ethiopia, the Persian Empire;quest;the largest empire before Rome;quest;has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the iquest;Westiquest; and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film 300 and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.

Same as: CLASSICS 146, CLASSICS 246, RELIGST 329

RELIGST 230B. Zen Studies. 4 Units.

Readings in recent English-language scholarship on Chan and Zen Buddhism.

Same as: RELIGST 330B

RELIGST 231X. Knowing God: Learning Religion in Popular Culture. 4 Units.

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education.

Same as: AMSTUD 231X, EDUC 231X, JEWISHST 291X

RELIGST 233. The Ethics of Religious Politics. 5 Units.

Is it possible for a deeply committed religious person to be a good citizen in a liberal, pluralistic democracy? Is it morally inappropriate for religious citizens to appeal to the teachings of their tradition when they support and vote for laws that coerce fellow citizens? Must the religiously committed be prepared to defend their arguments by appealing to 'secular reasons' ostensibly accessible to all 'reasonable' citizens? What is so special about religious claims of conscience and expression that they warrant special protection in the constitution of most liberal democracies? Is freedom of religion an illusion when it is left to ostensibly secular courts to decide what counts as religion? Exploration of the debates surrounding the public role of religion in a religiously pluralistic American democracy through the writings of scholars on all sides of the issue from the fields of law, political science, philosophy, and religious studies.

Same as: ETHICSOC 233R

RELIGST 234. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. n In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy.

Same as: JEWISHST 224, JEWISHST 324, RELIGST 334

RELIGST 235. Religion in Modern Society: Secularization and the Sacred. 4 Units.

What is the status of religion in modern life? Is the modern world "secular" in some fundamental, irreversible way and what does this mean? This course will explore these questions through variety of readings from leading sociologists, philosophers, and anthropologists. Our goal will be to understand in what ways industrialization, political liberalization, the rise of technology, and the success of modern science have been used to support the "secularization" thesis that the modern West rendered religion a thing of the past. A central question to be asked will be: do assessments of the place of religion in modernity necessitate a philosophy of history i.e., a theory not only of historical change, but of the meaning of this change as well? The course will begin by looking at the origins of the theory of secularization from its beginnings in Enlightenment attempts to understand the meaning of history. We will then turn to contemporary debates over the term "secular" against its counterpart, "religious", and the problems with their application to non-Western societies. We will read works by Talal Asad, Saba Mahmood, Max Weber, Charles Taylor, Jürgen Habermas, and Pope Benedict XVI.

Same as: RELIGST 335

RELIGST 238. Christian Neo-Platonism, East and West. 3-5 Units.

Christianity's shift to neo-Platonic Greek philosophical categories and its significance for contemporary spirituality. Readings from Plotinus, Proclus, Greek fathers such as Pseudo-Dionysus, and from Ambrose and Augustine. Same as: RELIGST 338

RELIGST 239. Luther and the Reform of Western Christianity. 3-5 Units.

Luther's theology, ethics, biblical interpretation, and social reforms and their significance for the remaking of Western Christianity. Readings include Luther's own writings and secondary sources about Luther and his world.

Same as: RELIGST 339

RELIGST 245. Religion, Reason, and Romanticism. 5 Units.

The late 18th-century European cultural shift from rationalist to romantic modes of thought and sensibility. Debates about religion as catalysts for the new *Zeitgeist*. Readings include: the Jewish metaphysician, Mendelssohn; the dramatist, Lessing; the philosopher of language and history, Herder; the critical idealist, Kant; and the transcendental idealist, Fichte.

RELIGST 246. Constructing Race and Religion in America. 4-5 Units.

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: CSRE 246, HISTORY 256G, HISTORY 356G, RELIGST 346

RELIGST 247B. Readings in Chinese Religious Texts: The Lingbao Scriptures. 4 Units.

A survey of the original Lingbao scriptures. Composed in the late-4th / early 5th century, these texts radically revised Daoist practice, incorporated elements of Buddhist thought and practice, and created liturgies that are still used in Daoist communities today. (Reading knowledge of Literary Chinese iquest;quest; required).

Same as: RELIGST 347B

RELIGST 248. Chinese Buddhism in World Historical Perspective. 3-5 Units.

Shared cosmologies, trade routes, and political systems. Prerequisite: background in Chinese or Japanese.

Same as: RELIGST 348

RELIGST 248A. Chinese Buddhism Beyond the Great Wall. 3-5 Units.

The thought, practice, and cultural resonance of the sorts of originally Chinese Buddhism that flourished to the north and northwest of China proper during the two to three centuries following the fall of the Tang - i.e., under the Khitan Liao (907-1125) and the Tangut Xixia (1032-1227) dynasties - with special emphasis on the later fortunes of the Huayan, Chan, and Mijiao (Esoteric) traditions. Prerequisite: reading knowledge of Chinese.

Same as: RELIGST 348A

RELIGST 250. Classics of Indian Buddhism. 4 Units.

Texts in English translation including discourses (sutras), philosophical treatises, commentaries, didactic epistles, hymns, biographies, and narratives.

RELIGST 251. Readings in Indian Buddhist Texts. 3-5 Units.

(Graduate students register for 351.) Introduction to Buddhist literature through reading original texts in Sanskrit. Prerequisite: Sanskrit.

Same as: RELIGST 351

RELIGST 252. Hearts and Diamonds: The Lives of Buddhist Sacred Texts. 4 Units.

An exploration of two key Mahayana Buddhist scriptures (the Heart & Diamond Sutras) and their histories, looking at what they say and how they have been used, from the first millennium to the present day.

RELIGST 252A. The Story of a Buddhist Megascripture: Readings in the Avatamsaka. 3-5 Units.

In this course we will explore the massive Mahayana Buddhist scriptural compilation known as the Avatamsaka Sutra (more correctly: Buddhavatamsaka Sutra). We will investigate the development of the text in India, study its contents, and consider its later reception in East Asia. Since much of the course will be devoted to reading sections of the Buddhavatamsaka, a reading knowledge of Chinese is required.

Same as: RELIGST 352A

RELIGST 253. Mountains, Buddhist Practice, and Religious Studies. 3-5 Units.

The notion of the sacred mountain. Readings from ethnographic and theoretical works, and primary sources.

Same as: RELIGST 353

RELIGST 254. Recent Contributions to Buddhist Studies. 3-5 Units.

This reading intensive course will examine nine areas in recent work in Buddhist studies, including ethnography, archaeology, monasticism, the study of "experience," and gender. May be repeated for credit.

Same as: RELIGST 354

RELIGST 255. Religion and Power in the Making of Modern South Asia. 3-5 Units.

This course examines the diverse ways that religious traditions have been involved in the brokering of power in South Asia from the late seventeenth century to the present day. We will examine the intersection of religion and power in different arenas, including historical memory, religious festivals, language politics, and violent actions. At the core of our inquiry is how religion is invoked in political contexts (and vice-versa), public displays of religiosity, and the complex dynamics of religion and the state. Among other issues, we will particularly engage with questions of religious identity, knowledge, and violence. HISTORY297F must be taken for 4-5 units.

Same as: HISTORY 297F, RELIGST 355

RELIGST 256. Music and Religious Experience in the Contemporary World. 3-5 Units.

Explores the central role of music in the performance and experience of religion, positioning music not as an adjunct to silent rituals and liturgy, but as the catalyst and carrier of religious experience, indeed as religious experience itself. Topics include: trance, spirit possession, heightened religious experience, sacred sound and chant, shamanism, politics, and identity. Musical traditions include: Zimbabwean mbira music, African-American church music, Southeast Asian Buddhist ritual music, South Asian Hindu and Islamic devotional music, shamanistic music of Southeast Asia.

Same as: MUSIC 186A, MUSIC 286A, RELIGST 156

RELIGST 257. Readings in Daoist Texts. 4 Units.

Readings from primary sources. Prerequisite: classical Chinese. Same as: RELIGST 357

RELIGST 257X. Female Divinities in China. 4-5 Units.

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: HISTORY 293E, HISTORY 393E, RELIGST 357X

RELIGST 258. Japanese Buddhist Texts. 3-5 Units.

Readings in medieval Japanese Buddhist materials. May be repeated for credit. Prerequisite: background in Japanese or Chinese.

Same as: RELIGST 358

RELIGST 259. Religion and Music in South Asia. 4-5 Units.

How music and other arts in South Asia are intertwined with religion. Classical, devotional, folk, and popular examples introduce Gods as musicians, sound as God, music as yoga, singing as devotion, music as iquest;ecstasyquest;-inducing, music as site for doctrinal argument, music and religion as vehicles for nationalism. Co-taught by professors of Music and Religious Studies, focusing Hinduism and Islam in India, Pakistan, and the diaspora. Music practice along with academic study; guest artists and films; no background required.

Same as: MUSIC 186, MUSIC 286

RELIGST 261A. Belief. 5 Units.

The post-Christain (or post-modern) age has given rise to new forms of faith, ranging from secular humanism and cultural atheism to rediscovery of the transcendent in the cosmos and quantum mechanics. However, unlike the era of "Christendom," belief is no longer necessarily hinged to faith. This course explores the origins of this phenomenon in Thomas Aquinas, and then newer philosophical approaches to understanding belief, ranging from Charles Taylor and Talal Asad and their theories of the secular, to Catherine Bell and the role of practice in believing. Finally, we turn to the work of three contemporary theorists of religious belief: Gianni Vattimo, Jean-Luc Marion, and Richard Kearney, who endeavor to cast believing outside established theological categories, yet still speak of "god."

Same as: in a post-Christian Age

RELIGST 263. Judaism and the Body. 4 Units.

Representations and discourses of the body in Jewish culture; theories of body and ritual. Case studies of circumcision, menstrual impurity, and intersexuality. Readings include classical texts in Jewish tradition and current discussions of these textual traditions.

RELIGST 271A. Dante's Spiritual Vision. 4-5 Units.

Poetry, ethics, and theology in Dante's Divine Comedy. Supplementary readings from classical authors such as St. Thomas Aquinas, and from modern writers, such as Jorge Borges. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. Students may take 271A without taking 271B. Consent of the instructor required.

RELIGST 271B. Dante's Spiritual Vision. 4-5 Units.

Poetry, ethics, and theology in Dante's Divine Comedy. Supplementary readings from classical authors such as St. Thomas, and from modern writers, such as Jorge Borges. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. Prerequisite: 271A.

RELIGST 272. Kant on Religion. 3-5 Units.

Critical examination of Kant's principle writings on religion against the background of his general theoretical and practical philosophy and guided by the hypothesis that his philosophy of religion continues to offer significant insights and resources to contemporary theories of religion. Recent reassessments of Kant on religion in the secondary literature will also be read and discussed.

Same as: RELIGST 372

RELIGST 273. Historicism and Its Problems: Ernst Troeltsch, the Study of Religion, and the Crisis of Historicism. 3-5 Units.

Examination of the early twentieth-century historian of religion, philosopher of culture, sociologist of religion, Christian theologian, and philosopher of history, Ernst Troeltsch, within the context of the late nineteenth-century "crisis of historicism," i.e., the historicization and relativization of religious, ethical, social, and political norms. Attention to seminal theorists of history (Herder, Kant, Ranke, Hegel, Nietzsche) in the post-Enlightenment German intellectual tradition and the attempts of Christian and Jewish thinkers in the Weimar era (Barth, Gogarten, Rosenzweig, L. Strauss) to "overcome" the crisis wrought by a radically historical approach to human culture.

Same as: RELIGST 373

RELIGST 274. From Kant to Kierkegaard. 3-5 Units.

(Graduate students register for 374. Undergrads register for 274 for 5 units.)

The philosophy of religion emerged from the European Enlightenment as a new genre of reflection on religion distinct from both dogmatic theology and rationalist dreams of a "natural" religion of reason. Neither beholden to pre-critical tradition, nor dismissive of what Thomas Nagel has termed "the religious attitude," this new, ostensibly secular, genre of religious thought sought to rethink the meaning of Christianity at a time of immense philosophical ferment. The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis on the theories of religion, the epistemological status of religious discourse, the role of history (especially the figure of Jesus), and the problem of alienation/reconciliation in seminal modern thinkers: Kant, Schleiermacher, Hegel, and Kierkegaard.

Same as: RELIGST 374

RELIGST 275. Kierkegaard. 3-5 Units.

(Graduate students register for 375.) Close reading of Kierkegaard's magnum opus, *Concluding Unscientific Postscript to Philosophical Fragments*, in its early 19th-century context.

Same as: RELIGST 375

RELIGST 277. The Later Heidegger: Art, Poetry, Language. 3 Units.

Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from "On the Origin of the Work of Art" and *Elucidations of Holderlin's Poetry*.

Same as: PHIL 234B, RELIGST 377

RELIGST 278. Heidegger: Confronting the Ultimate. 3-5 Units.

Heidegger's work on meaning, the self, and the sacred. Texts include *Being and Time*, courses and opuscula up to 1933, the *Letter on Humanism*, and *Contributions of Philosophy*.

Same as: RELIGST 378

RELIGST 279. After God: Why religion at all?. 4 Units.

God is dead, but where does religion come from? The end of the quest for God in twentieth century philosophy. Robert Bellah's *Religion in Human Evolution* plus seminal works of Heidegger, including *Being and Time*, 'What Is Metaphysics?' 'Nietzsche's Saying 'God is Dead.' 'N.B.: Class size limited. Apply early at tsheehan@stanford.edu.

Same as: RELIGST 379

RELIGST 279A. Heidegger on human being and God. 4 Units.

This lecture-seminar first raises the question of essential characteristics of human being, such as temporality, mortality, hermeneutics and the relation to meaning, and then, via readings from Karl Rahner, asks whether human being is open to a possible relation to a supernatural divinity.

Same as: RELIGST 379A

RELIGST 279X. American Jewish History: Learning to be Jewish in America. 2-4 Units.

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience.

History students must take course for at least 3 units.

Same as: AMSTUD 279X, EDUC 279X, HISTORY 288D, JEWISHST 297X

RELIGST 280. Schleiermacher: Reconstructing Religion. 3-5 Units.

Idealist philosopher, Moravian pietist, early German Romantic, co-founder of the University of Berlin, head preacher at Trinity Church, translator of Plato's works, Hegel's opponent, pioneer in modern hermeneutics, father of modern theology. Schleiermacher's controversial reconception of religion and theology in its philosophical context.

Same as: RELIGST 380

RELIGST 281. Asian Religions in America; Asian American Religions. 4 Units.

This course will analyze both the reception in America of Asian religions (i.e. of Buddhism in the 19th century), and the development in America of Asian American religious traditions.

Same as: AMSTUD 281, ASNAMST 281, RELIGST 381

RELIGST 282. King Solomon and the Search for Wisdom. 4 Units.

What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.

Same as: RELIGST 382

RELIGST 283A. Heidegger, Hölderlin, and the Gods. 3-5 Units.

The radical transformations in Western notions of God between the death of Hegel and the birth of historical materialism, arguing that questions about theism and atheism, humanism, and history formulated in the period 1831-50 are still pertinent. Texts from Hegel, the young Hegelians, Feuerbach, and Marx on issues of God, history, and the social dimensions of human nature.

Same as: RELIGST 383A

RELIGST 290. Majors Seminar. 5 Units.

Required of all majors and joint majors. The study of religion reflects upon itself. Representative modern and contemporary attempts to "theorize," and thereby understand, the phenomena of religion in anthropology, psychology, sociology, cultural studies, and philosophy. WIM.

RELIGST 293X. Church, State, & Schools: Issues in Education & Religion. 4 Units.

This course will examine interactions between religion and education, focusing on both formal and experiential sites in which people and communities explore, articulate, encounter, and perform religious ideologies and identities. The class will focus on different religious traditions and their encounters the institutions and structures of education in American culture, both in the United States and as it manifests in American culture transnationally.

Same as: EDUC 293X

RELIGST 297. Senior Essay/Honors Essay Research. 3-5 Units.

Guided by faculty adviser. May be repeated for credit. Prerequisite: consent of instructor and department.

RELIGST 298. Senior Colloquium. 5 Units.

For Religious Studies majors writing the senior essay or honors thesis. Students present work in progress, and read and respond to others. Approaches to research and writing in the humanities.

RELIGST 300. Theory in the Study of Religion. 4 Units.

This course explores how religious belief, ritual, and tradition, interact with, embed, or respond to aspects of social reality or human nature, such as economics, institutions, law, art, values, and psychology. The course examines a number of approaches to the study of religion, including sociological and anthropological ones. The course is intended for Religious Studies MA students and graduate students from other departments.

RELIGST 301. Islamic Law. 3-5 Units.

(This course is combined with LAW 586) Topics include marriage, divorce, inheritance, ritual, war, rebellion, abortion, and relations with non-Muslims. The course begins with the premodern period, in which jurists were organized in legal traditions called *madhabs*; schools of law. After examining the nature and functions of these institutions, we turn to the present era to study the relationship between customary law, state law, and the Islamic legal heritage in Egypt and Indonesia. The course explores Muslim laws and legal institutions and the factors that have shaped them, including social values and customs, politics, legal precedents, and textual interpretation.

Same as: RELIGST 201

RELIGST 301A. Gender in Classical Islamic Law. 3-5 Units.

The course examines classical Islamic society and law. It covers historical development, the unity and diversity of Muslim legal traditions, and the relationship between laws and values. Constructions of gender in law are examined through rituals, marriage, divorce, birth control, child custody, and sexuality.

Same as: RELIGST 201A

RELIGST 302. Islamic Studies Proseminar. 1-5 Unit.

Research methods and materials for the study of Islam. May be repeated for credit.

RELIGST 303. Myth, Place, and Ritual in the Study of Religion. 3-5 Units.

Sources include: ethnographic texts and theoretical writings; the approaches of Charles Long, Jonathan Z. Smith, Victor Turner, Michael D. Jackson, and Wendy Doniger; and lived experiences as recounted in Judith Sherman's *Say the Name: A Survivor's Tale in Prose and Poetry*, Jackson's *At Home in the World*, Marie Cardinal's *The Words to Say It*, and John Phillip Santosique's *Places Left Unfinished at the Time of Creation*.

Same as: RELIGST 203

RELIGST 304A. Theories and Methods. 4 Units.

Required of graduate students in Religious Studies. Approaches to the study of religion. Prerequisite: consent of instructor.

RELIGST 304B. Theories and Methods. 4 Units.

Required of graduate students in Religious Studies. Approaches to the study of religion. Prerequisite: consent of instructor.

RELIGST 306. Life, Love, and Death in Islamic Narratives. 3-5 Units.

A wide-ranging engagement with Islamic perspectives on fundamental human preoccupations. We will utilize religious and literary sources spanning Islamic history to discuss topics such as: the ends of human life in the material world: pleasures and pains of love for God and human beings; death and dying; eschatology and resurrection; and skepticism regarding religious claims. Emphasis on original sources in translation considered in relation to theoretical perspectives in the humanities.

RELIGST 308. Medieval Japanese Buddhism. 3-5 Units.

Japanese religion and culture, including Buddhism, Shinto, popular religion, and new religions, through the medium of film.

RELIGST 308A. Ex Oriente Lux: Orientalism and the Study of Religion. 3-5 Units.

This seminar is designed to expose students to issues relating to discourse and subjectivity within the textual constructions of Oriental religions in the colonial era. We will begin with Edward W. Said's provocative work on notions of representation and power embedded in the discourse on the Orient that established, produced, and, ultimately, perpetuated western knowledge about the Other. We will then discuss the impact of the Oriental Renaissance and the vital role that Eastern wisdom played in constructing the field of Comparative Religious Studies. In addition, students will also read ethnographies, fables, and travelogues that both support and undermine Said's thesis of an active West constructing a largely passive East. Same as: RELIGST 208A

RELIGST 308C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C

RELIGST 309. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.

From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past.

Same as: CLASSICS 147, CLASSICS 247

RELIGST 309A. Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity. 4-5 Units.

Modern Zoroastrian experience as race, religion, and ethnic identity. Some 60,000 Zoroastrians now live in India and have resided there for a millennium. In the 19th century, these peoples from Persia became colonial elites yet were acutely aware that they were not quite Indian, British, or Persian. Diverse ways this experience of dislocation has served as a defining characteristic in Parsi communal identity and contrast these South Asian experiences with the minority socio-politics of those who remained in Iran. Survey the colonial and post-colonial communities in England, East Africa, Hong Kong, Australia, and North America and examine the expression of these global diasporic experiences in literature and the arts.

Same as: RELIGST 209A

RELIGST 309D. 'Crow Eaters' & 'Fire Worshipers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit. 3-5 Units.

In the past three decades Parsi fiction has rapidly emerged as a unique and creative voice in modern Anglophone literature from South Asia. From Bapsi Sidhwa to Thrity Umrigar to Rohinton Mistry, Parsi novelists address the most poignant concerns of Zoroastrians living in an era of rapid social, political, and religious transformation. The erosion of tradition; the breakdown of the Parsi family; the demise of religion among the young; and the cultural losses and gains of living in diaspora are common themes in their works. The unique vantage point of the Parsis; neither Hindu nor Muslim, neither quite Indian nor quite British; will serve as a lens for examining the inherent tensions in multicultural societies both East and West.

Same as: RELIGST 209D

RELIGST 309E. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the Book of Kings of Ferdowsi.

Same as: CLASSICS 148, CLASSICS 248, RELIGST 209E

RELIGST 310. Islam, Art, Modernity. 3-5 Units.

Taught in conjunction with a major exhibition of modern Islamic art at the Cantor Museum. We will consider theoretical discussions regarding art and modern Muslim identities and examine the use of Islamic motifs in art and architecture in detail.

Same as: RELIGST 110

RELIGST 312. Buddhist Studies Proseminar. 1-5 Unit.

Research methods and materials for the study of Buddhism. May be repeated for credit. Prerequisite: reading knowledge of Chinese or Japanese.

RELIGST 313. Graduate Seminar in Chinese Buddhist Texts. 3-5 Units.

Graduate Seminar in Chinese Buddhist Texts: An in-depth reading of Zongmi's Chanyuan zhuquanji duxu ("Preface to the Collected Writings on the Source of Chan") (T#2015). Written in 833, the "Preface" is Zongmi's most ambitious and well-known work. It seeks to delineate the historical and doctrinal origins of the Chan tradition. In doing so, it is the first work to formulate the paradigm of a multi-branched genealogical tree that becomes the template in terms of which the subsequent Chan tradition described itself. It also tries to harmonize Chan (the practice of meditation) with the canonical teachings (doctrinal study) by adapting a Huayan philosophical framework to correlate different Chan traditions with different Chinese Buddhist doctrinal schools. In addition, it is particularly noteworthy for its analysis of the so-called sudden/gradual controversy, in which Zongmi develops an overarching scheme in which the different contending positions can all be seen to fit. The text is an excellent vehicle for giving students a grounding in both Tang-dynasty Chan history and teachings as well as the teachings of the main philosophical schools of Chinese Buddhism. The seminar will focus on a close reading of selected sections from Zongmi's text, especially those bearing on his strategies for harmonizing Chan and doctrinal teachings as well as his analysis of the sudden/gradual controversy. In doing so it will pay special attention to problems of translation. Meetings will be held in Buddhist Studies Library, located in Bldg 70 (Main Campus Quad).

RELIGST 313X. The Education of American Jews. 4 Units.

This course will take an interdisciplinary approach to the question of how American Jews negotiate the desire to retain a unique ethnic sensibility without excluding themselves from American culture more broadly. Students will examine the various ways in which people debate, deliberate, and determine what it means to be an "American Jew". This includes an investigation of how American Jewish relationships to formal and informal educational encounters through school, popular culture, religious ritual, and politics.

Same as: EDUC 313X, JEWISHST 393X

RELIGST 315. Third Bhavanakrama & the Writings of Héshang Moheyan: Scripture in Buddhist Scholastic Polemics. 3-5 Units.

Readings in the original languages (Sanskrit, Tibetan and Chinese) of materials from the debates of late 8th Century Tibet (so-called debate at Bsam-yas). The course focuses on the use of scriptural quotations in those passages where the arguments of Kamalasila, the leading Indian representative at the debates, best map on to the arguments of his Chinese rival, Heacute;shang Moheyan.

RELIGST 315A. Chinese Buddhism. 3-5 Units.

This course provides an overview of the major themes and historical developments in 2000 years of Buddhist history in China, from its early transmission from India to contemporary developments in the PRC, Taiwan and Hong Kong. Themes include monasticism, doctrine, popular devotion, state policy and the encounter with modernity.

RELIGST 317. Japanese Studies of Religion in China. 3 Units.

(Graduate students register for 317.) Readings in Japanese secondary sources on Chinese religions.
Same as: RELIGST 217

RELIGST 320. Religion and Literature. 4 Units.

grad seminar in religion and literature-description to follow.

RELIGST 321. The Talmud. 4 Units.

Strategies of interpretation, debate, and law making. Historical contexts.
Prerequisite: Hebrew.
Same as: RELIGST 221

RELIGST 321B. What is Talmud?. 5 Units.

In what sense can Talmud be studied as literature? Which voices can be identified? Concepts of author, editor, or redactor. The basic textual units of Talmud: sugya, chapter, and tractate. The sugya as literary genre. The aesthetic of talmudic dialectics.
Prerequisite: reading Hebrew with some understanding of biblical Hebrew.
Same as: RELIGST 221B

RELIGST 322B. Sufism Seminar. 3-5 Units.

Sufism through original texts and specialized scholarship. Prerequisite: ability to read at least one major language of Islamic religious literature (Arabic, Persian, Turkish, Urdu).
Same as: RELIGST 222B

RELIGST 324. Classical Islamic Texts. 3 Units.

The course is based on readings in primary Arabic sources in the key fields of pre-modern Islamic scholarship. The list of readings and topics will depend on the interests of the students. In addition to focusing on the language, contents, and context of the texts covered, the course introduces genre-specific historical research methods. The reading selections may be derived from Qur'anic interpretation (tafsir), the hadith literature, adab, biographical dictionaries, fiqh, tariqh, kalam, or Sufism. Reading knowledge of Arabic is required.
Same as: RELIGST 224

RELIGST 324B. Unveiling the Sacred: Explorations in Islamic Religious Imagination. 3-5 Units.

Poetry and prose in translation as well as historical studies. Islamic movements invested in the idea that the sensory world has a hidden or esoteric counterpart that can be understood or experienced through following particular religious programs. Various forms of Shi'ism and Sufism, millenarian and apocalyptic movements, the Nation of Islam and its offshoots. Philosophical propositions, historical contexts, and the role of ritual in the construction of religious systems.
Same as: RELIGST 224B

RELIGST 326A. Judaism and Hellenism. 3-5 Units.

interactions and conflicts between Jews and Greeks in the centuries following the conquests of Alexander the Great and the cultural/religious repercussions of their encounter. In what ways were Jews influenced by Greek culture? In what ways, and for what reasons, did they resist it? And how the interaction of these cultures shape the subsequent development of Judaism and Christianity? Jewish texts in the Greco-Roman period, including Jewish-Greek writers like Philo of Alexandria, the Apocrypha, the Dead Sea Scrolls, selected writings from the New Testament, and the Passover Haggadah.
Same as: RELIGST 226A

RELIGST 327. The Qur'an. 5 Units.

Early history, themes, structure, chronology, and premodern interpretation. Relative chronology of passages.
Same as: RELIGST 227

RELIGST 328S. The Study of the Midrash. 1-2 Unit.

Two-week block seminar; four sessions. Talmudic philology; development and transmission of the Talmudic text and manuscripts. Relationship between Midrash and Mishnah and between Mishnah and Tosefta; development of talmudic sugiot; relationship between the Babylonian and Palestinian Talmud.

RELIGST 329. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.

Stretching from India to Ethiopia, the Persian Empire; the largest empire before Rome; has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West; and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.
Same as: CLASSICS 146, CLASSICS 246, RELIGST 229

RELIGST 329X. Advanced Paleography. 5 Units.

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment.
Same as: CLASSICS 216, ENGLISH 300A, HISTORY 315

RELIGST 330B. Zen Studies. 4 Units.

Readings in recent English-language scholarship on Chan and Zen Buddhism.
Same as: RELIGST 230B

RELIGST 332X. Religion and Modernity. 5 Units.

What role has the category of religion played in the development of the modern state, both colonial and national? How have central concepts of liberal political thought, such as freedom, progress, and history, depended on certain normative ideas of religion? Through various genealogical, historical, and ethnographic inquiries, this course examines how the category of religion has both subtended and disturbed formations of colonial and post-colonial modernity.
Same as: ANTHRO 347

RELIGST 334. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy.

Same as: JEWISHST 224, JEWISHST 324, RELIGST 234

RELIGST 335. Religion in Modern Society: Secularization and the Sacred. 4 Units.

What is the status of religion in modern life? Is the modern world "secular" in some fundamental, irreversible way and what does this mean? This course will explore these questions through variety of readings from leading sociologists, philosophers, and anthropologists. Our goal will be to understand in what ways industrialization, political liberalization, the rise of technology, and the success of modern science have been used to support the "secularization" thesis that the modern West rendered religion a thing of the past. A central question to be asked will be: do assessments of the place of religion in modernity necessitate a philosophy of history i.e., a theory not only of historical change, but of the meaning of this change as well? The course will begin by looking at the origins of the theory of secularization from its beginnings in Enlightenment attempts to understand the meaning of history. We will then turn to contemporary debates over the term "secular" against its counterpart, "religious", and the problems with their application to non-Western societies. We will read works by Talal Asad, Saba Mahmood, Max Weber, Charles Taylor, Juul;rgen Habermas, and Pope Benedict XVI.

Same as: RELIGST 235

RELIGST 338. Christian Neo-Platonism, East and West. 3-5 Units.

Christianity's shift to neo-Platonic Greek philosophical categories and its significance for contemporary spirituality. Readings from Plotinus, Proclus, Greek fathers such as Pseudo-Dionysus, and from Ambrose and Augustine. Same as: RELIGST 238

RELIGST 339. Luther and the Reform of Western Christianity. 3-5 Units.

Luther's theology, ethics, biblical interpretation, and social reforms and their significance for the remaking of Western Christianity. Readings include Luther's own writings and secondary sources about Luther and his world.

Same as: RELIGST 239

RELIGST 340. Contemporary Religious Reflection. 3-5 Units.

Focus is on normative and prescriptive proposals by recent and contemporary philosophers and theologians, as opposed to the domination of Religious Studies by textual, historical, cultural, and other largely descriptive and interpretive approaches. Do such normative and prescriptive proposals belong in the academy? Has Religious Studies exorcised its theological nimbus only to find contemporary religious reflection reappearing elsewhere in the university?.

RELIGST 341. Comparative Perspectives on Classical Chinese Texts. 4-5 Units.

Classical Chinese texts, in prose and poetry, interpreted through comparative perspectives drawn from both inside and outside China. Consent of the instructor required.

RELIGST 346. Constructing Race and Religion in America. 4-5 Units.

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: CSRE 246, HISTORY 256G, HISTORY 356G, RELIGST 246

RELIGST 347. Chinese Buddhist Texts. 3-5 Units.

Chinese Buddhist texts from the Han Dynasty onwards, including sutra translations, prefaces, colophons, story collections and biographies. Prerequisite: reading competence in Chinese.

RELIGST 347B. Readings in Chinese Religious Texts: The Lingbao Scriptures. 4 Units.

A survey of the original Lingbao scriptures. Composed in the late-4th / early 5th century, these texts radically revised Daoist practice, incorporated elements of Buddhist thought and practice, and created liturgies that are still used in Daoist communities today. (Reading knowledge of Literary Chinese iquest;iquest; required).

Same as: RELIGST 247B

RELIGST 348. Chinese Buddhism in World Historical Perspective. 3-5 Units.

Shared cosmologies, trade routes, and political systems. Prerequisite: background in Chinese or Japanese.

Same as: RELIGST 248

RELIGST 348A. Chinese Buddhism Beyond the Great Wall. 3-5 Units.

The thought, practice, and cultural resonance of the sorts of originally Chinese Buddhism that flourished to the north and northwest of China proper during the two to three centuries following the fall of the Tang - i.e., under the Khitan Liao (907-1125) and the Tangut Xixia (1032-1227) dynasties - with special emphasis on the later fortunes of the Huayan, Chan, and Mijiao (Esoteric) traditions. Prerequisite: reading knowledge of Chinese.

Same as: RELIGST 248A

RELIGST 349. Meditation and Mythology in Chinese Buddhism. 3-5 Units.

Readings in Chinese texts and English scholarly literature on issues such as specific techniques and hagiographical imagery in Chinese Buddhist traditions of self-cultivation. Prerequisite: background in Chinese or Japanese.

RELIGST 350. Modern Western Religious Thought Proseminar. 1-5 Unit.

Selected topics in recent and contemporary religious thought. May be repeated for credit.

RELIGST 351. Readings in Indian Buddhist Texts. 3-5 Units.

(Graduate students register for 351.) Introduction to Buddhist literature through reading original texts in Sanskrit. Prerequisite: Sanskrit.

Same as: RELIGST 251

RELIGST 352A. The Story of a Buddhist Megascripture: Readings in the Avatamsaka. 3-5 Units.

In this course we will explore the massive Mahayana Buddhist scriptural compilation known as the Avatamsaka Sutra (more correctly: Buddhavatamsaka Sutra). We will investigate the development of the text in India, study its contents, and consider its later reception in East Asia. Since much of the course will be devoted to reading sections of the Buddhavatamsaka, a reading knowledge of Chinese is required.
Same as: RELIGST 252A

RELIGST 353. Mountains, Buddhist Practice, and Religious Studies. 3-5 Units.

The notion of the sacred mountain. Readings from ethnographic and theoretical works, and primary sources.
Same as: RELIGST 253

RELIGST 354. Recent Contributions to Buddhist Studies. 3-5 Units.

This reading intensive course will examine nine areas in recent work in Buddhist studies, including ethnography, archaeology, monasticism, the study of "experience," and gender. May be repeated for credit.
Same as: RELIGST 254

RELIGST 355. Religion and Power in the Making of Modern South Asia. 3-5 Units.

This course examines the diverse ways that religious traditions have been involved in the brokering of power in South Asia from the late seventeenth century to the present day. We will examine the intersection of religion and power in different arenas, including historical memory, religious festivals, language politics, and violent actions. At the core of our inquiry is how religion is invoked in political contexts (and vice-versa), public displays of religiosity, and the complex dynamics of religion and the state. Among other issues, we will particularly engage with questions of religious identity, knowledge, and violence. HISTORY297F must be taken for 4-5 units.
Same as: HISTORY 297F, RELIGST 255

RELIGST 356. The Brahma Net Sutra (Fanwang Jing). 4 Units.

A study of an important Chinese Buddhist apocryphal work, with special attention to interpretation of content, impact on monastic codes in medieval China, transmissional history and commentarial tradition.
Same as: RELIGST 256

RELIGST 357. Readings in Daoist Texts. 4 Units.

Readings from primary sources. Prerequisite: classical Chinese.
Same as: RELIGST 257

RELIGST 357X. Female Divinities in China. 4-5 Units.

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.
Same as: HISTORY 293E, HISTORY 393E, RELIGST 257X

RELIGST 358. Japanese Buddhist Texts. 3-5 Units.

Readings in medieval Japanese Buddhist materials. May be repeated for credit. Prerequisite: background in Japanese or Chinese.
Same as: RELIGST 258

RELIGST 370. Comparative Religious Ethics. 4 Units.

The difference that the word religious makes in religious ethics and how it affects issues of genre. Theoretical analyses with examples from W. and E. Asia. Prerequisite: consent of instructor.

RELIGST 372. Kant on Religion. 3-5 Units.

Critical examination of Kant's principle writings on religion against the background of his general theoretical and practical philosophy and guided by the hypothesis that his philosophy of religion continues to offer significant insights and resources to contemporary theories of religion. Recent reassessments of Kant on religion in the secondary literature will also be read and discussed.
Same as: RELIGST 272

RELIGST 373. Historicism and Its Problems: Ernst Troeltsch, the Study of Religion, and the Crisis of Historicism. 3-5 Units.

Examination of the early twentieth-century historian of religion, philosopher of culture, sociologist of religion, Christian theologian, and philosopher of history, Ernst Troeltsch, within the context of the late nineteenth-century "crisis of historicism," i.e., the historicization and relativization of religious, ethical, social, and political norms. Attention to seminal theorists of history (Herder, Kant, Ranke, Hegel, Nietzsche) in the post-Enlightenment German intellectual tradition and the attempts of Christian and Jewish thinkers in the Weimar era (Barth, Gogarten, Rosenzweig, L. Strauss) to "overcome" the crisis wrought by a radically historical approach to human culture.
Same as: RELIGST 273

RELIGST 374. From Kant to Kierkegaard. 3-5 Units.

(Graduate students register for 374. Undergrads register for 274 for 5 units.) The philosophy of religion emerged from the European Enlightenment as a new genre of reflection on religion distinct from both dogmatic theology and rationalist dreams of a "natural" religion of reason. Neither beholden to pre-critical tradition, nor dismissive of what Thomas Nagel has termed "the religious attitude," this new, ostensibly secular, genre of religious thought sought to rethink the meaning of Christianity at a time of immense philosophical ferment. The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis on the theories of religion, the epistemological status of religious discourse, the role of history (especially the figure of Jesus), and the problem of alienation/reconciliation in seminal modern thinkers: Kant, Schleiermacher, Hegel, and Kierkegaard.
Same as: RELIGST 274

RELIGST 375. Kierkegaard. 3-5 Units.

(Graduate students register for 375.) Close reading of Kierkegaard's magnum opus, *Concluding Unscientific Postscript to Philosophical Fragments*, in its early 19th-century context.
Same as: RELIGST 275

RELIGST 377. The Later Heidegger: Art, Poetry, Language. 3 Units.

Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from "On the Origin of the Work of Art" and Elucidations of Holderlin's Poetry.
Same as: PHIL 234B, RELIGST 277

RELIGST 378. Heidegger: Confronting the Ultimate. 3-5 Units.

Heidegger's work on meaning, the self, and the sacred. Texts include *Being and Time*, courses and opuscula up to 1933, the *Letter on Humanism*, and *Contributions of Philosophy*.
Same as: RELIGST 278

RELIGST 379. After God: Why religion at all?. 4 Units.

God is dead, but where does religion come from? The end of the quest for God in twentieth century philosophy. Robert Bellah's Religion in Human Evolution plus seminal works of Heidegger, including Being and Time, 'What Is Metaphysics?' 'Nietzsche's Saying 'God is Dead.' 'N.B.: Class size limited. Apply early at tsheehan@stanford.edu.
Same as: RELIGST 279

RELIGST 379A. Heidegger on human being and God. 4 Units.

This lecture-seminar first raises the question of essential characteristics of human being, such as temporality, mortality, hermeneutics and the relation to meaning, and then, via readings from Karl Rahner, asks whether human being is open to a possible relation to a supernatural divinity.
Same as: RELIGST 279A

RELIGST 380. Schleiermacher: Reconstructing Religion. 3-5 Units.
Idealist philosopher, Moravian pietist, early German Romantic, co-founder of the University of Berlin, head preacher at Trinity Church, translator of Plato's works, Hegel's opponent, pioneer in modern hermeneutics, father of modern theology. Schleiermacher's controversial reconception of religion and theology in its philosophical context.
Same as: RELIGST 280

RELIGST 381. Asian Religions in America; Asian American Religions. 4 Units.
This course will analyze both the reception in America of Asian religions (i.e. of Buddhism in the 19th century), and the development in America of Asian American religious traditions.
Same as: AMSTUD 281, ASNAMST 281, RELIGST 281

RELIGST 382. King Solomon and the Search for Wisdom. 4 Units.
What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.
Same as: RELIGST 282

RELIGST 383A. Heidegger, Hölderlin, and the Gods. 3-5 Units.
The radical transformations in Western notions of God between the death of Hegel and the birth of historical materialism, arguing that questions about theism and atheism, humanism, and history formulated in the period 1831-50 are still pertinent. Texts from Hegel, the young Hegelians, Feuerbach, and Marx on issues of God, history, and the social dimensions of human nature.
Same as: RELIGST 283A

RELIGST 385. Research in Buddhist Studies. 1-15 Unit.
Independent study in Buddhism. May be repeated for credit. Prerequisite: consent of instructor.

RELIGST 386. Research in Islamic Studies. 1-15 Unit.
Independent study in Islamic Studies. May be repeated for credit. Prerequisite: consent of instructor.

RELIGST 387. Research in Jewish Studies. 1-15 Unit.
Independent study in Jewish Studies. May be repeated for credit. Prerequisite: consent of instructor.

RELIGST 388. Research in Modern Religious Thought, Ethics, and Philosophy. 1-15 Unit.
Independent study in Modern Religious Thought, Ethics, and Philosophy. May be repeated for credit. Prerequisite: consent of instructor.

RELIGST 389. Individual Work for Graduate Students. 1-15 Unit.
May be repeated for credit. Prerequisite: consent of instructor.

RELIGST 390. Teaching Internship. 3-5 Units.
Required supervised internship for PhDs.

RELIGST 391. Teaching Religious Studies. 3 Units.
Workshop/seminar for doctoral students in Religious Studies and adjacent fields designed to cultivate methods for teaching Religious Studies in an academic setting.

RELIGST 392. Paper in the Field. 1-15 Unit.
Prerequisite: consent of graduate director. May be repeated for credit.

RELIGST 395. Master of Arts Thesis. 2-9 Units.

RELIGST 399. Recent Works in Religious Studies. 1-2 Unit.
Readings in secondary literature for Religious Studies doctoral students. May be repeated for credit.

RELIGST 801. TGR Project. 0 Units.
(Staff).

RELIGST 802. TGR Dissertation. 0 Units.

Russian, East European, Eurasian Studies Courses

REES 18. Understanding the Jews of Russia and Poland. 1 Unit.
A preparatory course, for field trip to Moscow and Warsaw, that would cover Russian and Polish History, former Soviet Jewry, international relations, and current social realities.

REES 23. Issues in Global Health: Russia and Eastern Europe. 1-2 Unit.
Activity course features Stanford faculty and researchers who lecture weekly on their experiences working international health issues. Focus this year will be on the global region including Russia, and East Europe.

REES 35. Films of Central Asia. 1-2 Unit.
Films with English subtitles from Tajikistan, Uzbekistan, Kazakhstan, Kyrgyzstan, and Turkmenistan. May be repeated once for credit. (AU).

REES 54A. Central Asia Through Films: A Weekly 3-Hour Seminar. 3-5 Units.
Through films this course explores major issues of contemporary peoples of Central Asia while learning fundamental concepts in cultural anthropology. In this seminar we will consider a wide range of examples, including first of all the new feature films, which will be used as a window into the modern reality and therefore could be served in a certain sense as anthropological fieldwork data. Films are prearranged by the instructor according to certain thematic subjects for in-class discussions.
Same as: ANTHRO 54A

REES 84. Zionism. 3 Units.
(Same as HISTORY 184. History majors and others taking 5 units, register for 184.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.
Same as: CSRE 84, HISTORY 84, JEWISHST 84

REES 100. Current Issues in Russian, East European, and Eurasian Studies. 1-2 Unit.
Enrollment limited to REES students. Scholars present analyses of methodologies, challenges, and current issues in the study of Russia, E. Europe, and Eurasia.

REES 105. Central and East European Politics. 5 Units.
Focus is on how the states of Central and East Europe, including the Baltic states, have moved from communism and the Soviet Bloc to democracy, NATO and the EU. Topics include the communist legacy, transitions and their legacies, ethnic issues, and the evolution of economic and social policies, and the comparison of democratization processes in these countries to democracies in other regions, such as Latin America and southern Europe.
Same as: REES 205

REES 130. With God in Russia: Orthodox Christianity in the 19th and 20th Centuries. 4-5 Units.
The experience of religion, particularly Orthodoxy, under tsars and commissars. Religion as a lived experience; practice and belief in the provinces and villages, intertwining of religion and folk customs (the so-called double faith); condition of the Church before and after the Revolutions of 1917; religion under Soviet control; and liberation of the Church since the collapse of the Soviet Union.
Same as: REES 330

REES 145D. Jewish American Literature. 5 Units.

Fiction of Jewish-American writers across the 20th and into the 21st centuries, both immigrants and subsequent generations of native-born Jews, to show how the topic of assimilation is thematized in the literature and to evaluate the distinctiveness of Jewish-American literature as a minority literature.

Same as: JEWISHST 155D

REES 184. Zionism. 5 Units.

(Same as History 84.) Hotly contested still, this course will open up the movement's ideas, practices, achievements and crises in such a way as to allow students to hear the fullest range of voices - Jewish, Arab, religious, secular, etc. It will track the movement from its appearance in the late nineteenth century until the establishment of State of Israel in 1948, and beyond.

Same as: CSRE 184C, HISTORY 184, JEWISHST 184

REES 200. Current Issues in Russian, East European, and Eurasian Studies. 1-2 Unit.

Enrollment limited to REEES students. Scholars present analyses of methodologies, challenges, and current issues in the study of Russia, E. Europe, and Eurasia.

REES 205. Central and East European Politics. 5 Units.

Focus is on how the states of Central and East Europe, including the Baltic states, have moved from communism and the Soviet Bloc to democracy, NATO and the EU. Topics include the communist legacy, transitions and their legacies, ethnic issues, and the evolution of economic and social policies, and the comparison of democratization processes in these countries to democracies in other regions, such as Latin America and southern Europe.

Same as: REES 105

REES 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 408C, RELIGST 208C, RELIGST 308C

REES 219. The Russian Economy. 4-5 Units.

Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development.

The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.

Same as: ECON 119

REES 220A. Literature and Cultural Politics in the Former Yugoslavia. 3-5 Units.

Socialist Yugoslavia disintegrated after 46 years. The story is a telling one, let's read it! Literature in Yugoslavia went through transformations from socialist-realism at the beginning toward nationalist-realism at the end. To understand this process, it is crucial to relate it to its political and ideological background: social myths and taboos, questions of language, cultural and class identity, individual and collective rights. These issues will be explored through fictional texts by prominent Yugoslav writers, including Ivo Andric, Miroslav Krleža, Milos Crnjanski, Mesa Selimovic, Danilo Kis.

Same as: REES 320A

REES 224A. The Soviet Civilization. 4-5 Units.

Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

Same as: HISTORY 224A, HISTORY 424A

REES 227. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.

Same as: HISTORY 227D, HISTORY 327D, REES 327

REES 231. Russia, the West and the Rest. 4 Units.

Focus on understanding the diversity of political, social, and economic outcomes in Russia since the collapse of the Soviet Union. Exploration of questions, including: Is Russia still a global power? Where does it have influence internationally, how much, and why? Developmentally, what is the relevant comparison set of countries? Is Russia's economic growth over the last decade truly similar to Brazil, China, and India or is it more comparable to Kazakhstan, Nigeria, and Kenya? How has Russia's domestic political trajectory from liberalizing country to increasingly autocratic affected its foreign policy toward Ukraine, Georgia, and other formerly Soviet states? Finally, is Russia's reemergence as an important global actor more apparent than real?.

Same as: IPS 231

REES 240. Post-Socialist Heritages: memorialisation, past mastering and nostalgia in Eurasia. 3-5 Units.

The post-Soviet story is far from resolved! While national identities and geopolitical alliances are being (re)negotiated across Eurasia, unresolved atrocities continue to reopen old wounds. Within this process the past is skillfully embraced to support and sustain conflicting political discourses. Drawing on a variety of highly topical case studies this course will explore the main dynamics and historically entrenched structures that define how the past plays out in the present since the disintegration of the Soviet Empire.

Same as: ARCHLGY 140, ARCHLGY 240

REES 244A. Practice of Everyday Life in Kazakhstan: From Nomadism to Modernity. 3-5 Units.

An interdisciplinary introduction to the historically nomadic land of Kazakhstan, its peoples and their lifestyles; the practice of everyday life. Ranked as the ninth largest country in the world, Kazakhstan is also the world's largest landlocked country; its territory is greater than Western Europe: it stretches from the fringes of Europe to the borders of Mongolia and China. The seminar surveys language and society, traditional economics and customary law, rituals and folk customs, local dwelling, craft and art, the cultural panorama, the historical relationship between sedentary and nomadic peoples as well as new approaches to the study of nomads in modernity. Speaking of the present time, we will follow the changing nomads in a changing world. The instructor is going to base, to the extent possible, on the extremely rich fieldwork data recently discovered in Kazakhstan -- the data is yet little known in the West. The seminar will make extensive use of audio-visual materials and films.

Same as: ANTHRO 144A

REES 247A. Folklore, Mythology, and Islam in Central Asia. 3-5 Units.

Central Asian cults, myths, and beliefs from ancient time to modernity. Life crisis rites, magic ceremonies, songs, tales, narratives, taboos associated with childbirth, marriage, folk medicine, and calendrical transitions. The nature and the place of the shaman in the region. Sources include music from the fieldwork of the instructor and the Kyrgyz epoch *Manas*. The cultural universe of Central Asian peoples as a symbol of their modern outlook.

Same as: ANTHRO 147A

REES 250A. Minaret and Mahallah: Women and Islam in Central Asia. 3-5 Units.

Introduction to women's culture and art in Muslim countries of Central Asia. Women, bearers of family rites and folklore, are the key figures in transmission of traditional culture and guardians of folk Islam. Women helped to keep the continuity of Islamic education in Central Asia during the harsh times of Communist dominance. The whole wealth of women's oral tradition will be demonstrated and examined to the extent possible. The course will make broad use of audio-visual materials.

Same as: ANTHRO 150A, FEMGEN 150A

REES 299. Directed Reading. 1-12 Unit.

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REES 300. MA Capstone Seminar. 1-3 Unit.

Required for and limited to REES MA candidates. Colloquia with REES Director and Associate Director to assist with refinement of research topic, advisor support, literature review, research, and thesis writing.

REES 301. An Introduction to Russian, East European and Eurasian Studies. 5 Units.

This seminar investigates the origins and evolution of the field and exposes students to major debates about the history, geography, politics, societies, economics, cultures, and languages of the region.

REES 301B. History and Politics in Russian and Eastern European Cinema. 5 Units.

From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film. Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica.

Same as: FILMSTUD 245B, FILMSTUD 445B

REES 312. Socio-Economic Issues in Contemporary Russia and Eastern. 3-5 Units.

Course focus on the political dynamics of market liberalization and response to economic crisis in these emerging markets, including the sources of support and opposition to reform, the interplay between international organizations and domestic politics, and the challenges of protecting the losers of economic liberalization.

REES 313. Transformation of Socialist Societies. 3-5 Units.

A quarter-century from the fall of the Berlin Wall, we have gained broad perspective on the challenges of wholesale transformations away from socialism. This course explores the process and social consequences of opening the economies of Eastern Europe, Eurasia, and China to market forces. We will answer questions about how individuals and social systems respond to the particular challenges of rapid economic and political openings, including demographic challenges, corruption, nationalism, and growing inequality. We will compare the Eastern European and Post-Soviet experiences of these issues with the Chinese experience, and highlight the similarities and distinctions between transformations in these societies.

Same as: SOC 313A

REES 320. State and Nation Building in Central Asia. 3-5 Units.

Issues of identity, development, and security following the dissolution of the Soviet Union and the emergence of independent states in Central Asia and the Southern Caucasus. Topics include the impact of 9/11, the spread of radical Islamist movements in the region, its growing role as a transit route for drugs, weapons, and possibly nuclear materials, the impact of the Soviet legacy, the nature of political and economic transformations, relations with neighboring countries, security challenges, and options facing U.S. policy makers.

REES 320A. Literature and Cultural Politics in the Former Yugoslavia. 3-5 Units.

Socialist Yugoslavia disintegrated after 46 years. The story is a telling one, let's read it! Literature in Yugoslavia went through transformations from socialist-realism at the beginning toward nationalist-realism at the end. To understand this process, it is crucial to relate it to its political and ideological background: social myths and taboos, questions of language, cultural and class identity, individual and collective rights. These issues will be explored through fictional texts by prominent Yugoslav writers, including Ivo Andric, Miroslav Krleza, Milos Crnjanski, Mesa Selimovic, Danilo Kis.

Same as: REES 220A

REES 327. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.

Same as: HISTORY 227D, HISTORY 327D, REES 227

REES 330. With God in Russia: Orthodox Christianity in the 19th and 20th Centuries. 4-5 Units.

The experience of religion, particularly Orthodoxy, under tsars and commissars. Religion as a lived experience; practice and belief in the provinces and villages, intertwining of religion and folk customs (the so-called double faith); condition of the Church before and after the Revolutions of 1917; religion under Soviet control; and liberation of the Church since the collapse of the Soviet Union.

Same as: REES 130

REES 335A. Animism and Alter-Native Modernities. 5 Units.

For many years indigenous knowledges were treated as a field of research for anthropologists and as "mistaken epistemologies," i. e., unscientific and irrational folklore and childish worldviews. This old view of animism was a product of the evolutionist and anthropocentric worldview of the Enlightenment. However within the framework of ecological humanities, current interest in posthumanism, postsecularism and discussions on building altermodernity (Michael Hardt and Antonio Negri), indigenous thought is used to critique modern epistemology and develop an alternative to the Western worldview. Treating native thought as an equivalent to Western knowledge is presented as a decolonizing and liberating practice. The term alter-native modernities as response to the challenges of Euromodernity and suggests modernities that might emerge out of indigenous ways of being in the world. Comparison between literature on indigenous cultures from Latin America and from Russia (animism in Amazonia and Siberia). Following recent works by anthropologists and archaeologists such as Nurit Bird-Rose, Philippe Descola, Graham Harvey, Tim Ingold and Viveiros de Castro, new animism is treated as an alternative (relational) ontology that allows rethinking the problem of matter and agency, goes beyond human exceptionalism and embraces non-humans. Topics include: alternative and alter-native modernities; Jean Piaget's theory of childhood animism; problem of anthropomorphism and personification; indigenous knowledge and the problem of epistemic violence; vitalist materialism (Jane Bennett, Rosi Braidotti); connectedness as the principle of life (relational epistemologies and ontologies); non-human agency (Bruno Latour).

Same as: ANTHRO 335A, FRENCH 335A

REES 408C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, RELIGST 208C, RELIGST 308C

REES 409. Iconoclasm. 5 Units.

Iconoclasm, iconophobia, and aniconism as markers of cultural transformation of the Mediterranean in the 7th-9th centuries. The identity crisis in the region as the Arabs established the Umayyad caliphate, conquering the Holy Land, Egypt, and Spain. The West consolidated around the Carolingians versus the East split between the Byzantines and the Arabs. How each of these three empires emerged from the ashes of late antique culture and carved an identity out of a common cultural foundation. The course will take place in the seminar room of the Art and Architectural Library located in the Cummings Art Building.

Same as: ARTHIST 209C, ARTHIST 409, CLASSICS 158, CLASSICS 258

Science in the Making Courses

SIMILE 91. Science In the Making an Integrated Learning Environment. 4 Units.

SIMILE is a new residentially-based program organized around the question of when something we might call "science" identifiably began, what it became, and what it might become. While we may believe that science, technology and medicine represent some of the powerful tools we have for making a difference in the world, SIMILE challenges students to consider these as dynamic and changing fields of knowledge which must be understood in their historical, cultural and social contexts. Only then can we consider how new ideas, interpretations, technological artifacts and systems respond to societal needs within the limits of what is possible but also, importantly, in light of what might even become plausible.

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SIMILE 95W. Science In the Making an Integrated Learning Environment, Writing Section. 4 Units.

SIMILE is a new residentially-based program organized around the question of when something we might call "science" identifiably began, what it became, and what it might become. While we may believe that science, technology and medicine represent some of the powerful tools we have for making a difference in the world, SIMILE challenges students to consider these as dynamic and changing fields of knowledge which must be understood in their historical, cultural and social contexts. Only then can we consider how new ideas, interpretations, technological artifacts and systems respond to societal needs within the limits of what is possible but also, importantly, in light of what might even become plausible.

Science, Technology, Society Courses

STS 1. The Public Life of Science and Technology. 5 Units.

Focus on key social, cultural, and values issues raised by contemporary scientific and technological developments through STS interdisciplinary lens that encompasses historical dimensions (e.g., legacy of scientific revolution); technological impact (e.g., affordances of new tools and media); economic and management aspects (e.g., business models, design and engineering strategies); legal and ethical elements (e.g., intellectual property, social justice); and societal response and participation (e.g., media coverage, forms of activism). Discussion section is required and will be assigned the first week of class.

STS 103Q. Reading and Writing Poetry about Science. 3 Units.

Preference to sophomores. Students will study recent poetry inspired by the phenomena and history of the sciences in order to write such poems themselves. These poems bring sensuous human experience to bear on biology, ecology, neuroscience, physics, astronomy, and geology, as well as on technological advances and missteps. Poets such as Mark Doty, Jody Gladding, Albert Goldbarth, Jorie Graham, Sarah Lindsay, Adrienne Rich, W.S. Merwin, or C. K. Williams. Grounding in poetics, research in individually chosen areas of science, weekly analytical and creative writing. Enrollment limited to 12.

STS 131. Science Technology & Environmental Justice. 4 Units.

The Bay Area is renowned for its technological innovations and progressive politics, including environmental justice activism. This course explores the multifaceted intersections of science, technology, and environmental issues, in the Bay Area and beyond. It also facilitates students' engagement with Wikipedia, as contributors and analysts. Throughout, students investigate the politics of place, with an eye to inequalities of race, class, gender, age, disability, and citizenship. Topics include: Internet and "new economy" geographies; public health and urban planning; food systems; climate change; innovation policy; "undone science."

STS 140. Science, Technology and Politics. 5 Units.

This course will critically interrogate the relationship between science and technology and politics. Politics plays a significant role in the production of scientific knowledge and technological artifacts. Science and technology in turn constitute crucial elements of politics and governance in modern democracy. This course will explore these interactions through (1) key theoretical texts in STS and (2) case studies of such issues as climate change, race and science, urban planning, elections and technology, and information technology in social movements. Preference to juniors and seniors. First class attendance mandatory. Enrollment limited to 16.

STS 160Q. Technology in Contemporary Society. 4 Units.

Preference to sophomores. Introduction to the STS field. The natures of science and technology and their relationship, what is most distinctive about these forces today, and how they have transformed and been affected by contemporary society. Social, cultural, and ethical issues raised by recent scientific and technological developments. Case studies from areas such as information technology and biotechnology, with emphasis on the contemporary U.S. Unexpected influences of science and technology on contemporary society and how social forces shape scientific and technological enterprises and their products. Enrollment limited to 12.

STS 165N. Cars: Past, Present, and Future. 3 Units.

(Formerly COMM 165N.) Preference to freshmen. Focus is on the past, present and future of the automobile, bridging the humanities, social sciences, design, and engineering. Focus on the human experiences of designing, making, driving, being driven, living with, and dreaming of the automobile. A different theme featured each week in discussion around a talk and supported by key readings and media. Course is informed by history, archaeology, ethnography, human-technology interaction, mechanical engineering, and cognitive science.

STS 190. Issues in Technology and the Environment. 4 Units.

Humans have long shaped and reshaped the natural world with technologies. Once a menacing presence to conquer or an infinite reserve for resources, nature is now understood to require constant protection from damage and loss. This course will examine humanity's varied relationship with the environment, with a focus on the role of technology. Topics include: industrialization, modernism, nuclear technology, and biotechnology. Students will explore theoretical and methodological approaches in STS and conduct original research that addresses this human-nature-technology nexus. STS majors must have Senior status to enroll in this Senior Capstone course.

STS 199. Individual Work. 1-5 Unit.

Every unit of credit is understood to represent three hours of work per week per term and is to be agreed upon between the student and the faculty member.

STS 199A. Curricular Practical Training. 1 Unit.

Students obtain internship in a relevant research or industrial activity to enhance their professional experience consistent with their degree program and area of concentration. Prior to enrolling students must get internship approved by the STS Program Director. At the end of the quarter, a one-page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own internship. Limited to declared STS majors only. Course may be repeated twice.

STS 199J. Editing a Science Technology and Society Journal. 1-2 Unit.

The Science Technology and Society (STS) Program has a student journal, *Intersect*, that has been publishing STS student papers for a number of years. This course involves learning about how to serve as an editor of a peer-reviewed journal, while serving as one of the listed editors of *Intersect*. Entirely operated online, the journal uses a work-flow management to help with the submission process, peer-review, editing, and publication. Student editors learn by being involved in the publishing process, from soliciting manuscripts to publishing the journal's annual issue, while working in consultation with the instructor. Students will also learn about current practices and institutional frameworks around open access and digital publishing.

STS 200A. Food and Society: Politics, Culture and Technology. 5 Units.

This course will examine how politics, culture, and technology intersect in our food practices. Through a survey of academic, journalistic, and artistic works on food and eating, the course will explore a set of key analytical frameworks and conceptual tools in STS, such as the politics of technology, classification and identity, and nature/culture boundaries. The topics covered include: the industrialization of agriculture; technology and the modes of eating (e.g., the rise of restaurants); food taboos; globalization and local foodways; food and environmentalism; and new technologies in production (e.g., genetically modified food). Through food as a window, the course intends to achieve two broad intellectual goals. First, students will explore various theoretical and methodological approaches in STS. In particular, they will pay particular attention to the ways in which politics, culture, and technology intersect in food practices. Second, student will develop a set of basic skills and tools for their own critical thinking and empirical research, and design and conduct independent research on a topic related to food. First class attendance mandatory. STS majors must have Senior status to enroll in this Senior Capstone course.

STS 200B. Global Mobilities. 5 Units.

In this STS senior capstone seminar, students will study the local and global impacts of the technologies that have increased personal mobility. STS majors must have Senior status to enroll in this Senior Capstone course. Same as: ANTHRO 146

STS 200C. STS Senior Capstone. 5 Units.

Genetics, Ethics and Society. This course will explore three socially transforming components of genetics research that hold simultaneously liberating and constraining possibilities for populations and publics, both locally and globally. Topically the course will be divided into three sections. First, we will examine past and present issues dealing with the study of human subjects, as well as recent proposals to eventually bring full genome scans to every individual (personal genomics). Next we will learn of large-scale projects that aim to map the presence of environmental pathogens by their genetic signatures on a planetary scale and how different global populations may be affected. The last section of the course will focus on still other projects and policies that aim to expand the scope and capacity of state and international law enforcement through DNA-based forensics (the FBI CODIS database and the UKiquest;s Human Provenance Pilot Project). Projects like the latter also overlap with theories about community, families, and citizens who may or may not be linked through DNA. New concepts, such as the forensic "genetic informant" within a family unit, human DNA and isotope iquest;country matchesiquest; in cases of state asylum, and DNA based kinship rules for family reunification in many Western countries, will be explored. In all three sections we will also examine scientific ethics when subject populations are minorities, or somehow structurally disadvantaged globally.n This capstone course will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state and certain publics in shaping scientific research agendas that promise to reorganize critical aspects of human life. Students will be encouraged to explore these dynamics within such important societal domains as health, law, markets of bio-surveillance, and the growing industry of disease and heritage DNA identity testing among others. We will read works from social scientists of science practice, ethicists, medial humanists and scientists. This course will equip students with tools to write about the intersection of science and society and to engage in a research project that relates to the topical foci of the course, broadly conceived. Same as: ANTHRO 200C

STS 200D. Text Technologies: A History. 5 Units.

Beginning with cave painting, carving, cuneiform, hieroglyph, and other early textual innovations, survey of the history of writing, image, sound, and byte, all text technologies employed to create, communicate and commemorate. Focus on the recording of language, remembrance and ideas explicating significant themes seen throughout history; these include censorship, propaganda, authenticity, apocalypticism, technophobia, reader response, democratization and authority. The production, transmission and reception of tablet technology, the scroll, the manuscript codex and handmade book, the machine-made book, newspapers and ephemera; and investigate the emergence of the phonograph and photograph, film, radio, television and digital multimedia. The impact of these various text technologies on their users, and try to draw out similarities and differences in our cultural and intellectual responses to evolving technologies. STS majors must have senior status to enroll in this senior capstone course. Same as: ENGLISH 184H

STS 200E. Technology, Nature, and Environmentalism. 5 Units.

Humans have long shaped and reshaped the natural world with technologies. Once a menacing presence to conquer or an infinite reserve for resources, nature is now understood to require constant protection from damage and loss. Humanity's relationships with the environment have changed over time and differed across societies. In this course, students (1) explore diverse ways in which people in different historical and cultural settings have conceptualized nature and their relationships with it, with a focus on the role of technology; and (2) learn the basics of STS research and conduct an original study that addresses this human-nature-technology nexus. First class attendance mandatory. STS majors must have senior status to enroll in this senior capstone course.

STS 200F. Sociology of Innovation and Invention. 5 Units.

This course examines the social, cultural, and economic factors that foster novelty. We will study a wide array of historical contexts, from the Renaissance to the present day, in which clusters of related innovations transformed the way things are done. We ask when do such innovations cascade out and produce social inventions that, for good and bad, create profound changes in how things are done, leading to new forms of organizations and new categories of people. Seminar/lecture format, reading intensive, final term paper. Prerequisite: admission to the course is restricted to declared STS seniors and is by application only. Email Andrew Weger (aweger@stanford.edu) for an application. Applications must be submitted by 5pm on November 14th.

STS 200G. Paperwork. 5 Units.

"Paperwork" is an intensive reading course in a seminar format, concerning the production, circulation and mediation of "paperwork" both as a material and symbolic infrastructure for the operation of modern institutions and governance. We will explore diverse techniques and technologies of paperwork, including note-taking, memos, lists, files, and documents, and forms of paperwork such as medical record, petition, passport, ID card, immigration paper, as well as archives and other mnemonic technologies both as cultural practices and reflexive objects. The goal of the course is to understand "bureaucracy" in the fields of law, business, and public administration, as well as in civil society generally, from the vantage point of concrete inscription, circulation, and storage of papers and documents. Readings will include works by Bruno Latour, Jacques Derrida, Michel Foucault, Cornelia Vismann, Friedrich Kittler, and others. Same as: ANTHRO 146G

STS 200H. Ethics, Science, & Technology. 5 Units.

Critical analysis of ethical issues raised by recent or emerging advances in science and engineering. Issues: privacy, intellectual property, design equity, the public interest, ethical responsibilities of technical practitioners, research ethics, and freedom of inquiry. Advances from fields such as IT, biotechnology, nanotechnology, neurotechnology, construction technology, and transport technology. Seminar limited to 25 senior STS majors. Prerequisite: a course in ethics or permission of the instructor.

STS 200I. Art and Technology. 5 Units.

The dynamic relationship between art and technology and its formative impact on culture, politics and society. Beginning with Aristotle on the notion of techne and its implications for art and craft, the seminar will focus primarily on the modern period as well as contemporary developments. Topics: The invention of linear perspective during the Renaissance as influenced by Arab mathematics; the culture of optical devices and painting; the birth of photography and cinema and new forms of pictorial representation; the avant-garde and the iquest;Machine Ageiquest;; art and technology collaborations during the 1960s; interactivity and the rise of media arts; sound art; biotechnology and the arts. Guest speakers and possible field trips. Enrollment limited to STS Senior majors and art and art history majors. Same as: ARTHIST 269A

STS 210. Ethics, Science, and Technology. 4 Units.

Ethical issues raised by advances in science and technology. Topics: biotechnology including agriculture and reproduction, the built environment, energy technologies, and information technology. Prerequisite: 110 or another course in ethics. Limited enrollment.

STS 299. Advanced Individual Work. 1-5 Unit.

For students in the STS Honors program. Every unit of credit is understood to represent three hours of work per week per term and is to be agreed upon between the student and the faculty member. May be repeated for credit.

Scientific Computing Comput'I Math Courses

SCCM 398. Curricular Practical Training. 1 Unit.

Provides students with on-the-job training under the guidance of experienced, on-site supervisors. Students must register the quarter after their training. Students receive credit and a grade after submitting a concise report detailing work activities, problems worked on, and key results. Prerequisite: written consent of adviser. (Staff).

SCCM 499. Advanced Reading and Research. 1-15 Unit.

Prerequisites: majoring in SC/CM; consent of adviser. (Staff).

Slavic General Courses Slavic Language Courses

SLAVLANG 1. First-Year Russian, First Quarter. 5 Units.

Functionally-based communicative approach, including essential Russian grammar. Discussions of Russian culture and the Russian view of reality.

SLAVLANG 1A. Accelerated First-Year Russian, Part 1. 5 Units.

First quarter of the two-quarter accelerated sequence. For students with little or no prior experience studying Russian. Students acquire beginning proficiency in Russian at an accelerated pace through intensive studying of basic Russian grammar and functional vocabulary. The course emphasis is put on practice in speaking, reading, and writing Russian with special insight into Russian culture. Completion of 2A fulfills the University Language Requirement.

SLAVLANG 2. First-Year Russian, Second Quarter. 5 Units.

Continuation of SLAVLANG 1. Functionally-based communicative approach, including essential Russian grammar. Discussions of Russian culture and the Russian view of reality. Prerequisite: Placement Test or SLAVLANG 1.

SLAVLANG 2A. Accelerated First-Year Russian, part 2. 5 Units.

Continuation of Slavlang 1A. Completes the first-year sequence in two rather than three quarters. Students develop first-year proficiency in Russian at an accelerated pace through intensive studying of basic Russian grammar and functional vocabulary and active language use. The course emphasis is put on practice in speaking, reading, and writing Russian through diverse materials and appropriate cultural contexts. The course fulfills the University foreign language requirement. nPrerequisite: Slavlang 1A or consent of instructor.

SLAVLANG 3. First-Year Russian, Third Quarter. 5 Units.

Continuation of SLAVLANG 2. Functionally-based communicative approach, including essential Russian grammar. Discussions of Russian culture and the Russian view of reality. Prerequisite: Placement Test or SLAVLANG 2.

SLAVLANG 6. Russian for Native Speakers, Second Quarter. 2 Units.

Self-paced. Reading and writing skills and communicating in formal and informal settings. Does not fulfill the University foreign language requirement. Prerequisite: SLAVLANG 5.

SLAVLANG 7. Russian for Native Speakers, Third Quarter. 2 Units.

Continuation of SLAVLANG 6. Self-paced. Reading and writing skills and communicating in formal and informal settings. Does not fulfill the University foreign language requirement. Prerequisite: SLAVLANG 6.

SLAVLANG 51. Second-Year Russian, First Quarter. 5 Units.

Proficiency development at the intermediate level, including more difficult grammar such as numbers, verb conjugation, and aspect. Vocabulary, speaking skills. Prerequisite: Placement Test, SLAVLANG 3.

SLAVLANG 52. Second-Year Russian, Second Quarter. 5 Units.

Continuation of 51. Proficiency development at the intermediate level, including mMore difficult grammar such as numbers, verb conjugation, and aspect. Vocabulary, speaking skills. Prerequisite: placement test or 51.

SLAVLANG 53. Second-Year Russian, Third Quarter. 5 Units.

Continuation of 52. Proficiency development at the intermediate level, including mMore difficult grammar such as numbers, verb conjugation, and aspect. Vocabulary, speaking skills. Prerequisite: placement test or 52.

SLAVLANG 55. Intermediate Russian Conversation. 2 Units.

May be repeated for credit. Prerequisite: SLAVLANG 3 or equivalent placement.

SLAVLANG 60A. Beginning Russian Conversation. 1 Unit.

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SLAVLANG 60B. Intermediate Russian Conversation. 1 Unit.

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SLAVLANG 60C. Advanced Russian Conversation. 1 Unit.

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SLAVLANG 60E. The Sensuality of Slavic Sustenance. 1 Unit.

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SLAVLANG 60F. Perspectives on Slavic Culture and History through Film. 1 Unit.

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SLAVLANG 60H. Culture and Politics of Russian Athleticism through the lens of Sochi 2014. 1 Unit.

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SLAVLANG 60M. Songs and Poems of Comrades, Cossacks, Gypsies, and Peasants. 1 Unit.

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SLAVLANG 60P. Slav Dom Theme Projects. 1 Unit.

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SLAVLANG 60T. Teaching Slavic Conversation. 1 Unit.

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SLAVLANG 70. Reading in Russian. 2 Units.

The course is designed to develop reading competence in Russian. This is not a traditional language course that takes an integrated four-skill approach. The goal of the course is to reach proficiency of advanced level in reading Russian authentic materials pertinent to history and culture. The emphasis is on vocabulary building, reading comprehension, and translation. nIntermediate level of Russian is required.

SLAVLANG 99. Language Specials. 1-5 Unit.

Prerequisite: consent of instructor.

SLAVLANG 111. Third-Year Russian, First Quarter. 4 Units.

Continuation of SLAVLANG 53. A snapshot of Russian life. Reading comprehension, conversational competence, grammatical accuracy, and cultural sophistication. Prerequisite: Placement Test or SLAVLANG 53.

SLAVLANG 112. Third-Year Russian, Second Quarter. 4 Units.

Continuation of SLAVLANG 111. A snapshot of Russian life. Reading comprehension, conversational competence, grammatical accuracy, and cultural sophistication. Prerequisite: Placement Test or SLAVLANG 111.

SLAVLANG 113. Third-Year Russian, Third Quarter. 4 Units.

Continuation of SLAVLANG 112. A snapshot of Russian life. Reading comprehension, conversational competence, grammatical accuracy, and cultural sophistication. Prerequisite: Placement Test or SLAVLANG 112.

SLAVLANG 177. Fourth-Year Russian, First Quarter. 3 Units.

Continuation of SLAVLANG 113. Culture, history, and current events. Films, classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Review and fine-tuning of grammar and idiomatic usage. Prerequisite: Placement Ttest, SLAVLANG 113.

SLAVLANG 178. Fourth-Year Russian, Second Quarter. 3 Units.
Continuation of SLAVLANG 177. Culture, history, and current events. Films, classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Review and fine-tuning of grammar and idiomatic usage. Prerequisite: Placement Test, SLAVLANG 177.

SLAVLANG 179. Fourth-Year Russian, Third Quarter. 3 Units.
Continuation of SLAVLANG 178. Culture, history, and current events. Films, classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Review and fine-tuning of grammar and idiomatic usage. Prerequisite: Placement Test, SLAVLANG 178.

SLAVLANG 181. Fifth-Year Russian, First Quarter. 3 Units.
Continuation of SLAVLANG 179. Language proficiency maintenance; appropriate for majors and non-majors with significant language experience overseas. Discussions, oral presentations, and writing essays on contemporary Russia. Prerequisite: Placement Test, or SLAVLANG 179.

SLAVLANG 182. Fifth-Year Russian, Second Quarter. 3 Units.
Continuation of SLAVLANG 181. Language proficiency maintenance; appropriate for majors and non-majors with significant language experience overseas. Discussions, oral presentations, and writing essays on contemporary Russia. Prerequisite: Placement Test or SLAVLANG 181.

SLAVLANG 183. Fifth-Year Russian, Third Quarter. 3 Units.
Continuation of SLAVLANG 182. Language proficiency maintenance; appropriate for majors and non-majors with significant language experience overseas. Discussions, oral presentations, and writing essays on contemporary Russia. Prerequisite: Placement Test or SLAVLANG 182.

SLAVLANG 184A. Russian Reading Conversation and Composition. 2-3 Units.
Proficiency in reading, spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

SLAVLANG 184B. Russian Advanced Conversation and Composition. 2-3 Units.
Proficiency in spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

SLAVLANG 184C. Russian Advanced Conversation and Composition. 2-3 Units.
Proficiency in spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

SLAVLANG 199. Individual Work. 1-5 Unit.
Prerequisite: consent of instructor.

SLAVLANG 220. Russian for Slavic PhD Students. 1-3 Unit.
For DLCL graduate students who will teach Russian language and literature. nCourse objective is to improve spoken Russian on literary and pedagogical topics. Prerequisite: consent of instructor.

SLAVLANG 299. Independent Study. 1-5 Unit.

SLAVLANG 394. Graduate Studies in Russian Conversation. 1-3 Unit.

SLAVLANG 395. Graduate Studies in Russian. 1-5 Unit.
Prerequisite: consent of instructor.n (Staff).

Slavic Languages and Literatures Courses

SLAVIC 77Q. Russia's Weird Classic: Nikolai Gogol. 3-4 Units.

This seminar investigates the work and life of Nikolai Gogol, the most eccentric of Russian authors, the founder of what was dubbed Fantastic (or Magic) Realism. Our investigation will be based on close reading of the works written in various genres and created in various stages of Gogol's literary career. This study provides a perspective on the relationship between Romanticism and Realism in Russian literature (the so-called "Natural School" of the 1830-1840s), and between the popular Ukrainian culture and "high" Russian and West European traditions in Gogol's oeuvre. The seminar traces Gogol's influences on subsequent Russian literature (Dostoevsky in particular) and investigates the impact of his work on XX century modernist literature, theatre, music, and painting (Vladimir Nabokov, literature of the absurd, Dmitry Shostakovich, Marc Chagall). The seminar is intended for students interested in literature and literary studies.

SLAVIC 78N. Poetry to Prose: The Birth of the Great Russian Novel in Alexander Pushkin's Eugene Onegin. 3-4 Units.

Devoted to a close reading and detailed discussion of Alexander Pushkin's masterpiece in the context of XIX century Russian and continental literary history. Pushkin (1799-1837) is the founder of modern Russian literature; his place in it is comparable to that of Shakespeare in Britain. Taught in English.

SLAVIC 115. Between Europe and Asia: Introduction to Russian Culture. 3 Units.

The course investigates the main stages of Russian history and civilization. Taught in Russian.

SLAVIC 129. Russian Versification: History and Theory. 3-4 Units.

A survey of metric forms, rhyming principles and stanzaic patterns in the Russian poetry of the 18th - 21st centuries. Taught in Russian. Prerequisite: Two years of Russian.
Same as: SLAVIC 329

SLAVIC 145. Survey of Russian Literature: The Age of Experiment. 3-5 Units.

This course discusses the transition from predominantly poetic to predominantly prosaic creativity in the Russian literature of the first half of the 19th century Russian literature and the birth of the great Russian novel. It covers three major Russian writers -- Alexander Pushkin, Mikhail Lermontov and Nikolai Gogol -- and examines the changes in the Russian literary scene affected by their work. An emphasis is placed on close reading of literary texts and analysis of literary techniques employed in them. Taught in English.
Same as: SLAVIC 345

SLAVIC 146. The Great Russian Novel: Tolstoy and Dostoevsky. 3-5 Units.

War and Peace and Brothers Karamazov within the broader intellectual and historical context. Focus is on literary form and the novel as a medium for philosophical investigation. Central concerns include: the genre of the novel, depiction of history, concepts of the self, religious experience in fiction. Course taught in English.

SLAVIC 147. Modern Russian Literature and Culture: The Age of War and Revolution. 3-5 Units.

The Age of Revolution: Readings in Russian Modernist Prose of the 1920-30s: What makes Russian modernist prose special? Or is there anything special about Russian modernist prose? This course aims to answer these questions through close readings of works by Babel, Mandelstam, Zoshchenko, Platonov, Olesha and Bulgakov. Aesthetic issues such as hero, plot, and narrative devices will be addressed with the aid of contemporaneous literary theory (Shklovsky, Tynianov, Eikhenbaum, Bakhtin). Novels and theory will be read in English.
Same as: SLAVIC 347

SLAVIC 148. Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin. 3-5 Units.

Russian culture and society since 1953 through literature (in English translation). Topics: opposition and dissent; generational conflict; modernization; everyday life, gender, ethnicity, class, citizenship, exit from communism. Literature of the "Thaw," state-published and samizdat, "village" and "cosmopolitan," the new emigration, Sots-Art, and the Russian "post-modern." Solzhenitsyn, Shalamov, Trifonov, Siniavsky-Tertz, Erofeev, Dovlatov, Brodsky, Petrushevskaya, Pelevin, Ulitskaya, Sorokin. Requirements: three reaction papers and final exam (UG); research paper for graduate credit (extra section for graduate students; may register for SLAVLIT 399). Same as: SLAVIC 348

SLAVIC 156. Nabokov in the Transnational Context. 3-5 Units.

Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel "The Gift," "Lolita" (the novel and screenplay), and "Pale Fire." Readings in English. Russian speakers will be encouraged to read Russian texts in original. Same as: COMPLIT 115, COMPLIT 315, SLAVIC 356

SLAVIC 179. Literature from Old Rus' and Medieval Russia. 2-4 Units.

From earliest times through the 17th century. The development of literary and historical genres, and links among literature and art, architecture, and religious culture. Readings in English; graduate students read in original. Same as: SLAVIC 379

SLAVIC 181. Philosophy and Literature. 5 Units.

(Formerly CLASSGEN 81) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track; majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. Taught in English. Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81

SLAVIC 187. History of 18th and 19th century Russian Poetry. 3-4 Units.

Close analysis of lyrical poems of Russian classical poets from Mikhail Lomonosov to Vladimir Soloviev. Taught in Russian. Prerequisite: Two years of Russian. Same as: SLAVIC 387

SLAVIC 188. 20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky. 3-5 Units.

Developments in and 20th-century Russian poetry including symbolism, acmeism, futurism, and literature of the absurd. Emphasis is on close readings of individual poems. Taught in Russian. Same as: SLAVIC 388

SLAVIC 190. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought. 3-5 Units.

Anna Karenina, the novel as a case study in the contest between "modernity" and "tradition," their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a "philosophical" prism and vice versa (30% each); class discussion and Forum (10%). Same as: COMPLIT 190, COMPLIT 390, SLAVIC 390

SLAVIC 194. Russia: Literature, Film, Identity, Alterity. 3-5 Units.

How do Russian literature and film imagine Russian identity; and, in contrast, the ethnic or national Other? Does political and literary theory analyzing national identity and the literary imagination elsewhere hold true in the Russian context? Texts include works by Pushkin, Dostoevsky, Tolstoy, Blok, Mayakovsky, Platonov; Soviet and post-Soviet films; theory and history. Recommended for returnees from Moscow, Slavic majors, and CREEES MA students. Accepted for IR credit. Readings in English and films subtitled; additional section for Russian readers. Taught in English. Same as: SLAVIC 394

SLAVIC 195. Russian and East European Theater. 3-5 Units.

Evolution of modernist Russian/EEur. dramaturgy, theatrical practices, landmark productions from Chekhov-Meyerhold-Grotowski to present; re-performance of classics; techniques of embodiment. Taught in English. Same as: SLAVIC 395

SLAVIC 198. Writing Between Languages: The Case of Eastern European Jewish Literature. 3-5 Units.

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well. Same as: JEWISHST 148, JEWISHST 348, SLAVIC 398

SLAVIC 199. Individual Work for Undergraduates. 1-5 Unit.

Open to Russian majors or students working on special projects. May be repeated for credit. Prerequisite: consent of instructor.

SLAVIC 200. Proseminar in Literary Theory and Study of Russian Literature. 3-5 Units.

Introduction to advance study of Russian literature and culture: profession, discipline, theoretical perspectives. Variety of approaches, from semiological to psychoanalytic, phenomenological, historical, and sociological; practical exercises in the analysis of verse, narrative, and visual representation in literature and art. Three short essays (800 words) and a review of a recent monograph on Russian literature and culture. Required for graduate students and honors seniors in Russian; first-year graduate students must enroll during their first quarter. Prerequisites: Knowledge of Russian language and literature.

SLAVIC 226. BAKHTIN AND HIS LEGACY. 3-5 Units.

"Quests for my own word are in fact quests for a word that is not my own, a word that is more than myself," writes Mikhail Bakhtin towards the end of his life. It was this ceaseless pursuit of another word that allowed Bakhtin, one of the most distinguished literary critics of the twentieth century, to author several influential literary theory concepts, many of which deal with the ideas of multiplicity, diversity and unfinalizability. The seminar explores these core concepts through close reading of key texts in English and investigates their reverberations in the writings of other thinkers such as Kristeva, de Man and Derrida.

SLAVIC 230. 18th Century Russian Literature. 5 Units.

For graduate students and upper-level undergraduates. Russian literature of the long 18th century, from the late 1600s to 1800. Readings in the Baroque, Neoclassicism and Sentimentalism. Major works are examined in their literary and historical context and also in relation to the principal subcultures of the period, including the court, academy, church and Old Believer diaspora.

SLAVIC 235. Late and Post-Soviet Literature. 3-5 Units.

This course will cover major trends and in Russian literature of the late and post-Soviet periods. We will give some consideration of related developments in art and cinema. Readings will be in Russian, and course discussions will be in English.

SLAVIC 236. The Russian Long Take. 3-5 Units.

"Time flows in a film not by virtue but in defiance of montage-cuts," wrote the great Russian filmmaker Andrei Tarkovsky. An exploration of the phenomenon of long take (a single continuous shot which presents 'a vision of time') and its aesthetic and philosophical significance to the art of cinema. Key films by cult Russian/Soviet auteurs such as Andrei Tarkovsky, Sergei Paradzhanov and Aleksandr Sokurov will be used as case studies and read through the prism of film theory (Gilles Deleuze, Andre Bazin and Jean Epstein). Taught in English.

SLAVIC 242. Artists and Power: Eastern European Literature and Film from 1945 to 1991. 2-5 Units.

During the Cold War, the highly diverse region of Eastern Europe was largely united by a common political allegiance to the USSR. The oppressive politics of the Eastern Bloc regimes meant that artists were frequently compelled to respond to political pressure in their works. This situation has been interpreted according to the logic of the Cold War: artists were either courageous dissidents who opposed the regime or brainwashed conformists. In this course we will consider examples that conform to this frame--literature and film of political reform as well as models of Socialist Realism. In addition, however, we will also consider works of self-reflection, escapism, and every-day life under Socialism, in order to arrive at a more complete understanding of the cultural history of the era. The course will include literature and film produced by artists from Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, the Soviet Union, and Yugoslavia. All readings will be in English.

SLAVIC 251. Dostoevsky: Narrative Performance and Literary Theory. 3-5 Units.

In-depth engagement with a range of Dostoevsky's genres: early works (epistolary novella *Poor Folk* and experimental *Double*), major novels (*Crime and Punishment*, *The Idiot*), less-read shorter works ("A Faint Heart," "Bobok," and "The Meek One"), and genre-bending *House of the Dead* and *Diary of a Writer*. Course applies recent theory of autobiography, performance, repetition and narrative gaps, to Dostoevsky's transformations of genre, philosophical and dramatic discourse, and narrative performance. Slavic students read primary texts in Russian, other participants in translation. Course conducted in English. For graduate students; undergraduates with advanced linguistic and critical competence may enroll with consent of instructor.

Same as: COMPLIT 219

SLAVIC 300B. Research Tools and Professionalization Workshop. 1 Unit.

This course introduces graduate students in Slavic Studies to library, archival, and web resources for research, grant opportunities, publication strategies, and professional timelines. Open to PhD students in the Slavic Department and other departments and to MA students in CREEES.

SLAVIC 311. Introduction to Old Church Slavic. 2-4 Units.

The first written language of the Slavic people. Grammar. Primarily a skills course, with attention to the historical context of Old Church Slavic.

SLAVIC 315. Isaac Babel and His Worlds. 3-4 Units.

Isaac Babel, his oeuvre, literary, theatrical, and cinematic; his milieu; cultural and historical setting; literary and cultural legacy. Taught in English, knowledge of Russian language and literature strongly recommended.

SLAVIC 325. Readings in Russian Realism. 3-5 Units.

For graduate students or upper-level undergraduates. What did Realism mean for late imperial Russian writers? What has it meant for twentieth-century literary theory? As we seek to answer these questions, we read Tolstoy, Dostoevsky, Turgenyev, and Chekhov, alongside their brilliant but less often taught contemporaries such as Goncharov, Saltykov-Shchedrin, Leskov, Garshin, Korolenko, Gorky, Andreev, and Bunin. Taught in English; readings in Russian. Prerequisite: Three years of Russian.

SLAVIC 327. Boris Pasternak and 20th century Russian Modernist Poetry. 3-5 Units.

An emphasis is made on close reading of the poetry of Boris Pasternak, Marina Tsvetaeva and Vladimir Mayakovsky. Taught in Russian.

SLAVIC 329. Russian Versification: History and Theory. 3-4 Units.

A survey of metric forms, rhyming principles and stanzaic patterns in the Russian poetry of the 18th - 21st centuries. Taught in Russian. Prerequisite: Two years of Russian.

Same as: SLAVIC 129

SLAVIC 340. Russia's Castaway Classic: Andrei Platonov. 3-5 Units.

"The power of devastation [Platonov's texts] inflict upon their subject matter exceeds by far any demands of social criticism and should be measured in units that have very little to do with literature as such," wrote Joseph Brodsky. Explores key texts of Andrei Platonov, who is frequently considered the greatest Russian prose writer of the twentieth century, and covers major critical approaches to his "devastating" oeuvre. The texts will be read in Russian, discussion in English.

SLAVIC 345. Survey of Russian Literature: The Age of Experiment. 3-5 Units.

This course discusses the transition from predominantly poetic to predominantly prosaic creativity in the Russian literature of the first half of the 19th century Russian literature and the birth of the great Russian novel. It covers three major Russian writers -- Alexander Pushkin, Mikhail Lermontov and Nikolai Gogol -- and examines the changes in the Russian literary scene affected by their work. An emphasis is placed on close reading of literary texts and analysis of literary techniques employed in them. Taught in English.

Same as: SLAVIC 145

SLAVIC 347. Modern Russian Literature and Culture: The Age of War and Revolution. 3-5 Units.

The Age of Revolution: Readings in Russian Modernist Prose of the 1920-30s: What makes Russian modernist prose special? Or is there anything special about Russian modernist prose? This course aims to answer these questions through close readings of works by Babel, Mandelstam, Zoshchenko, Platonov, Olesha and Bulgakov. Aesthetic issues such as hero, plot, and narrative devices will be addressed with the aid of contemporaneous literary theory (Shklovsky, Tynianov, Eikhenbaum, Bakhtin). Novels and theory will be read in English.

Same as: SLAVIC 147

SLAVIC 348. Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin. 3-5 Units.

Russian culture and society since 1953 through literature (in English translation). Topics: opposition and dissent; generational conflict; modernization; everyday life, gender, ethnicity, class, citizenship, exit from communism. Literature of the "Thaw," state-published and samizdat, "village" and "cosmopolitan," the new emigration, Sots-Art, and the Russian "post-modern." Solzhenistyn, Shalamov, Trifonov, Siniavsky-Tertz, Erofeev, Dovlatov, Brodsky, Petrushevskaya, Pelevin, Ulitskaya, Sorokin. Requirements: three reaction papers and final exam (UG); research paper for graduate credit (extra section for graduate students; may register for SLAVLIT 399).

Same as: SLAVIC 148

SLAVIC 356. Nabokov in the Transnational Context. 3-5 Units.

Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel "The Gift," "Lolita" (the novel and screenplay), and "Pale Fire." Readings in English. Russian speakers will be encouraged to read Russian texts in original.

Same as: COMPLIT 115, COMPLIT 315, SLAVIC 156

SLAVIC 369. Folklore Theory and Slavic Folklore. 1-3 Unit.

Why do educated elites care about popular or folk culture, and how do they use it? An intellectual history of two centuries of folklore theory, with examples drawn from Eastern European (Slavic and Jewish) lore; students collect other folklore themselves and analyze it. Separate section for Russian readers.

SLAVIC 370. Pushkin. 2 Units.

Pushkin's poems, prose, and drafts in dialogue with contemporaries and cultural milieu. Emphasis on innovation and controversy in genre, lyrical form and personal idiom, shaping a public discourse. Taught in English.

SLAVIC 372. Osip Mandelstam In Context and the Russian Experience: 1891-1991. 1-4 Unit.

Osip Mandelstam from Symbolism to Acmeism, to Post-Modernism: poetry, thought, culture, politics, reception. Russian Symbolism (Baudelaire, Mallarme, Ivanov, Bely, Blok, Annensky, Kuzmin); Acmeism/Futurism; reception; Mandelstam in Soviet civilization; poet's social function; memory, biography and cultural theory; Acmeist paradigm in the late Soviet/post-Soviet poetry: Sots-Art, Kibirov, Gandlevsky, Rubinshtein, et al. Prerequisite: Advanced Russian strongly recommended.

SLAVIC 379. Literature from Old Rus' and Medieval Russia. 2-4 Units.

From earliest times through the 17th century. The development of literary and historical genres, and links among literature and art, architecture, and religious culture. Readings in English; graduate students read in original. Same as: SLAVIC 179

SLAVIC 387. History of 18th and 19th century Russian Poetry. 3-4 Units.

Close analysis of lyrical poems of Russian classical poets from Mikhail Lomonosov to Vladimir Soloviev. Taught in Russian. Prerequisite: Two years of Russian. Same as: SLAVIC 187

SLAVIC 388. 20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky. 3-5 Units.

Developments in and 20th-century Russian poetry including symbolism, acmeism, futurism, and literature of the absurd. Emphasis is on close readings of individual poems. Taught in Russian. Same as: SLAVIC 188

SLAVIC 390. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought. 3-5 Units.

Anna Karenina, the novel as a case study in the contest between "modernity" and "tradition," their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a "philosophical" prism and vice versa (30% each); class discussion and Forum (10%).

Same as: COMPLIT 190, COMPLIT 390, SLAVIC 190

SLAVIC 394. Russia: Literature, Film, Identity, Alterity. 3-5 Units.

How do Russian literature and film imagine Russian identity iquest; and, in contrast, the ethnic or national Other? Does political and literary theory analyzing national identity and the literary imagination elsewhere hold true in the Russian context? Texts include works by Pushkin, Dostoevsky, Tolstoy, Blok, Mayakovsky, Platonov; Soviet and post-Soviet films; theory and history. Recommended for returnees from Moscow, Slavic majors, and CREES MA students. Accepted for IR credit. Readings in English and films subtitled; additional section for Russian readers. Taught in English. Same as: SLAVIC 194

SLAVIC 395. Russian and East European Theater. 3-5 Units.

Evolution of modernist Russian/EEur. dramaturgy, theatrical practices, landmark productions from Chekhov-Meyerhold-Grotowski to present; re-performance of classics; techniques of embodiment. Taught in English. Same as: SLAVIC 195

SLAVIC 398. Writing Between Languages: The Case of Eastern European Jewish Literature. 3-5 Units.

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well.

Same as: JEWISHST 148, JEWISHST 348, SLAVIC 198

SLAVIC 399. INDIVIDUAL WORK. 1-15 Unit.

Open to Russian majors or students working on special projects. May be repeated for credit. Prerequisite: consent of instructor.

SLAVIC 802. TGR Dissertation. 0 Units.

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Slavic Literature Courses

Sociology Courses

SOC 1. Introduction to Sociology at Stanford. 5 Units.

The Stanford Sociology department includes some of the best-known and most influential thinkers in the discipline. This class will be an opportunity to meet them and hear about their research and other interests that occupy them as professional sociologists. As you learn about their work, you also will learn about key concepts, methods, and theoretical orientations within sociology.

SOC 14N. Inequality in American Society. 4 Units.

An overview of the major forms of inequality in American society, their causes and consequences. Special attention will devoted to to public policy associated with inequality.

SOC 15N. The Transformation of Socialist Societies. 3 Units.

Preference to freshmen. The impact of societal organization on the lives of ordinary people in socialist societies and in the new societies arising through the processes of political, economic, and social transformation. Do the concepts of democratization and marketization suffice to characterize ongoing changes? Enrollment limited to 16.

SOC 16N. African Americans and Social Movements. 3 Units.

Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's rights; LGBT rights, environmental movement, and contemporary political conservatism. Same as: AFRICAAM 16N, CSRE 16N

SOC 22N. The Roots of Social Protest. 3 Units.

Preference to freshmen. The conditions under which social protest occurs and the emergence, success, and viability of contemporary social movements. Examples include women's civil rights, ecology, and antiwar and anti-globalization movements in the U.S. and elsewhere. Sociological theories to explain the timing, location, and causes of mobilization; how researchers evaluate these theories. Comparison of tactics, trajectories, and outcomes.

SOC 24N. Themes in Political and Historical Sociology: The Political Party. 4 Units.

This class focuses on the political party and on the different scholarly perspectives from which it has been studied. We will study these perspectives analytically; to find the main elements that characterize them; and historically; to understand how the party has operated in different contexts and how scholarly interpretations have changed in time. The emphasis on the party requires a contextualization of two processes that have shaped the functioning of the institutions of the state in the last decades; one operating below the state and the other operating above. From below the state, the fragmentation of interests has been challenging the traditional identities that used to be embedded in the party. From above, international economic processes have been undermining the role of the state, and thus of the party, as the main vehicle for bringing grievances into the political arena. Thus, part of the agenda of the party is dominated by the activities of organized social movements that only partially follow traditional cleavages (class, status, race, ethnicity, urban/rural), while another part is dominated by multinational firms and banks that only partially represent national interests. Yet, to the extent that the institutions of the state remain relevant, the political party remains a powerful and significant actor of Modern democracies. The fundamental question of this class is to understand the way in which the party continues to shape the functioning of the state. We will approach this question analytically and historically. Analytically, we will read through various definitions of what a party is. The aim is not to arrive at a correct definition of the party (there is not such a thing!) but to sharpen the differences between the several approaches. Historically, we will study the party in action with the goal of understanding the perspective from which the party was portrayed. Together, in this double exercise you will learn the tools of the trade, so to speak, of political sociology.

SOC 45Q. Understanding Race and Ethnicity in American Society. 4 Units.

Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16.

Same as: CSRE 45Q

SOC 46N. Race, Ethnic, and National Identities: Imagined Communities. 3 Units.

Preference to freshmen. How new identities are created and legitimated. What does it mean to try on a different identity? National groups and ethnic groups are so large that one individual can know only an infinitesimal fraction of other group members. What explains the seeming coherence of groups? If identities are a product of the imagination, why are people willing to fight and die for them? Enrollment limited to 16.

SOC 100ASB. Pre-field Course for Alternative Spring Break. 1 Unit.

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more information.

SOC 100D. Organizational Theory. 3 Units.

Schools, prisons, hospitals, universities, restaurants, nations, sports teams - organizations are all around. They employ us, feed us, and provide us with sources of identity. This course is an introduction to the basic concepts and classic theories about organizations. What defines an organization? How should organizations structure themselves to accomplish their goals? When is it most desirable for an organizations merge with another? Lectures and readings will explore such questions, and contemporary examples in the media will bring them to life.

SOC 100SI. Student Initiated Course. 1 Unit.**SOC 101D. Interpersonal Relations. 3 Units.**

This course examines what happens when people interact together and how that interaction affects the nature of their thoughts, relationships, and behaviors. We will take a look at research from sociology and psychology to explore a diverse set of issues including conformity, stereotypes, and cognitive biases. At times we will look at deeply individual topics like cognition and happiness and at other times we will look at more macro-level issues like how we are affected by our social networks. However, throughout the whole class we will be looking at the dynamic and complex relationship between the individual and the social world.

SOC 102D. Social Movements in the 21st Century: Innovations in Structures and Strategies. 4 Units.

The study of social movements is well developed in sociology, but has largely focused on movements that occurred prior to widespread use of cell phones, the Internet and social media. These technologies have allowed not just new mobilization strategies, but also new tactics and organizational structures. Recognizing the power of new technologies to change the way we interact and organize is integral to understanding the future of social movements as well as more routine organizational structures and interpersonal interactions.

SOC 103D. Can Women (and Men) Have it All? Gender and Work in the 21st Century. 3 Units.

This course will cover the current understanding of gender inequality in modern workplaces; its sources, operationalizations, and consequences. Drawing from gender theories about topics like the motherhood penalty, unconscious bias in interactions, occupational segregation, work-life conflict, sexual harassment, and the backlash against women leaders, this course will explore the fundamental question: why do women continue to suffer in the workplace relative to men? The course will also examine the parallel question: what obstructs men from becoming more involved in the home? As families become less and less traditional, reflecting increasing diversity in.

SOC 104D. The Social Psychology of US Attitudes to Criminal Behaviors. 3 Units.

This course examines how social groups, laws, and popular media impact Americans' attitudes towards criminal behaviors. It draws on sociological and psychological research, enabling students to appreciate but also critique academic research. Among the topics covered are social influence, laws, and media bias. Students will conduct a research project on a topic of their choosing and present their findings to the class at the end of the quarter.

SOC 107. China After Mao. 5 Units.

China's post-1976 recovery from the late Mao era; its reorientation toward an open market-oriented economy; the consequences of this new model and runaway economic growth for standards of living, social life, inequality, and local governance; the political conflicts that have accompanied these changes.

Same as: SOC 207

SOC 108. Political & Historical Sociology. 5 Units.

The differences between historical and sociological analysis of past events. The difference between constructing sociological explanations and describing past events. Topics include: the rise of Christianity, the mafia in a Sicilian village, the trade network of the East India Company.

Same as: SOC 208

SOC 111. State and Society in Korea. 4 Units.

20th-century Korea from a comparative historical perspective. Colonialism, nationalism, development, state-society relations, democratization, and globalization with reference to the Korean experience.

Same as: INTNLREL 143, SOC 211

SOC 111D. Social-Psychology and Economics: The trouble with how economists think you think. 5 Units.

This course will compare and contrast explanations for human behavior; specifically, those derived from economic theory with those from social-psychological research. Rationality, decision-making, happiness, motivation, the persistence of inequality, and evaluation of outputs will be examined. It will also investigate the shortcomings of estimating individual preferences without taking into account macro-level phenomenon, such as hierarchy and justice. For students who lack familiarity with economics, the course will also cover basic economic theory as necessary. The use of economic versus social-psychological theory in determining appropriate public policy will also be explored.

SOC 112. Comparative Democratic Development. 5 Units.

Social, cultural, political, economic, and international factors affecting the development and consolidation of democracy in historical and comparative perspective. Individual country experiences with democracy, democratization, and regime performance. Emphasis is on the third wave of democratization over the past three decades and contemporary possibilities for democratic change. (Diamond).

Same as: POLISCI 147

SOC 113. Comparative Corruption. 4 Units.

Causes, effects, and solutions to various forms of corruption in business and politics in both developing regions (e.g. Asia, E. Europe) and developed ones (the US and the EU).

Same as: POLISCI 143S

SOC 113D. Sociology of Sport. 5 Units.

This course is designed to examine sports from a sociological perspective and to develop a greater understanding of the impact of sports on societies and individuals. We will analyze sports and sporting cultures using several theoretical frameworks such as functionalism, conflict theory, critical theory, feminist theory, and an internationalist perspective. This course will address questions such as: What role do sports have in society? How can we understand the importance societies place on sports? How are social inequalities replicated or challenged through sports? How do sports influence individuals and the construction of a social reality?.

SOC 114. Economic Sociology. 4 Units.

(Graduate students register for 214.) The sociological approach to production, distribution, consumption, and markets, emphasizing the impact of norms, power, social structure, and institutions on the economy. Comparison of classic and contemporary approaches to the economy among the social science disciplines. Topics: consumption, labor markets, organization of professions such as law and medicine, the economic role of informal networks, industrial organization, including the structure and history of the computer and popular music industries, business alliances, capitalism in non-Western societies, and the transition from state socialism in E. Europe and China.

Same as: SOC 214

SOC 114D. Sociology of the Great Recession. 5 Units.

The Great Recession (2007-2009), one of the most socially significant events of our time. This course will cover the economic, social, cultural, and political consequences of the recession. We will address its impact on: inequality; job prospects for college graduates; trust in the government; the 2012 presidential election; marriage; child birth; and immigration.

We examine the rise of protest movements during the recession period, such as Occupy Wall Street and the Tea Party, and explore the idea of "class warfare". Class will feature several guest speakers and will focus on developing a general understanding of trends emerging in these events.

SOC 115. Topics in Economic Sociology. 5 Units.

(Graduate students register for 315.) Discussion of topics initially explored in 114/214, with emphasis on countries and cultures outside N. America. Possible topics: families and ethnic groups in the economy, corporate governance and control, corporate strategy, relations among firms in industrial districts and business groups, the impact of national institutions and cultures on economic outcomes, transitions from state socialism and the role of the state in economic development. Possible case studies: the U.S., Germany, Italy, Britain, France, Brazil, Korea, India, Japan, and China.

Prerequisite: 114/214 or 314.

Same as: SOC 315

SOC 115D. Can Law Fix Race? Race, Law, and Contemporary American Society. 5 Units.

In this Age of Obama, why are we still talking about legal remedies to racial inequality? This course will explore this question from an interdisciplinary perspective, focusing on perspectives from law and social science. Students will read both actual Supreme Court opinions as well as foundational works in the sociology of race and law. Through readings and discussion, students will leave this course with 1) a background in the historical role of the law in relation to race; 2) an understanding in how lawquest;s role in the maintenance of racial inequality has evolved; and 3) an ability to articulate their own views on why we are and whether we should be still talking about race, using both theory and empirical evidence to support their views. Specifically, students will be able to answer this question: iquest;Is it appropriate for law to attempt to remedy racial inequality?iquest;.

SOC 116. Chinese Organizations and Management. 5 Units.

Seminar for advanced undergraduates and all graduate students.

Same as: SOC 216

SOC 116D. The Sociological Complexities of Human Trafficking. 5 Units.

Human trafficking is more than a crime and a human rights violation; it reveals the complex interactions of social norms, policies, and actions. In this course, we will consider norms of sexuality and morality in relation to sex trafficking and consenting sex workers, politics and labor policy in relation to labor trafficking and day workers, and political consumerism as a form of collective action in relation to fair trade. Specific topics include the impact of legalized prostitution on human trafficking, the effects of the annual US-released Trafficking In Persons report on international migrant labor laws, and the question of whether or not fair trade is fair. This seminar will provide students opportunities to think critically about society and to collaborate as researchers and activists on the issue of human trafficking.

SOC 117A. China Under Mao. 5 Units.

(Graduate students register for 217A.) The transformation of Chinese society from the 1949 revolution to the eve of China's reforms in 1978: creation of a socialist economy, reorganization of rural society and urban workplaces, emergence of new inequalities of power and opportunity, and new forms of social conflict during Mao's Cultural Revolution of 1966-69 and its aftermath.

Same as: SOC 217A

SOC 117D. Recognizing Inequality. 3 Units.

Over the last few years social and economic inequality has become a major topic in the media and public policy. Gaps and inequalities between groups exist across a range of arenas including education, wages and promotions, housing and cultural consumption. In this course we'll bring these big ideas down to the individual level--investigating and analyzing manifestations of inequality in our everyday lives, considering why these inequalities exist and developing strategies to alleviate them. This seminar will call upon students' imagination and analytical savvy to tackle pressing societal problems by considering the dynamics of their own lives. In the process, students will develop skills that can be applied in fields as diverse as public policy, health care, non-profit work and entrepreneurship.

SOC 118. Social Movements and Collective Action. 4 Units.

Why social movements arise, who participates in them, the obstacles they face, the tactics they choose, and how to gauge movement success or failure. Theory and empirical research. Application of concepts and methods to social movements such as civil rights, environmental justice, antiglobalization, and anti-war.

Same as: SOC 218

SOC 119. Understanding Large-Scale Societal Change: The Case of the 1960s. 5 Units.

The demographic, economic, political, and cultural roots of social change in the 60s; its legacy in the present U.S.

Same as: SOC 219

SOC 120. Interpersonal Relations. 4 Units.

(Graduate students register for 220.) Forming ties, developing norms, status, conformity, deviance, social exchange, power, and coalition formation; important traditions of research have developed from the basic theories of these processes. Emphasis is on understanding basic theories and drawing out their implications for change in a broad range of situations, families, work groups, and friendship groups.

Same as: SOC 220

SOC 121. The Individual in Social Structure: Foundations in Sociological Social Psychology. 5 Units.

Dynamics of the relationship between the individual and social structure, the relationship between the individual and immediate social context, and relationships between individuals. Focus is on the dominant theoretical perspectives in sociological social psychology: social structure and personality, structural social psychology, and symbolic interactionism.

SOC 123. Sex and Love in Modern U.S. Society. 3 Units.

Social influences on private intimate relations involving romantic love and sexuality. Topics include the sexual revolution, contraception, dating, hook-ups, cohabitation, sexual orientation, and changing cultural meanings of marriage, gender, and romantic love.

Same as: FEMGEN 123, SOC 223

SOC 124. The New Science of Right and Wrong: The Social Psychology of Morality and Justice. 4 Units.

Social psychology class focusing on topics related to morality, broadly defined (generosity, moral reasoning, discrimination, obedience, deviance, political psychology).

Same as: SOC 224

SOC 125. Sociology of Religion. 5 Units.

The social patterns of religious belief and practice, and the classical and contemporary theoretical approaches to understanding these patterns. Topics: churches, sects and cults, sources of religious pluralism, relationships between religion and aspects of social structures including the economy, class structure, ethnicity, social networks, and the state.

SOC 125D. Sociology of Learning. 3 Units.

Learn how to learn. We spend considerable time learning in school, yet we devote comparatively little time to investigating the learning process. This course uses a variety of learning situations to interrogate how we learn, understand how our social environment shapes the process, and refine our own unique learning styles. We employ project-based, experiential methods to enhance the exploration of core sociological concepts that affect learning, such as status, authority, and norms. Emphasis is placed on the social construction of specific contexts for learning such as school, work, and even the artist's studio. Students develop learning skills that are transferable to other classes and non-school contexts.

SOC 126. Introduction to Social Networks. 5 Units.

(Graduate students register for 226.) Theory, methods, and research. Concepts such as density, homogeneity, and centrality; applications to substantive areas. The impact of social network structure on individuals and groups in areas such as communities, neighborhoods, families, work life, and innovations.

Same as: SOC 226

SOC 127. Bargaining, Power, and Influence in Social Interaction. 5 Units.

(Graduate students register for 227.) Research and theoretical work on bargaining, social influence, and issues of power and justice in social settings such as teams, work groups, and organizations. Theoretical approaches to the exercise of power and influence in social groups and related issues in social interaction such as the promotion of cooperation, effects of competition and conflict, negotiation, and intergroup relations. Enrollment limited to 40.

Same as: SOC 227

SOC 128. Introduction to Social Network Analysis. 5 Units.

(Graduate students register for SOC 228.) Theory and methods of network analysis in sociology (with an emphasis on social movements), anthropology, history, social psychology, economics, political science, and public health. Prerequisite: basic mathematics.

Same as: SOC 228

SOC 129. Social Psychology: Self and Society. 3 Units.

Why do people behave the way they do? This fundamental question drives social psychology, a field that bridges psychology and sociology. This course surveys social psychological research on a wide variety of topics including conformity, morality, respect, generosity, identity, and prejudice, giving students a deeper understanding of the causal architecture of the social world.

Same as: SOC 229

SOC 129X. Urban Education. 3-4 Units.

(Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, CSRE 112X, EDUC 112X, EDUC 212X, SOC 229X

SOC 130. Education and Society. 4-5 Units.

The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

Same as: EDUC 120C, EDUC 220C, SOC 230

SOC 132. Sociology of Education: The Social Organization of Schools. 4 Units.

Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

Same as: EDUC 110, EDUC 310, SOC 332

SOC 132J. Sociology of Jewishness. 3-5 Units.

Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

Same as: CSRE 132J, JEWISHST 132D

SOC 133. Law and Wikinomics: The Economic and Social Organization of the Legal Profession. 1-5 Unit.

(Graduate and Law students enroll in 333.) Seminar. Emphasis is on the labor market for large-firm lawyers, including the market for entry-level lawyers, attorney retention and promotion practices, lateral hiring of partners, and increased use of forms of employment such as the non-equity form of partnership. Race and gender discrimination and occupational segregation; market-based pressure tactics for organizational reform. Students groups collect and analyze data about the profession and its markets. Multimedia tools for analysis and for producing workplace reforms. May be repeated for credit. Prerequisite: consent of instructor. Same as: SOC 333

SOC 134. Education, Gender, and Development. 4 Units.

Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes. Same as: EDUC 197, FEMGEN 297

SOC 135. Poverty, Inequality, and Social Policy in the United States. 3 Units.

This course will investigate three main questions: What is poverty? What are its causes? and What do we do in the United States to alleviate it? We will examine these questions by learning about government and private nonprofit social policies. We will also explore arguments for and against those policies. Specifically, we will look at topics like hunger, housing costs, minimum wage, healthcare reform, education, welfare and other income supports. The class will be discussion based with the expectation that you come to class having completed the reading, with reflections and preliminary answers to guiding questions, your own questions in mind, and full participation in activities.

Same as: SOC 235

SOC 136. Sociology of Law. 4 Units.

(Graduate students register for 236) Major issues and debates. Topics include: historical perspectives on the origins of law; rationality and legal sanctions; normative decision making and morality; cognitive decision making; crime and deviance; the law in action versus the law on the books; organizational responses to law in the context of labor and employment; the roles of lawyers, judges, and juries; and law and social change emphasizing the American civil rights movement.

Same as: SOC 236

SOC 136A. Law and Society. 5 Units.

Law and social inequality. Major sociological perspectives on where the law comes from, what law and justice systems do, and how they work.

Same as: SOC 236A

SOC 136B. Advanced Topics in Sociology of Law. 5 Units.

(Same as LAW 538.) Historical perspectives on the origins of law, rationality and legal sanctions, law on the books versus the law in action, crime and deviance, school desegregation, privatization of prisons, American civil rights, file sharing, jury decision making, the role of lawyers and judges, and cynicism about the American legal system.

Same as: SOC 236B

SOC 137. Global Capitalism and Development. 4 Units.

Global interactions are the norm in today's emerging markets. We explore how globalization affects capitalism in the developing world, including the process of market creation, responses to economic crisis, the actors and mechanisms behind policy diffusion, the effects of globalization on socio-economic development, and the prospects for change.

SOC 138. American Indians in Comparative Historical Perspective. 4 Units.

(Graduate students register for 238.) Demographic, political, and economic processes and events that shaped relations between Euro-Americans and American Indians, 1600-1890. How the intersection of these processes affected the outcome of conflicts between these two groups, and how this conflict was decisive in determining the social position of American Indians in the late 19th century and the evolution of the doctrine of tribal sovereignty.

Same as: NATIVEAM 138, SOC 238

SOC 139. American Indians in Contemporary Society. 4 Units.

(Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions such as tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history.

Same as: NATIVEAM 139, SOC 239

SOC 140. Introduction to Social Stratification. 3 Units.

(Graduate students register for 240.) The main classical and modern explanations of the causes of social, economic, and political inequality. Issues include: power; processes that create and maintain inequality; the central axes of inequality in contemporary societies (race, ethnicity, class, and gender); the consequences of inequality for individuals and groups; and how social policy can mitigate and exacerbate inequality. Cases include technologically simple groups, the Indian caste system, and the modern U.S.

Same as: SOC 240

SOC 141. Controversies about Inequality. 5 Units.

(Graduate students register for 241.) Debate format involving Stanford and guest faculty. Forms of inequality including racial, ethnic, and gender stratification; possible policy interventions. Topics such as welfare reform, immigration policy, affirmative action, discrimination in labor markets, sources of income inequality, the duty of rich nations to help poor nations, and causes of gender inequality.

Same as: SOC 241

SOC 142. Sociology of Gender. 5 Units.

(Graduate students register for 242.) Gender inequality in contemporary American society and how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes; arguments and evidence for each approach. The social consequences of gender inequality such as the feminization of poverty, and problems of interpersonal relations.

Same as: FEMGEN 142, FEMGEN 242, SOC 242

SOC 143. Sociology of the Middle Class. 4 Units.

This class focuses on understanding of how social research is conducted, and gaining the ability to evaluate the quality of empirical research. The course will focus on the process of designing a research project, including: formulating research questions, developing hypotheses, developing valid and reliable measures, deciding on the types of data needed, making decisions on sampling, choosing research design and data collection methods, the challenges of making causal inferences, and criteria for evaluating the quality of social research.

SOC 144. Inequality and the Workplace. 5 Units.

How characteristics of workplaces, such as hiring practices, workforce diversity, organizational policies and legal mandates, produce variation in inequality. Examines the sources, extent, and consequences of workplace inequality across gender, racial and ethnic lines. Topics include earnings, social status, geographical location, and opportunities for people in the workforce.

Same as: SOC 244

SOC 145. Race and Ethnic Relations in the USA. 4 Units.

(Graduate students register for 245.) Race and ethnic relations in the U.S. and elsewhere. The processes that render ethnic and racial boundary markers, such as skin color, language, and culture, salient in interaction situations. Why only some groups become targets of ethnic attacks. The social dynamics of ethnic hostility and ethnic/racial protest movements. Same as: CSRE 145, SOC 245

SOC 146. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: CSRE 196C, ENGLISH 172D, PSYCH 155, TAPS 165

SOC 148. Comparative Ethnic Conflict. 4 Units.

Causes and consequences of racial and ethnic conflict, including nationalist movements, ethnic genocide, civil war, ethnic separatism, politics, indigenous peoples' movements, and minority rights movements around the world.

Same as: CSRE 148, SOC 248

SOC 149. The Urban Underclass. 4 Units.

(Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor.

Same as: SOC 249, URBANST 112

SOC 150. Race and Political Sociology. 3 Units.

How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena.

Same as: CSRE 150, SOC 250

SOC 151. From the Cradle to the Grave: How Demographic Processes Shape the Social World. 5 Units.

(Graduate students register for 251.) Comparative analysis of historical, contemporary, and anticipated demographic change. Draws on case studies from around the world to explore the relationship between social structure and population dynamics. Introduces demographic measures, concepts and theory. Course combines lecture and seminar-style discussion.

Same as: SOC 251

SOC 152. The Social Determinants of Health. 4 Units.

How social differences, such as where we live, whether and how we work, or how much money we make, and our gender, race or ethnicity, also play a role in who gets sick and who does not.

Same as: SOC 252

SOC 155. The Changing American Family. 4 Units.

Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change.

Same as: FEMGEN 155, FEMGEN 255, SOC 255

SOC 156. Ritual, Politics, Power. 5 Units.

Our everyday lives are made up of multiple routines, some consciously staged and imagined and others unconscious and insidious. Anthropologists call these rituals. Rituals shape every aspect of our lives, creating our symbolic universes and governing the most minute of our practices. For early anthropologists and for those interested in religious and symbolic life, rituals and rites were seen as both one of the most universal features of human existence, and, as that which enables us to reflect upon our human existence. A prominent example are that of the rites de passage; found in every culture, from puberty initiation rites, weddings or funerals, which socially signal the change from one status to another. While initially for anthropologists, rituals marked the difference between the sacred and the profane, soon scholars began to see the ubiquity of ritual and the symbolic in shaping even the most mundane activity such as the structure of a meal and why one is not meant to eat dessert before the main course. The first half of the class examines these different debates surrounding the meaning and effects of rituals and rites. The second half of the class takes these debates to think about the question of power and politics. We return to the question of how our symbolic universes are staged and imagined by us through ritual forms such as the annual Presidential pardoning the turkey; at Thanksgiving. The question of power however pushes us even further to ask why it is that we obey particular kinds of authority, consent to particular actions, and find ourselves doing things we haven't consciously decided to do. Many have argued that these kinds of political questions about how we respond and are shaped by power have something to do with our symbolic worlds and ritual, from the most obvious (the monarchy) to the most subtle (listening in a classroom). Throughout the course, these abstract questions will be grounded in cross-cultural examples and analysis.

Same as: ANTHRO 152

SOC 159. Social and Cultural Dimensions of Global Indigeneity. 4 Units.

This course will expose students to the rise of a world-wide indigenous identity, common themes embraced by indigenous people, and common challenges these groups confront when dealing with the larger social environment that surrounds them. Topics to be covered include tribal sovereignty, rights, and recognition; language preservation; the maintenance of cultural integrity and ethnic authenticity; cultural production and the commodification of indigenous culture; literary traditions; indigenous social movements; natural resources and land disputes; and the disadvantaged social position that these groups typically occupy.

Same as: SOC 259

SOC 160. Formal Organizations. 4 Units.

(Graduate students register for 260.) The roles of formal organizations in production processes, market transactions, and social movements; and as sources of income and ladders of mobility. Relationships of modern organizations to environments and internal structures and processes.

Concepts, models, and tools for analyzing organizational phenomena in contemporary societies. Sources include the literature and case studies.

Same as: SOC 260

SOC 161. The Social Science of Entrepreneurship. 4 Units.

(Graduate students register for 261.) Who is likely to become an entrepreneur and where is entrepreneurship likely to occur? Classic and contemporary theory and research. Interaction with expert practitioners in creating entrepreneurial opportunities including venture and corporate capitalists. The role of culture, markets, hierarchies, and networks. Market creation and change, and factors that affect success of new organizations. Field projects on entrepreneurial environments such as technology licensing offices, entrepreneurial development organizations, venture capital firms, and corporate venturing groups.

Same as: SOC 261

SOC 162. Markets and Governance. 4 Units.

Social and political forces that shape market outcomes. The emergence and creation of markets, how markets go wrong, and the roles of government and society in structuring market exchange. Applied topics include development, inequality, globalization, and economic meltdown. Preference to Sociology majors and Sociology cotermin students.
Same as: SOC 262

SOC 163. Foundations of Organizational Theory. 5 Units.

Foundational material in organizational theory literature.
Same as: SOC 263

SOC 164. Immigration and the Changing United States. 4 Units.

The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration.
Same as: CHILATST 164, CSRE 164, SOC 264

SOC 165. Seminar on the Everyday Lives of Immigrants. 5 Units.

Everyday experience of immigrants and the immigrant second generation through the ethnographic lens. Ethnographies that focus on the immigrant experience. Limited enrollment.
Same as: SOC 265

SOC 166. Mexicans, Mexican Americans, and Chicanos in American Society. 5 Units.

Contemporary sociological issues affecting Mexican-origin people in the U.S. Topics include: the immigrant experience, immigration policy, identity, socioeconomic integration, internal diversity, and theories of incorporation.
Same as: SOC 266

SOC 167A. Asia-Pacific Transformation. 4 Units.

Post-WW II transformation in the Asia-Pacific region, with focus on the ascent of Japan, the development of newly industrialized capitalist countries (S. Korea and Taiwan), the emergence of socialist states (China and N. Korea), and the changing relationship between the U.S. and these countries.
Same as: SOC 267A

SOC 168. Global Organizations: Managing Diversity. 4 Units.

Analytical tools derived from the social sciences to analyze global organizations, strategies, and the tradeoffs between different designs of organizations. Focus is on tribal mentality and how to design effective organizations for policy implementation within and across institutional settings. Recommended: PUBLPOL 102, MS&E 180, SOC 160, ECON 149, or MGTECON 330.
Same as: PUBLPOL 168, PUBLPOL 268, SOC 268

SOC 170. Classics of Modern Social Theory. 4 Units.

(Graduate students register for 270). Preference to Sociology majors. Contributions of Marx, Weber, and Durkheim to contemporary sociology. Topics: the problem of social order and the nature of social conflict; capitalism and bureaucracy; the relationship between social structure and politics; the social sources of religion and political ideology; and the evolution of modern societies. Examples from contemporary research illustrate the impact of these traditions. Limited enrollment.
Same as: SOC 270

SOC 173. Gender and Higher Education: National and International Perspectives. 4 Units.

This course examines the ways in which higher education structures and policies affect females, males, and students in relation to each other and how changes in those structures and policies improve experiences for females and males similarly or differently. Students are expected to gain an understanding of theories and perspectives from the social sciences relevant to an understanding of the role of higher education in relation to structures of gender differentiation and hierarchy. Topics include undergraduate and graduate education; identity and sexuality; gender and science; gender and faculty; and the development of feminist scholarship and pedagogy. Attention is paid to how these issues are experienced by women and men in the United States, including people of color, and by academics throughout the world, and how these have changed over time.
Same as: EDUC 173, EDUC 273, FEMST 173, SOC 273

SOC 177D. Economic Elites in the 21st Century. 3 Units.

While absolute world poverty has declined considerably in the last twenty years, elites have gained disproportionately from the growth of the global economy, leading to serious concerns about inequality and to protests against the 1% in several countries. This course addresses the role of economic elites in the world economy and their relationship to global inequality. Topics include the evolution and consequences of global inequality, the composition and concentration of economic elites in various countries, and economic elites' influence on global governance and the world economy.

SOC 180A. Foundations of Social Research. 4 Units.

Formulating a research question, developing hypotheses, probability and non-probability sampling, developing valid and reliable measures, qualitative and quantitative data, choosing research design and data collection methods, challenges of making causal inference, and criteria for evaluating the quality of social research. Emphasis is on how social research is done, rather than application of different methods. Limited enrollment; preference to Sociology and Urban Studies majors, and Sociology coterms.
Same as: SOC 280A

SOC 180B. Introduction to Data Analysis. 4 Units.

Methods for analyzing and evaluating quantitative data in sociological research. Students will be taught how to run and interpret multivariate regressions, how to test hypotheses, and how to read and critique published data analyses. Limited enrollment; preference to Sociology majors.
Same as: SOC 280B

SOC 181B. Sociological Methods: Statistics. 5 Units.

(Graduate students register for 281B.) Statistical methods of relevance to sociology: contingency tables, correlation, and regression.
Same as: SOC 281B

SOC 190. Undergraduate Individual Study. 1-5 Unit.

Prior arrangement required.

SOC 191. Undergraduate Directed Research. 1-5 Unit.

Work on a project of student's choice under supervision of a faculty member. Prior arrangement required.

SOC 192. Undergraduate Research Apprenticeship. 1-5 Unit.

Work in an apprentice-like relationship with faculty on an on-going research project. Prior arrangement required.

SOC 193. Undergraduate Teaching Apprenticeship. 1-5 Unit.

Prior arrangement required.

SOC 196. Senior Thesis. 1-15 Unit.

Work on an honors thesis project under faculty supervision (see description of honors program). Must be arranged early in the year of graduation or before.

SOC 200. Junior/Senior Seminar for Majors. 4 Units.

For Sociology majors. Capstone course in which sociological problems are framed, linked to theories, and answers pursued through research designs. Independent research. How to formulate a research question; how to integrate theory and methods. Prerequisites: SOC 170, 180B.

SOC 201. Preparation for Senior Project. 5 Units.

First part of capstone experience for Urban Studies majors pursuing an internship-based research project or honors thesis. Assignments culminate in a research proposal, which may be submitted for funding. Students also identify and prepare for a related internship, normally to begin in Spring Quarter in URBANST 201B or in Summer. Research proposed in the final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research. Service Learning Course (certified by Haas Center).

Same as: URBANST 201

SOC 202. Preparation for Senior Research. 5 Units.

Required of all juniors in Urban Studies and those juniors in Sociology planning on writing an honors thesis. Students write a research prospectus and grant proposal, which may be submitted for funding. Research proposal in final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research.

Same as: URBANST 202

SOC 204. Senior Seminar. 5 Units.

Conclusion of capstone sequence. Students write a substantial paper based on the research project developed in 202. Students in the honors program may incorporate paper into their thesis. Guest scholar chosen by students.

Same as: URBANST 203

SOC 207. China After Mao. 5 Units.

China's post-1976 recovery from the late Mao era; its reorientation toward an open market-oriented economy; the consequences of this new model and runaway economic growth for standards of living, social life, inequality, and local governance; the political conflicts that have accompanied these changes.

Same as: SOC 107

SOC 208. Political & Historical Sociology. 5 Units.

The differences between historical and sociological analysis of past events. The difference between constructing sociological explanations and describing past events. Topics include: the rise of Christianity, the mafia in a Sicilian village, the trade network of the East India Company.

Same as: SOC 108

SOC 211. State and Society in Korea. 4 Units.

20th-century Korea from a comparative historical perspective. Colonialism, nationalism, development, state-society relations, democratization, and globalization with reference to the Korean experience.

Same as: INTNLREL 143, SOC 111

SOC 214. Economic Sociology. 4 Units.

(Graduate students register for 214.) The sociological approach to production, distribution, consumption, and markets, emphasizing the impact of norms, power, social structure, and institutions on the economy. Comparison of classic and contemporary approaches to the economy among the social science disciplines. Topics: consumption, labor markets, organization of professions such as law and medicine, the economic role of informal networks, industrial organization, including the structure and history of the computer and popular music industries, business alliances, capitalism in non-Western societies, and the transition from state socialism in E. Europe and China.

Same as: SOC 114

SOC 216. Chinese Organizations and Management. 5 Units.

Seminar for advanced undergraduates and all graduate students.

Same as: SOC 116

SOC 217A. China Under Mao. 5 Units.

(Graduate students register for 217A.) The transformation of Chinese society from the 1949 revolution to the eve of China's reforms in 1978: creation of a socialist economy, reorganization of rural society and urban workplaces, emergence of new inequalities of power and opportunity, and new forms of social conflict during Mao's Cultural Revolution of 1966-69 and its aftermath.

Same as: SOC 117A

SOC 218. Social Movements and Collective Action. 4 Units.

Why social movements arise, who participates in them, the obstacles they face, the tactics they choose, and how to gauge movement success or failure. Theory and empirical research. Application of concepts and methods to social movements such as civil rights, environmental justice, antiglobalization, and anti-war.

Same as: SOC 118

SOC 219. Understanding Large-Scale Societal Change: The Case of the 1960s. 5 Units.

The demographic, economic, political, and cultural roots of social change in the 60s; its legacy in the present U.S.

Same as: SOC 119

SOC 220. Interpersonal Relations. 4 Units.

(Graduate students register for 220.) Forming ties, developing norms, status, conformity, deviance, social exchange, power, and coalition formation; important traditions of research have developed from the basic theories of these processes. Emphasis is on understanding basic theories and drawing out their implications for change in a broad range of situations, families, work groups, and friendship groups.

Same as: SOC 120

SOC 223. Sex and Love in Modern U.S. Society. 3 Units.

Social influences on private intimate relations involving romantic love and sexuality. Topics include the sexual revolution, contraception, dating, hook-ups, cohabitation, sexual orientation, and changing cultural meanings of marriage, gender, and romantic love.

Same as: FEMGEN 123, SOC 123

SOC 224. The New Science of Right and Wrong: The Social Psychology of Morality and Justice. 4 Units.

Social psychology class focusing on topics related to morality, broadly defined (generosity, moral reasoning, discrimination, obedience, deviance, political psychology).

Same as: SOC 124

SOC 224B. Microsociology: Social Structure and Interaction. 4 Units.

How to interpret interpersonal situations using microsociological theories. Focuses on the role of intention, identity, routines, scripts, rituals, conceptual frameworks, talk and emotions in social interaction. Processes by which interactions reverberate outward to transform groups and social structures. Special consideration will be placed on organizational contexts like schools, workplaces and policy decision arenas.

Same as: EDUC 312B

SOC 226. Introduction to Social Networks. 5 Units.

(Graduate students register for 226.) Theory, methods, and research. Concepts such as density, homogeneity, and centrality; applications to substantive areas. The impact of social network structure on individuals and groups in areas such as communities, neighborhoods, families, work life, and innovations.

Same as: SOC 126

SOC 227. Bargaining, Power, and Influence in Social Interaction. 5 Units.

(Graduate students register for 227.) Research and theoretical work on bargaining, social influence, and issues of power and justice in social settings such as teams, work groups, and organizations. Theoretical approaches to the exercise of power and influence in social groups and related issues in social interaction such as the promotion of cooperation, effects of competition and conflict, negotiation, and intergroup relations. Enrollment limited to 40.

Same as: SOC 127

SOC 228. Introduction to Social Network Analysis. 5 Units.

(Graduate students register for SOC 228.) Theory and methods of network analysis in sociology (with an emphasis on social movements), anthropology, history, social psychology, economics, political science, and public health. Prerequisite: basic mathematics.

Same as: SOC 128

SOC 229. Social Psychology: Self and Society. 3 Units.

Why do people behave the way they do? This fundamental question drives social psychology, a field that bridges psychology and sociology. This course surveys social psychological research on a wide variety of topics including conformity, morality, respect, generosity, identity, and prejudice, giving students a deeper understanding of the causal architecture of the social world.

Same as: SOC 129

SOC 229X. Urban Education. 3-4 Units.

(Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, CSRE 112X, EDUC 112X, EDUC 212X, SOC 129X

SOC 230. Education and Society. 4-5 Units.

The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

Same as: EDUC 120C, EDUC 220C, SOC 130

SOC 231. World, Societal, and Educational Change: Comparative Perspectives. 4-5 Units.

Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

Same as: EDUC 136, EDUC 306D

SOC 234. Research Seminar on Access to Justice. 1-5 Unit.

The functions and dysfunctions of modern legal systems. Topics include: official statements of the U.S. and the EU about the rights of parties to civil disputes; the roles of lawyers as gatekeepers and facilitators; the filtering process by which injuries and experiences become the basis for legal claims; access to and use of courts; the balance of power and advantage between individual persons and organizations in disputes. Prerequisite: advanced undergraduate or graduate standing, or consent of instructor.

Same as: SOC 334

SOC 235. Poverty, Inequality, and Social Policy in the United States. 3 Units.

This course will investigate three main questions: What is poverty? What are its causes? and What do we do in the United States to alleviate it? We will examine these questions by learning about government and private nonprofit social policies. We will also explore arguments for and against those policies. Specifically, we will look at topics like hunger, housing costs, minimum wage, healthcare reform, education, welfare and other income supports. The class will be discussion based with the expectation that you come to class having completed the reading, with reflections and preliminary answers to guiding questions, your own questions in mind, and full participation in activities.

Same as: SOC 135

SOC 236. Sociology of Law. 4 Units.

(Graduate students register for 236) Major issues and debates. Topics include: historical perspectives on the origins of law; rationality and legal sanctions; normative decision making and morality; cognitive decision making; crime and deviance; the law in action versus the law on the books; organizational responses to law in the context of labor and employment; the roles of lawyers, judges, and juries; and law and social change emphasizing the American civil rights movement.

Same as: SOC 136

SOC 236A. Law and Society. 5 Units.

Law and social inequality. Major sociological perspectives on where the law comes from, what law and justice systems do, and how they work.

Same as: SOC 136A

SOC 236B. Advanced Topics in Sociology of Law. 5 Units.

(Same as LAW 538.) Historical perspectives on the origins of law, rationality and legal sanctions, law on the books versus the law in action, crime and deviance, school desegregation, privatization of prisons, American civil rights, file sharing, jury decision making, the role of lawyers and judges, and cynicism about the American legal system.

Same as: SOC 136B

SOC 238. American Indians in Comparative Historical Perspective. 4 Units.

(Graduate students register for 238.) Demographic, political, and economic processes and events that shaped relations between Euro-Americans and American Indians, 1600-1890. How the intersection of these processes affected the outcome of conflicts between these two groups, and how this conflict was decisive in determining the social position of American Indians in the late 19th century and the evolution of the doctrine of tribal sovereignty.

Same as: NATIVEAM 138, SOC 138

SOC 239. American Indians in Contemporary Society. 4 Units.

(Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions such as tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history.

Same as: NATIVEAM 139, SOC 139

SOC 240. Introduction to Social Stratification. 3 Units.

(Graduate students register for 240.) The main classical and modern explanations of the causes of social, economic, and political inequality. Issues include: power; processes that create and maintain inequality; the central axes of inequality in contemporary societies (race, ethnicity, class, and gender); the consequences of inequality for individuals and groups; and how social policy can mitigate and exacerbate inequality. Cases include technologically simple groups, the Indian caste system, and the modern U.S.

Same as: SOC 140

SOC 240W. CPI Workshop. 1-2 Unit.

A workshop devoted to presenting ongoing research on poverty and inequality in the United States. Open to all students interested in (a) building a better infrastructure for monitoring poverty and inequality, (b) building cutting-edge models of the causes and consequences of poverty and inequality, and (c) building better policy to reduce poverty and inequality. Required for all National Poverty Fellows funded by the Stanford Center on Poverty and Inequality.
Same as: SOC 340W

SOC 241. Controversies about Inequality. 5 Units.

(Graduate students register for 241.) Debate format involving Stanford and guest faculty. Forms of inequality including racial, ethnic, and gender stratification; possible policy interventions. Topics such as welfare reform, immigration policy, affirmative action, discrimination in labor markets, sources of income inequality, the duty of rich nations to help poor nations, and causes of gender inequality.
Same as: SOC 141

SOC 242. Sociology of Gender. 5 Units.

(Graduate students register for 242.) Gender inequality in contemporary American society and how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes; arguments and evidence for each approach. The social consequences of gender inequality such as the feminization of poverty, and problems of interpersonal relations.
Same as: FEMGEN 142, FEMGEN 242, SOC 142

SOC 244. Inequality and the Workplace. 5 Units.

How characteristics of workplaces, such as hiring practices, workforce diversity, organizational policies and legal mandates, produce variation in inequality. Examines the sources, extent, and consequences of workplace inequality across gender, racial and ethnic lines. Topics include earnings, social status, geographical location, and opportunities for people in the workforce.
Same as: SOC 144

SOC 245. Race and Ethnic Relations in the USA. 4 Units.

(Graduate students register for 245.) Race and ethnic relations in the U.S. and elsewhere. The processes that render ethnic and racial boundary markers, such as skin color, language, and culture, salient in interaction situations. Why only some groups become targets of ethnic attacks. The social dynamics of ethnic hostility and ethnic/racial protest movements.
Same as: CSRE 145, SOC 145

SOC 248. Comparative Ethnic Conflict. 4 Units.

Causes and consequences of racial and ethnic conflict, including nationalist movements, ethnic genocide, civil war, ethnic separatism, politics, indigenous peoples' movements, and minority rights movements around the world.
Same as: CSRE 148, SOC 148

SOC 249. The Urban Underclass. 4 Units.

(Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor.
Same as: SOC 149, URBANST 112

SOC 250. Race and Political Sociology. 3 Units.

How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena.
Same as: CSRE 150, SOC 150

SOC 251. From the Cradle to the Grave: How Demographic Processes Shape the Social World. 5 Units.

(Graduate students register for 251.) Comparative analysis of historical, contemporary, and anticipated demographic change. Draws on case studies from around the world to explore the relationship between social structure and population dynamics. Introduces demographic measures, concepts and theory. Course combines lecture and seminar-style discussion.
Same as: SOC 151

SOC 252. The Social Determinants of Health. 4 Units.

How social differences, such as where we live, whether and how we work, or how much money we make, and our gender, race or ethnicity, also play a role in who gets sick and who does not.
Same as: SOC 152

SOC 254. Welfare State. 4-5 Units.

This seminar introduces students to the key literature, questions, and debates about the modern welfare state. Emergence, growth, and purported demise of the welfare state. American welfare state in comparative perspective. Social and political factors affecting state development including political parties, labor markets, gender, demographic change, and immigration.
Same as: SOC 354

SOC 255. The Changing American Family. 4 Units.

Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change.
Same as: FEMGEN 155, FEMGEN 255, SOC 155

SOC 257. Causal Inference in Quantitative Educational and Social Science Research. 3-5 Units.

Quantitative methods to make causal inferences in the absence of randomized experiment including the use of natural and quasi-experiments, instrumental variables, regression discontinuity, matching estimators, longitudinal methods, fixed effects estimators, and selection modeling. Assumptions implicit in these approaches, and appropriateness in research situations. Students develop research proposals relying on these methods. Prerequisites: exposure to quantitative research methods; multivariate regression.
Same as: EDUC 255B

SOC 258. Applied Quasi-Experimental Research in Education. 3-5 Units.

Course will provide hands-on practice in analysis of data from experimental and quasi-experimental research designs, including a) instrumental variables estimators; b) regression discontinuity estimators; c) difference-in-difference estimators; d) matching estimators; e) fixed effects estimators; and f) panel data methods (including individual fixed effects models, lagged covariate adjustment models, growth models, etc.). Prerequisites: satisfactory completion of EDUC 255B, EDUC 257C or SOC 257.
Same as: EDUC 255C

SOC 259. Social and Cultural Dimensions of Global Indigeneity. 4 Units.

This course will expose students to the rise of a world-wide indigenous identity, common themes embraced by indigenous people, and common challenges these groups confront when dealing with the larger social environment that surrounds them. Topics to be covered include tribal sovereignty, rights, and recognition; language preservation; the maintenance of cultural integrity and ethnic authenticity; cultural production and the commodification of indigenous culture; literary traditions; indigenous social movements; natural resources and land disputes; and the disadvantaged social position that these groups typically occupy.
Same as: SOC 159

SOC 260. Formal Organizations. 4 Units.

(Graduate students register for 260.) The roles of formal organizations in production processes, market transactions, and social movements; and as sources of income and ladders of mobility. Relationships of modern organizations to environments and internal structures and processes. Concepts, models, and tools for analyzing organizational phenomena in contemporary societies. Sources include the literature and case studies. Same as: SOC 160

SOC 261. The Social Science of Entrepreneurship. 4 Units.

(Graduate students register for 261.) Who is likely to become an entrepreneur and where is entrepreneurship likely to occur? Classic and contemporary theory and research. Interaction with expert practitioners in creating entrepreneurial opportunities including venture and corporate capitalists. The role of culture, markets, hierarchies, and networks. Market creation and change, and factors that affect success of new organizations. Field projects on entrepreneurial environments such as technology licensing offices, entrepreneurial development organizations, venture capital firms, and corporate venturing groups. Same as: SOC 161

SOC 262. Markets and Governance. 4 Units.

Social and political forces that shape market outcomes. The emergence and creation of markets, how markets go wrong, and the roles of government and society in structuring market exchange. Applied topics include development, inequality, globalization, and economic meltdown. Preference to Sociology majors and Sociology cotermin students. Same as: SOC 162

SOC 263. Foundations of Organizational Theory. 5 Units.

Foundational material in organizational theory literature. Same as: SOC 163

SOC 264. Immigration and the Changing United States. 4 Units.

The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration. Same as: CHILATST 164, CSRE 164, SOC 164

SOC 265. Seminar on the Everyday Lives of Immigrants. 5 Units.

Everyday experience of immigrants and the immigrant second generation through the ethnographic lens. Ethnographies that focus on the immigrant experience. Limited enrollment. Same as: SOC 165

SOC 266. Mexicans, Mexican Americans, and Chicanos in American Society. 5 Units.

Contemporary sociological issues affecting Mexican-origin people in the U.S. Topics include: the immigrant experience, immigration policy, identity, socioeconomic integration, internal diversity, and theories of incorporation. Same as: SOC 166

SOC 267A. Asia-Pacific Transformation. 4 Units.

Post-WW II transformation in the Asia-Pacific region, with focus on the ascent of Japan, the development of newly industrialized capitalist countries (S. Korea and Taiwan), the emergence of socialist states (China and N. Korea), and the changing relationship between the U.S. and these countries. Same as: SOC 167A

SOC 268. Global Organizations: Managing Diversity. 4 Units.

Analytical tools derived from the social sciences to analyze global organizations, strategies, and the tradeoffs between different designs of organizations. Focus is on tribal mentality and how to design effective organizations for policy implementation within and across institutional settings. Recommended: PUBLPOL 102, MS&E 180, SOC 160, ECON 149, or MGTECON 330. Same as: PUBLPOL 168, PUBLPOL 268, SOC 168

SOC 270. Classics of Modern Social Theory. 4 Units.

(Graduate students register for 270). Preference to Sociology majors. Contributions of Marx, Weber, and Durkheim to contemporary sociology. Topics: the problem of social order and the nature of social conflict; capitalism and bureaucracy; the relationship between social structure and politics; the social sources of religion and political ideology; and the evolution of modern societies. Examples from contemporary research illustrate the impact of these traditions. Limited enrollment. Same as: SOC 170

SOC 273. Gender and Higher Education: National and International Perspectives. 4 Units.

This course examines the ways in which higher education structures and policies affect females, males, and students in relation to each other and how changes in those structures and policies improve experiences for females and males similarly or differently. Students are expected to gain an understanding of theories and perspectives from the social sciences relevant to an understanding of the role of higher education in relation to structures of gender differentiation and hierarchy. Topics include undergraduate and graduate education; identity and sexuality; gender and science; gender and faculty; and the development of feminist scholarship and pedagogy. Attention is paid to how these issues are experienced by women and men in the United States, including people of color, and by academics throughout the world, and how these have changed over time. Same as: EDUC 173, EDUC 273, FEMST 173, SOC 173

SOC 280A. Foundations of Social Research. 4 Units.

Formulating a research question, developing hypotheses, probability and non-probability sampling, developing valid and reliable measures, qualitative and quantitative data, choosing research design and data collection methods, challenges of making causal inference, and criteria for evaluating the quality of social research. Emphasis is on how social research is done, rather than application of different methods. Limited enrollment; preference to Sociology and Urban Studies majors, and Sociology cotermin students. Same as: SOC 180A

SOC 280B. Introduction to Data Analysis. 4 Units.

Methods for analyzing and evaluating quantitative data in sociological research. Students will be taught how to run and interpret multivariate regressions, how to test hypotheses, and how to read and critique published data analyses. Limited enrollment; preference to Sociology majors. Same as: SOC 180B

SOC 281B. Sociological Methods: Statistics. 5 Units.

(Graduate students register for 281B.) Statistical methods of relevance to sociology: contingency tables, correlation, and regression. Same as: SOC 181B

SOC 300. Workshop: Teaching Development. 2 Units.

For first-year Sociology doctoral students only. The principles for becoming an effective instructor, adviser, and mentor to undergraduates. Topics: ethics, course organization and syllabus development, test construction and grading, conflict resolution, common classroom problems, and University policies related to matters such as sexual harassment. Technologies and other topics related to making effective presentations, and campus resources to improve classroom performance. Roundtable discussions with faculty and advanced graduate students known for teaching excellence. Students may be asked to give a demonstration lecture.

SOC 305. Graduate Proseminar. 1 Unit.

For first-year Sociology doctoral students only. Introduction and orientation to the field of Sociology.

SOC 308. Social Demography. 4-5 Units.

For graduate students and advanced undergraduates. Topics: models of fertility behavior, migration models, stable population theory, life table analysis, data sources, and measurement problems. How population behavior affects social processes, and how social processes influence population dynamics. Recommended: sociological research methods; basic regression analysis and log linear models.

SOC 309. Nations and Nationalism. 4-5 Units.

The nation as a form of collective identity in the modern era. Major works in the study of nations and nationalism from comparative perspectives with focus on Europe and E. Asia.

SOC 310. Political Sociology. 4-5 Units.

Theory and research on the relationship between social structure and politics. Social foundations of political order, the generation and transformation of ideologies and political identities, social origins of revolutionary movements, and social consequences of political revolution. Prerequisite: doctoral student.

SOC 311A. Workshop: Comparative Studies of Educational and Political Systems. 1-5 Unit.

Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor.

Same as: EDUC 387A

SOC 311B. Workshop: Comparative Systems of Educational and Political Systems. 1-5 Unit.

Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor.

Same as: EDUC 387B

SOC 311C. Workshop: Comparative Studies of Educational and Political Systems. 1-5 Unit.

Analysis of quantitative and longitudinal data on national educational systems and political structures. Prerequisite: consent of instructor. May be repeated for credit.

Same as: EDUC 387C

SOC 312W. Workshop: Political Sociology, Social Movements, and Collective Action. 1-2 Unit.

Faculty and student presentations of ongoing research on topics including: social movement and organizations, and the relationship between them; democracy movements; legislative and policy outcomes; and collective action tactics, strategies, and trajectories. May be repeated for credit. Restricted to Sociology doctoral students; others by consent of instructor.

SOC 313A. Transformation of Socialist Societies. 3-5 Units.

A quarter-century from the fall of the Berlin Wall, we have gained broad perspective on the challenges of wholesale transformations away from socialism. This course explores the process and social consequences of opening the economies of Eastern Europe, Eurasia, and China to market forces. We will answer questions about how individuals and social systems respond to the particular challenges of rapid economic and political openings, including demographic challenges, corruption, nationalism, and growing inequality. We will compare the Eastern European and Post-Soviet experiences of these issues with the Chinese experience, and highlight the similarities and distinctions between transformations in these societies.

Same as: REES 313

SOC 314. Economic Sociology. 4-5 Units.

Classical and contemporary literature covering the sociological approach to markets and the economy, and comparing it to other disciplines. Topics: consumption, labor, professions, industrial organization, and the varieties of capitalism; historical and comparative perspectives on market and non-market provision of goods and services, and on transitions among economic systems. The relative impact of culture, institutions, norms, social networks, technology, and material conditions. Prerequisite: doctoral student status or consent of instructor.

SOC 315. Topics in Economic Sociology. 5 Units.

(Graduate students register for 315.) Discussion of topics initially explored in 114/214, with emphasis on countries and cultures outside N. America. Possible topics: families and ethnic groups in the economy, corporate governance and control, corporate strategy, relations among firms in industrial districts and business groups, the impact of national institutions and cultures on economic outcomes, transitions from state socialism and the role of the state in economic development. Possible case studies: the U.S., Germany, Italy, Britain, France, Brazil, Korea, India, Japan, and China. Prerequisite: 114/214 or 314.

Same as: SOC 115

SOC 315W. Workshop: Economic Sociology and Organizations. 1-2 Unit.

Theory, methods, and research in the sociology of the economy and of formal organizations, through presentations of ongoing work by students, faculty, and guest speakers, and discussion of recent literature and controversies. May be repeated for credit. Restricted to Sociology doctoral students; others by consent of instructor.

SOC 316. Historical and Comparative Sociology. 4-5 Units.

Theory and research on macro-historical changes of sociological significance such as the rise of capitalism, the causes and consequences of revolutions, and the formation of the modern nation state and global world system. Methodological issues in historical and comparative sociology.

SOC 317W. Workshop: Networks, Histories, and Theories of Action. 1-2 Unit.

Yearlong workshop where doctoral students are encouraged to collaborate with peers and faculty who share an interest in researching the network dynamics, histories and theories of action that help explain particular social phenomena. Students present their own research and provide helpful feedback on others' work. Presentations may concern dissertation proposals, grants, article submissions, book proposals, datasets, methodologies and other texts. Repeatable for credit.

Same as: EDUC 317X

SOC 318. Social Movements and Collective Action. 4-5 Units.

Topics: causes, dynamics, and outcomes of social movements; organizational dimensions of collective action; and causes and consequences of individual activism.

SOC 320. Foundations of Social Psychology. 4-5 Units.

Major theoretical perspectives, and their assumptions and problems, in interpersonal processes and social psychology. Techniques of investigation and methodological issues. Perspectives: symbolic interaction, social structure and personality, and cognitive and group processes.

SOC 321W. Workshop: Social Psychology and Social Structure. 1-2 Unit.

Advanced graduate student workshop in social psychology. Current theories and research agendas, recent publications, and presentations of ongoing research by faculty and students. May be repeated for credit. Prerequisite: consent of instructor.

SOC 323. Sociology of the Family. 4-5 Units.

Sociological research on changing family forms. Topics include courtship, marriage, fertility, divorce, conflict, relationship skills and satisfaction, gender patterns, power relations within the family, and class and race differences in patterns. Enrollment limited to graduate students.

SOC 324. Social Networks. 3-5 Units.

How the study of social networks contributes to sociological research. Application of core concepts to patterns of relations among actors, including connectivity and clusters, duality of categories and networks, centrality and power, balance and transitivity, structural equivalence, and blockmodels. Friendship and kinship networks, diffusion of ideas and infectious diseases, brokerage in markets and organizations, and patronage and political influence in historical contexts.

SOC 325W. Family Workshop: Sociology Phd students present and critique work on family and demography.. 1-2 Unit.

Sociology Phd students will present their own work weekly, and read and critique the research-in-progress of their peers on issues of family, household structure, interpersonal relationships, marriage, demography, survey data, demographic methods, statistical methods, and related fields.

SOC 327. Frontiers of Social Psychology. 1-5 Unit.

Advanced topics, current developments, theory, and empirical research. Possible topics include social identity processes, status beliefs and processes, social exchange, affect and social cohesion, legitimacy, social difference and inequality, norms, and social dilemmas.

SOC 331. The Conduct of Qualitative Inquiry. 3-4 Units.

Two quarter sequence for doctoral students to engage in research that anticipates, is a pilot study for, or feeds into their dissertations. Prior approval for dissertation study not required. Students engage in common research processes including: developing interview questions; interviewing; coding, analyzing, and interpreting data; theorizing; and writing up results. Participant observation as needed. Preference to students who intend to enroll in 327C.

Same as: EDUC 327A

SOC 332. Sociology of Education: The Social Organization of Schools. 4 Units.

Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

Same as: EDUC 110, EDUC 310, SOC 132

SOC 333. Law and Wikinomics: The Economic and Social Organization of the Legal Profession. 1-5 Unit.

(Graduate and Law students enroll in 333.) Seminar. Emphasis is on the labor market for large-firm lawyers, including the market for entry-level lawyers, attorney retention and promotion practices, lateral hiring of partners, and increased use of forms of employment such as the non-equity form of partnership. Race and gender discrimination and occupational segregation; market-based pressure tactics for organizational reform. Students groups collect and analyze data about the profession and its markets. Multimedia tools for analysis and for producing workplace reforms. May be repeated for credit. Prerequisite: consent of instructor. Same as: SOC 133

SOC 334. Research Seminar on Access to Justice. 1-5 Unit.

The functions and dysfunctions of modern legal systems. Topics include: official statements of the U.S. and the EU about the rights of parties to civil disputes; the roles of lawyers as gatekeepers and facilitators; the filtering process by which injuries and experiences become the basis for legal claims; access to and use of courts; the balance of power and advantage between individual persons and organizations in disputes. Prerequisite: advanced undergraduate or graduate standing, or consent of instructor. Same as: SOC 234

SOC 336. Sociology of Law. 3-5 Units.

Sociological examination of law as a mechanism of social regulation and as a field of knowledge. Explores classical and contemporary theoretical and empirical contributions to the sociology of law. Law and social control, law and social change, social reality of the law, the profession and practice of law, legal mobilization, and the influence of race, gender, and social status in legal decisions and processes.

SOC 338W. Workshop: Sociology of Law. 1-5 Unit.

(Same as LAW 581.) Required for joint degree J.D./Ph.D. students in Sociology in the first three years of program; open to Ph.D. students in Sociology and related disciplines. Empirical, sociological study of law and legal institutions. Topics such as the relation of law to inequality and stratification, social movements, organizations and institutions, political sociology and state development, and the social construction of disputes and dispute resolution processes. Research presentations. Career development issues. May be repeated for credit.

SOC 339. Gender Meanings and Processes. 5 Units.

Current theories and research on the social processes, such as socialization, status processes, stereotyping, and cognition, that produce gender difference and inequality. Intersections of gender with race, class, and bodies. Applications to workplaces, schools, families, and intimate relationships. Prerequisite: Sociology doctoral student or consent of instructor.

SOC 340W. CPI Workshop. 1-2 Unit.

A workshop devoted to presenting ongoing research on poverty and inequality in the United States. Open to all students interested in (a) building a better infrastructure for monitoring poverty and inequality, (b) building cutting-edge models of the causes and consequences of poverty and inequality, and (b) building better policy to reduce poverty and inequality. Required for all National Poverty Fellows funded by the Stanford Center on Poverty and Inequality.

Same as: SOC 240W

SOC 341W. Workshop: Inequality. 1-2 Unit.

Causes, consequences, and structure of inequality; how inequality results from and shapes social classes, occupations, professions, and other aspects of the economy. Research presentations by students, faculty, and guest speakers. Discussion of controversies, theories, and recent writings. May be repeated for credit. Restricted to Sociology doctoral students; others by consent of instructor.

SOC 342B. Gender and Social Structure. 4-5 Units.

The role of gender in structuring contemporary life. Social forces affecting gender at the psychological, interactional, and structural levels. Gender inequality in labor markets, education, the household, and other institutions. Theories and research literature.

SOC 346. Workshop: Ethnography. 1-2 Unit.

Restricted to doctoral students. Student research employing ethnographic methods. May be repeated for credit. Prerequisite: consent of instructor.

SOC 347. Race and Ethnicity in Society and Institutions. 1-5 Unit.

Primarily for doctoral students. Major theories and empirical research. Emphasis is on schooling and race, racial identity, urban issues, and the impact of immigration on race relations.

Same as: EDUC 315X

SOC 348. Advanced Topics in the Sociology of Gender. 3-5 Units.

Seminar for graduate students who have research projects in progress that focus on questions about gender and society. Research projects can be at any stage from the initial development to the final writing up of results. Focus is on questions posed by the research projects of the seminar participants. Readings include relevant background to each other's questions and present their own work in progress. A final paper reports the progress on the seminar member's research project.

SOC 350. Sociology of Race. 4-5 Units.

Emphasis on cultural approaches that focus on meaning and meaning-making in the realm of race and race relations. Issues and complications in conceptualizing and theorizing race. Differentiation, organization, and stratification by race across a range of domains. Identity, political and economic participation, group solidarity. Prerequisite: Sociology doctoral student or consent of instructor.

SOC 350W. Workshop: Migration, Race, Ethnicity and Nation. 1-3 Unit.

Current theories and research, recent publications, and presentations of ongoing research by faculty and students. May be repeated for credit. Prerequisite: consent of instructor.

SOC 353X. Inequality, Society, and Education. 3-5 Units.

The course will focus on developing students' understanding of theory and research on several key issues in the relationship between education and inequality: 1) what are the recent patterns and trends in both economic and educational inequality? 2) what kinds of inequality (from a normative/philosophical perspective) should we worry about? 3) how do we measure educational inequality? 4) how are economic and educational inequality linked? 5) what policies/practices might reduce educational inequality? The course will be a graduate student seminar, with enrollment capped at 20-25. Same as: EDUC 253X

SOC 354. Welfare State. 4-5 Units.

This seminar introduces students to the key literature, questions, and debates about the modern welfare state. Emergence, growth, and purported demise of the welfare state. American welfare state in comparative perspective. Social and political factors affecting state development including political parties, labor markets, gender, demographic change, and immigration. Same as: SOC 254

SOC 357. Immigration and Assimilation. 3-5 Units.

Major theoretical debates and empirical applications in the study of immigrant assimilation. Topics include racial and ethnic identity, socioeconomic integration, political participation, and national identity. Companion to SOC 358.

SOC 358. Sociology of Immigration. 1-5 Unit.

Topics include: the process of migration; historical perspectives; immigrant integration; transnationalism; immigration policy; labor; nations and nationalism.

SOC 359. Organizations and Uncertainty. 3-5 Units.

Organizations and environments characterized by institutional uncertainty. Beliefs at the roots of shared routines and institutional myths are absent. Institutionalists and neo-institutionalists, organizations facing uncertain institutional environments.

SOC 361. Social Psychology of Organizations. 3 Units.

Seminar. Social psychological theories and research relevant to organizational behavior. Current research topics; theories in micro-organizational behavior. Topics include models of attribution, choice and decision making, intergroup behavior, stereotyping, and social influence. Prerequisites: Ph.D student; graduate-level social psychology course.

SOC 361W. Workshop: Networks and Organizations. 1-3 Unit.

For students doing advanced research. Group comments and criticism on dissertation projects at any phase of completion, including data problems, empirical and theoretical challenges, presentation refinement, and job market presentations. Collaboration, debate, and shaping research ideas. Prerequisite: courses in organizational theory or social network analysis. Same as: EDUC 361

SOC 362. Organization and Environment. 3 Units.

This seminar considers the leading sociological approaches to analyzing relations of organizations and environments, with a special emphasis on dynamics. Attention is given to theoretical formulations, research designs, and results of empirical studies. Prerequisite: Enrollment in a PhD program.

SOC 363A. Seminar on Organizational Theory. 5 Units.

The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

Same as: EDUC 375A, MSE 389

SOC 363B. Seminar on Organizations: Institutional Analysis. 3-5 Units.

Seminar. Key lines of inquiry on organizational change, emphasizing network, institutional, and evolutionary arguments. Same as: EDUC 375B

SOC 366. Organizational Analysis. 4 Units.

Principles of organizational behavior and analysis; theories of group and individual behavior; organizational culture; and applications to school organization and design. Case studies. Same as: EDUC 288

SOC 366A. Organizational Ecology. 3 Units.

This seminar examines theoretical and methodological issues in the study of the ecology of organizations. Particular attention is given to the dynamics that characterize the interface between organizational populations and their audiences.

Same as: OB 601

SOC 367. Institutional Analysis of Organizations. 3-5 Units.

Reading and research on the nature, origins, and effects of the modern institutional system. Emphasis is on the effects of institutional systems on organizational structure.

SOC 368W. Workshop: China Social Science. 1 Unit.

For Ph.D. students in the social sciences and history. Research on contemporary society and politics in the People's Republic of China. May be repeated for credit. Prerequisite: consent of instructor.

Same as: POLISCI 448R

SOC 370A. Sociological Theory: Social Structure, Inequality, and Conflict. 5 Units.

Restricted to Sociology doctoral students. The traditions of structural analysis derived from the work of Marx, Weber, and related thinkers. Antecedent ideas in foundational works are traced through contemporary theory and research on political conflict, social stratification, formal organization, and the economy. Priority is given to first year Sociology students.

SOC 370B. Social Interaction and Group Process. 3-5 Units.

Theoretical strategies for the study of interaction, group, and network processes, including rational choice and exchange theory, the theory of action, symbolic interactionism, formal sociology, and social phenomenology. Antecedent ideas in foundational works and contemporary programs of theoretical research.

SOC 372. Theoretical Analysis and Design. 3-5 Units.

Theoretical analysis and the logical elements of design, including the systematic analysis of the logical structure of arguments, the relationship of arguments to more encompassing theoretical or metatheoretical assumptions, the derivation of logical implications from arguments, assessments of theoretically significant problems or gaps in knowledge.

SOC 374. Philanthropy and Civil Society. 1-3 Unit.

Cross-listed with Law (LAW 781), Political Science (POLISCI 334) and Sociology (SOC 374). Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

Same as: EDUC 374, POLISCI 334

SOC 375. Cooperation, Cohesion, and Morality. 3-5 Units.

This class reviews research on mechanisms promoting social cohesion from various social sciences, with a special emphasis on cooperation, morality, and hierarchy. Assignments: Students will complete several short proposed study designs and a final empirical project proposal. Prerequisite: Doctoral student in Sociology, Psychology, or the Graduate School of Business, or consent of instructor.

SOC 376. Perspectives on Organization and Environment: Social Movement Organizations and Environments. 3 Units.

This course examines the interaction between organizations and their environments. It is given every year by a different faculty member. What follows is the description of the course for the academic year 2012-13: This research seminar explores recent theory and research on social movement organizations and their environments. We'll consider the way in which organizational theories help us to explain social movement phenomena, and the way in which social movement theories help us to explain organizational phenomena.

SOC 377. Comparing Institutional Forms: Public, Private, and Nonprofit. 4 Units.

For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials. Same as: EDUC 377, GSBGEN 346, PUBLPOL 317

SOC 378. Seminar on Institutional Theory and World Society. 1-5 Unit.

Sociological analyses of the rise and impact of the expanded modern world order, with its internationalized organizations and globalized discourse. Consequences for national and local society: education, political organization, economic structure, the environment, and science. The centrality of the individual and the rationalized organization as legitimated actors.

SOC 380. Qualitative Methods. 3-5 Units.

Priority to Sociology doctoral students. Emphasis is on observational and interview-based research. Limited enrollment.

SOC 381. Sociological Methodology I: Introduction. 5 Units.

Enrollment limited to first-year Sociology doctoral students. Basic math and statistics. Types of variables, how to recode and transform variables, and how to manage different types of data sets. How to use and think about weights. Introduction to statistical packages and programming. Introduction to multiple regression, and introduction to the interpretation of regression results.

SOC 382. Sociological Methodology II: Principles of Regression Analysis. 4-5 Units.

Preference to Sociology doctoral students. Required for Ph.D. in Sociology. Enrollment limited to first-year Sociology doctoral students. Rigorous treatment of linear regression models, model assumptions, and various remedies for when these assumptions are violated. Introduction to panel data analysis. Enrollment limited to 15. Prerequisites: 381.

SOC 383. Sociological Methodology III: Models for Discrete Outcomes. 5 Units.

Required for Ph.D. in Sociology; enrollment limited to first-year Sociology doctoral students. The rationale for and interpretation of static and dynamic models for the analysis of discrete variables. Prerequisites: 381 and 382, or equivalents.

SOC 384. New Models and Methods in the Social Sciences. 3 Units.

Two-week intensive introduction to new statistical approaches. Emphasis is on applications. Topics may include network models, multilevel models, latent class models, mixed methods, new qualitative methods, growth models, geostatistical tools, survey-based experiments, new methods for estimating causal effects, web-based surveys, advanced discrete choice models, and diffusion models.

SOC 385A. Research Practicum I. 1-2 Unit.

Workshop on research methods for third year Sociology doctoral students. Ongoing student research, methodological problems, and possible solutions. Required for third year paper.

SOC 385B. Research Practicum II. 1 Unit.

Continuation of 385A. Workshop on research methods for second year Sociology doctoral students. Ongoing student research, methodological problems, and possible solutions. Required for second year paper.

SOC 388. Log-Linear Models. 3-5 Units.

Analysis of categorical data with log-linear and negative binomial models. Measures of fit and hypothesis testing.

SOC 389. Mixed Method Research Design and Analysis. 3-5 Units.

Research designs that incorporate qualitative and quantitative analyses in a single project. The tension between thinking case-wise and variable-wise; how the focus on relationships between variables that is the hallmark of the quantitative approach can be brought into qualitative work.

SOC 390. Graduate Individual Study. 1-5 Unit.

May be repeated for credit.

SOC 391. Graduate Directed Research. 1-5 Unit.

May be repeated for credit.

SOC 392. Research Apprenticeship. 1-5 Unit.

May be repeated for credit.

SOC 393. Teaching Apprenticeship. 1-15 Unit.

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SOC 396. Sociology Colloquium. 1 Unit.

The Sociology Colloquium is a semimonthly seminar held throughout the academic year, in which distinguished scholars lecture about their cutting-edge research findings. Sociology Students must enroll or credit and it is required for all first and second year Sociology students.

SOC 635. Social Movements and Organizations. 4 Units.

This research seminar is intended for students seeking to learn more about how collective action underpins institutional change in organizations and industries, and how the success of collective action, in turn, hinges on organizational structures and processes to recruit and mobilize individuals. The purpose of this course is to provide you a roadmap for you to roam the terrain of movements and organizations, and be prepared to generate original research ideas that extend inquiry in your chosen area of research.

SOC 670. Designing Social Research. 4 Units.

This is a course in the design of social research, with a particular emphasis on research field (i.e., non-laboratory) settings. As such, the course is a forum for discussing and developing an understanding of the different strategies social theorists employ to explain social processes, develop theories, and make these theories as believable as possible. In general, these issues will be discussed in the context of sociological research on organizations, but this will not be the exclusive focus of the course. A range of topics will be covered, for example: formulating and motivating research questions; varieties of explanation; experimental and quasi-experimental methods, including natural experiments; counterfactual models; conceptualization and measurement; sampling and case selection; qualitative and quantitative approaches. This course is particularly oriented toward developing an appreciation of the tradeoffs of different approaches. It is well suited to Ph.D. students working on qualifying papers and dissertation proposals.

SOC 802. TGR Dissertation. 0 Units.

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Spanish Language Courses

SPANLANG 1. First-Year Spanish, First Quarter. 5 Units.

Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Influences shaping the production of oral and written texts in the Spanish- and English-speaking world.

SPANLANG 1A. Accelerated First-Year Spanish, Part 1. 5 Units.

Completes first-year sequence in two rather than three quarters. For students with previous knowledge of Spanish, or those with a strong background in another Romance language. SPANLANG 2A fulfills the University Foreign Language Requirement. Prerequisite: Placement Test.

SPANLANG 1G. Accelerated First-Year Business Spanish, Part 1. 4 Units.

For GSB students only. Limited enrollment.

SPANLANG 2. First-Year Spanish, Second Quarter. 5 Units.

Continuation of SPANLANG 1. Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Prerequisite: Placement Test or SPANLANG 1.

SPANLANG 2A. Accelerated First-Year Spanish, Part 2. 5 Units.

Continuation of SPANLANG 1A. Completes first-year sequence in two rather than three quarters. For students with previous knowledge of Spanish, or those with a strong background in another Romance language. Prerequisite: Placement Test or SPANLANG 1A. Fulfills the University language requirement.

SPANLANG 2G. Accelerated First-Year Business Spanish, Part 2. 4 Units.

Continuation of 1G. For GSB students only. Limited enrollment.

SPANLANG 3. First-Year Spanish, Third Quarter. 5 Units.

Continuation of SPANLANG 2. Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Prerequisite: Placement Test or SPANLANG 2. Fulfills the University Foreign Language Requirement.

SPANLANG 3G. Spanish for Business Professionals. 4 Units.

For GSB students only. Limited enrollment.

SPANLANG 5A. Intensive First-Year Spanish, Part A. 5 Units.

Same as SPANLANG 1. Goal is to engage in interactions with Spanish speakers in socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Only Stanford graduate students restricted to 9 units may register for 205A,B,C.

SPANLANG 5B. Intensive First-Year Spanish, Part B. 5 Units.

Same as SPANLANG 2. Continuation of 5A. Goal is to engage in interactions with Spanish speakers in socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

SPANLANG 5C. Intensive First-Year Spanish, Part C. 5 Units.

Same as SPANLANG 3. Continuation of 5B. Continuation of 5A. Goal is to engage in interactions with Spanish speakers in socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 2 or 5B. Fulfills the University Foreign Language Requirement.

SPANLANG 10. Beginning Oral Communication. 2 Units.

Additional pronunciation, vocabulary, and speaking skills. May be repeated once for credit. Prerequisite: one quarter of Spanish, demonstrated oral proficiency above the novice level; may be taken concurrently with SPANLANG 2, SPANLANG 2A 2A, or SPANLANG 3.

SPANLANG 11C. Second-Year Spanish: Cultural Emphasis, First Quarter. 4-5 Units.

Continuation of SPANLANG 3 or SPANLANG 2A. Sequence integrating culture and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic, and professional contexts. `C` content focuses on societal and cultural components of the Spanish-speaking world. Prerequisite: Placement Test, SPANLANG 3 or SPANLANG 2A.

SPANLANG 11R. Second-Year Spanish: Emphasis on International Relations, First Quarter. 4-5 Units.

Continuation of SPANLANG 3 or SPANLANG 2A. Sequence integrating geopolitics and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic, and professional contexts. `R` content focuses on international relations and socioeconomics of the Spanish-speaking world. Prerequisite: Placement Test, SPANLANG 2A or SPANLANG 3.

SPANLANG 12C. Second-Year Spanish: Cultural Emphasis, Second Quarter. 4-5 Units.

Continuation of SPANLANG 11C. Sequence integrating culture and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic, and professional contexts. `C` content focuses on societal and cultural components of the Spanish-speaking world. Prerequisite: Placement Test, SPANLANG 11C or 11R.

SPANLANG 12R. Second-Year Spanish: Emphasis on International Relations, Second Quarter. 4-5 Units.

Continuation of SPANLANG 11R. Sequence integrating geopolitics and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic, and professional contexts. `R` content focuses on international relations and socioeconomics of the Spanish-speaking world. Prerequisite: Placement Test, SPANLANG 11R or 11C.

SPANLANG 13C. Second-Year Spanish: Cultural Emphasis, Third Quarter. 4-5 Units.

Continuation of SPANLANG 12C. Sequence integrating culture and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic, and professional contexts. `C` content focuses on societal and cultural components of the Spanish-speaking world. Prerequisite: Placement Test, SPANLANG 12C or 12R. Fulfills the IR major Language Requirement.

SPANLANG 13R. Second-Year Spanish: Emphasis on International Relations, Third Quarter. 4-5 Units.

Continuation of SPANLANG 12R. Sequence integrating geopolitics and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language, international relations, and socioeconomics of the Spanish-speaking world. Prerequisite: SPANLANG 12R. Fulfills the IR major Language Requirement.

SPANLANG 13SL. Second-Year Spanish: Emphasis on Service Learning, Third Quarter. 4-5 Units.

Continuation of SPANLANG 12. Integration of community engagement and language, with emphasis on developing advanced proficiency in oral and written discourse. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, community and professional contexts. SL content focuses on immersion in civics-based reciprocity and service learning in the Spanish-speaking local community. Service Learning Course (certified by Haas Center). Prerequisite: Placement Test, SPANLANG 12C, 12R, 12M or 12S. Fulfills the IR major Language Requirement. Same as: CHILATST 13SL

SPANLANG 15. Intermediate Oral Communication. 3 Units.

Emphasis is on interaction in Spanish locally and globally. Regional vocabularies and cultures at home and abroad. Interaction with local native Spanish speakers and communities globally via the Internet. May be repeated once for credit. Prerequisite: SPANLANG 2A, SPANLANG 3 and demonstrated oral proficiency above the low intermediate level.

SPANLANG 15S. Intermediate Oral Communication. 3 Units.

Emphasis is on interaction in Spanish locally and globally. Regional vocabularies and cultures at home and abroad. Interaction with local native Spanish speakers and communities globally via the Internet. May be repeated once for credit. Prerequisite: first-year Spanish and demonstrated oral proficiency above the low intermediate level.

SPANLANG 21B. Second-Year Spanish for Heritage Language Students, First Quarter. 3-5 Units.

Emphasis is on ability to communicate orally and in writing. Spelling and the written accent. Goal is to understand, interpret, and analyze texts, movies, radio, and television. Written language skills include rules for editing written language. Third quarter focus is on the development of written and oral styles and registers used in more formal settings. Prerequisite: Placement Test.

SPANLANG 22B. Second-Year Spanish for Heritage Language Students, Second Quarter. 3-5 Units.

Continuation of SPANLANG 21B. Emphasis is on ability to communicate orally and in writing. Spelling and the written accent. Goal is to understand, interpret, and analyze texts, movies, radio, and television. Written language skills include rules for editing written language. Prerequisite: Placement Test, SPANLANG or 21B.

SPANLANG 23B. Second-Year Spanish for Heritage Language Students, Third Quarter. 3-5 Units.

Continuation of SPANLANG 22B. Emphasis is on ability to communicate orally and in writing. Spelling and the written accent. Goal is to understand, interpret, and analyze texts, movies, radio, and television. Written language skills include rules for editing written language. Third quarter Focus is on the development of written and oral styles and registers used in more formal settings. Prerequisite: Placement Test or SPANLANG 22B.

SPANLANG 25A. Intensive Second-Year Spanish, Part A. 4 Units.

Same as SPANLANG 11. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: one year of college Spanish or equivalent.

SPANLANG 25B. Intensive Second-Year Spanish, Part B. 4 Units.

Same as SPANLANG 12. Continuation of 25A. Prerequisite: 25A or equivalent.

SPANLANG 25C. Intensive Second-Year Spanish, Part C. 4 Units.

Same as SPANLANG 13. Continuation of 25B. Prerequisite: 25B or equivalent.

SPANLANG 99. Language Specials. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

SPANLANG 100. Advanced Oral Communication. 3 Units.

For students who have completed second-year Spanish or who have oral skills above the intermediate level. Interactive activities require students to persuade, analyze, support opinions, and gather and interpret others' points of view. Focus is on vocabulary enrichment and idiomatic expressions. Cultural, literary, political, and journalistic readings. May be repeated once for credit. Prerequisite: SPANLANG 13 or equivalent.

SPANLANG 101. The Structure of Spanish. 5 Units.

Criteria and skills to analyze Spanish grammatical structure. Identification of word functions in sentences and texts, types of sentences, and terminology. Structure of nouns, adjectives, and verbs, and their relationship with meaning. The differences between Spanish grammar as a formal system and in everyday life. Prerequisite: SPANLANG 13C, SPANLANG 13R or SPANLANG 23B.

SPANLANG 102. Composition and Writing Workshop. 3-5 Units.

Individual development of the ability to write in Spanish. Emphasis is on style and diction, and on preparing and writing essays on literary topics. Non-Spanish majors or minors may choose topics more closely related to their studies for projects. Prerequisite: two years of college Spanish or equivalent.

SPANLANG 102B. Composition and Writing Workshop for Heritage Language Students. 3-5 Units.

For students with a good understanding of written accents, spelling, and syntax. Focus is on the craft of writing with emphasis on brainstorming, planning, outlining, drafting, revising, style, diction, and editing. Writing essays on literary topics. Non-Spanish majors or minors may choose topics related to their studies. Prerequisite: 23B or equivalent.

SPANLANG 121M. Spanish for Medical Students. 3 Units.

First quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on taking the medical history. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).

Same as: HRP 280

SPANLANG 122M. Spanish for Medical Students. 2 Units.

Second quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on performing a physical examination. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).

Same as: HRP 281

SPANLANG 123M. Spanish for Medical Students. 2-3 Units.

Third quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on different specialties and medical conditions. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).

Same as: HRP 282

SPANLANG 131M. Spanish for Heritage and Foreign Language Pre-Med and Public Health Students. 3-4 Units.

For pre-med or public health students who grew up in homes where Spanish is spoken or for students who possess a considerable command of Spanish. Focus is on developing the ability to provide information on health-related topics to Spanish speakers in the U.S. Students participate in the organization and delivery of information on preventive health care in a workshop setting to a Spanish-speaking community.

SPANLANG 199. Individual Reading. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

SPANLANG 205A. Intensive First-Year Spanish for Stanford Grads, Part A. 3-5 Units.

Equivalent to SPANLANG 1. For Stanford graduate students only. Goal is to engage in interactions with Spanish speakers using socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units.

SPANLANG 205B. Intensive First-Year Spanish for Stanford Grads, Part B. 3-5 Units.

Equivalent to SPANLANG 2. Continuation of 205A. For Stanford graduate students only. Goal is to engage in interactions with Spanish speakers using socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205A or equivalent.

SPANLANG 205C. Intensive First-Year Spanish for Stanford Grads, Part C. 3-5 Units.

Equivalent to SPANLANG 3. Continuation of 205B. For Stanford graduate students only. Goal is to engage in interactions with Spanish speakers using socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205B or equivalent.

SPANLANG 225A. Intensive Second-Year Spanish for Stanford Grads, Part A. 3-4 Units.

Same as SPANLANG 11. For Stanford Graduate students restricted to 9 units. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: one year of college Spanish or equivalent.

SPANLANG 225B. Intensive Second-Year Spanish for Stanford Grads, Part B. 3-4 Units.

Same as SPANLANG 12. Continuation of 225A. For Stanford Graduate students restricted to 9 units. Prerequisite 225A or equivalent.

SPANLANG 225C. Intensive Second-Year Spanish for Stanford Grads, Part C. 3-4 Units.

Same as SPANLANG 13. Continuation of 225B. For Stanford Graduate students restricted to 9 units. Prerequisite 225B or equivalent.

SPANLANG 250. Reading Spanish. 3 Units.

Reading Spanish - For students who have already taken Spanish for at least one year or have superior reading proficiency in another Romance language. Emphasis is on academic texts. Fulfills University reading requirements for advanced degrees if students earn a grade of 'B'.

SPANLANG 394. Graduate Studies in Spanish Conversation. 1-3 Unit.

Prerequisite: consent of instructor.

SPANLANG 395. Graduate Studies in Spanish. 1-5 Unit.

Prerequisite: consent of instructor.

Special Language Program Courses

SPECLANG 75. Greek Culture, Ideals, and Themes. 3 Units.

Introduction to Greek culture and its global influence in a social historical context, through images from its past and institutions in contemporary Greek society. Limited enrollment.

SPECLANG 90A. First - Year Estonian First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through emphasizing all skills, speaking, reading, writing, and listening. Estonian culture.

SPECLANG 90B. First- Year Estonian- Second quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through emphasizing all skills, speaking, reading, writing, and listening. Estonian culture.

SPECLANG 90C. First Year Estonian- Third Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through emphasizing all skills, speaking, reading, writing, and listening. Estonian culture.

SPECLANG 99. Language Specials. 2-5 Units.

Prerequisite: Consent of instructor.

SPECLANG 106A. Third-Year Albanian, First Quarter. 3 Units.

Continuation of SPECLANG 105C. Prerequisite: SPECLANG 105C.

SPECLANG 106B. Third-Year Albanian, Second Quarter. 4 Units.

Continuation of SPECLANG 106A. Prerequisite: SPECLANG 106A.

SPECLANG 107. Reading Sanskrit. 2-4 Units.

Focus is on readings of Sanskrit passages and Sanskrit epics Ramayana or Mahabharata. Discussions will include English translations of Sanskrit poems. Knowledge of Sanskrit grammar require. May be repeat for credit.

SPECLANG 109A. First-Year Bengali- First Quarter. 5 Units.

Grammatical structures, vocabulary and sentence patterns through speaking, reading, writing and listening. Bengali Culture.

SPECLANG 109B. First-Year Bengali-2nd qtr. 5 Units.

Grammatical structures, vocabulary and sentence patterns through speaking, reading, writing and listening. Bengali Culture- Prerequisite- 109A.

SPECLANG 109C. First-Year Bengali - Third Quarter. 5 Units.

Grammatical structures, vocabulary and sentence patterns through speaking, reading, writing and listening. Bengali Culture -Prerequisite 109B.

SPECLANG 110A. Second-Year Bengali. 4 Units.

Second Year Bengali is the first course in a three-quarter sequence. The course focuses on developing all four skills as students gain practice in the use of the language in a range of situations, including conversations discussions and presentations. The course is organized thematically, with each lesson integrating elements of Bengali culture, review of relevant grammar concepts, and opportunities to use the language in real-world communication contexts. We use Bengali texts, multimedia products and other materials designed to suit the students' interest; interests and proficiency.

SPECLANG 110B. Second-Year Bengali - Second Quarter. 4 Units.**SPECLANG 110C. Second-Year Bengali - Third Quarter. 4 Units.**

Second Year Bengali is the third course in a three-quarter sequence. The course focuses on developing all four skills as students gain practice in the use of the language in a range of situations, including conversations discussions and presentations. The course is organized thematically, with each lesson integrating elements of Bengali culture, review of relevant grammar concepts, and opportunities to use the language in real-world communication contexts. We use Bengali texts, multimedia products and other materials designed to suit the students' interest; interests and proficiency.

SPECLANG 129A. First-Year Ukrainian, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Ukrainian culture.

SPECLANG 129B. First-Year Ukrainian, Second Quarter. 4 Units.

Continuation of SPECLANG 129A. Prerequisite: SPECLANG 129A.

SPECLANG 129C. First-Year Ukrainian, Third Quarter. 4 Units.

Continuation of SPECLANG 129B. Prerequisite: SPECLANG 129B.

SPECLANG 130A. Second-Year Ukrainian, First Quarter. 4 Units.

Continuation of SPECLANG 129C. Prerequisite: SPECLANG 129C. Fulfills the University Foreign Language Requirement.

SPECLANG 130B. Second-Year Intermediate Ukrainian, Second Quarter. 4 Units.

Continuation of SPECLANG 130A. Prerequisite: SPECLANG 130A.

SPECLANG 131A. Third-Year Ukrainian, First Quarter. 4 Units.

Continuation of SPECLANG 130C. Prerequisite: SPECLANG 130C.

SPECLANG 138A. First-Year Navajo, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Navajo culture.

SPECLANG 138B. First-Year Navajo, Second Quarter. 4 Units.

Continuation of SPECLANG 138A. Prerequisite: SPECLANG 138A.

SPECLANG 138C. First-Year Navajo, Third Quarter. 4 Units.

Continuation of SPECLANG 138B. Prerequisite: SPECLANG 138B. Fulfills the University Foreign Language Requirement.

SPECLANG 144A. First-Year Tagalog, First Quarter. 5 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Tagalog culture.

SPECLANG 144B. First-Year Tagalog, Second Quarter. 5 Units.

Continuation of SPECLANG 144A. Prerequisite: SPECLANG 144A.

SPECLANG 144C. First-Year Tagalog, Third Quarter. 5 Units.

Continuation of SPECLANG 144B. Prerequisite: SPECLANG 144B. Fulfills the University Foreign Language Requirement.

SPECLANG 145A. Second-Year Tagalog, First Quarter. 4 Units.

Continuation of SPECLANG 144C. Prerequisite: SPECLANG 144C.

SPECLANG 145B. Second-Year Tagalog, Second Quarter. 4 Units.

Continuation of SPECLANG 145A. Prerequisite: SPECLANG 145A.

SPECLANG 145C. Second-Year Tagalog, Third Quarter. 4 Units.

Continuation of SPECLANG 145B. Prerequisite: SPECLANG 145B.

SPECLANG 146A. Third-Year Tagalog, First Quarter. 4 Units.

Continuation of SPECLANG 145C. Prerequisite: SPECLANG 145C or consent of instructor.

SPECLANG 146B. Third-Year Tagalog, Second Quarter. 4 Units.

Continuation of SPECLANG 146A. Prerequisite: SPECLANG 146A.

SPECLANG 146C. Third-Year Tagalog, Third Quarter. 4 Units.

Continuation of SPECLANG 146B. Prerequisite: SPECLANG 146B.

SPECLANG 150A. First-Year Vietnamese, First Quarter. 5 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Vietnamese culture.

SPECLANG 150B. First-Year Vietnamese, Second Quarter. 5 Units.

Continuation of SPECLANG 150A. Prerequisite: SPECLANG 150A.

SPECLANG 150C. First-Year Vietnamese, Third Quarter. 5 Units.

Continuation of SPECLANG 150B. Prerequisite: SPECLANG 150B. Fulfills the University Foreign Language Requirement.

SPECLANG 151A. Second-Year Vietnamese, First Quarter. 4 Units.

Continuation of SPECLANG 150C. Prerequisite: SPECLANG 150C.

SPECLANG 151B. Second-Year Vietnamese, Second Quarter. 4 Units.

Continuation of SPECLANG 151A. Prerequisite: SPECLANG 151A.

SPECLANG 151C. Second-Year Vietnamese, Third Quarter. 4 Units.

Continuation of SPECLANG 151B. Prerequisite: SPECLANG 151B.

SPECLANG 152A. First-Year Hindi, First Quarter. 5 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Hindi culture.

SPECLANG 152B. First-Year Hindi, Second Quarter. 5 Units.

Continuation of SPECLANG 152A. Prerequisite: SPECLANG 152A.

SPECLANG 152C. First-Year Hindi, Third Quarter. 5 Units.

Continuation of SPECLANG 152B. Prerequisite: SPECLANG 152B. Fulfills the University language requirement.

SPECLANG 153A. Second-Year Hindi, First Quarter. 4 Units.

Continuation of SPECLANG 152C. Second year sequence requires completion of first year or consent of the instructor. Focus on expanding all language skills, mastering grammar patterns and new vocabulary through authentic readings, writing essays, oral presentations and the use of multimedia-based materials. Focus on cultural proficiency. Prerequisite: SPECLANG 152C.

SPECLANG 153B. Second-Year Hindi, Second Quarter. 4 Units.

Continuation of SPECLANG 153A. Prerequisite: SPECLANG 153A.

SPECLANG 153C. Second-Year Hindi, Third Quarter. 4 Units.

Continuation of SPECLANG 153B. Prerequisite: SPECLANG 153B.

SPECLANG 154A. Third-Year Hindi, First Quarter. 4 Units.

Continuation of SPECLANG 153C. Prerequisite: SPECLANG 153C.

SPECLANG 154B. Third-Year Hindi, Second Quarter. 4 Units.

Continuation of SPECLANG 154A. Prerequisite: SPECLANG 154A.

SPECLANG 154C. Third-Year Hindi, Third Quarter. 4 Units.

Continuation of SPECLANG 154B. Prerequisite: SPECLANG 154B.

SPECLANG 156A. First-Year Indonesian, First Quarter. 5 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Indonesian culture.

SPECLANG 156B. First-Year Indonesian, Second Quarter. 5 Units.

Continuation of SPECLANG 156A. Prerequisite: SPECLANG 156A.

SPECLANG 156C. First-Year Indonesian, Third Quarter. 5 Units.

Continuation of SPECLANG 156B. Prerequisite: SPECLANG 156B.

SPECLANG 157A. Second-Year Indonesian, First Quarter. 4 Units.

Continuation of SPECLANG 156C. Prerequisite: SPECLANG 156C. Fulfills the University language requirement.

SPECLANG 157B. Second-Year Indonesian, Second Quarter. 4 Units.

Continuation of SPECLANG 157A. Prerequisite: SPECLANG 157A.

SPECLANG 157C. Second-Year Indonesian, Third Quarter. 4 Units.

Continuation of SPECLANG 157B. Prerequisite: SPECLANG 157B.

SPECLANG 158A. Third-Year Indonesian, First Quarter. 4 Units.

Continuation of SPECLANG 157C. Prerequisite: SPECLANG 157C.

SPECLANG 162A. Beginning Tamil, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Tamil culture.

SPECLANG 162B. Beginning Tamil, Second Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Tamil culture.

SPECLANG 162C. Beginning Tamil, Third Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Tamil culture.

SPECLANG 164A. First-Year Czech, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Czech culture.

SPECLANG 164B. First-Year Czech, Second Quarter. 4 Units.

Continuation of SPECLANG 164A. Prerequisite: SPECLANG 164A.

SPECLANG 164C. First-Year Czech, Third Quarter. 4 Units.

Continuation of SPECLANG 164B. Prerequisite: SPECLANG 164B.

SPECLANG 165A. Second-Year Czech, First Quarter. 3 Units.

Continuation of SPECLANG 164C. Prerequisite: SPECLANG 164C. Fulfills the University language requirement.

SPECLANG 165C. Second-Year Czech, Third Quarter. 3 Units.

Continuation of SPECLANG 165B. Prerequisite: SPECLANG 165B.

SPECLANG 167A. First-Year Polish, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Polish culture.

SPECLANG 167B. First-Year Polish, Second Quarter. 4 Units.

Continuation of SPECLANG 167A. Prerequisite: SPECLANG 167A.

SPECLANG 167C. First-Year Polish, Third Quarter. 4 Units.

Continuation of SPECLANG 167B. Prerequisite: SPECLANG 167B.

SPECLANG 168A. Second-Year Polish, First Quarter. 3 Units.

Continuation of SPECLANG 167C. Prerequisite: SPECLANG 167C. Fulfills the University language requirement.

SPECLANG 168B. Second-Year Polish, Second Quarter. 3 Units.
Continuation of SPECLANG 168A. Prerequisite: SPECLANG 168A.

SPECLANG 168C. Second-Year Polish, Third Quarter. 3 Units.
Continuation of SPECLANG 168B. Prerequisite: SPECLANG 168B.

SPECLANG 169A. Third-Year Polish, First Quarter. 4 Units.
Continuation of SPECLANG 168C. Prerequisite: SPECLANG 168C.

SPECLANG 169B. Third-Year Polish, Second Quarter. 4 Units.
Continuation of SPECLANG 169A. Prerequisite: SPECLANG 169A.

SPECLANG 170A. First-Year Modern Greek, First Quarter. 5 Units.
Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Greek culture.

SPECLANG 170B. First-Year Modern Greek, Second Quarter. 5 Units.
Continuation of SPECLANG 170A. Prerequisite: SPECLANG 170A.

SPECLANG 170C. First-Year Modern Greek, Third Quarter. 5 Units.
Continuation of SPECLANG 170B. Emphasis on speaking, reading, writing and listening. Student-centered, interactive approach focuses on mastering the basic grammar structures and basic vocabulary through a multimodal approach. Introduction to the Greek culture. Prerequisite: SPECLANG 170B. Fulfills the University language requirement.

SPECLANG 171A. Second-Year Modern Greek, First Quarter. 4 Units.
Continuation of SPECLANG 170C. Grammar structures and vocabulary through authentic materials. Cultural proficiency. Prerequisite: SPECLANG 170C.

SPECLANG 171B. Second-Year Modern Greek, Second Quarter. 4 Units.
Continuation of SPECLANG 171A. Prerequisite: SPECLANG 171A.

SPECLANG 171C. Second-Year Modern Greek, Third Quarter. 4 Units.
Continuation of SPECLANG 171B. Prerequisite: SPECLANG 171B.

SPECLANG 172A. Modern Greek Language and Culture through Literature and Film, First Quarter. 4 Units.
Accelerated. Vocabulary enrichment through multimedia, online materials.

SPECLANG 172B. Modern Greek Language and Culture through Literature and Film, Second Quarter. 4 Units.
Continuation of 172A.

SPECLANG 172C. Modern Greek Language and Culture through Literature and Film, Third Quarter. 4 Units.
Accelerated. Vocabulary enrichment through multimedia, online materials.

SPECLANG 173A. First-Year Hungarian, First Quarter. 4 Units.
Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Hungarian culture.

SPECLANG 173B. First-Year Hungarian, Second Quarter. 4 Units.
Continuation of SPECLANG 173A. Prerequisite: SPECLANG 173A.

SPECLANG 173C. First-Year Hungarian, Third Quarter. 4 Units.
Continuation of SPECLANG 173B. Prerequisite: SPECLANG 173B.

SPECLANG 174A. First-Year Quechua, First Quarter. 4 Units.
Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Quechua culture.

SPECLANG 174B. First-Year Quechua, Second Quarter. 4 Units.
Continuation of SPECLANG 174A. Prerequisite: SPECLANG 174A.

SPECLANG 174C. First-Year Quechua, Third Quarter. 4 Units.
Continuation of SPECLANG 174B. Prerequisite: SPECLANG 174B.

SPECLANG 175A. Second-Year Quechua, First Quarter. 3 Units.
Continuation of SPECLANG 174C. Prerequisite: SPECLANG 174C. Fulfills the University Foreign Language Requirement.

SPECLANG 175B. Second-Year Quechua, Second Quarter. 4 Units.
Continuation of SPECLANG 175A. Prerequisite: SPECLANG 175A.

SPECLANG 175C. Second-Year Quechua, Third Quarter. 4 Units.
Continuation of SPECLANG 175B. Prerequisite: SPECLANG 175B.

SPECLANG 176A. First-Year Thai, First Quarter. 4 Units.
Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Thai culture.

SPECLANG 176B. First-Year Thai, Second Quarter. 4 Units.
Continuation of SPECLANG 176A. Prerequisite: SPECLANG 176A.

SPECLANG 176C. First-Year Thai, Third Quarter. 4 Units.
Continuation of SPECLANG 176B. Prerequisite: SPECLANG 176B.

SPECLANG 177A. Second-Year Thai, First Quarter. 3 Units.
Continuation of SPECLANG 176C. Prerequisite: SPECLANG 176 C. Fulfills the University Foreign Language Requirement.

SPECLANG 177B. Second-Year Thai, Second Quarter. 4 Units.
Continuation of SPECLANG 177A. Prerequisite: SPECLANG 177A.

SPECLANG 177C. Second-Year Thai, Third Quarter. 4 Units.
Continuation of SPECLANG 177B. Prerequisite: SPECLANG 177B.

SPECLANG 178A. First-Year Sign Language, First Quarter. 4 Units.
Comprehension and production skills; cultural awareness necessary for communication. Limited enrollment.

SPECLANG 178B. First-Year Sign Language, Second Quarter. 4 Units.
Continuation of SPECLANG 178A. Prerequisite: SPECLANG 178A.

SPECLANG 178C. First-Year Sign Language, Third Quarter. 4 Units.
Continuation of SPECLANG 178B. Prerequisite: SPECLANG 178B. Fulfills the University language requirement.

SPECLANG 179A. Second-Year Sign Language, First Quarter. 4 Units.
Continuation of SPECLANG 178C. Additional functional structures, lexical items, and history. Prerequisite: SPECLANG 178B. Limited enrollment.

SPECLANG 179B. Second-Year Sign Language, Second Quarter. 4 Units.
Continuation of SPECLANG 179A. Prerequisite: SPECLANG 179A. Limited enrollment.

SPECLANG 179C. Second-Year Sign Language, Third Quarter. 4 Units.
Continuation of SPECLANG 179B. Prerequisite: SPECLANG 179B. Limited enrollment.

SPECLANG 182A. Second-Year Hungarian, First Quarter. 3 Units.
Continuation of SPECLANG 173C. Prerequisite: SPECLANG 173C. Fulfills the University Foreign Language Requirement.

SPECLANG 182B. Second-Year Hungarian, Second Quarter. 3 Units.
Continuation of SPECLANG 182A. Prerequisite: SPECLANG 182A.

SPECLANG 182C. Second-Year Hungarian, Third Quarter. 3 Units.
Continuation of SPECLANG 182B. Prerequisite: SPECLANG 182B.

SPECLANG 183A. First-Year Sanskrit, First Quarter. 4 Units.
Full class in the script, grammar, and vocabulary of the Sanskrit language of ancient India. Also included will be some readings from the Bhagavad Gita. No previous knowledge of Sanskrit required.

SPECLANG 183B. First-Year Sanskrit, Second Quarter. 4 Units.
Continuation of SPECLANG 183A. Prerequisite: SPECLANG 183A.

SPECLANG 184A. Second-Year Sanskrit, First Quarter. 4 Units.
Continuation of SPECLANG 183C. Readings from the Sanskrit epics Ramayana or Mahabharata. Knowledge of Sanskrit grammar required. Prerequisite: SPECLANG 183C.

SPECLANG 184B. Second-Year Sanskrit, Second Quarter. 4 Units.
Continuation of SPECLANG 184A. Prerequisite: SPECLANG 184A.

SPECLANG 184C. Second-Year Sanskrit, Third Quarter. 4 Units.
Continuation of SPECLANG 184B. Prerequisite: SPECLANG 184B.

SPECLANG 186. Introduction to Serbo-Croatian. 1-2 Unit.

Description: This introductory course focuses on the acquisition of fundamental communication skills. Students learn to understand and carry on simple conversations on daily life topics such as work, personal interests, family, and friends, and also to conduct simple transactions related to traveling, studying or working in the region.

SPECLANG 186A. First-Year Serbo-Croatian, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Serb and Croat culture.

SPECLANG 186B. First-Year Serbo-Croatian, Second Quarter. 4 Units.

Continuation of SPECLANG 186A. Prerequisite: SPECLANG 186A.

SPECLANG 189A. First-Year Hawaiian, First Quarter. 4 Units.**SPECLANG 189B. First-Year Beginning Hawaiian, Second Quarter. 4 Units.**

Continuation of SPECLANG 189A. Prerequisite: SPAECLANG 189A.

SPECLANG 189C. First-Year Hawaiian, Third Quarter. 4 Units.

Continuation of SPECLANG 189B. Prerequisite: SPECLANG 189B. Fulfills the University Foreign Language Requirement.

SPECLANG 192A. First-Year Kazakh, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Kazakh culture.

SPECLANG 192B. First-Year Kazakh, Second Quarter. 4 Units.

Continuation of SPECLANG 192A. Prerequisite: SPECLANG 192A.

SPECLANG 192C. First-Year Kazakh, Third Quarter. 4 Units.

Continuation of SPECLANG 192B. Prerequisite: SPECLANG 192B.

SPECLANG 193A. Second-Year Kazakh, First Quarter. 3 Units.

Continuation of SPECLANG 192C. Prerequisite: SPECLANG 192C. Fulfills the University language requirement.

SPECLANG 193B. Second-Year Kazakh, Second Quarter. 3 Units.

Continuation of SPECLANG 193A. Prerequisite: SPECLANG 193A.

SPECLANG 193C. Second-Year Kazakh, Third Quarter. 3 Units.

Continuation of SPECLANG 193B. Prerequisite: SPECLANG 193B.

SPECLANG 198Q. Modern Greece in Film and Literature. 3-5 Units.

Preference to sophomores. Cultural and literary highlights. Filmmakers include Kakoyannis, Dassen, Boulmetis, Angelopoulos, and Scorsese; readings from Eugenides, Gage, Kavafis, Kazantzakis, Samarakis, Seferis, and Elytis.

SPECLANG 202. Introduction to Gandhari. 1-3 Unit.

Grammar and readings of Gandhari, a middle-Indic language from Afghanistan. Mostly we will read these newly published early Buddhist texts in Roman script, but will also read from photographs of the original birch-bark fragments in their Kharosthi script. Knowledge of Sanskrit and Pali expected, but not required.

SPECLANG 215A. Modern Greek for Heritage Language Learners, First Quarter. 2-4 Units.

For students of Greek background. Sources include authentic texts, multimedia materials, and Greek media.

SPECLANG 215B. Modern Greek for Heritage Language Learners, Second Quarter. 2-4 Units.

Continuation of SPECLANG 215A. Prerequisite: SPECLANG 215A.

SPECLANG 215C. Modern Greek for Heritage Language Learners, Third Quarter. 2-4 Units.

Continuation of SPECLANG 215B. Prerequisite: SPECLANG 215A.

SPECLANG 218A. Beginning Urdu, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Urdu culture.

SPECLANG 218B. Beginning Urdu, Second Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Urdu culture.

SPECLANG 219A. Intermediate Urdu, First Quarter. 4 Units.**SPECLANG 219B. Intermediate Urdu, Second Quarter. 4 Units.**

(Staff).

SPECLANG 224A. Third-Year Vietnamese, First Quarter. 4 Units.

Continuation of SPECLANG 151C. Grammar structures and vocabulary through authentic materials. Cultural proficiency. Prerequisite: SPECLANG 151C or consent of instructor.

SPECLANG 224B. Third-Year Vietnamese, Second Quarter. 4 Units.

Continuation of SPECLANG 224A. Prerequisite: SPECLANG 224A or consent of instructor.

SPECLANG 224C. Third-Year Vietnamese, Third Quarter. 4 Units.

Continuation of SPECLANG 224B. Prerequisite: SPECLANG 224B or consent of instructor.

SPECLANG 229A. Beginning Pashto, First Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Pashto culture.

SPECLANG 229B. Beginning Pashto, Second Quarter. 4 Units.

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Pashto culture.

SPECLANG 239A. Second-Year Uzbek, First Quarter. 3 Units.

Continuation of SPECLANG 238C. Prerequisite: SPECLANG 228C or consent of instructor. Fulfills the University Foreign Language Requirement.

SPECLANG 239B. Second-Year Uzbek, Second Quarter. 3 Units.

Continuation of SPECLANG 239A. Prerequisite: SPECLANG 239A or consent of instructor.

SPECLANG 239C. Second-Year Uzbek, Third Quarter. 3 Units.

Continuation of SPECLANG 239B. Prerequisite: SPECLANG 239B or consent of instructor.

SPECLANG 240A. Third-Year Uzbek, First quarter. 3 Units.

Continuation of SPECLANG 239C. Prerequisite: SPECLANG 239C or consent of instructor.

SPECLANG 247A. First-Year Lakota, First Quarter. 4 Units.**SPECLANG 247B. First-Year Lakota, Second Quarter. 4 Units.**

Continuation of SPECLANG 247A. Prerequisite: SPECLANG 247A or consent of instructor.

SPECLANG 247C. First-Year Lakota, Third Quarter. 4 Units.

Continuation of SPECLANG 247B. Prerequisite: SPECLANG 247B or consent of instructor. Fulfills the University Foreign Language Requirement.

SPECLANG 248. Introduction to Siouan Language & Culture II. 5 Units.

Continuation of the Introduction to Siouan Language & Culture I. This course will take a more focused approach on one cultural aspect of Dakota/Nakota/Lakota culture through the analysis of Dakota/Nakota/Lakota words in the lyrics of songs sung in the Sundance as a focus of study in the continuing use of language in the Dakota/Nakota/Lakota culture."

SPECLANG 248A. Second-Year Lakota, First Quarter. 4 Units.**SPECLANG 248B. Second-Year Lakota. 4 Units.**

prerequisite- speclang 248A.

SPECLANG 248C. Second-Year Lakota, third Quarter. 4 Units.

Prerequisite- must have completed 248B.

SPECLANG 250A. First-Year Romanian, First Quarter. 4 Units.

SPECLANG 250B. First-Year Romanian, Second Quarter. 4 Units.
Continuation of SPECLANG 250A. Prerequisite: SPECLANG 250A or consent of instructor.

SPECLANG 250C. First-Year Romanian, Third Quarter. 4 Units.
Continuation of SPECLANG 250B. Prerequisite: SPECLANG 250B or consent of instructor.

SPECLANG 251A. Second-Year Romanian, First Quarter. 3 Units.
Continuation of SPECLANG 250C. Prerequisite: SPECLANG 250C or consent of instructor. Fulfills the University Foreign Language Requirement.

SPECLANG 251B. Second-Year Romanian, Second Quarter. 3 Units.
Continuation of SPECLANG 251A. Prerequisite: SPECLANG 251A or consent of instructor.

SPECLANG 251C. Second-Year Romanian, Third Quarter. 3 Units.
Continuation of SPECLANG 251B. Prerequisite: SPECLANG 251B or consent of instructor.

SPECLANG 254C. Third-Year Hungarian, Third Quarter. 3 Units.
Continuation of SPECLANG 254B. Prerequisite: SPECLANG 254B or consent of instructor.

SPECLANG 255A. Fourth-Year Albanian, 1st quarter. 4 Units.
Continuation of SPECLANG 106C.

SPECLANG 255B. Fourth-Year Albanian, 2nd quarter. 4 Units.
Continuation of SPECLANG 255A.

SPECLANG 255C. Fourth-Year Albanian, 3rd Quarter. 4 Units.
Continuation of 255B.

SPECLANG 260A. Third-Year Modern Greek, First Quarter. 4 Units.
Continuation of SPECLANG 171C. Prerequisite: SPECLANG 171C or consent of instructor.

SPECLANG 260B. Third-Year Modern Greek, Second Quarter. 4 Units.
Continuation of SPECLANG 260A. Prerequisite: SPECLANG 260A or consent of instructor.

SPECLANG 260C. Third-Year Modern Greek, Third Quarter. 4 Units.
Continuation of SPECLANG 260B. Prerequisite: SPECLANG 260B or consent of instructor.

SPECLANG 264A. Advanced Czech Conversation, First Quarter. 1-4 Unit.
Repeatable once for credit.

SPECLANG 265A. Third-Year Hungarian, First Quarter. 3 Units.
Continuation of SPECLANG 182C. Prerequisite completion of SPECLANG 182C or consent of instructor.

SPECLANG 265B. Third-Year Hungarian, Second Quarter. 3 Units.
Continuation of SPECLANG 265A. Prerequisite completion of SPECLANG 265A or consent of instructor.

SPECLANG 265C. Third-Year Hungarian, Third Quarter. 3 Units.
Continuation of SPECLANG 265B. Prerequisite completion of SPECLANG 265B or consent of instructor.

SPECLANG 297. Directed Reading. 1-5 Unit.
Prerequisite: consent of instructor.- For Grad students only.

SPECLANG 395. Graduate Studies in Special Language. 1-5 Unit.
Prerequisite: consent of instructor.

Stanford Global Studies Courses

GLOBAL 220. American Foreign Policy: Interests, Values, and Process. 5 Units.

This seminar will examine the tension in American foreign policy between pursuing U.S. security and economic interests and promoting American values abroad. The course will retrace the theoretical and ideological debates about values versus interests, with a particular focus on realism versus liberalism. The course will examine the evolution of these debates over time, starting with the French revolution, but with special attention given to the Cold War, American foreign policy after September 11th, and the Obama administration. The course also will examine how these contending theories and ideologies are mediated through the U.S. bureaucracy that shapes the making of foreign policy. ** NOTE: Initial registration for this course does not guarantee enrollment. All interested students should attend the first class. Final enrollment criteria will be detailed on the first day of class. There will be 10 seats for graduate students and 10 seats for undergraduate students.

Same as: IPS 242, POLISCI 217A

GLOBAL 249A. The Iranian Cinema: Image and Meaning. 1-3 Unit.

This course will focus on the analysis of ten Iranian films with the view of conducting a discourse on the semiotics of Iranian art and culture. Each session will be designated to the viewing of a film by a prominent Iranian film-maker. Students are expected to prepare for class by having previously examined other available films by the film-maker under consideration.

Same as: COMPLIT 249A

GLOBAL 249B. Iranian Cinema in Diaspora. 1-3 Unit.

Despite enormous obstacles, immigrant Iranian Filmmakers, within a few decades (after the Iranian revolution), have created a slow but steady stream of films outside Iran. They were originally started by individual spontaneous attempts from different corners of the world and by now we can identify common lines of interest amongst them. There are also major differences between them. These films have never been allowed to be screened inside Iran, and without any support from the global system of production and distribution, as independent and individual attempts, they have enjoyed little attention. Despite all this, Iranian cinema in exile is in no sense any less important than Iranian cinema inside Iran. In this course we will view one such film, made outside Iran, in each class meeting and expect to reach a common consensus in identifying the general patterns within these works and this movement. Questions such as the ones listed below will be addressed in our meetings each week: What changes in aesthetics and point of view of the filmmaker are caused by the change in his or her work environment? Though unwantedly these films are made outside Iran, how related are they to the known (recognized) cinema within Iran? And in fact, to what extent do these films express things that are left unsaid by the cinema within Iran?.

Same as: COMPLIT 249B

GLOBAL 249C. Contemporary Iranian Theater. 1-3 Unit.

Today Iranian plays - both in traditional and contemporary styles - are staged in theater festivals throughout the world play their role in forming a universal language of theater which combine the heritages from countries in all five continents. Despite many obstacles, some Iranian plays have been translated into English and some prominent Iranian figures are successful stage directors outside Iran. Forty-six years ago when "Theater in Iran" (a monograph on the history of Iranian plays) by Bahram Beyzaie was first published, it put the then contemporary Iranian theater movement--which was altogether westernizing itself blindly - face to face with a new kind of self-awareness. Hence in today's generation of playwrights and stage directors in Iran, all know something of their theatrical heritage. In this course we will spend some class sessions on the history of theater in Iran and some class meetings will be concentrating on contemporary movements and present day playwrights. Given the dearth of visual documents, an attempt will be made to present a picture of Iranian theater to the student. Students are expected to read the recommended available translated plays of the contemporary Iranian playwrights and participate in classroom discussions.

Same as: COMPLIT 249C

GLOBAL 250. Bollywood and Beyond: An Introduction to Indian Film. 3-4 Units.

A broad engagement with Indian cinema: its relationship with Indian politics, history, and economics; its key thematic concerns and forms; and its adaptation of and response to global cinematic themes, genres, and audiences. Locating the films within key critical and theoretical debates and scholarship on Indian and world cinemas. Goal is to open up what is often seen as a dauntingly complex region, especially for those who are interested in but unfamiliar with its histories and cultural forms.

Same as: COMPLIT 247, FILMSTUD 250B

Stanford in Washington Courses

SIW 103. Economic Growth and Development Patterns, Policies, and Prospects. 5 Units.

SIW 104. Congressional Oversight and the Press. 5 Units.

SIW 105. Education Policy. 5 Units.

SIW 106. Criminal Justice Policy. 5 Units.

SIW 107. Civil Rights Law. 5 Units.

SIW 108. Urban Policy. 5 Units.

SIW 109. Trans-Atlantic Relations. 5 Units.

SIW 110. U.S. Foreign Policy. 3 Units.

SIW 111. Composing a Life in Public Service. 3 Units.

SIW 112. Health Policy Making in the US. 5 Units.

SIW 113. Critical Health Issues in the U.S. and Abroad. 5 Units.

SIW 115. Health and Environmental Regulatory Policy. 5 Units.
(Staff).

SIW 116. International Environmental Policy. 5 Units.

SIW 118. Topics in American Politics and Public Policy. 3 Units.

SIW 119. U. S. and Europe: Cooperation or Competition?. 5 Units.

SIW 120. Law and Public Policy in the Federal Government. 5 Units.

SIW 121. Economic Analysis of Federal Environmental and Health Regulations. 5 Units.

SIW 122. Energy, Environment and Security in South Asia. 5 Units.

SIW 124. The American Presidency: From TR to Nixon. 5 Units.

SIW 128. Transitions in Energy Policy Speakers Series. 2 Units.

SIW 129. Women's, Maternal, and Children's Health. 5 Units.

SIW 130. Security through Partnerships, Partnerships through Security. 5 Units.

SIW 131. United States and Europe in Comparative Perspective. 5 Units.

SIW 132. Bridging the gap between environmental science and policy. 5 Units.

SIW 135. Federal Education Policy. 5 Units.

SIW 137. Energy and Environment: Technology, Economics and Policy. 5 Units.

SIW 138. Game Theory and Mathematical Models of Politics. 5 Units.

SIW 140. Health and Environmental Policy Speaker Series. 2 Units.

SIW 142. Images of National Politics from Classics in Political Science. 5 Units.

SIW 144. Energy, Environment, Climate and Conservation Policy: A Washington, D.C. Perspective. 5 Units.

SIW 146. Diplomacy in Practice: Security Issues in the South Caucasus. 5 Units.

SIW 148. Art and the First Amendment: Testing the Limits of Expression. 5 Units.

This course will take place in Washington D.C.

Same as: ARTHIST 148

SIW 151. Banking Regulation 5 Years After the Crisis. 5 Units.

SIW 153. Energy and Climate Cooperation in the Western Hemisphere. 5 Units.

SIW 155. Images of National Politics from Classics in Political Science. 5 Units.

SIW 156. Lobbying and the Art of Public Policy Advocacy. 5 Units.

SIW 182. Arguing about the Constitution. 5 Units.

SIW 183. U.S. Immigration Politics and Policy. 5 Units.

SIW 184. Whose History? A Smithsonian Overview. 5 Units.

SIW 198Y. Health Policy. 5 Units.

SIW 198Z. International Economic Policy. 5 Units.

SIW 201A. CSRE Public Policy Seminar. 3-5 Units.

SIW 201B. CSRE Public Policy Seminar. 3-5 Units.

SIW 214. From the Pantheon to the Capitol: Architecture, Cosmology, Mathematics and Illusion. 5 Units.

This course traces the history of the dome over two millennia, from temples to the gods to Temples of the State, and from cosmic archetype to architectural fetish. The narrative interweaves the themes of the dome as image of the Cosmos, religious icon, national landmark, and political monument. It examines the dome not only as a venue for structural innovation, but also metaphysical geometry and transcendent illusionism. Individual case studies will familiarise you with major architects from Hadrian to Richard Rogers and historical milestones from the Dome of the Rock to the Capitol in Washington DC. Same as: ARTHIST 214

Statistics Courses

STATS 42Q. Undergraduate Admissions to Selective Universities - a Statistical Perspective. 2 Units.

The goal is the building of a statistical model, based on applicant data, for predicting admission to selective universities. The model will consider factors such as gender, ethnicity, legacy status, public-private schooling, test scores, effects of early action, and athletics. Common misconceptions and statistical pitfalls are investigated. The applicant data are not those associated with any specific university.

STATS 48N. Riding the Data Wave. 3 Units.

Imagine collecting a bit of your saliva and sending it in to one of the personalized genomics company: for very little money you will get back information about hundreds of thousands of variable sites in your genome. Records of exposure to a variety of chemicals in the areas you have lived are only a few clicks away on the web; as are thousands of studies and informal reports on the effects of different diets, to which you can compare your own. What does this all mean for you? Never before in history humans have recorded so much information about themselves and the world that surrounds them. Nor has this data been so readily available to the lay person. Expression as "data deluge" are used to describe such wealth as well as the loss of proper bearings that it often generates. How to summarize all this information in a useful way? How to boil down millions of numbers to just a meaningful few? How to convey the gist of the story in a picture without misleading oversimplifications? To answer these questions we need to consider the use of the data, appreciate the diversity that they represent, and understand how people instinctively interpret numbers and pictures. During each week, we will consider a different data set to be summarized with a different goal. We will review analysis of similar problems carried out in the past and explore if and how the same tools can be useful today. We will pay attention to contemporary media (newspapers, blogs, etc.) to identify settings similar to the ones we are examining and critique the displays and summaries there documented. Taking an experimental approach, we will evaluate the effectiveness of different data summaries in conveying the desired information by testing them on subsets of the enrolled students.

STATS 50. Mathematics of Sports. 3 Units.

The use of mathematics, statistics, and probability in the analysis of sports performance, sports records, and strategy. Topics include mathematical analysis of the physics of sports and the determinations of optimal strategies. New diagnostic statistics and strategies for each sport. Corequisite: STATS 60, 110 or 116. Same as: MCS 100

STATS 60. Introduction to Statistical Methods: Precalculus. 5 Units.

Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. Same as: PSYCH 10, STATS 160

STATS 90. Mathematics in the Real World. 3 Units.

Introduction to non-calculus applications of mathematical ideas and principles in real-world problems. Topics include probability and counting, basic statistical concepts, geometric series. Applications include insurance, gambler's ruin, false positives in disease testing, present value of money, and mortgages. No knowledge of calculus required. Enrollment limited to students who do not have Stanford credit for a high school or college course in calculus or statistics. Same as: MATH 16

STATS 110. Statistical Methods in Engineering and the Physical Sciences. 4-5 Units.

Introduction to statistics for engineers and physical scientists. Topics: descriptive statistics, probability, interval estimation, tests of hypotheses, nonparametric methods, linear regression, analysis of variance, elementary experimental design. Prerequisite: one year of calculus.

STATS 116. Theory of Probability. 3-5 Units.

Probability spaces as models for phenomena with statistical regularity. Discrete spaces (binomial, hypergeometric, Poisson). Continuous spaces (normal, exponential) and densities. Random variables, expectation, independence, conditional probability. Introduction to the laws of large numbers and central limit theorem. Prerequisites: MATH 52 and familiarity with infinite series, or equivalent.

STATS 141. Biostatistics. 3-5 Units.

Introductory statistical methods for biological data: describing data (numerical and graphical summaries); introduction to probability; and statistical inference (hypothesis tests and confidence intervals). Intermediate statistical methods: comparing groups (analysis of variance); analyzing associations (linear and logistic regression); and methods for categorical data (contingency tables and odds ratio). Course content integrated with statistical computing in R. Same as: BIO 141

STATS 155. Statistical Methods in Computational Genetics. 3 Units.

The computational methods necessary for the construction and evaluation of sequence alignments and phylogenies built from molecular data and genetic data such as micro-arrays and data base searches. How to formulate biological problems in an algorithmic decomposed form, and building blocks common to many problems such as Markovian models, multivariate analyses. Some software covered in labs (Python, Biopython, XGobi, MrBayes, HMMER, Probe). Prerequisites: knowledge of probability equivalent to STATS 116, STATS 202 and one class in computing at the CS 106 level. Writing intensive course for undergraduates only. Instructor consent required. (WIM).

STATS 160. Introduction to Statistical Methods: Precalculus. 5 Units.

Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. Same as: PSYCH 10, STATS 60

STATS 167. Probability: Ten Great Ideas About Chance. 4 Units.

Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116.

Same as: PHIL 166, PHIL 266, STATS 267

STATS 191. Introduction to Applied Statistics. 3-4 Units.

Statistical tools for modern data analysis. Topics include regression and prediction, elements of the analysis of variance, bootstrap, and cross-validation. Emphasis is on conceptual rather than theoretical understanding. Applications to social/biological sciences. Student assignments/projects require use of the software package R. Recommended: 60, 110, or 141.

STATS 195. Introduction to R. 1 Unit.

This short course runs for the first four weeks of the quarter and is offered in fall and spring. It is recommended for students who want to use R in statistics, science, or engineering courses and for students who want to learn the basics of R programming. The goal of the short course is to familiarize students with R's tools for scientific computing. Lectures will be interactive with a focus on learning by example, and assignments will be application-driven. No prior programming experience is needed. Topics covered include basic data structures, File I/O, graphs, control structures, etc. and some useful packages in R.

Same as: CME 195

STATS 198. Practical Training. 1-3 Unit.

For students majoring in Mathematical and Computational Science only. Students obtain employment in a relevant industrial or research activity to enhance their professional experience.

STATS 199. Independent Study. 1-15 Unit.

For undergraduates.

STATS 200. Introduction to Statistical Inference. 3 Units.

Modern statistical concepts and procedures derived from a mathematical framework. Statistical inference, decision theory; point and interval estimation, tests of hypotheses; Neyman-Pearson theory. Bayesian analysis; maximum likelihood, large sample theory. Prerequisite: 116.

STATS 201. Design and Analysis of Experiments. 3-5 Units.

Theory and applications. Factors that affect response. Optimum levels of parameters. How to balance theory and practical design techniques. Prerequisites: basic statistics and probability theory.

STATS 202. Data Mining and Analysis. 3 Units.

Data mining is used to discover patterns and relationships in data. Emphasis is on large complex data sets such as those in very large databases or through web mining. Topics: decision trees, association rules, clustering, case based methods, and data visualization. Prereqs: Probability at the level of Stats 116 and familiarity with linear algebra.

STATS 203. Introduction to Regression Models and Analysis of Variance. 3 Units.

Modeling and interpretation of observational and experimental data using linear and nonlinear regression methods. Model building and selection methods. Multivariable analysis. Fixed and random effects models. Experimental design. Pre- or corequisite: 200.

STATS 205. Introduction to Nonparametric Statistics. 3 Units.

Nonparametric analogs of the one- and two-sample *t*-tests and analysis of variance; the sign test, median test, Wilcoxon's tests, and the Kruskal-Wallis and Friedman tests, tests of independence. Nonparametric regression and nonparametric density estimation, modern nonparametric techniques, nonparametric confidence interval estimates.

STATS 206. Applied Multivariate Analysis. 3 Units.

Introduction to the statistical analysis of several quantitative measurements on each observational unit. Emphasis is on concepts, computer-intensive methods. Examples from economics, education, geology, psychology. Topics: multiple regression, multivariate analysis of variance, principal components, factor analysis, canonical correlations, multidimensional scaling, clustering. Pre- or corequisite: 200.

STATS 207. Introduction to Time Series Analysis. 3 Units.

Time series models used in economics and engineering. Trend fitting, autoregressive and moving average models and spectral analysis, Kalman filtering, and state-space models. Seasonality, transformations, and introduction to financial time series. Prerequisite: basic course in Statistics at the level of 200.

STATS 208. Introduction to the Bootstrap. 3 Units.

The bootstrap is a computer-based method for assigning measures of accuracy to statistical estimates. By substituting computation in place of mathematical formulas, it permits the statistical analysis of complicated estimators. Topics: nonparametric assessment of standard errors, biases, and confidence intervals; related resampling methods including the jackknife, cross-validation, and permutation tests. Theory and applications. Prerequisite: course in statistics or probability.

STATS 209. Statistical Methods for Group Comparisons and Causal Inference. 3 Units.

Critical examination of statistical methods in social science applications, especially for cause and effect determinations. Topics: path analysis, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, longitudinal data, mediating and moderating variables. See <http://web.stanford.edu/~rag/stat209/>. Prerequisite: intermediate-level statistical methods.

Same as: EDUC 260X, HRP 239

STATS 211. Meta-research: Appraising Research Findings, Bias, and Meta-analysis. 3 Units.

Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics.

Same as: HRP 206, MED 206

STATS 212. Applied Statistics with SAS. 3 Units.

Data analysis and implementation of statistical tools in SAS. Topics: reading in and describing data, categorical data, dates and longitudinal data, correlation and regression, nonparametric comparisons, ANOVA, multiple regression, multivariate data analysis, using arrays and macros in SAS. Prerequisite: statistical techniques at the level of STATS 191 or 203; knowledge of SAS not required.

STATS 213. Introduction to Graphical Models. 3 Units.

Multivariate Normal Distribution and Inference, Wishart distributions, graph theory, probabilistic Markov models, pairwise and global Markov property, decomposable graph, Markov equivalence, MLE for DAG models and undirected graphical models, Bayesian inference for DAG models and undirected graphical models. Prerequisites: STATS 217, STATS 200 (preferably STATS 300A), MATH 104 or equivalent class in linear algebra. Same as: STATS 313

STATS 216. Introduction to Statistical Learning. 3 Units.

Overview of supervised learning, with a focus on regression and classification methods. Syllabus includes: linear and polynomial regression, logistic regression and linear discriminant analysis; cross-validation and the bootstrap, model selection and regularization methods (ridge and lasso); nonlinear models, splines and generalized additive models; tree-based methods, random forests and boosting; support-vector machines; Some unsupervised learning: principal components and clustering (k-means and hierarchical). Computing is done in R, through tutorial sessions and homework assignments. This math-light course is offered via video segments (MOOC style), and in-class problem solving sessions. Prerequisites: first courses in statistics, linear algebra, and computing.

STATS 216V. Introduction to Statistical Learning. 3 Units.

Overview of supervised learning, with a focus on regression and classification methods. Syllabus includes: linear and polynomial regression, logistic regression and linear discriminant analysis; cross-validation and the bootstrap, model selection and regularization methods (ridge and lasso); nonlinear models, splines and generalized additive models; tree-based methods, random forests and boosting; support-vector machines; Some unsupervised learning: principal components and clustering (k-means and hierarchical). Computing is done in R, through tutorial sessions and homework assignments. This math-light course is offered remotely only via video segments (MOOC style). TAs will host remote weekly office hours using an online platform such as Google Hangout or BlueJeans. There are four homework assignments, a midterm, and final exam. Prerequisites: first courses in statistics, linear algebra, and computing.

STATS 217. Introduction to Stochastic Processes. 2-3 Units.

Discrete and continuous time Markov chains, poisson processes, random walks, branching processes, first passage times, recurrence and transience, stationary distributions. Non-Statistics masters students may want to consider taking STATS 215 instead. Prerequisite: STATS 116 or consent of instructor.

STATS 218. Introduction to Stochastic Processes. 3 Units.

Renewal theory, Brownian motion, Gaussian processes, second order processes, martingales.

STATS 219. Stochastic Processes. 3 Units.

Introduction to measure theory, L_p spaces and Hilbert spaces. Random variables, expectation, conditional expectation, conditional distribution. Uniform integrability, almost sure and L_p convergence. Stochastic processes: definition, stationarity, sample path continuity. Examples: random walk, Markov chains, Gaussian processes, Poisson processes, Martingales. Construction and basic properties of Brownian motion. Prerequisite: STATS 116 or MATH 151 or equivalent. Recommended: MATH 115 or equivalent. Same as: MATH 136

STATS 221. Introduction to Mathematical Finance. 3-4 Units.

Interest rate and discounted value. Financial derivatives, hedging, and risk management. Stochastic models of financial markets, introduction to Ito calculus and stochastic differential equations. Black-Scholes pricing of European options. Optimal stopping and American options. Prerequisites: MATH 53, STATS 116, or equivalents.

STATS 222. Statistical Methods for Longitudinal Data. 2-3 Units.

Research designs and statistical procedures for time-ordered (repeated-measures) data. The analysis of longitudinal panel data is central to empirical research on learning, development, aging, and the effects of interventions. Topics include: measurement of change, growth curve models, analysis of durations including survival analysis, experimental and non-experimental group comparisons, reciprocal effects, stability. See <http://web.stanford.edu/~rag/stat222/>. Prerequisite: intermediate statistical methods.

Same as: EDUC 351A

STATS 231. Statistical Learning Theory. 3 Units.

(Same as STATS 231) How do we formalize what it means for an algorithm to learn from data? This course focuses on developing mathematical tools for answering this question. We will present various common learning algorithms and prove theoretical guarantees about them. Topics include online learning, kernel methods, generalization bounds (uniform convergence), and spectral methods. Prerequisites: A solid background in linear algebra and probability theory, statistics and machine learning (STATS 315A or CS 229). Convex optimization (EE 364a) is helpful but not required.

Same as: CS 229T

STATS 237. Theory of Investment Portfolios and Derivative Securities. 3 Units.

Asset returns and their volatilities. Markowitz; portfolio theory, capital asset pricing model, multifactor pricing models. Measures of market risk. Financial derivatives and hedging. Black-Scholes; pricing of European options. Valuation of American options. Implied volatility and the Greeks. Prerequisite: STATS 116 or equivalent.

STATS 238. The Future of Finance. 2 Units.

If you are interested in a career in finance or that touches finance (legal, regulatory, corporate, public policy), this course will give you a useful perspective. We will survey the players and current landscape of the global markets as the world continues to evolve from the financial crisis. We will discuss the sweeping change underway at the policy level by regulators and legislators around the world and this will include guest-lecturer perspectives on where the greatest opportunities exist for students entering or touching the world of finance today. The course will also review, in a non-technical way, the basics of the financial derivatives and other quantitative techniques that are a core part of the global capital markets. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application found on the Public Policy website to the instructor at tbeder@stanford.edu. Please visit <https://publicpolicy.stanford.edu/academics/undergraduate/> forms to locate the Consent Application Form for this class. The form is located on the Public Policy website under "Academics" and "Forms." See Consent Application Form for submission deadline.

Same as: ECON 152, ECON 252, PUBLPOL 364

STATS 239. Mathematical and Computational Finance Seminar. 1 Unit.

Same as: CME 242

STATS 239A. Workshop in Quantitative Finance. 1 Unit.

Topics of current interest.

STATS 239B. Workshop in Quantitative Finance. 1 Unit.

Topics of current interest. May be repeated for credit.

Same as: CME 239B

STATS 240. Statistical Methods in Finance. 3-4 Units.

(SCPD students register for 240P.) Regression analysis and applications to investment models. Principal components and multivariate analysis. Likelihood inference and Bayesian methods. Financial time series. Estimation and modeling of volatilities. Statistical methods for portfolio management. Prerequisite: STATS 200 or equivalent.

STATS 240P. Statistical Methods in Finance. 3 Units.

For SCPD students; see 240.

STATS 241. Data-driven financial and risk econometrics. 3-4 Units.

(SCPD students register for 241P.) Substantive and empirical modeling approaches in options and interest rate markets. Nonlinear least squares and nonparametric regression. Multivariate time series modeling and forecasting. Applications of canonical correlation analysis and cointegration. Statistical trading strategies and their evaluation. Prerequisite: 240 or equivalent.

STATS 241P. Data-driven financial and risk econometrics. 3 Units.

For SCPD students; see STATS241.

STATS 242. Algorithmic Trading and Quantitative Strategies. 3 Units.

An introduction to financial trading strategies based on methods of statistical arbitrage that can be automated. Methodologies related to high frequency data and stylized facts on asset returns; models of order book dynamics and order placement, dynamic trade planning with feedback; momentum strategies, pairs trading. Emphasis on developing and implementing models that reflect the market and behavioral patterns. Prerequisite: STATS 240 or equivalent.

STATS 243. Financial Models and Statistical Methods in Active Risk Management. 2-4 Units.

(SCPD students register for 243P.) Market risk and credit risk, credit markets. Back testing, stress testing and Monte Carlo methods. Logistic regression, generalized linear models and generalized mixed models. Loan prepayment and default as competing risks. Survival and hazard functions, correlated default intensities, frailty and contagion. Risk surveillance, early warning and adaptive control methodologies. Banking and bank regulation, asset and liability management. Prerequisite: STATS 240 or equivalent. Same as: CME 243

STATS 243P. Financial Models and Statistical Methods in Risk Management. 3 Units.

For SCPD students; see STATS243.

STATS 244. Quantitative Trading: Algorithms, Data, and Optimization. 2-4 Units.

Statistical trading rules and performances evaluation. Active portfolio management and dynamic investment strategies. Data analytics and models of transactions data. Limit order book dynamics in electronic exchanges. Algorithmic trading, informatics, and optimal execution. Market making and inventory control. Risk management and regulatory issues. Prerequisites: STATS 240 or equivalent.

STATS 250. Mathematical Finance. 3 Units.

Stochastic models of financial markets. Forward and futures contracts. European options and equivalent martingale measures. Hedging strategies and management of risk. Term structure models and interest rate derivatives. Optimal stopping and American options. Corequisites: MATH 236 and 227 or equivalent. Same as: MATH 238

STATS 253. Analysis of Spatial and Temporal Data. 3 Units.

A unified presentation of statistical methods for correlated data, such as spatial data and time series. Classical techniques based on Gaussian data, such as ARMA and kriging. State-space approaches, such as Kalman filtering and hidden Markov models. Point processes. Frequency domain and Bayesian approaches. Emphasis on emerging applications, such as music analysis, image processing, and digital humanities -- although classical applications, such as geology and finance, will also be covered. Prerequisites: linear algebra, STATS 200, exposure to linear regression.

STATS 260A. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student. Same as: HRP 260A

STATS 260B. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student. Same as: HRP 260B

STATS 260C. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student. Same as: HRP 260C

STATS 261. Intermediate Biostatistics: Analysis of Discrete Data. 3 Units.

Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference. Same as: BIOMEDIN 233, HRP 261

STATS 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis. 3 Units.

Methods for analyzing longitudinal data. Topics include Kaplan-Meier methods, Cox regression, hazard ratios, time-dependent variables, longitudinal data structures, profile plots, missing data, modeling change, MANOVA, repeated-measures ANOVA, GEE, and mixed models. Emphasis is on practical applications. Prerequisites: basic ANOVA and linear regression. Same as: HRP 262

STATS 263. Design of Experiments. 3 Units.

Experiments vs observation. Confounding. Randomization. ANOVA. Blocking. Latin squares. Factorials and fractional factorials. Split plot. Response surfaces. Mixture designs. Optimal design. Central composite. Box-Behnken. Taguchi methods. Computer experiments and space filling designs. Prerequisites: probability at STATS 116 level or higher, and at least one course in linear models. Same as: STATS 363

STATS 267. Probability: Ten Great Ideas About Chance. 4 Units.

Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116. Same as: PHIL 166, PHIL 266, STATS 167

STATS 270. A Course in Bayesian Statistics. 3 Units.

Advanced-level Bayesian statistics. Topics: Discussion of the mathematical and theoretical foundation for Bayesian inferential procedures. Examination of the construction of priors and the asymptotic properties of likelihoods and posterior densities. Discussion including but not limited to the case of finite dimensional parameter space. Prerequisite: familiarity with standard probability and multivariate distribution theory. Same as: STATS 370

STATS 290. Paradigms for Computing with Data. 3 Units.

Advanced programming and computing techniques to support projects in data analysis and related research. For Statistics graduate students and others whose research involves data analysis and development of associated computational software. Prerequisites: Programming experience including familiarity with R; computing at least at the level of CS 106; statistics at the level of STATS 110 or 141.

STATS 297. Practical Training. 1-3 Unit.

For students in the M.S. program in Financial Mathematics only. Students obtain employment, with the approval and supervision of a faculty member, in a relevant industrial or research activity to enhance their professional experience. Students must submit a written final report upon completion of the internship in order to receive credit. May be repeated once for credit. Prerequisite: consent of adviser.

STATS 298. Industrial Research for Statisticians. 1-3 Unit.

Masters-level research as in 299, but with the approval and supervision of a faculty adviser, it must be conducted for an off-campus employer. Students must submit a written final report upon completion of the internship in order to receive credit. May be repeated once for credit. Prerequisite: enrollment in Statistics M.S. or Ph.D. program, prior to candidacy.

STATS 299. Independent Study. 1-10 Unit.

For Statistics M.S. students only. Reading or research program under the supervision of a Statistics faculty member. May be repeated for credit.

STATS 300. Advanced Topics in Statistics. 2-3 Units.

Topic: Exploratory Multivariate Data Analysis. Describing and visualizing data with principal component analysis (PCA) for continuous data, correspondence analysis (CA) for contingency tables, multiple correspondence analysis (MCA) for categorical data, factorial analysis for mixed data (FAMD) for both continuous and categorical data, and multiple factor analysis (MFA) for data structured into groups of variables. Studying and visualization of the correlation between groups of variables with the RV coefficient. Performing PCA with missing values, matrix completion of continuous and categorical data with principal components. Examples from sensory analysis, public health, genetics. All the analysis will be performed with R.

STATS 300A. Theory of Statistics. 2-3 Units.

Finite sample optimality of statistical procedures; Decision theory: loss, risk, admissibility; Principles of data reduction: sufficiency, ancillarity, completeness; Statistical models: exponential families, group families, nonparametric families; Point estimation: optimal unbiased and equivariant estimation, Bayes estimation, minimax estimation; Hypothesis testing and confidence intervals: uniformly most powerful tests, uniformly most accurate confidence intervals, optimal unbiased and invariant tests. Prerequisites: Real analysis, introductory probability (at the level of STATS 116), and introductory statistics.

STATS 300B. Theory of Statistics. 2-4 Units.

Elementary decision theory; loss and risk functions, Bayes estimation; UMVU estimator, minimax estimators, shrinkage estimators. Hypothesis testing and confidence intervals: Neyman-Pearson theory; UMP tests and uniformly most accurate confidence intervals; use of unbiasedness and invariance to eliminate nuisance parameters. Large sample theory: basic convergence concepts; robustness; efficiency; contiguity, locally asymptotically normal experiments; convolution theorem; asymptotically UMP and maximin tests. Asymptotic theory of likelihood ratio and score tests. Rank permutation and randomization tests; jackknife, bootstrap, subsampling and other resampling methods. Further topics: sequential analysis, optimal experimental design, empirical processes with applications to statistics, Edgeworth expansions, density estimation, time series.

STATS 300C. Theory of Statistics. 2-4 Units.

Decision theory formulation of statistical problems. Minimax, admissible procedures. Complete class theorems ("all" minimax or admissible procedures are "Bayes"), Bayes procedures, conjugate priors, hierarchical models. Bayesian non parametrics: diaichlet, tail free, poly trees, bayesian sieves. Inconsistency of bayes rules.

STATS 302. Qualifying Exams Workshop. 3 Units.

Prepares Statistics Ph.D. students for the qualifying exams by reviewing relevant course topics and problem solving strategies.

STATS 303. PhD First Year Student Workshop. 1 Unit.

For Statistics First Year PhD students only. Discussion of relevant topics in first year student courses, consultation with PhD advisor.

STATS 305. Introduction to Statistical Modeling. 3 Units.

Review of univariate regression. Multiple regression. Geometry, subspaces, orthogonality, projections, normal equations, rank deficiency, estimable functions and Gauss-Markov theorem. Computation via QR decomposition, Gram-Schmidt orthogonalization and the SVD. Interpreting coefficients, collinearity, graphical displays. Fits and the Hat matrix, leverage & influence, diagnostics, weighted least squares and resistance. Model selection, Cp/Aic and crossvalidation, stepwise, lasso. Basis expansions, splines. Multivariate normal distribution theory. ANOVA: Sources of measurements, fixed and random effects, randomization. Emphasis on problem sets involving substantive computations with data sets. Prerequisites: consent of instructor, 116, 200, applied statistics course, CS 106A, MATH 114.

STATS 306A. Methods for Applied Statistics. 3 Units.

Regression modeling extended to categorical data. Logistic regression. Loglinear models. Generalized linear models. Discriminant analysis. Categorical data models from information retrieval and Internet modeling. Prerequisite: 305 or equivalent.

STATS 306B. Methods for Applied Statistics: Unsupervised Learning. 2-3 Units.

Unsupervised learning techniques in statistics, machine learning, and data mining.

STATS 310A. Theory of Probability. 2-4 Units.

Mathematical tools: sigma algebras, measure theory, connections between coin tossing and Lebesgue measure, basic convergence theorems. Probability: independence, Borel-Cantelli lemmas, almost sure and L_p convergence, weak and strong laws of large numbers. Large deviations. Weak convergence; central limit theorems; Poisson convergence; Stein's method. Prerequisites: 116, MATH 171. Same as: MATH 230A

STATS 310B. Theory of Probability. 2-3 Units.

Conditional expectations, discrete time martingales, stopping times, uniform integrability, applications to 0-1 laws, Radon-Nikodym Theorem, ruin problems, etc. Other topics as time allows selected from (i) local limit theorems, (ii) renewal theory, (iii) discrete time Markov chains, (iv) random walk theory, (v) ergodic theory. Prerequisite: 310A or MATH 230A. Same as: MATH 230B

STATS 310C. Theory of Probability. 2-4 Units.

Continuous time stochastic processes: martingales, Brownian motion, stationary independent increments, Markov jump processes and Gaussian processes. Invariance principle, random walks, LIL and functional CLT. Markov and strong Markov property. Infinitely divisible laws. Some ergodic theory. Prerequisite: 310B or MATH 230B. Same as: MATH 230C

STATS 311. Information Theory and Statistics. 3 Units.

Information theoretic techniques in probability and statistics. Fano, Assouad, and Le Cam methods for optimality guarantees in estimation. Large deviations and concentration inequalities (Sanov's theorem, hypothesis testing, entropy method, concentration of measure). Approximation of (Bayes) optimal procedures, surrogate risks, f-divergences. Penalized estimators and minimum description length. Online game playing, gambling, no-regret learning. Prerequisites: EE 376A (or equivalent) or STATS 300A. Same as: EE 377

STATS 312. Statistical Methods in Neuroscience. 3 Units.

The goal is to discuss statistical methods for neuroscience in their natural habitat: the research questions, measurement technologies and experiment designs used in modern neuroscience. We will emphasize both the choice and quality of the methods, as well as the reporting, interpretation and visualization of results. Likely topics include preprocessing and signal extraction for single-neuron and neuroimaging technologies, statistical models for single response, encoding and decoding models, multiple-responses and parametric maps, and testing. Participation includes analyzing methods and real data, discussing papers in class, and a final project. Requirements: we will assume familiarity with linear models, likelihoods etc. Students who have not taken graduate level statistics courses are required to contact the instructor. Background in neuroscience is not assumed.

STATS 313. Introduction to Graphical Models. 3 Units.

Multivariate Normal Distribution and Inference, Wishart distributions, graph theory, probabilistic Markov models, pairwise and global Markov property, decomposable graph, Markov equivalence, MLE for DAG models and undirected graphical models, Bayesian inference for DAG models and undirected graphical models. Prerequisites: STATS 217, STATS 200 (preferably STATS 300A), MATH 104 or equivalent class in linear algebra. Same as: STATS 213

STATS 314. Advanced Statistical Methods. 3 Units.

Topic this year is empirical likelihood. Empirical likelihood (EL) allows likelihood based inferences without assuming any parametric form for the likelihood. It is based instead on reweighting the sample values. It provides data driven shapes for confidence regions and confidence bands. EL tests have competitive power. This course covers: nonparametric maximum likelihood and likelihood ratios, censoring and truncation, biased sampling, estimating equations, GMM, Bayesian bootstrap, Euclidean and Kullback-Leibler log likelihoods and recent research directions.

STATS 315A. Modern Applied Statistics: Learning. 2-3 Units.

Overview of supervised learning. Linear regression and related methods. Model selection, least angle regression and the lasso, stepwise methods. Classification. Linear discriminant analysis, logistic regression, and support vector machines (SVMs). Basis expansions, splines and regularization. Kernel methods. Generalized additive models. Kernel smoothing. Gaussian mixtures and the EM algorithm. Model assessment and selection: crossvalidation and the bootstrap. Pathwise coordinate descent. Sparse graphical models. Prerequisites: STATS 305, 306A,B or consent of instructor.

STATS 315B. Modern Applied Statistics: Data Mining. 2-3 Units.

Two-part sequence. New techniques for predictive and descriptive learning using ideas that bridge gaps among statistics, computer science, and artificial intelligence. Emphasis is on statistical aspects of their application and integration with more standard statistical methodology. Predictive learning refers to estimating models from data with the goal of predicting future outcomes, in particular, regression and classification models. Descriptive learning is used to discover general patterns and relationships in data without a predictive goal, viewed from a statistical perspective as computer automated exploratory analysis of large complex data sets.

STATS 316. Stochastic Processes on Graphs. 1-3 Unit.

Local weak convergence, Gibbs measures on trees, cavity method, and replica symmetry breaking. Examples include random k -satisfiability, the assignment problem, spin glasses, and neural networks. Prerequisite: 310A or equivalent.

STATS 317. Stochastic Processes. 3 Units.

Semimartingales, stochastic integration, Ito's formula, Girsanov's theorem. Gaussian and related processes. Stationary/isotropic processes. Integral geometry and geometric probability. Maxima of random fields and applications to spatial statistics and imaging.

STATS 318. Modern Markov Chains. 3 Units.

Tools for understanding Markov chains as they arise in applications. Random walk on graphs, reversible Markov chains, Metropolis algorithm, Gibbs sampler, hybrid Monte Carlo, auxiliary variables, hit and run, Swedson-Wong algorithms, geometric theory, Poincare-Nash-Cheeger-Log-Sobolov inequalities. Comparison techniques, coupling, stationary times, Harris recurrence, central limit theorems, and large deviations.

STATS 319. Literature of Statistics. 1-3 Unit.

Literature study of topics in statistics and probability culminating in oral and written reports. May be repeated for credit.

STATS 320. Heterogeneous Data with Kernels. 3 Units.

Mathematical and computational methods necessary to understanding analysis of heterogeneous data using generalized inner products and Kernels. For areas that need to integrate data from various sources, biology, environmental and chemical engineering, molecular biology, bioinformatics. Topics: Distances, inner products and duality. Multivariate projections. Complex heterogeneous data structures (networks, trees, categorical as well as multivariate continuous data). Canonical correlation analysis, canonical correspondence analysis. Kernel methods in Statistics. Representer theorem. Kernels on graphs. Kernel versions of standard statistical procedures. Data cubes and tensor methods.

STATS 321. Modern Applied Statistics: Transposable Data. 2-3 Units.

Topics: clustering, biclustering, and spectral clustering. Data analysis using the singular value decomposition, nonnegative decomposition, and generalizations. Plaid model, aspect model, and additive clustering. Correspondence analysis, Rasch model, and independent component analysis. Page rank, hubs, and authorities. Probabilistic latent semantic indexing. Recommender systems. Applications to genomics and information retrieval. Prerequisites: 315A,B, 305/306A,B, or consent of instructor.

STATS 322. Function Estimation in White Noise. 3 Units.

Gaussian white noise model sequence space form. Hyperrectangles, quadratic convexity, and Pinsker's theorem. Minimax estimation on L_p balls and Besov spaces. Role of wavelets and unconditional bases. Linear and threshold estimators. Oracle inequalities. Optimal recovery and universal thresholding. Stein's unbiased risk estimator and threshold choice. Complexity penalized model selection. Connecting fast wavelet algorithms and theory. Beyond orthogonal bases.

STATS 324. Multivariate Analysis. 2-3 Units.

Classic multivariate statistics: properties of the multivariate normal distribution, determinants, volumes, projections, matrix square roots, the singular value decomposition; Wishart distributions, Hotelling's T-square; principal components, canonical correlations, Fisher's discriminant, the Cauchy projection formula.

STATS 325. Multivariate Analysis and Random Matrices in Statistics. 2-3 Units.

Topics on Multivariate Analysis and Random Matrices in Statistics (full description TBA).

STATS 329. Large-Scale Simultaneous Inference. 1-3 Unit.

Estimation, testing, and prediction for microarray-like data. Modern scientific technologies, typified by microarrays and imaging devices, produce inference problems with thousands of parallel cases to consider simultaneously. Topics: empirical Bayes techniques, James-Stein estimation, large-scale simultaneous testing, false discovery rates, local fdr, proper choice of null hypothesis (theoretical, permutation, empirical nulls), power, effects of correlation on tests and estimation accuracy, prediction methods, related sets of cases ("enrichment"), effect size estimation. Theory and methods illustrated on a variety of large-scale data sets.

STATS 330. An Introduction to Compressed Sensing. 3 Units.

Compressed sensing is a new data acquisition theory asserting that one can design nonadaptive sampling techniques that condense the information in a compressible signal into a small amount of data. This revelation may change the way engineers think about signal acquisition. Course covers fundamental theoretical ideas, numerical methods in large-scale convex optimization, hardware implementations, connections with statistical estimation in high dimensions, and extensions such as recovery of data matrices from few entries (famous Netflix Prize).

Same as: CME 362

STATS 331. Survival Analysis. 2 Units.

The course introduces basic concepts, theoretical basis and statistical methods associated with survival data. Topics include censoring, Kaplan-Meier estimation, logrank test, proportional hazards regression, accelerated failure time model, multivariate failure time analysis and competing risks. The traditional counting process/martingale methods as well as modern empirical process methods will be covered. Prerequisite: Understanding of basic probability theory and statistical inference methods.

STATS 333. Modern Spectral Analysis. 3 Units.

Traditional spectral analysis encompassed Fourier methods and their elaborations, under the assumption of a simple superposition of sinusoids, independent of time. This enables development of efficient and effective computational schemes, such as the FFT. Since many systems change in time, it becomes of interest to generalize classical spectral analysis to the time-varying setting. In addition, classical methods suffer from resolution limits which we hope to surpass. In this topics course, we follow two threads. On the one hand, we consider the estimation of instantaneous frequencies and decomposition of source signals, which may be time-varying. The thread begins with the empirical mode decomposition (EMD) for non-stationary signal decomposition into intrinsic mode functions (IMFs), introduced by N. Huang et al [1], together with its machinery of the sifting process and computation of the Hilbert spectrum, resulting in the so-called adaptive harmonic model (AHM). Next, this thread considers the wavelet synchrosqueezing transform (WSST) proposed by Daubechies et al [2], which attempts to estimate instantaneous frequencies (IFs), via the frequency re-assignment (FRA) rule, that facilitates non-stationary signal decomposition. In reference [3], a real-time method is proposed for computing the FRA rule; and in reference [4], the exact number of AHM components is determined with more precise estimation of the IFs, for more accurate extraction of the signal components and polynomial-like trend. In another thread, recent developments in optimization have been applied to obtain time-varying spectra or very high-resolution spectra; in particular, references [5]-[8] give examples of recent results where convex estimation is applied to obtain new and more highly resolved spectral estimates, some with time-varying structure.

STATS 338. Topics in Biostatistics. 3 Units.

Data monitoring and interim analysis of clinical trials. Design of Phase I, II, III trials. Survival analysis. Longitudinal data analysis.

STATS 341. Applied Multivariate Statistics. 3 Units.

Theory, computational aspects, and practice of a variety of important multivariate statistical tools for data analysis. Topics include classical multivariate Gaussian and undirected graphical models, graphical displays. PCA, SVD and generalizations including canonical correlation analysis, linear discriminant analysis, correspondence analysis, with focus on recent variants. Factor analysis and independent component analysis. Multidimensional scaling and its variants (e.g. Isomap, spectral clustering). Students are expected to program in R. Prerequisite: STATS 305 or equivalent.

STATS 344. Introduction to Statistical Genetics. 3 Units.

Statistical methods for analyzing human genetics studies of Mendelian disorders and common complex traits. Probable topics include: principles of population genetics; epidemiologic designs; familial aggregation; segregation analysis; linkage analysis; linkage-disequilibrium-based association mapping approaches; and genome-wide analysis based on high-throughput genotyping platforms. Prerequisite: STATS 116 or equivalent or consent of instructor.

Same as: GENE 244

STATS 345. Statistical and Machine Learning Methods for Genomics. 3 Units.

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets. Same as: BIO 268, BIOMEDIN 245, CS 373, GENE 245

STATS 350. Topics in Probability Theory: Probabilistic Concepts in Statistical Physics and Information Theory. 1-3 Unit.

Concentration of measure techniques. Mean field models for disordered systems: infinite size limit, computing the free energy, ultrametricity, dynamics. Interpolation techniques and infinite size limit in information theory and coding. May be repeated once for credit. Prerequisite: 310A or equivalent.

STATS 351. Random Walks, Networks and Environment. 3 Units.

Selected material about probability on trees and networks, random walk in random and non-random environments, percolation and related interacting particle systems. Prerequisite: Exposure to measure theoretic probability and to stochastic processes.

STATS 351A. An Introduction to Random Matrix Theory. 3 Units.

Patterns in the eigenvalue distribution of typical large matrices, which also show up in physics (energy distribution in scattering experiments), combinatorics (length of longest increasing subsequence), first passage percolation and number theory (zeros of the zeta function). Classical compact ensembles (random orthogonal matrices). The tools of determinantal point processes.

Same as: MATH 231A

STATS 355. Observational Studies. 2-3 Units.

This course will cover statistical methods for the design and analysis of observational studies. Topics for the course will include the potential outcomes framework for causal inference; randomized experiments; methods for controlling for observed confounders in observational studies; sensitivity analysis for hidden bias; instrumental variables; tests of hidden bias; coherence; and design of observational studies.

Same as: HRP 255

STATS 360. Advanced Statistical Methods for Earth System Analysis. 3 Units.

Introduction for graduate students to important issues in data analysis relevant to earth system studies. Emphasis on methodology, concepts and implementation (in R), rather than formal proofs. Likely topics include the bootstrap, non-parametric methods, regression in the presence of spatial and temporal correlation, extreme value analysis, time-series analysis, high-dimensional regressions and change-point models. Topics subject to change each year. Prerequisites: STATS 110 or equivalent.

Same as: EESS 260

STATS 362. Topic: Monte Carlo. 2-3 Units.

Random numbers and vectors: inversion, acceptance-rejection, copulas. Variance reduction: antithetics, stratification, control variates, importance sampling. MCMC: Markov chains, detailed balance, Metropolis-Hastings, random walk Metropolis, independence sampler, Gibbs sampling, slice sampler, hybrids of Gibbs and Metropolis, tempering. Sequential Monte Carlo. Quasi-Monte Carlo. Randomized quasi-Monte Carlo. Examples, problems and motivation from Bayesian statistics, machine learning, computational finance and graphics. May be repeat for credit.

STATS 363. Design of Experiments. 3 Units.

Experiments vs observation. Confounding. Randomization. ANOVA. Blocking. Latin squares. Factorials and fractional factorials. Split plot. Response surfaces. Mixture designs. Optimal design. Central composite. Box-Behnken. Taguchi methods. Computer experiments and space filling designs. Prerequisites: probability at STATS 116 level or higher, and at least one course in linear models.

Same as: STATS 263

STATS 366. Modern Statistics for Modern Biology. 3 Units.

Application based course in nonparametric statistics. Modern toolbox of visualization and statistical methods for the analysis of data, examples drawn from immunology, microbiology, cancer research and ecology. Methods covered include multivariate methods (PCA and extensions), sparse representations (trees, networks, contingency tables) as well as nonparametric testing (Bootstrap, permutation and Monte Carlo methods). Hands on, use R and cover many Bioconductor packages. Prerequisite: Minimal familiarity with computers. Instructor consent.

Same as: BIOS 221

STATS 367. Statistical Models in Genetics. 3 Units.

Statistical problems in association and linkage analysis of qualitative and quantitative traits in human and experimental populations; sequence alignment and analysis; population genetics/evolution (Wright-Fisher model, Kingman coalescent, models of nucleotide substitution); related computational algorithms. Prerequisites: knowledge of probability through elementary stochastic processes and statistics through likelihood theory.

STATS 370. A Course in Bayesian Statistics. 3 Units.

Advanced-level Bayesian statistics. Topics: Discussion of the mathematical and theoretical foundation for Bayesian inferential procedures. Examination of the construction of priors and the asymptotic properties of likelihoods and posterior densities. Discussion including but not limited to the case of finite dimensional parameter space. Prerequisite: familiarity with standard probability and multivariate distribution theory.

Same as: STATS 270

STATS 374. Large Deviations Theory. 3 Units.

Combinatorial estimates and the method of types. Large deviation probabilities for partial sums and for empirical distributions, Cramer's and Sanov's theorems and their Markov extensions. Applications in statistics, information theory, and statistical mechanics. Prerequisite: MATH 230A or STATS 310. Offered every 2-3 years.

Same as: MATH 234

STATS 375. Inference in Graphical Models. 3 Units.

Graphical models as a unifying framework for describing the statistical relationships between large sets of variables; computing the marginal distribution of one or a few such variables. Focus is on sparse graphical structures, low-complexity algorithms, and their analysis. Topics include: variational inference; message passing algorithms; belief propagation; generalized belief propagation; survey propagation. Analysis techniques: correlation decay; distributional recursions. Applications from engineering, computer science, and statistics. Prerequisite: EE 278, STATS 116, or CS 228. Recommended: EE 376A or STATS 217.

STATS 376A. Information Theory. 3 Units.

The fundamental ideas of information theory. Entropy and intrinsic randomness. Data compression to the entropy limit. Huffman coding. Arithmetic coding. Channel capacity, the communication limit. Gaussian channels. Kolmogorov complexity. Asymptotic equipartition property. Information theory and Kelly gambling. Applications to communication and data compression. Prerequisite: EE178 or STATS 116, or equivalent. Same as: EE 376A

STATS 376B. Network Information Theory. 3 Units.

Network information theory deals with the fundamental limits on information flow in networks and the optimal coding schemes that achieve these limits. It aims to extend Shannon's point-to-point information theory and the Ford-Fulkerson max-flow min-cut theorem to networks with multiple sources and destinations. The course presents the basic results and tools in the field in a simple and unified manner. Topics covered include: multiple access channels, broadcast channels, interference channels, channels with state, distributed source coding, multiple description coding, network coding, relay channels, interactive communication, and noisy network coding. Prerequisites: EE376A.

Same as: EE 376B

STATS 390. Consulting Workshop. 1-3 Unit.

Skills required of practicing statistical consultants, including exposure to statistical applications. Students participate as consultants in the department's drop-in consulting service, analyze client data, and prepare formal written reports. Seminar provides supervised experience in short term consulting. May be repeated for credit. Prerequisites: course work in applied statistics or data analysis, and consent of instructor.

STATS 396. Research Workshop in Computational Biology. 1-2 Unit.

Applications of Computational Statistics and Data Mining to Biological Data. Attendance mandatory. Instructor approval required.

STATS 397. PhD Oral Exam Workshop. 1 Unit.

For Statistics PhD students defending their dissertation.

STATS 398. Industrial Research for Statisticians. 1-3 Unit.

Doctoral research as in 298, but must be conducted for an off-campus employer. Final report required. May be repeated for credit. Prerequisite: Statistics Ph.D. candidate.

STATS 399. Research. 1-10 Unit.

Research work as distinguished from independent study of nonresearch character listed in 199. May be repeated for credit.

STATS 801. TGR Project. 0 Units.

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STATS 802. TGR Dissertation. 0 Units.

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Stem Cell Biology and Regenerative Medicine Courses

STEMREM 83Q. The Stem Cell: Biological, Social, and Practical Aspects of Stem Cell Research. 3 Units.

Preference to sophomores. Ethical, legal, social, and economic dimensions of stem cell research such as the discovery of human embryonic stem cells and the international landscape of public policy. How stem cells work, their role in the upkeep of the human body, and current and future uses in medicine. Issues at the intersection of science and society such as human-animal hybrids, notions of justice in intellectual property law, distribution of health care, and the major ethical frameworks defining the debate. Prerequisite: AP Biology.

STEMREM 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

STEMREM 200. Stem Cell Intensive. 1 Unit.

Open to first year Stem Cell Biology and Regenerative Medicine graduate students or consent of Instructor. Hands-on, five-day immersion to learn basic methods of tissue culture, mouse embryo fibroblast (MEF) preparation, embryonic stem and induced pluripotent stem (ES/iPS) cell culture, differentiation, DNA isolation, polymerase chain reaction (PCR), sequencing, and basic microscopy.

STEMREM 201A. Stem Cells and Human Development: From Embryo to Cell Lineage Determination. 1-2 Unit.

For graduate, undergraduate and medical students. Offers didactic lectures focused on human developmental biology, derivation of pluripotent stem cells, cell sorting, genomics, bioinformatics, imaging and other related topics. Provides the educational foundation and social group building within each first-year class of STEMREM graduate students. Students enrolling for 1 unit attend all lectures; students enrolling for 2 units attend all lectures and discussion sections.

STEMREM 201B. Stem Cells and Human Development Laboratory. 3 Units.

Limited enrollment restricted to first year majors. Lab fee may apply. Focus is on human development from embryo to cell lineage determination. Emphasis is on human developmental biology, derivation of pluripotent stem cells, cell sorting, genomics, bioinformatics, imaging and other related topics. Comprehensive laboratory-based instruction focused on human developmental biology, derivation of pluripotent stem cells, cell sorting, genomics, bioinformatics, imaging and other related topics. Provides hands-on skills development within each first-year class of STEMREM graduate students. Must be taken concurrently with STEMREM 201A.

STEMREM 202. Stem Cells and Translational Medicine. 3-5 Units.

For graduate, undergraduate and medical students. Focus is on fundamentals of stem cell biology and regenerative Medicine. Topics include exploration of the well-studied system of hematopoiesis, molecular pathways of pluripotency and tissue-specific stem cells and ends with coverage of aging as related to stem cell dynamics. Features include lectures on the basic science of each topic, followed by clinical applications in order to show the mechanisms and methods to translate findings to therapeutic applications, culminated with construction of a research proposal or business plan in an area of interest, to be further explored in STEMREM 203. Students enrolling for 3 units submit four of seven problem-sets; students enrolling for 4 units submit five of seven problem-sets; students enrolling for 5 units turn in seven of seven problem-sets.

STEMREM 203. Stem Cells Immersion: Applications in Medicine, Business and Law. 3 Units.

For graduate and medical students. Provides the clinical, pharmaceutical, biotechnology or business immersion necessary to allow insight into the world of medicine from multiple vantage points, setting the stage for students to translate research successfully beyond the academic sphere and gain the necessary knowledge to move their research proposal/business plan forward (from STEMREM 202). Prerequisites: STEMREM 201A and STEMREM 202.

STEMREM 250. Regenerative Medicine Seminar Series. 1 Unit.

For graduate, medical and undergraduate students. A forum for Stanford researchers to meet, hear about what is going on in Stem Cell Biology and Regenerative Medicine at Stanford, and spark collaborations. Topics include all areas of regenerative medicine, broadly defined, ranging from fundamental biological principles and basic science advances to novel applications in biotechnology, stem cell biology, and human disease.

STEMREM 280. Stem Cell Biology and Regenerative Medicine Journal Club. 2 Units.

For graduate, medical and undergraduate students. Review of current literature in both basic and translational medicine as it relates to stem cell biology and/or regenerative medicine in a seminar format consisting of both faculty and student presentations. Includes discussions led by faculty experts in the area covered for that particular session. Topics may range widely, depending on the available literature and students' interests. Students are expected to review the chosen article before class presentations and participate in discussion. Discussion includes methodology and statistical analysis of each study and its relevance to stem cell biology and/or regenerative medicine.

STEMREM 281. Landmark Papers in Immunology and Stem Cell Biology: How to Pose Experimental Questions. 2 Units.

Focus on deciphering article titles to accurately assess the biological question being asked, and what experiment design might best approach the question, encouraging students to become experimentalists, not memorizers, of information presented by authors. Topics include implications of paper questions for the field, deciphering paper titles, hypothesizing research questions.

STEMREM 299. Directed Reading in Stem Cell Biology and Regenerative Medicine. 1-18 Unit.

Prerequisite: consent of instructor.

STEMREM 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

STEMREM 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

STEMREM 801. TGR Project. 0 Units.

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STEMREM 802. TGR Dissertation. 0 Units.

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Strategic Management Courses

STRAMGT 110Q. Making Sense of Strategy. 3 Units.

Get the strategy right, and the chance for success is great. Nowhere is this more evident than in today's world of major challenges. Strategy is at the heart of problem solving and achieving objectives, yet few people can define strategy, much less understand how to conceptualize, design, and execute effective strategies that yield the best outcomes. This course will meet once a week to focus on interesting and engaging case studies, each of which illustrates a key ingredient of strategy. Some are well-known historical events, while others are less obvious, but all have a strategic lesson to share. They are quite diverse, from the planning of a high-risk rescue in the Colorado Rockies, to a product crisis in a Fortune 50 company, to a little-known failed military mission of WWII, to a commercial airline disaster. The ability to think through challenging and varied scenarios is both instructive and mind-stretching. There will be some pre-reading on each case study and there may be a field trip for students to put their lessons into practice. The course is designed to be highly interactive; all to enable students to unravel the mystery and power of strategic thinking. Students will also have the opportunity to select and analyze a case reflecting interests of their own. This course can help students not only prepare for a career in a range of fields, but also as they meet the challenges of their current coursework. Problem-solving skills are central in every walk of life; this seminar can help students build a stronger foundation for sound decision-making.

STRAMGT 207. Strategic Leadership. 3 Units.

This course examines fundamental issues of general management and leadership within an organization. You will learn about setting an organization's strategic direction, aligning structure to implement strategy, and leading individuals within the firm. You will master concepts, frameworks, and tools to assess an industry and a firm's competitive environment, and to craft alternatives. You will study the interplay among formal structure, informal networks, and culture in shaping organizational performance. By integrating leadership theory, the lessons of practical application, and your own experience, you will develop skills and capabilities essential to leading others. And you'll gain a better understanding of your own leadership preferences, strengths, and weaknesses.

STRAMGT 209. Leadership Laboratory. 1 Unit.

Having the opportunity to choose one's colleagues is rare in corporate life - we usually inherit them when we join an organization. More often than not, when we assume a management position in an organization, we inherit our subordinates as well. How do we maximize the performance of the teams we become part of? What interpersonal skills give us influence? Which interpersonal strengths can propel us to our next promotion? What development areas might prevent our ascension to the executive suite? In the Leadership Labs, we focus on these questions. However, rather than tackle cases where you can distance yourself in comfortable analytical discussions, we throw you into experiential exercises, testing your ability to build effective relationships, motivate others, and influence outcomes. The Leadership Labs are designed for deep self-reflection about what behaviors you choose to use, the consequences of those behaviors, and given choices, how you might be even more productive. In total, there are ten Leadership Lab Sessions--six, three-hour Interpersonal Skills Labs, and four, 90-minute Managerial Skills Labs. The Interpersonal Skills Labs sessions are comprised of short lectures and increasingly challenging simulations and role-plays facilitated by the Ar buckle Leadership Fellows. The Leadership Fellows are second-year GSB students who have participated in a rigorous training program that prepares them to facilitate the exercises and cases used in the Interpersonal Skills Labs. In the 90-minute Managerial Skills Labs we examine several common managerial challenges faced by executives. Together with Faculty, students explore these topics using four case examples, each asking students to evaluate a series of situations, develop alternatives for their resolution, and ultimately recommend and implement a course of action from the point of view of the company's owner/manager. We have selected small to mid-sized businesses as the context for these discussions in order to highlight the impact that key decisions and their implementation can have on the broader organization. Class preparation should include not only analysis and conclusions, but also specific recommendations on implementation. Students should come to class prepared to role play important conversations between management and other key individuals.

STRAMGT 210. Managerial Skills. 1 Unit.

In the Managerial Skills Labs we examine several common managerial challenges faced by executives. Together with Faculty, students explore these topics using four case examples, each asking students to evaluate a series of situations, develop alternatives for their resolution, and ultimately recommend and implement a course of action from the point of view of the company's owner/manager. We have selected small to mid-sized businesses as the context for these discussions in order to highlight the impact that key decisions and their implementation can have on the broader organization. Class preparation should include not only analysis and conclusions, but also specific recommendations on implementation. Students should come to class prepared to role play important conversations between management and other key individuals.

STRAMGT 257. Sloan: Strategic Leadership. 2 Units.

This 9-session course focuses on situations where senior executives must execute strategic action fast because of rapidly changing environmental conditions. The focus of the course is on the approaches successful leaders use to recognize the need for strategic change early, determine which particular approach is likely to be successful, and then implement the change to its conclusion. Leaders in these situations often confront the problem that many people in the organization do not yet recognize the need for change and resist making the personal adjustments required. The course provides these leaders with tools to initiate and execute the changes required to address key strategic challenges: how to capitalize better on the position an organization occupies in its environment, how to reposition the organization relative to its competitors and how to develop and implement a plan to accomplish the required changes successfully. GSB professor Robert A. Burgelman, an active field researcher of strategic change in complex organizations, and Dr. Robert Pearl, CEO of The Permanente Medical Group, Kaiser Permanente, who has taken one of the largest healthcare delivery organizations in the world through a major strategic change journey, jointly teach this course.

STRAMGT 258. MSx: Strategic Management. 4 Units.

This course deals with the overall general management of the business enterprise. Extensive case studies of a variety of companies of differing size, industry, and current conditions provide the basis for the comprehensive analysis and establishment of a strategic management approach for the organization. Frameworks are presented for strategy identification and evaluation; assessing industry attractiveness; evaluating the firm's capabilities, resources, and position; determining the optimal horizontal and vertical scope of the firm; entering into strategic alliances and joint ventures; and formulating and implementing strategy in multi-business organizations.

STRAMGT 259. MSx: Generative Leadership. 2 Units.

Generative Leadership: How to Create Innovative Ideas and Convey Them with Impact There are three major sections to this course - Design Thinking, The Improvisational Mindset, and High Performance Communication. Design Thinking Outcome: Participants learn to employ User Centered Design as promoted by the Stanford d.school. They become adept at Empathizing with the end user, practicing focused Need Finding, Defining the Problem, Ideating, Rapidly Prototyping and Adapting to Feedback. Experiences: Participants learn the Design Thinking process through a hands-on, collaborative design challenge, like redesigning the Briefcase for a specific user. The Improvisational Mindset Outcome: The participants increase their ability to respond flexibly to novel situations and to generate innovative solutions on a collaborative, creative team. The mindset is cultivated by practicing 5 key principles. Say "Yes, and". Treat Mistakes as Gifts. Inspire your Partner. Dare to be Obvious. Notice the World. Experiences: The key principles are taught through a series of immersive theater exercises derived from Johnstone, Spolin, and Ryan. Valuable readings include IMPROV WISDOM, by Patricia Ryan and journal articles on improv and brainstorming. High Performance Communication Outcome: The final segment of the class is a chance to apply the principles of User Centered Design and the Improvisational Mindset to design and deliver messages that go beyond just transmitting information - they get results. Participants successfully use a version of the Design Thinking process to rapidly develop content that is tuned to the audience's needs, and that they can deliver in a way that is agile and responsive to real time feedback. Experiences: Generative Leadership culminates in a group presentation designed to influence key stakeholders. To be successful, participants will have to draw on all sections of the course. AS WE SPEAK is our text.

STRAMGT 279. MSx: Global Strategic Management. 4 Units.

This course introduces the basic concepts of strategic management, focusing on their application in a semi-globalized world, where international borders are less significant than in the past but still very important. There are texts that will be required reading, but each class will also feature a case discussion.

STRAMGT 308. Entrepreneurship from the Perspective of Women. 3 Units.

This seminar will showcase successful women entrepreneurs and their professional and personal journeys. We will study how they navigated finding an idea, forming and building a team, being an effective leader, raising money, overcoming setbacks, and assembling a board. We will explore some of the unique challenges women face when approaching entrepreneurship. Speakers will also include female venture capitalists and social entrepreneurs, and male entrepreneurs. The class will use cases, panel discussions, readings and videos and social time with the panelists. This class is appropriate for women and men considering starting a high-impact venture as well as those who are just curious about entrepreneurship. This class will help you understand your own capabilities and interest in being an entrepreneur.

STRAMGT 313. The New Business Ideas Workshop. 4 Units.

This workshop provides students with a forum through which they can develop and receive feedback on a new venture idea. It covers: the process of finding new business ideas; how to research and vet a new idea; how to pivot an idea; how to build a business model around an idea; and how to ultimately pitch the idea to others. The workshop is targeted at students who do not have a new business idea or are in the very early stages of thinking about an idea. As part of the workshop, students will spend time helping classmates think through and improve their ideas. Students have the option to present their ideas at the end of the quarter to outside guests or submit a progress report.

STRAMGT 315. From Launch to Liquidity. 3 Units.

This course considers the challenges faced by start-ups in achieving liquidity. We take the perspectives of organizational behavior, marketing, and finance, and examine forks in the road faced by firms that have already launched products. Marketing topics include how to market firms for sale and calculating the addressable market. Organizational topics include hiring and firing, and the role of founders after sales. Finance topics include how the choice between sale and IPO affects value realized, and private equity exits.

STRAMGT 321. Create a New Venture: From Idea to Launch I. 4 Units.

This is an integrated lab course in Entrepreneurship designed to teach students the process of creating a new viable venture - from idea to launch. It is a dynamic and interactive course organized around projects undertaken by teams of 3 to 4 registered students from the MSx and MBA programs, together with other graduate students within Stanford who bring expertise of particular relevance to the idea being pursued. This course is designed not only for students with immediate entrepreneurial aspirations, but also for any student considering starting an entrepreneurial venture at some point in his or her career. The course is a two quarter class, with admission to the class by team and idea. In the winter quarter, teams will research, craft, and morph their idea into a viable business concept. In the spring quarter they will further refine their concept and develop a strategy and plan to attract financial, human and other resources. At the end of the spring quarter, teams will present their plan to a panel of experts and potential investors to simulate the funding process. The new course builds on a predecessor course S356 "Evaluating Entrepreneurial Opportunities" and encapsulates new and important research and findings as they relate to the process of new venture creation. The teaching method is primarily learning by doing (LBD) through a structured process and supported by relevant lectures. Learning is further enhanced through meetings with the instructor, coaching by experienced mentors and review by peers. Field research as well as prototype product development are integral to the course. Since admittance to S321/S322 is by team and the quality of their idea, team formation takes place during the autumn quarter. Informal student mixers and seminars will be held to facilitate team formation and idea generation. Each team of 3-4 students should preferably consist of 1 or more MSx students and graduate students from the MBA program or other Schools - Engineering, Medicine, Law, Science, Education - to bring diversity and depth to the team. The application-selection process is described on the S321/S322 website.

STRAMGT 322. Create a New Venture: From Idea to Launch II. 4 Units.

This is an integrated lab course in Entrepreneurship designed to teach students the process of creating a new viable venture - from idea to launch. It is a dynamic and interactive course organized around projects undertaken by teams of 3 to 4 registered students from the MSx and MBA programs, together with other graduate students within Stanford who bring expertise of particular relevance to the idea being pursued. This course is designed not only for students with immediate entrepreneurial aspirations, but also for any student considering starting an entrepreneurial venture at some point in his or her career. The course is a two quarter class, with admission to the class by team and idea. In the winter quarter, teams will research, craft, and morph their idea into a viable business concept. In the spring quarter they will further refine their concept and develop a strategy and plan to attract financial, human and other resources. At the end of the spring quarter, teams will present their plan to a panel of experts and potential investors to simulate the funding process. The new course builds on a predecessor course S356 "Evaluating Entrepreneurial Opportunities" and encapsulates new and important research and findings as they relate to the process of new venture creation. The teaching method is primarily learning by doing (LBD) through a structured process and supported by relevant lectures. Learning is further enhanced through meetings with the instructor, coaching by experienced mentors and review by peers. Field research as well as prototype product development are integral to the course. Since admittance to S321/S322 is by team and the quality of their idea, team formation takes place during the autumn quarter. Informal student mixers and seminars will be held to facilitate team formation and idea generation. Each team of 3-4 students should preferably consist of 1 or more MSx students and graduate students from the MBA program or other Schools - Engineering, Medicine, Law, Science, Education - to bring diversity and depth to the team. The application-selection process is described on the S321/S322 website.

STRAMGT 323. Design Thinking in the Context of Global Scale Organizations. 4 Units.

Driving innovation at large global organizations is extremely challenging. As organizations establish and become successful, the culture and processes calcify and resisting changes becomes the norm. As a result, organizations fail to reframe big problems, identify unmet needs and challenge the status quo. The goal of this course is to prepare students for design thinking in complex, globally distributed organizations. Specifically, the goal is to impart students with a personal sense of creative confidence but also (1) be confident in their ability to navigate global scale organizations that are multi-disciplinary and multi-cultural, (2) recognize patterns of resistant behavior, (3) create coalitions of support at different levels of the organization (and externally), (4) be willing to adapt, adjust and even drop what they have learned about design thinking for a particular situation, (5) be patient, gritty and have the tenacity to drive change and (6) leverage technology to come up with design solutions. Students in this course will work in interdisciplinary teams to work on projects that will be sponsored by external partners including for and non-profit businesses and government agencies. The projects will be on real world challenges that global scale organizations face and on finding solutions using design thinking principles and technology. This full immersion course provides the opportunity for students to get practical training in design thinking, solve big problems while also figuring out a way to leverage design thinking and technology to create a lasting and global impact.

STRAMGT 325. Starting and Growing a Social Venture. 4 Units.

This course is for students who may want to undertake an entrepreneurial career by starting and/or joining the senior management team of a social venture. It covers all phases of a venture - ideation and venture creation, resource acquisition, managing growth and harvest/exit. The instructors believe, for the most part, social ventures (which include both for-profit and non-profit structures) should be treated and managed like profit maximizing ventures, and many topics and themes encountered in this course will be similar to those covered in other entrepreneurial courses, such as Formation of New Ventures. Of course there are important differences related specifically to social ventures, some of which are critical to understand properly to effectively start and manage a social enterprise. We will highlight these differences throughout our sessions, so while that the lessons learned in this class can be generalized to all ventures, we do not advise you to take this class unless you really want to learn about social ventures. All the cases used in class and class discussions will be about early stage companies and organizations in the social venture space. Guests, both social entrepreneurs active in the field, and social impact investors, are heavily featured in class discussions and are an important part of the classroom experience.

STRAMGT 341. Achieving Social Impact. 4 Units.

Social Enterprise explores a range of leading issues focused on the challenges and opportunity for impact through social entrepreneurship. Students explore a range of organizations from nonprofits, to for-profits, to hybrid forms of organization, and examine issues from a variety of different perspectives, including those of entrepreneur, CEO, funder, and board member. Designed to appeal to students who seek to take on leadership roles in social value creation throughout their careers, whether as leaders in the private, nonprofit, or government sectors, or some combination thereof. Social Enterprise focuses on innovative approaches for creating social value through a variety of social enterprises. Cases explore the unique challenges of creating and leading social enterprises, particularly those that depart from traditional approaches to social value creation. The course modules encompass the following topics: Undertaking the Social Entrepreneurship Process; Mobilizing Economic and Human Resources; Achieving Social Objectives with Commercial Vehicles; Crafting Alliances; Managing Growth; Measuring and Managing Performance; Governing for Excellence. The course utilizes case studies and readings. There will also be frequent direct interaction with dynamic social entrepreneurs who will discuss challenges that they currently face in their organizations and who will share with students their experiential wisdom. For the course paper, students will carry out field-based research in teams, analyzing a significant strategic or operational issue of a social enterprise of their choosing. This field-based applied learning component in lieu of an exam has proven to be a particular enriching for students with high impact on the organizations.

STRAMGT 348. Creating and Managing Very Early Stage Ventures. 4 Units.

The early stages of a new venture pose special challenges and issues for founders. For some entrepreneurs, the questions are basic: Should I seek to start a new business? And, How can I find an idea worth pursuing? Later, the question is: How do I evaluate whether my (our) idea is worth pursuing? To answer these questions, it is useful for founders to have an integrated framework for evaluating new business opportunities. In this class we develop such a framework and show how it can usefully compare and contrast new product or service businesses. We also consider the very first steps startups must take. These include how startups can begin to accumulate resources, as well as early legal, organizational, personnel and financial issues that must be handled. The course is largely case-based. It is supplemented with lectures and guests. The target audience is students who are thinking about forming a new venture early in their career. This class is appropriate for first or second year MBAs who have not yet taken S356, as well as other Stanford graduate students.

STRAMGT 350. Global Value Chain Strategies. 4 Units.

This course addresses how the increasingly large number of firms that use or provide outsourcing and "offshoring" can create a sustainable competitive advantage. Students who complete the course will have a framework and a set of concepts that can be used to position a firm for strategic advantage in these supply networks. Positioning in and strategic analysis of product markets is covered in a variety of courses and books. A distinguishing feature of this course is that it addresses positioning and strategic analysis for firms operating as part of a network of providers, sellers and buyers... the factor markets. The course takes a general management perspective and provides examples through cases and discussions with visitors. The major theme of the course is that these firms must carefully consider how they position themselves in both the product and factor markets.

STRAMGT 351. Building and Managing Professional Sales Organizations. 4 Units.

The focus of this class is on the challenges and key issues associated with the creation and management of a professional sales organization. Our emphasis is developing and managing the selling effort of business-to-business and business-to-consumer capital goods and services. There will be relatively little emphasis on sales technique (i.e., students should not expect a course on "How to be a Better Salesperson"). The course is organized to follow the development of the sales function from strategic inception through to execution and implementation: choosing a go-to-market model (e.g., direct sales, VARs, OEMs, hybrid models); building and structuring the sales organization (e.g., sales learning curve, organizational structure, allocating territories and quotas); and managing the sales force (e.g., hiring/firing, compensation, forecasting, culture). We will address these topics in the context of both early stage ventures and later stage enterprises.

STRAMGT 353. Entrepreneurship: Formation of New Ventures. 4 Units.

This course is offered for students who at some time may want to undertake an entrepreneurial career by pursuing opportunities leading to partial or full ownership and control of a business. The course deals with case situations from the point of view of the entrepreneur/manager rather than the passive investor. Many cases involve visitors, since the premise is that opportunity and action have large idiosyncratic components. Students must assess opportunity and action in light of the perceived capabilities of the individuals and the nature of the environments they face. The course is integrative and will allow students to apply many facets of their business school education. Each section will have a specific focus, please select the instructor(s) with your interests: Leslie, Rachleff - High tech ventures; Ellis, Chambers, Childs - Diverse types of ventures; Foster - Diverse types of ventures; Siegel, Brady - High tech emphasis, but diverse types of ventures; Reiss, Chess - Very early stage ventures.

STRAMGT 354. Entrepreneurship and Venture Capital. 4 Units.

Many of America's most successful entrepreneurial companies have been substantially influenced by professionally managed venture capital. This relationship is examined from both the entrepreneur's and the venture capitalist's perspective. From the point of view of the entrepreneur, the course considers how significant business opportunities are identified, planned, and built into real companies; how resources are matched with opportunity; and how, within this framework, entrepreneurs seek capital and other assistance from venture capitalists or other sources. From the point of view of the venture capitalist, the course considers how potential entrepreneurial investments are evaluated, valued, structured, and enhanced; how different venture capital strategies are deployed; and how venture capitalists raise and manage their own funds. The course includes a term-long project where students work in teams (4-5 students per team) to write a business plan (or a business model canvas) for a venture of the team's choosing.

STRAMGT 355. Managing Growing Enterprises. 4 Units.

This course is offered for students who, in the near term, aspire to the management and full or partial ownership of a new or newly-acquired business. The seminar, which is limited to 40 students, has a strong implementation focus, and deals in some depth with certain selected, generic entrepreneurial issues, viewed from the perspective of the owner/manager. Broad utilization is made of case materials, background readings, visiting experts, and role playing. Throughout the course, emphasis is placed on the application of analytical tools to administrative practice.

STRAMGT 356. The Startup Garage: Design. 4 Units.

Startup Garage is an intensive hands-on, project-based course, in which graduate students will apply the concepts of design thinking, engineering, finance, business and organizational skills to design and test new business concepts that address real world needs. Our aspiration is to help teams identify an unmet customer need, design new products or services that meet that need, and develop business models to support the creation and launch of startup products or services. Even those teams that do not successfully launch a venture, or individuals who decide not to move forward, will learn critical, cutting-edge techniques about starting and launching a venture. Collaborative, multi-disciplinary teams will identify and work with users, domain experts, and industry participants to identify and deeply understand customer needs, then proceed to design products or services and a business model to address those needs. Each team will conceive, design, build, and field-test critical aspects of both the product or service and the business model. This course is offered by the Graduate School of Business. It integrates methods from human-centered design, lean startup, and business model planning. The course focuses on developing entrepreneurial skills (using short lectures and in-class exercises) and then applying these skills to specific problems faced by those users identified by the teams. Teams will get out of the building and interact directly with users and advisors to develop a deep understanding of the challenges they face and to field test their proposed services, products, and business models.

STRAMGT 359. Aligning Start-ups with their Market. 4 Units.

Most everyone associated with technology start-ups would agree that the most important initial characteristic of a successful endeavor is a compelling vision. The journey from vision to escape velocity is highly dependent on management's ability to translate that vision into a product or service that closely and economically addresses a customer's significant point of pain. Without a tight product market fit, the start-up's offering will not be able to break through the market's gravitational forces which strongly favor existing solutions, resulting in likely failure. With tight product/market fit, it is far more likely the company will achieve repeatable and growing sales success. Conventional wisdom dictates that a start-up launching a new product should focus its energy understanding what the market wants (problem) and then translating that knowledge into an optimal set of product features (solution). This is the ideal strategy if one is attacking a market that already exists. However if the start-up pursues an entirely new market or re-segments an existing market, customers are unlikely to be able to articulate the benefits and features they will need. The approaches required to pursue new or re-segmented markets are radically different from those applied to existing markets. As a result it is not relentless execution and exploitation of a well understood market that will lead to success, but discovery of a new market or segment that is in need of the product as envisioned. If done well, this process of finding the optimal product/market fit has a disproportionate impact on success. Our intention is to create a course that explores the many issues associated with optimizing product/market fit. Two group papers comprise 50% of a student's grade with class participation representing the remainder. STRAMGT 353 is recommended prior to taking this course.

STRAMGT 365. Strategic Decision Making. 4 Units.

This compressed course concerns the analysis of strategic decision-making, with an emphasis on the process of "big stakes" analysis in complex corporate settings. The first week is devoted primarily to the tools of this process and to coping with (strategic) unawareness (especially in competitive situations). The second week is devoted primarily to "learning by doing," as we apply the tools developed in the first week to real-life problems. The overall objective of the course is to develop the student's working knowledge of these techniques, so the student can fruitfully apply these techniques on his/her own. The course may be taken as a two-unit compressed course by signing up for STRAMGT 565 and participating in the first week only. Alternately, students may sign up for both weeks, by registering for STRAMGT 365. Students who sign up initially for STRAMGT 565 will be able to decide late in week 1 whether to continue into week 2 (in effect, these students will have the registration changed from 565 to 365). Note that, in the registration process, students who rank STRAMGT 365 will have a greater chance of getting a spot than students ranking STRAMGT 565. (It will not be possible to change in midstream from 365 to 565, i.e., to drop the second week.) Students will be expected to do approximately 90 minutes of work outside of class each day both weeks. A group project will be the main work product in the second week. The course will be taught jointly by Carl Spetzler, Chairman, Strategic Decisions Group and Professor Yossi Feinberg.

STRAMGT 366. The Startup Garage: Testing and Launch. 4 Units.

Teams that concluded at the end of the fall quarter that their preliminary product or service and business model suggest a path to viability, continue with the winter quarter course. In this course, the teams develop more elaborate versions of their product/service and business model, perform a series of experiments to test the key hypotheses about their product and business model, and prepare and present an investor pitch for a seed round of financing to a panel of seasoned investors and entrepreneurs. The key premise for the course is that a robust venture creation process involves development and validation of a series of hypotheses about a new product or service, its value proposition, and how the business will acquire customers, make money, scale up to achieve profitability, and raise funds to achieve the key milestones to profitability. In Startup Garage: Testing and Launch, teams will learn how to precisely formulate these hypotheses and early stage milestones, and how to test them using one or more of the following low-cost approaches: a) online experiments with minimally viable products; b) interviews with partners, advisors, investors, and business experts; c) analogies from existing businesses that were successful in proving hypotheses that are analogous to what the new startup wants to prove. The course focuses on further developing entrepreneurial skills using the same pedagogical approach used in S356: short lectures, extensive in-class exercises focused on each team's specific projects, and 'get out of the building' assignments. Teams will have the opportunity to:

- Get out of the building and interact with users, advisors, investors and partners to develop a deep understanding of the challenges they face, to field test their proposed services, products, and business models, and to gather data.
- Interpret the data and make important startup decisions in the context of their own project: pivot, persevere, or perish
- Develop creative go-to-market strategies and test their effectiveness
- Develop and deliver in front of real investors an investor pitch, elevator pitch and executive summary
- Negotiate term sheets with venture investors
- Develop a hiring plan for their first year of operation and consider equity and other compensation plan.

STRAMGT 367. Social Entrepreneurship and Social Innovation. 3 Units.

This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ "entrepreneurial skills," such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all else. We will study some of the most promising and the best-proven innovations for improving people's lives. We will also examine mature projects that are now tackling the issue of "scale", moving from local innovations to solutions that create deep systemic changes for larger numbers of economically disadvantaged individuals and communities throughout the world. This year we will focus on what are the constraints and opportunities for creating a social enterprise at scale. The process of "scale" poses tremendous challenges. Even when organizations manage to overcome the many obstacles to growth, and achieve appreciable scale, this approach is seldom sufficient to achieve significant social impact on its own. This year our course will pay particular attention to network approaches which require the mobilization of a vast array of actors and resources, but have the potential to generate rapid and sustained social impact.

STRAMGT 368. Strategic Management of Nonprofit Organizations and Social Ventures. 4 Units.

This course seeks to provide a survey of the strategic, governance, and management issues facing a wide range of nonprofit organizations and their executive and board leaders, in the era of venture philanthropy and social entrepreneurship. The students will also be introduced to core managerial issues uniquely defined by this sector such as development/fundraising, investment management, performance management and nonprofit finance. The course also provides an overview of the sector, including its history and economics. Cases involve a range of nonprofits, from smaller, social entrepreneurial to larger, more traditional organizations, including education, social service, environment, health care, religion, NGO's and performing arts. In exploring these issues, this course reinforces the frameworks and concepts of strategic management introduced in the core first year courses. In addition to case discussions, the course employs role plays, study group exercises and many outsider speakers.

STRAMGT 369. Social Entrepreneurship. 4 Units.

This course is about the efforts of private citizens to create effective responses to social needs and innovative solutions to social problems. History is full of examples of this kind of activity, though its character continues to evolve. Social entrepreneurs are increasingly blurring the lines between the sectors, using for-profit and hybrid forms of organization to achieve social objectives. This creates new opportunities for applying business skills in the social sector. Despite its prominence and complexity, this combination of private initiative and public purpose is not well understood. The objectives of this course are: (1) to introduce students to the concepts, practices, and challenges of social entrepreneurship in the United States and around the world; (2) to equip students with frameworks and tools that will help them be more effective in their socially entrepreneurial pursuits, and (3) to engage students in a joint learning process as a better understanding of this emerging field is developed by all in this class.

STRAMGT 371. Strategic Management of Technology and Innovation. 4 Units.

This course focuses on the strategic management of technology-based innovation in the firm. The purpose is to provide students with concepts, frameworks, and experiences that are useful for taking part in the management of innovation processes in the firm. The course examines how they can be managed effectively. Specific topics include: assessing the innovative capabilities of the firm, managing the Corporate R & D function, managing the interfaces between functional groups in the development function in the firm, understanding and managing technical entrepreneurs, building technology-based distinctive competencies and competitive advantages, technological leadership versus followership in competitive strategy, institutionalizing innovation, attracting and keeping corporate entrepreneurs.

STRAMGT 373. Strategic Thinking in Action --- in Business and Beyond. 4 Units.

The seminar's aim is to develop participants' ability to create strategically informed action plans that are imaginative, inspiring and workable in highly dynamic environments. The seminar's pedagogy involves informed debate to evaluate and hone well-researched views by the participants and instructors, as well as the writing and presentation of position papers by small groups of seminar participants on the seminar's focal theme. Andy Grove will continue to participate as co-instructor of the seminar, but at a reduced level. In the course of the seminar discussions, we aim to deepen our understanding of strategic dynamics and transformational change at the societal, industry and organizational levels of analysis. In fall 2010, the focal theme of the seminar will be "The Future Role of Silicon Valley: Prospective Strategic Analyses." Within the overarching theme, we will research four sub-themes. Domain experts for three of the sub-themes have committed to co-leading the related sessions with the instructors (see below). The four sub-themes are: 1. The role of Silicon Valley in the future of the semiconductor industry. George Cogan, Partner at Bain & Company and expert of the semiconductor industry, will co-lead this sub-theme. 2. The role of Silicon Valley in the future of the computer industry. Tien Tzuo, CEO of Zuora Inc. and expert of SaaS and cloud computing, will co-lead this sub-theme. 3. The role of Silicon Valley in the future of the automotive industry. Sven Beiker, Executive Director of the Center for Automotive Research at Stanford - CARS, will co-lead this sub-theme. 4. The role of Silicon Valley in the future of U.S. Employment. Andy Grove will lead this sub-theme. Two seminar sessions will be devoted to each sub-theme. The first session will be led by the instructors. It will involve discussion of reading material and data and focus on refining the key research questions for the sub-theme. The second session (4 weeks later) will be led by the student team carrying out research on that sub-theme. Seminar participants will organize into four teams, each one focused on a sub-theme. Each team will research the forces that are shaping the evolving role of Silicon Valley in relation to their sub-theme, try to assess the implications of that evolution for the future of the U.S. economy, and propose executable recommendations for strengthening Silicon Valley's future role. Each team will be expected to produce a monograph (10-15 pages) presenting and discussing its findings and recommendations, to be handed in at the end of the quarter.

STRAMGT 376. Entrepreneur Leader-Identity Development: A Critical-Incident Approach. 4 Units.

Entrepreneurship can be an exhaustive experience. This course is structured to provide valuable skills and strategies aimed at enabling aspiring entrepreneurs to mitigate personal burnout while in pursuit of new ventures. In terms of this course, an entrepreneur is defined as a person who risks mobilizing resources to capitalize on a perceived opportunity of value-creation-change. A "social entrepreneur" creates social value, a "business entrepreneur" creates profit, and a "hybrid entrepreneur" blends the two. This course will tailor student's class work to fit his or her entrepreneurial orientation. Students who opt to focus their coursework on social or environmental entrepreneurship may petition to have this course count toward the Certificate in Public Management and Social Innovation. Research is showing that a significant career hazard of entrepreneurship is emotional burnout- exhaustion from raising capital, growing new teams, competing with established players, and more contributes to the challenges of entrepreneurship. The goal of this course is to teach students how to identify and develop an increased capacity in emotional resilience as a means of mitigating burnout in oneself and in the diverse "community of actors" one is attempting to mobilize into concerted action aimed at value-creation-change. Research is also showing that one of the key causes of chronic stress is leader-identity development: when men and women of diverse-identities - different from the dominant-identity, engage in value-creation-change within a given community of practice and context, chronic adversity is a given. The effort of diverse-identities to lead value-creation-change introduces a chronic re-evaluation and re-definition of 'leader' within the given culture. From a global perspective this chronic adversity dynamic is especially true for women leaders. For men and women of diverse-identity, this dynamic is a consequence of power inequity. Both the diverse-identity and dominant-identity leader need to strategically anticipate and proactively address this dynamic in order to sustain his or her role as an agent of value-creation-change. Using the "critical-incident empathetic-inquiry" approach students will interview aspiring and practicing entrepreneurs on how they successfully recovered from, adapted to, and sustained perseverance in the face of situational and chronic adversity. These interviews will be recorded and analyzed from both a content and emotional decision-making perspective. Particular attention will be paid to how the practice of "empathetic-inquiry" in itself is a learnable micro-intervention with the potential of alleviating stress, supporting recovery, and sustaining effort. It is presented, taught, and practiced as a fundamental "emotional literacy" entrepreneur leadership skill. From a diversity perspective, students will also be exploring how unsupported leader-identity development within a given cultural context and community of practice can be a major cause of stress and burnout. Via the "critical-incident empathetic inquiry" process students will focus on interviewing and learning from "exemplars" with whom they identify, with the aim of learning from "exemplars" personal leader-identity journey. This course enables students to be practitioners of "empathetic inquiry" in entrepreneurial contexts in order to provide an added advantage to GSB students pursuing entrepreneurship after graduation and beyond.

STRAMGT 378. Strategic Leadership of Nonprofits. 4 Units.

Formulating, evaluating, and implementing mission and strategy. Case studies from nonprofits in social services, health care, education, and arts and culture. The interaction of strategy and mission, industry structure and evolution, strategic change, growth and replication, corporate strategy, governance, commercialization, alliances, capacity building, and leadership. Same as: EDUC 377D

STRAMGT 381. Leading Strategic Change in the Health Care Industry. 3 Units.

This seminar provides the opportunity for students to study the structure and dynamics of the U.S. health care industry, and some of the ways it intersects with the global health care industry. The U.S. health care industry represents over 15 percent of the nation's GDP and is rapidly changing as a result of government regulatory reform enacted in 2010. The seminar's aim is to develop participants' ability to create strategically informed action plans that are imaginative, inspiring and workable in this highly dynamic environment. The seminar's pedagogy involves informed debate to evaluate and hone well-researched views by the participants and instructors, as well as the writing and presentation of position papers by small groups of seminar participants on the key dynamics of the industry. In the course of the seminar discussions, we aim to deepen our understanding of strategic dynamics and transformational change at the societal, industry and organizational levels of analysis. After developing a complete picture of the structure of the health care industry and the strategic relationships among the key players - the strategic landscape -, the seminar will focus on how health care reform and other external forces will affect the strategic opportunities and challenges of four types of players in the strategic landscape: (1) Incumbents (e.g., pharmaceutical companies, hospital companies, insurance companies); (2) entrepreneurial startups (e.g., home monitoring, genetic testing companies, information services); (3) cross-boundary disruptors (e.g., health clinics, Wal-Mart, Cisco, Google); and (4) international health care providers (e.g. in Mexico, India, Thailand) Four student teams will be formed to focus on one of the four types of players. Each team will prepare a research paper focused on determining how their type of player can take advantage of the regulatory, technological, social, cultural and demographic changes, and who will be the likely winners and why. During the first round of discussions (sessions 2-5) all participants will take part in examining the different parts of the competitive landscape. During the second round (sessions 6-9), the different teams will present their research findings and perspectives about the strategic opportunities and threats which exist. As part of the second set of sessions, the instructors will bring in domain experts to further augment the discussion.

STRAMGT 508. Entrepreneurship from the Perspective of Women. 2 Units.

There are now over a dozen courses taught on entrepreneurship at the GSB. These courses cover a wide range of topics of interest to the budding entrepreneur and venture capitalists. But what unique challenges do women face when approaching entrepreneurship? This seminar will showcase successful women entrepreneurs and the challenges they encountered in funding, communication styles, lifestyle balance, and paths to success. We will do so with mini-cases, panel discussions, readings, and some social time with experienced entrepreneurs. Men are also welcome to enroll.

STRAMGT 512. The Yin and Yang of Family Business Transitions. 2 Units.

This seminar provides students with practical solutions to some of the challenges faced in family business transitions. Family businesses are by far the dominant form of commerce world-wide, albeit the majority are small "mom and pop shops." Some research shows that large businesses, whatever the form of ownership, have an average lifespan of around forty years, while small businesses (at least in Japan and Europe) average around twelve years. So, if businesses in general do not survive, then it is a wonder that any family business can survive from one generation to another, let alone two, three, four or more. There are three essential requirements to succeed in a family business transition. First, it may seem obvious that the business must succeed, but it is less obvious what advantages a family business has over its non-family-owned counterparts. Second, the ownership structure must effectively maintain family cohesion and support the business. Finally, family members need to organize in thoughtful ways to work effectively with one another. The beauty of a family business is that it can be more profitable than companies with non-family ownership. Two fundamentals, at least, provide this advantage - a strong value system and a long-term economic perspective. The operative word above, however, is "can"; it is by no means a foregone conclusion that a family business will be more successful. Families must thoughtfully develop their advantages, while at the same time avoiding the pitfalls that are inherent in any family business. Accordingly, this course is offered for students whose families own a family business or who are interested in the special challenges faced by family businesses. International students are encouraged to register as different cultural perspectives to family business will enrich the experience for everyone. Particular focus will be given to the transitions from one generation to another and the lessons learned that can be applied during the entire life of the business.

STRAMGT 513. New Venture Pitch Workshop. 2 Units.

This workshop provides students with a forum through which they can develop and receive feedback on a new venture idea. Class time will be devoted to understanding how to improve the viability of a new venture idea and how to present that idea clearly to others. At the course conclusion, students will present their idea to others in the class and outside guests. The workshop can handle up to 15 ideas or teams; you may develop your own idea and pitch, or partner with other students. You must have your team formed before registering for the course. Note: students should be pitching ideas that are at an EARLY stage, ones that have not been pitched previously or are existing businesses.

STRAMGT 514. The Improvisational Entrepreneur. 1 Unit.

Improvisational acting (i.e., improv) requires fast, flexible, and creative thinking; intense listening and effective self-presentation; and the ability to act without fear of failure. These skills are also vital for being a successful entrepreneur. In this class, you will learn techniques of improvisational acting that can transform your thinking about business and your approach to life.

STRAMGT 516. Fundamentals of Effective Selling. 2 Units.

The primary objective of this course is to introduce students to the fundamentals of how to sell and to what selling is truly about. The course is appropriate for anyone who wants to understand and show proficiency with the skills required by different selling situations (e.g., direct sales of products and services, selling oneself in an interview, raising money for a new venture, running a company as CEO, etc.). The course looks at the entire selling process of lead generation, prospecting, qualifying, discovery, understanding and selling value, customizing presentations, objection handling, negotiation and closing, and demonstrates how curiosity plays a critical role in every stage of the process. This is not a typical GSB case-study-based course. Students who have taken the class describe it as a hands-on, skill-based class. As students in this class, you will work together in groups outside of class to complete team-based exercises designed to introduce you to selling fundamentals in each stage of the selling process. You will be practicing and utilizing newly learned skills in real life each week; there will be lots of repetition. You will then come together in class with the instructors to share and process the learning from these exercises.

STRAMGT 517. Topics in Digital Business. 2 Units.

This class will guide students through in-depth research projects focusing on specific case studies of digital businesses, where students select topics individually or in teams. The research projects must be framed using principles from economics and strategy. The course will review conceptual frameworks from the economics of platform markets, such as economies of scale, network effects, entry strategies for new businesses as well as defensive strategies by incumbents. Possible topics include financial technology, virtual currency, internet marketplaces, the sharing economy, online advertising and advertising technology, big data, and analytics.

STRAMGT 524. Strategy Implementation. 2 Units.

The seminar is built around five company visits to some of the most innovative firms in Silicon Valley. We visit their location, meet with mid-level managers who are encouraged to engage us in candid conversation about the challenges facing the company, and the challenges they personally face on a daily basis to implement their firm's strategy. Key questions include: What is the role, if any, of middle-managers in helping to formulate strategy? How is the strategy communicated to employees? In what circumstances do middle-managers explicitly invoke the strategy, if at all? What role do middle-managers play in strategic change? Do you distinguish financial and strategic health in your business? If so, do you quantify strategic health? How important is culture to the company's success and how do you reinforce this? What challenges have you faced in managing growth and organizational change at your company? What are the challenges to managing innovation in your company? The seminar will be particularly useful to students interested in strategy consulting or line management positions where you will participate in the strategy process, or any kind of implementation role. Each day we will spend time in class before each company visit to discuss a reading, the company background, and share reactions to the day's visit (this is an especially important aspect of the experience). In the past we have visited: Apple, Cisco, Facebook, Google, Ideo, Tesla and Yahoo!, among others. We plan to organize the same or similar visits this year.

STRAMGT 526. Managing to Outcomes in Government, Education, and Nonprofit Organizations. 2 Units.

This course focuses on actionable measurement in government agencies, non-profit organizations, and schools. Actionable means that the measurement is used by managers and other stakeholders to make decisions, influence behavior, and hold agents accountable. The course explores the intersection of several ideas that seem to be in some tension with each other. (1) You can't manage what you can't measure, (2) Measurement is expensive and its results are often ignored, (3) Not everything that counts can be counted and not everything that can be counted counts (apocryphally attributed to Einstein), (4) The more any quantitative social indicator is used for decision making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor. (Campbell's Law). Among other things, we will consider logic models, theories of change, strategic design, monitoring and evaluation, social impact measures, performance contracting, and techniques for improving the behavior and accountability of individuals and organizations. The classes will be taught mainly through case studies that place the students in the position of managers and stakeholders called upon to make decisions. We will examine the challenges of managing to outcomes in various contexts, including government agencies (e.g., police departments), nonprofit organizations, and schools. We will also look at innovative funding vehicles that depend on measuring outcomes, such as conditional and unconditional cash transfers, pay for performance schemes, and social impact bonds.

STRAMGT 527. Product Entrepreneurship. 2 Units.

What distinguishes conventional products from hits? The class builds a framework for taking instincts through to idea phase and finally to creation of breakthrough products in creative and online markets. It will begin by dissecting the mechanics of successful video game design, which will then be extended to broader application in the launch of consumer products in a variety of markets and contexts. The objective is to systematically analyze the DNA of a hit product, from product design and testing through to post launch challenges and rapid scaling. We will focus on product attributes as they relate to consumers, organizational challenges, intermediators and, more broadly, the strategic competitive environment.

STRAMGT 531. Venture Capital and Innovation. 1 Unit.

In this course, we will investigate to what extent venture capital (in the U.S. elsewhere) fosters innovation as well as how other types of financing can drive or hinder innovation. Our discussion will be based on most recent academic and industry empirical evidence, as well as illustrative case studies. We will start with discussing venture capital as an industry, explain the organizational structure of venture capital firms as well as incentives of different players in the industry. We then explore in more detail how we can measure innovation and the relationship between VC industry and innovation activity.

STRAMGT 532. Intellectual Property: Financial and Strategic Management. 2 Units.

In today's competitive marketplace, companies -- from Fortune 500 firms to early stage start-ups -- rely on intellectual property (IP) to keep them one step ahead of the game. The role of IP as a strategic business asset has been punctuated by the recent multi-billion dollar deals and acquisitions involving patent portfolios, as well as the fierce Mobile market patent wars raging in courts around the world. This class will explore the value of corporate IP assets by thinking strategically about how to effectively leverage the knowledge, trade secrets, patents, technologies, trademarks, structures and processes that are critical across industries. We will focus on the elements of a successful IP strategy, and how that strategy is shaped by economic, strategic, legal, regulatory, and market factors. Through a combination of case studies, class discussion and guest speakers, we will cover a variety of issues shaping a successful IP strategy in today's global business environment. Some of the topics we will cover include: * Building and managing an IP portfolio that is aligned with business objectives; * The innovation cycle and technology transfer mechanisms; * IP portfolio monetization strategies (e.g., licensing, sale, enforcement); * IP considerations in Mergers & Acquisitions; * Tax planning related to IP (e.g., cross border transfer pricing, IP holding companies); * Managing corporate IP litigation risk; * Patent reform and the role of the U.S. Patent & Trademark Office (USPTO); * IP rights challenges while doing business in developing countries; * IP strategies for start-ups & entrepreneurs. Ms. Efrat Kasznik is an IP valuation and strategy expert with more than twenty years of experience advising companies of all sizes, from startups to Fortune 100s, on extracting value from their IP. She is the founder and President of Foresight Valuation Group, an IP consulting and startup advisory firm providing valuation and strategy services for a range of purposes, including M&A, financial reporting, technology commercialization decisions, tax compliance, transfer pricing, and litigation damages. Ms. Kasznik has been a co-founder, CFO and advisor to several startups and incubators in the US and Europe, including the Stanford Venture Studio at the GSB. She is listed on the IAM 300 list of World Leading IP Strategists, and is a member of the leadership committee of the High Tech Sector, Licensing Executives Society.

STRAMGT 533. Strategizing in Creative Industries. 1 Unit.

Creative success is highly unpredictable; but creativity is increasingly becoming a source of competitive advantage in a variety of markets, from music and film, to new media, video games and software. Creative competitiveness brings with it a set of unique strategic challenges. How do you anticipate market reaction when there are no agreed-upon criteria for evaluating quality? How are barriers to entry retained, or overcome, in industries pervaded by reputation and status? How can creative talent be managed effectively under such circumstances? And what are the strategic implications of emerging digital technologies on the dynamics of creative markets? This course is intended for students interested in understanding these issues, especially from the point of view of new entrants. It focuses primarily, though not exclusively, on the intersection between traditional creative markets such as music and film, and digital technology. We will explore recent cases of innovative startups on the forefront of digital media; of companies intermediating between producers and consumers such as social movie services and online radio; and on the strategic analysis of creative markets. In particular, we will explore insights from recent research on consumer taste and how identity impacts success in creative domains.

STRAMGT 535. Entrepreneurial Approaches to Education Reform. 2 Units.

This course will investigate the ways in which entrepreneurs have and could transform K-12 public schooling in the United States, a \$650 billion dollar industry that has a direct and long-term effect on nation's economy, democracy and culture. We will explore how human capital solutions, new schools, and technology products can all dramatically improve student learning and solve pain points. We will study a variety of ways to evaluate the efficacy, scalability, and financial sustainability of entrepreneurial enterprises serving students, families, educators and administrators in public education. The course will feature for-profit, not-for-profit, as well as double-bottom-line organizations. This course is suitable for students aspiring to be entrepreneurs, leaders in entrepreneurial organizations, leaders in educational organizations, donors or investors. Gloria Lee is a serial education entrepreneur who co-founded Aspire Public Schools, Teaching Channel, and Yu Ming Charter School. She is currently Chief Operating Officer at NewSchools Venture Fund.

STRAMGT 536. The Startup Garage: The China Version. 1 Unit.

A condensed version of Startup Garage focused on exploring entrepreneurial opportunities in China. Stanford teams will work jointly with students at the Graduate School of Management at our partner, Peking University (PKU). The teams' goals will be to identify a business startup model that has been successful in the US and explore how to modify and transplant that model for the Chinese market. We will be meeting in our immersive classroom at the GSB, and we will connect with our partners at their classroom in the Stanford Center at Peking University. The course will begin with a workshop that introduces the key concepts taught at Startup Garage: empathy, ideating, prototyping and testing of the complete business model. Teams will apply in a rapid fashion all steps of the Startup Garage process to their business idea. Because a central element of the Startup Garage is to get out of the building, the partnership with PKU will enable the teams at Stanford to have access to on the ground, out-of-the-building, real time information. The process will culminate into a short presentation summarizing each team's assessment about the viability of the business idea and immediate next steps. At the end of the course, teams who wish to continue exploring their business idea can join the fall quarter version of Startup Garage and maintain their collaboration with their PKU team. Teams will be formed within the course, and they will be advised by our network of Startup Garage advisors, which includes investors with experience in the Chinese market, as well as advisors and faculty from PKU. Instructor: Stefanos Zenios Stefanos Zenios is a professor at the GSB and the director of the Center for Entrepreneurial Studies. He is the lead architect of Startup Garage, an experiential second year elective in which teams of students explore new business ideas by using a combination of design thinking and lean startup tools. He is continuously exploring ways to apply the Startup Garage process to different entrepreneurial challenges, including the challenge of exploring entrepreneurial opportunities in emerging economies.

STRAMGT 537. Leading Change in Public Education. 2 Units.

Public education in America is at a crossroads. Does our education system have what it takes to produce graduates who are prepared for college, career, and citizenship in our increasingly digital and pluralistic world? Will income and ethnic achievement gaps continue to be pervasive and persistent in our nation's largest urban cities? Will family zip code determine educational destiny for the next generation of students? How will technological advances that have disrupted so many other sectors affect American public education? Which strategies and reforms are truly demonstrating results and which are merely passing fads? As in all large-scale enterprises undergoing rapid, transformative change, leadership matters greatly. Fortunately, over the last decade, the reform of American public education has been led by a number of innovative and results-oriented leaders at the state, district and charter levels. These leaders are bringing additional urgency, strategies, and ideas designed to prepare America's schools and her students for the century ahead. Some ideas are proving to be critical levers for change, others are facing significant political challenges, and others have not delivered on expected results. Many of them hold lessons for how future educational leaders can contribute to transforming public education for the next generation of K-12 students. This course will focus on school system leadership for education reform. The course will provide an overview of the critical issues facing K-12 public education in America today, and what is going on across the U.S. during this transformative period of change. Once this context is set, students will study education leaders and systems change strategies from the last 10-15 years at the state, district and charter levels. We will focus on leaders across five domains: Leadership in crisis situations, strategic leadership, "china-breaking" leadership, sustaining leadership, and next generation leadership. We will also look at leadership examples from outside K-12 education to broaden our thinking about what leadership styles and strategies could be effective here. Students will debate the strategies and efficacy of how different leaders approached systems-level change and will form their own working hypotheses of what is needed to help transform the American education system. Case studies in school system leadership will form the primary basis for classroom assignments and discussion. We will examine what went right and what went wrong in each case, focusing particularly on the decisions that school system leaders faced and the implications of their decisions. Most cases will be supplemented with research publications, technical notes, news clips, and/or videos to deepen the students' understanding of the context or issues discussed in the cases. Dan Katzir worked for Bain & Company, Teach for America and Sylvan Learning Systems before joining The Broad Foundation as its founding managing director. He is an experienced case study teacher and the editor of "The Redesign of Urban School Systems" (Harvard University Press, 2013). Please note that for two of the nine weeks, this course will meet on Wednesday instead of Monday: Wednesday, May 20 (instead of Monday, May 18) Wednesday, May 27 (instead of Monday, May 25, which is Memorial Day).

STRAMGT 538. Financial Technologies. 2 Units.

This class will provide an overview of the rapidly evolving world of financial technologies. New market entrants are promising to change the way we borrow, save, invest, and transact. Incumbents enjoy substantial market power but are struggling to keep up technologically as they wrestle with antiquated core infrastructure. We will analyze the emerging competitive landscape and the strategic dynamics in play. The class will begin with a short review of digital platform economics in which we will cover basic concepts such as network effects and economies of scale. We will then dive into a series of case studies and industry analyses. Particular attention will be paid to the areas of payments, alternative credit, and virtual currencies.

STRAMGT 542. Entrepreneurial Investing in Health Care. 1 Unit.

Investing in the healthcare sector is fraught with idiosyncratic challenges. First, the sector is very diverse and it spans biopharmaceuticals, medical devices, diagnostics, health care information technology, and health care services. Second, business models are evolving: business-to-business, business-to-physician, Business-to-patient, Business-to-business-to-patient, Business-to-business-to-physician, etc. Third, the sector is exposed to strong nonmarket forces: regulatory and reimbursement which are important elements to one's investment thesis. These challenges are amplified when investments focus on either early stage private ventures, or small capitalization public companies. Yet the possible returns for early stage and small cap investors are significant: fledgling healthcare companies can grow to multibillion business and can have a long and lasting impact on people's life and wellbeing. Topics to examine in the seminar include- Investment criteria that investors use to screen investment opportunities in this sector. Specific issues in biotech, medical devices, and services will be addressed. How early stage ventures evolve as they mature and how the investment criteria change with the stage of the company. How the investors change with the stage of the company: venture capitalists, private equity, public markets. We will examine these topics through a combination of guest presentations, lectures, and practical applications to real investment opportunities. Tentative List of Speakers: Mike Kaplan (MMC Health Services); Noah Knauf (Warburg Pincus Health Care Group); Oleg Nodelman (EcoR1 -Capital value-oriented biotech investment fund); Tom McKinley (Cardinal Partners); Peter Ehrich (Crassey & Co); David Kim (Ghost Treen Capital); Marc Galetting (Longitude Capital); Anne DeGheest (Health Teach Capital) Instructor: Stefanos Zenios Stefanos Zenios is a professor at the GSB and an expert on health care systems and the on innovation processes. He has completed a study in which he has developed a data driven methodology that can be used by investors to identify predictors of success in early stage ventures. He will share his research findings with the class.

STRAMGT 543. Entrepreneurial Acquisition. 2 Units.

For aspiring entrepreneurs who don't have a burning idea or desire to start a company from scratch, acquiring a small business can provide a direct route to running and growing a business. This class will explore entrepreneurial acquisition (EA). As the course covers topics such as what makes a good industry, raising capital, how to source deals, dealing with investors, due diligence, and negotiation, the course is also applicable to those interested in private equity, venture capital, start-ups, and general management. The class relies heavily on the case method, and each class includes guests (often the case protagonists) who bring practical and current experience to the classroom. The two group projects are intended to be highly practical, simulating real-world situations. Professors Dodson and Kelly each have over 20 years of experience in the subject matter.

STRAMGT 544. Scaling Excellence. 2 Units.

The premise of the course is that managers are concerned with how to scale excellence in organizations and that scaling skills are essential for any leadership role. It will be taught with Shantanu Narayen, the CEO of Adobe. The course is designed to appeal to a wide range of audiences: students seeking to build new organizations, or turn around poorly performing organizations, or grow existing organizations to greater heights. We will focus on how to transform the footprint of a firm, and yet, not lose the mindset. Executives also need to think about to spread 'good behaviors' and make them widespread very quickly, and conversely, on how to shrink bad behaviors and make them small very quickly. This course aims to train students into becoming effective leaders of organizational change. We will use a mix of cases written specially for the course, and 'live cases' with guest speakers from the C-Suite.

STRAMGT 545. Ensuring Social Innovation Scales: Across Borders, Across Sectors, and Across "the Valley of Death". 2 Units.

The world has made great progress in addressing some of the globe's challenges, but we have much more to do -- only possible by developing and scaling new technological and social science interventions. Over the past three decades, we have applauded many breakthrough research, design and technology innovations, and more recently we have witnessed an encouraging commitment to strengthen health, education, finance and other systems to support reaching "the last mile" of development. With this barbell approach, however, we have often ignored, misunderstood and under-invested in the critical, tough and unsexy challenges crossing the middle of the value chain -- innovation's valley of death: product and system adaptation and evaluation; evidence generation and design validation; formal or informal regulatory approval and registration; and the appropriate design, introduction and optimization of the intervention's uptake of before markets, governments or other systems can truly take them to scale. This class will use an inter-disciplinary approach to look at a variety of economic, scientific, and systemic factors that pull innovation forward, that push it from behind, and often to the world's detriment block its successful implementation and scaling. Grounding the work on both traditional and emerging research and theories on social change and development, we would apply real world experiences and several important case studies in order to examine the way good ideas get stuck advancing to real solutions, and how innovations fail to scale to make any meaningful impact on outcomes that matter. We will also examine the root causes for these challenges. More important, we will focus on innovations and methodologies that have overcome these barriers, where we have witnessed both simple and complex innovations reach literally millions or even billions of lives. The seminar will involve a combination of lectures, case studies, visiting lecturers, and a project tackling a particular aspect of a specific problem. While the aperture on innovation theory would be quite wide across multiple sectors and models, the focused case examples would be derived from global health innovations. Our goal is to help the next generation of social innovation leaders think more about some of the mistakes of the past, and lessons for the future, and new ways of approaching old problems, all from a practitioner's point of view.

STRAMGT 546. Small Business Strategy. 2 Units.

This course will develop Business Strategy frameworks, some of which will be familiar from the core Strategy class and others of which will be new, and apply them to small businesses. Some of the businesses we will look at will be established businesses that will always be small, others will be family businesses, and some will be start-ups that hope to scale. Each session, we will spend some time developing frameworks based on required reading. Then we will analyze individual companies using a combination of written case studies, video and audio excerpts of interviews with small business owners, and guest speakers (or, if feasible, company visits). Issues we will consider include:

- What makes a business scalable?
- When are barriers to entry feasible and sustainable?
- How can a firm differentiate itself? How might that limit growth?
- What can small firms do effectively that large organizations cannot?
- How do organizational issues such as incentives, hiring, and delegation limit growth and/or create advantages for small companies?

 Grades will be based on class participation, a short written assignment applying concepts from the class, and a take-home exam. For background on the instructor's small business strategy project, see <http://www.roadside-mba.com/>.

STRAMGT 547. Entrepreneurial Opportunities in Developing Economies. 2 Units.

As technology-driven ventures are having more and more impact, entrepreneurial ecosystems have been developing in recent years around the developing world. Following the lead of Silicon Valley, the most developed and sophisticated ecosystem of all, these newly formed industry networks that include universities, incubators and accelerator programs, angel investor networks and venture capital firms can now support local entrepreneurs and innovation better than ever before. As developing economies grow and get more sophisticated, entrepreneurial opportunities arise across markets and industries. Despite this fertile ground for new endeavors, entrepreneurs face particular challenges and risks that they would not encounter in Silicon Valley.

STRAMGT 552. Angel And Venture Capital: Financing and Decision-Making. 1 Unit.

This course covers some of the stages of investment in early stage high-growth companies, especially the seed funding of a novel idea to initial venture capital rounds. We will concentrate on how investors and entrepreneurs make and should make important decisions at different stages and on typical mistakes. Some questions that we will discuss are: How do angels and VCs generate and process their deal flow and select companies? What are typical mistakes of entrepreneurs in raising capital and negotiating with financiers? How do VC funds operate and make decisions? How are VCs involved in business decisions such as recruiting talent and replacing CEOs? What are the important provisions of financial contracts between VCs and founders? How to value early-stage companies? The course is mostly case-based. The course is for those who want to become entrepreneurs and thus likely consumers of angel and VC financing and those who want to pursue a career in the financial services industry. No prior knowledge of the VC industry is needed.

STRAMGT 554. Entrepreneurship and Venture Capital. 2 Units.

This new course, STRAMGT 554, is a two unit version of the popular course, STRAMGT 354: Entrepreneurship and Venture Capital. Many of America's most successful entrepreneurial companies have been substantially influenced and supported by professionally managed venture capital funds. This relationship is examined from both the entrepreneur's and the venture capitalist's perspective. From the point of view of the entrepreneur, the course considers how significant and global business opportunities are identified, planned, and built into real companies; how resources are matched with opportunity; and how, within this framework, entrepreneurs seek capital and other assistance from venture capitalists, angel investors or other sources. From the point of view of the venture capitalist, the course considers how potential entrepreneurial investments are evaluated, valued, structured, and enhanced; how different venture capital strategies are deployed; and how venture capitalists raise and manage their own funds and add value to their companies. This course represents a shorter, more intense version of STRAMGT 354 - Entrepreneurship and Venture Capital. Students should not take both courses, as there is considerable overlap in course content.

STRAMGT 555. Managing Growing Enterprises. 2 Units.

This seminar is offered for students who, in the near term, aspire to the management and full or partial ownership of a new or newly acquired business. The seminar will deal in some depth with certain selected, generic entrepreneurial issues, viewed from the perspective of the owner/manager. Broad utilization will be made of case materials, background readings, visiting experts, and role playing. Throughout the course, emphasis will be placed on the application of analytical tools to administrative practice. This course is a condensed version of the four unit sections (S355) of the same course title. The course prioritizes the material from S355, covering much of the same material, but not to the depth covered in the four unit sections.

STRAMGT 556. Venture Studio for Credit. 2 Units.

Venture Studio for Credit, offered by the Stanford Graduate School of Business, is a project-based course in which students apply the concepts of design thinking, engineering, finance, business and organizational skills to design and test new business concepts that address real world needs. Our aspiration is to help teams identify an unmet customer need, design new products or services that meet that need and develop business models to support the creation and launch of startup products or services. Students will learn critical techniques about starting and launching a venture. This skills set is applicable to intrapreneurship as well. Teams will work one-on-one with an instructor and staff coach each week to help them navigate the Startup Garage innovation process. Teams are invited to move through the innovation process at their own pace. Instructors and coaches help ensure teams capture key learning and skills and apply them to their project. By the end of the course you and your team will have developed, prototyped and tested a novel product or service and business model.

556 - Venture Studio for Credit: Design Collaborative, multi-disciplinary teams will identify and work with users, domain experts, and industry participants to identify and deeply understand customer needs and design products/services and a business model to address those needs. Each team will conceive, design, build, and field-test critical aspects of both the product or service and the business model. This course integrates methods from human-centered design, lean startup, and business model planning. The course focuses on developing entrepreneurial skills and applying those skills to specific problems faced by those users identified by the teams. Teams will get out of the building and interact directly with users to develop a deep understanding of the challenges they face and to field test their proposed services, products, and business models.

STRAMGT 562. Intellectual Property: Financial and Strategic Management. 1 Unit.

In today's competitive marketplace, smart companies from Fortune 500 firms to early stage start-ups rely on innovation to keep them one step ahead of the game. The role of intellectual property (IP) as a strategic business asset has been punctuated by the recent multi-billion dollar deals involving patent portfolios, as well as the fierce patent wars raging in courts around the world. This class will help you understand the value of IP, by thinking strategically about how to effectively leverage the trade secrets, patents, technologies, trademarks, structures and processes that are critical to many businesses. The class will focus on the state-of-the-art, best practices related to IP strategy, and how they are shaped by economic, strategic, legal, regulatory, and market factors. Through a combination of case studies, class discussion and guest speakers, the class will cover a variety of issues shaping a successful IP strategy in today's global marketplace. Some of the topics we will cover include:

- n- Building and managing an IP portfolio that is aligned with business objectives;
- n- The innovation cycle and technology transfer mechanisms;
- n- Extracting value from the IP portfolio through transactions (e.g., licensing, sale, enforcement);
- n- IP valuation in financial reporting;
- n- Tax planning related to IP (e.g., cross border transfer pricing, IP holding companies);
- n- Review of corporate IP litigation and the principals of IP damages;
- n- Patent reform and the role of the U.S. Patent & Trademark Office (USPTO);
- n- IP strategies for start-ups & entrepreneurs

Ron Kasznik is Professor of Accounting (Stanford GSB). Ms. Efrat Kasznik is an IP valuation and strategy expert, with 20 years of consulting experience, focusing on helping companies bring their innovation to market. She is the founder and President of Foresight Valuation Group, an IP consulting firm providing valuation and strategy. Ms. Kasznik is a member of the leadership committee of the Licensing Executives Society (LES) High Tech Sector, and has been listed on the IAM Strategy 300 list of top IP strategists in 2013.

STRAMGT 565. Strategic Decision Making. 2 Units.

This compressed course concerns the analysis of strategic decision-making, with an emphasis on the process of "big stakes" analysis in complex corporate settings. The first week is devoted primarily to the tools of this process and to coping with (strategic) unawareness (especially in competitive situations). The second week is devoted primarily to "learning by doing," as we apply the tools developed in the first week to real-life problems. The overall objective of the course is to develop the student's working knowledge of these techniques, so the student can fruitfully apply these techniques on his/her own. The course may be taken as a two-unit compressed course by signing up for STRAMGT 565 and participating in the first week only. Alternately, students may sign up for both weeks, by registering for STRAMGT 365. Students who sign up initially for STRAMGT 565 will be able to decide late in week 1 whether to continue into week 2 (in effect, these students will have the registration changed from 565 to 365). Note that, in the registration process, students who rank STRAMGT 365 will have a greater chance of getting a spot than students ranking STRAMGT 565. (It will not be possible to change in midstream from 365 to 565, i.e., to drop the second week). Students will be expected to do approximately 90 minutes of work outside of class each day both weeks. A group project will be the main work product in the second week. The course will be taught jointly by Carl Spetzler, Chairman, Strategic Decisions Group and Professor Yossi Feinberg.

STRAMGT 567. Social Entrepreneurship and Social Innovation. 2 Units.

This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ "entrepreneurial skills," such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all else. We will study some of the most promising and the best-proven innovations for improving people's lives. We will also examine mature projects that are now tackling the issue of "scale", moving from local innovations to solutions that create deep systemic changes for larger numbers of economically disadvantaged individuals and communities throughout the world. This year we will focus on what are the constraints and opportunities for creating a social enterprise at scale. The process of "scale" poses tremendous challenges. Even when organizations manage to overcome the many obstacles to growth, and achieve appreciable scale, this approach is seldom sufficient to achieve significant social impact on its own. This year our course will pay particular attention to network approaches which require the mobilization of a vast array of actors and resources, but have the potential to generate rapid and sustained social impact.

STRAMGT 573. Strategic Thinking in Action - In Business & Beyond: Evolution of the Global Semiconductor Industry. 2 Units.

This six-session 2-point Bass seminar will involve students (maximum 20) in analyzing the evolution of the global semiconductor industry in light of the convergence of computing and wireless communications, and how it has been and will be affected by strategic actions of entrepreneurial startups, incumbent corporations, and governments in multiple geographies. The purpose of the seminar is to help students sharpen their skills at the intersection of business strategy and technology strategy in order to more effectively lead strategic change in and of large complex systems. While the instructors will provide relevant pre-readings, students will be expected to complement these materials with their own research of theoretical and empirical sources. Class discussions will focus on several topics: 1) the converging computing and wireless communications industries; 2) The future growth of key market segments of the semiconductor industry; 3) The prospects of different technologies and architectures going forward; and, 4) The future structure of the semiconductor industry. Students will be expected to help structure the discussion and move it forward toward conclusions. Students will organize into teams each focused on one of the topics and prepare a five-to-ten page group report of their most important findings and conclusions that extend current knowledge.

STRAMGT 574. Strategic Thinking in Action - In Business and Beyond. 2 Units.

This five-session 2-point Bass seminar will involve students (maximum 18) in analyzing the emerging global electric automotive industry by focusing on: (1) The electric automotive industry in the U.S. and Europe, (2) the electric automotive industry in Japan and Korea, and (3) the electric automotive industry in China. We will each time examine the strategies of the key automotive companies as well as that of the government and other key players such as infrastructure providers. The purpose of the seminar is to help students sharpen their skills in identifying facilitating and impeding forces of strategic change, and in assessing and estimating the direction and rate of strategic change. While the instructors will provide relevant pre-readings related to these topics, students will be expected to complement these materials with their own research of theoretical and empirical sources. They will also be expected to help structure the discussion and move it forward toward conclusions. Students will organize into three teams each focused on one of the regions and prepare a five-to-ten page group report of their most important findings and conclusions that extend current knowledge.

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STRAMGT 577. Strategic Interactions. 1 Unit.

This course will cover advanced game theoretical tools by studying applications to competitive and cooperative interactions. Game theory provides an analytical method for modeling decision makers, their actions, preferences, information, dynamics and decision making process. Complex strategic environments usually do not yield themselves to a simple game structure, hence this course will be based on cases suggested by the students. Students will suggest a case (in the form of an industry, a specific interaction, a topic, etc.) the class will then jointly analyze the selected cases.

STRAMGT 583. The Challenges in/with China. 2 Units.

To general objective of the course is to develop a solid grasp of the socio-economic and political situation in China (with its challenges both for China and for the rest of the world) in order to be able to define sustainable strategies for managing effectively in China and for handling the growing interdependence between China and the rest of the world. From looking at the performance of China - as perceived in US, Europe and emerging markets - students will get an insight in the current complex dynamics of China development (without the hype and with realism) and discuss alternative scenarios, with their business and socio-political consequences on the medium term. From this analysis and with a prospective perspective in mind, we will explore alternative strategic business approaches and management practices required to build, overtime, a mutually rewarding growing inter-dependence. More specifically, the course will initially identify the multi-causality behind China's achievements and discuss some of the dysfunctions associated, today, with such performance. The conditions of management effectiveness required to enter and succeed in the Chinese market will be identified while the challenges faced by the global expansion of Chinese firms overseas will be illustrated. Corporate governance issues, societal changes in China will be discussed in order to understand the context in which alternative scenarios for the future of China can be built. The course will rely upon different pedagogical methods; it will create conditions to share and leverage students' experience and it will make use of a number of recent cases and research results. Auditors will be admitted (pending space), but they will have to be present (and prepared) in all the sessions.

STRAMGT 584. New Business Models in Emerging Markets. 2 Units.

In recent years, we've seen an explosion of innovative business models blazing new trails in emerging markets. Many of these models are achieving commercial success while transforming the lives of low-income populations. Using nine cases of both early-stage, entrepreneur-led ventures and later-stage, public or large-cap firms, this course will examine best practices for scaling new enterprises in emerging markets. It will do so primarily through the lens of a potential investor. It will also explore what is required to spark, nurture and scale entire sectors that serve rapidly growing, often low-income markets. What does it mean to work in markets with limited infrastructure? What common mistakes are made - whether in business model design, in supply chains, or in dealing with government - and how can we avoid them? Which are the best business models to serve markets that corporations have traditionally ignored, and in which government has failed to deliver? Who might be threatened by the success of these new businesses? The seminar is a good match for Stanford students interested in working or investing in emerging markets. It will be taught by Matt Bannick, who leads Omidyar Network (a \$744m impact investing fund) and is the former President of eBay International and of PayPal.

STRAMGT 585. International Business. 2 Units.

This course addresses key issues in the creation and implementation of company strategies in the international environment: Why and how do firms internationalize? How should a firm assess the opportunities and risks in a foreign environment? What are the competences a firm needs successfully to enter foreign markets, where it faces unfamiliar environments and entrenched local competitors? How does a firm balance risk and return in deciding the best mode of foreign market entry? What are the strategic options available to a firm in competing internationally? How do international firms organize to deal with complexity? The course is in two parts, which are closely linked. The first is concerned with the strategy and operations of international firm, focusing on how corporations overcome the challenges of foreign environments to expand globally. This section covers foreign market assessment (analyzing the business opportunities and investment climate in a foreign country) and foreign entry strategy, including the alternatives of exporting, licensing, greenfield foreign direct investment or cross-border M&A. We look at trade-offs firms face between global or regional operating economies, on the one hand, and responsiveness to local customers, on the other, leading them to adopt global versus multi-local strategies. In the second part, we consider the development and adaptation of competences in the face of international competition. This section concerns the operational processes and organization structures firms use to support their international strategies. These include the generation and diffusion of knowledge across the corporate network, and the role of innovation and leadership in the transformation of international companies. The course uses a combination of case studies, problems, lectures and discussion, over a variety of companies and countries. Country settings include Japan, Spain, Italy, Singapore, India, Brazil, Romania, China, and the US. Companies may include P&G, Singapore Airlines, Timken, Indesit, HP, Inditex (Zara), Arcor and others.

STRAMGT 586. New World Global Business. 2 Units.

This elective is concerned with two themes: 1. The strategies and competitive basis of new business challengers-- enterprises based in the countries of the "New World" of rapidly developing economies, including China, India, Brazil and Russia, Mexico, Indonesia and Turkey; 2. How companies based in the developed world can compete with the challengers. The rapidly developing economies are the home bases for highly competitive new firms which have employed novel and successful business models to gain significant stakes in domestic markets. Their home economies have been, to varying degrees, less affected than the mature economies by the global financial crisis and their firms have been able to continue remarkable domestic growth trajectories. Further, many of these firms are outwardly focused and rapidly gaining positions in the developed world, where they are challenging the interests of developed world multinationals. For global incumbents, it is critical to understand the strategies of the new challengers and how to compete with them. The focus of the course will be on these New World firms, with the aim of understanding the strategies and competences they are deploying in their successful expansion. Integral to their developing global competences is the role of disruptive innovation, addressing under-served markets, and exploiting institutional distance in establishing competitive positions in the home base. Yet it is not clear to what extent these competences can be successfully translated into more developed markets. The course will address strategies multinationals based in the developed world can adopt to counter the new challengers and succeed in their home markets, as well as in the home markets of these challengers. The course will be taught with newly developed case studies written for this and related courses. The cases provide insight into the strategies of New World companies, how companies from the developed world can address the opportunities and risks in New World countries and use them as platforms for expansion. The following are examples of companies which will be included: Natura - Exporting Brazilian Beauty, Brazil; Lenovo: Managing a Global Merger, China; Haier: Taking a Chinese Company Global, China; Infosys Technologies Ltd.: Looking to the Future, India; TNK-BP: Russian Oil and Foreign Interests, Russia; Samsung Electronics: Global Flash Memory Business, Korea; Arcor: The Challenge of Becoming a Global Competitor, Argentina; Metro Cash & Carry, Russia, India, China; Monsanto: Realizing Biotech Value in Brazil, Brazil; US; Arcelik's International Expansion, Turkey; Studio Moderna in Eastern Europe, Slovenia.

STRAMGT 587. Strategy and Management in Developing Economies. 1 Unit.

An important channel for economic development, and the progress of poverty alleviation, is to drive productivity improvements and growth among firms in developing countries. Yet scaling firms in environments characterized by extreme poverty, weak institutions and high levels of inequality poses severe challenges. This seminar will explore the issues facing firms in such environments, including the strategic challenges the firms face as well as the challenges involved in improving managerial practices. Many of the issues and potential solutions to these problems are poorly understood, and the goal of the seminar will be to deepen everyone's understanding of the challenges, as well as brainstorm about potential solutions. This will be an interactive seminar, based on readings and/or guest speakers, with students expected to engage in active discussion of the materials.

STRAMGT 588. Leading Organizations. 2 Units.

This course studies principles for leading organizations and creating business value from the perspective of a high-level executive. Topics include product development, business models and pricing, people management, time allocation, measurement and accountability, creative destruction, the development of new capabilities, and marketing.

STRAMGT 691. PhD Directed Reading. 1-15 Unit.

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691

STRAMGT 692. PhD Dissertation Research. 1-15 Unit.

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692

STRAMGT 802. TGR Dissertation. 0 Units.

Same as: ACCT 802, FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802

Structural Biology Courses

SBIO 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

SBIO 225. Biochips and Medical Imaging. 3 Units.

The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies.

Same as: EE 225, MATSCI 382

SBIO 228. Computational Structural Biology. 3 Units.

Interatomic forces and interactions such as electrostatics and hydrophobicity, and protein structure in terms of amino acid properties, local chain conformation, secondary structure, domains, and families of folds. How protein motion can be simulated. Bioinformatics introduced in terms of methods that compare proteins via their amino acid sequences and their three-dimensional structures. Structure prediction via simple comparative modeling. How to detect and model remote homologues. Predicting the structure of a protein from knowledge of its amino acid sequence. Via Internet.

Same as: BIOPHYS 228

SBIO 241. Biological Macromolecules. 3-5 Units.

The physical and chemical basis of macromolecular function. Topics include: forces that stabilize macromolecular structure and their complexes; thermodynamics and statistical mechanics of macromolecular folding, binding, and allostery; diffusional processes; kinetics of enzymatic processes; the relationship of these principles to practical application in experimental design and interpretation. The class emphasizes interactive learning, and is divided equally among lectures, in-class group problem solving, and discussion of current and classical literature. Enrollment limited to 50. Prerequisites: Background in biochemistry and physical chemistry recommended but material available for those with deficiency in these areas; undergraduates with consent of instructor only.

Same as: BIOC 241, BIOPHYS 241, GENE 241

SBIO 242. Methods in Molecular Biophysics. 3 Units.

Experimental methods in molecular biophysics from theoretical and practical standpoints. Emphasis is on X-ray diffraction, nuclear magnetic resonance, and fluorescence spectroscopy. Prerequisite: physical chemistry or consent of instructor.

Same as: BIOPHYS 242

SBIO 274. Topics in Nucleic Acid Structure and Function. 2 Units.

Principles of nucleic acid structure and function. Methods for investigating nucleic acid structure. Limited to graduate students and postdoctoral fellows in structural biology. Prerequisite: consent of instructor.

SBIO 299. Directed Reading in Structural Biology. 1-18 Unit.

Prerequisite: consent of instructor.

SBIO 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

SBIO 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

SBIO 801. TGR Project. 0 Units.**SBIO 802. TGR Dissertation. 0 Units.**

Structured Liberal Education Courses

SLE 91. Structured Liberal Education. 8 Units.

Three quarter sequence; restricted to and required of SLE students. Comprehensive study of the intellectual foundations of the western tradition in dialogue with eastern, indigenous, and postcolonial perspectives. The cultural foundations of western civilization in ancient Greece, Rome, and the Middle East, with attention to Buddhist and Hindu counterparts and the questions these traditions address in common. Texts and authors include Homer, Plato, Aristotle, Greek tragedy, Sappho, the Hebrew Bible, the New Testament, Saint Augustine, and texts from Hindu and Buddhist traditions.

SLE 92. Structured Liberal Education. 8 Units.

Three quarter sequence; restricted to and required of SLE students. Comprehensive study of the intellectual foundations of the western tradition in dialogue with eastern, indigenous, and postcolonial perspectives. The foundations of the modern world, from late antiquity through the Middle Ages, the Renaissance, the Enlightenment, and the Scientific Revolution. Authors include Dante, Descartes, Shakespeare, and texts from Chinese and Islamic traditions.

SLE 93. Structured Liberal Education. 8 Units.

Three quarter sequence; restricted to and required of SLE students. Comprehensive study of the intellectual foundations of the western tradition in dialogue with eastern, indigenous, and postcolonial perspectives. Modernity as a period in intellectual history and a problem in the human sciences. Authors include Marx, Nietzsche, Freud, Kafka, Woolf, Eliot, and Sartre.

SLE 199. Teaching SLE. 1 Unit.**SLE 299. Structured Liberal Education Capstone Seminar. 1 Unit.**

Senior capstone project for students who were enrolled in SLE their freshman year.

Surgery Courses

SURG 60Q. Virtual to Real: Fundamentals of Human Anatomy. 3 Units.

Advances in imaging technologies allow us to interact with anatomical information in ways that have not been previously possible. This course is designed to teach human anatomy through the interpretation of radiographs and CT scans, and the correlation of these images to real anatomy. Utilizes resources such as virtual interactive scans via the virtual anatomy table and interactive digital applications to aid students in developing their image interpretive skills. First six weeks focus on image interpretation and the remaining four weeks on the utilization of this knowledge in the understanding and identification of human anatomy on human prosecutions (cadaver material).

SURG 68Q. Current Concepts in Transplantation. 3 Units.

Preference to sophomores. Biological aspects of cell and organ transplantation, including issues that arise in the popular media. Diseases for which transplantation is a treatment, the state of the art in human transplantation, transplantation of animal tissue into humans (xenotransplantation), development of new tissue and organs in the laboratory (tissue engineering and cloning), and development of drugs and biological strategies to promote long-term survival of the tissue or organ (tolerance). How to write a scientific abstract, critique scientific literature, and research and present topics in contemporary transplantation.

SURG 70Q. Surgical Anatomy of the Hand: From Rodin to Reconstruction. 2 Units.

The surgical anatomy of the hand is extremely complex in terms of structure and function. Exploration of the anatomy of the hand in different contexts: its representation in art forms, the historical development of the study of hand anatomy, current operative techniques for reconstruction, advances in tissue engineering, and the future of hand transplantation.

SURG 71Q. Procedural Anatomy. 3 Units.

Study of human anatomy through the understanding of eight to ten common conditions, such as diseases, injuries, and genetic defects, that affect the head and neck region and the associated surgical procedures to treat these conditions. Students are exposed to the modalities involved in confirming the diagnosis of these common conditions, the benefits and risks of the procedures to treat these conditions, and the anatomy affected by the conditions and procedures. The laboratory component exposes students to surgical procedures on cadaver material and the learning of anatomy via 3D digital images, the 3D dissection table and models. The focus is on learning clinically relevant anatomy of the head and neck region.

SURG 72Q. Anatomy in Society. 3 Units.

Preference to sophomores. The influence of human anatomy on the design of commercial products and competitive activities (such as: automobile and furniture design, sports clothing and shoe design, robotics, and dance and choreography). How societal advancements have evolved to increasingly accommodate human form and function. Guest speakers in the fields of design, architecture, and sports. Exposure to human anatomy via cadaver material, 3D digital images, the 3D dissection table and models.

SURG 101. Regional Study of Human Structure. 5 Units.

Enrollment limited to seniors and graduate students. Comprises two parts, lecture and lab, both of which are required. Lectures in regional anatomy and dissection of the human cadaver; the anatomy of the trunk and limbs through the dissection process, excluding the head and neck.

SURG 101A. Head and Neck Anatomy. 3 Units.

Introduces students to human anatomy of the head and neck through a dissection based course. Students use proper anatomical terminology to describe structures and their relationships. Emphasis on typical anatomy as seen in healthy individuals, with some examples of anatomical variation introduced through dissection and clinical cases. Ideal for senior undergraduate students who have completed SURG 101 or equivalent, are familiar with basic anatomy, and have some dissection experience. Prerequisites: Surgery 101 or equivalent.

SURG 110. Basic Cardiac Life Support for Undergraduates. 1 Unit.

Preference to undergraduates. Teaches one- and two-rescuer adult CPR and management of an obstructed airway using the American CPR model. Does not satisfy MD student BCLS requirement; MD students take Surgery 201.

SURG 111A. Emergency Medical Technician Training. 3-4 Units.

Basics of life support outside the hospital setting. Topics include emergency patient assessments for cardiac, respiratory, and neurological emergencies, as well as readiness training for emergencies on and off campus. Lectures, practicals, and applications. Students taking the class for 4 units complete additional FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Freshmen and Sophomores are highly encouraged to apply. Prerequisites: application (see <http://surg211.stanford.edu>), and consent of instructor. Same as: SURG 211A

SURG 111B. Emergency Medical Technician Training. 3-4 Units.

Continuation of 111A/211A. Approach to traumatic injuries. Topics include head, neck, and trunk injuries, bleeding and shock, burn emergencies, and environmental emergencies. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Prerequisites: 111A/211A, CPR-PR certification, and consent of instructor. Same as: SURG 211B

SURG 111C. Emergency Medical Technician Training. 3-4 Units.

Continuation of 111B/211B. Special topics in EMS. Topics include pediatric, obstetric, and gynecologic emergencies, EMS operations, mass casualty incidents, and assault. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT certification exam. Prerequisites: 111B/211B, CPR-PR certification, and consent of instructor. Same as: SURG 211C

SURG 112A. Advanced Training and Teaching for the EMT. 2-3 Units.

Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include airway and stroke management, abdominal emergencies, prehospital pharmacology, and teaching skills. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent EMT Certification course), CPR-PR certification, and consent of instructor. Same as: SURG 212A

SURG 112B. Advanced Training and Teaching for the EMT. 2-3 Units.

Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include assessment and treatment of the undifferentiated trauma patient (including airway management, monitoring, and evaluation) and prehospital care in nontraditional locations. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent EMT Certification course), CPR-PR certification, and consent of instructor. Same as: SURG 212B

SURG 112C. Advanced Training and Teaching for the EMT. 2-3 Units.

Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include mass casualty incidents, assaults, and pediatric emergencies. Expanded scope topics may be included - ACLS, ultrasound, and suturing. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent EMT Certification course), CPR-PR certification, and consent of instructor. Same as: SURG 212C

SURG 122. Biosecurity and Bioterrorism Response. 4-5 Units.

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. This course satisfies the TiS requirement for Engineering students; please check with your major advisor to verify this. 4 units for twice weekly attendance (Mon. and Wed.); additional 1 unit for writing a research paper for 5 units total maximum. PLEASE NOTE: This class will meet for the first time on Wednesday, April 1.

Same as: BIOE 122, PUBLPOL 122

SURG 125. Social Emergency Medicine and Community Engagement. 1 Unit.

Stanford Health Advocates and Research in the Emergency Department (SHAR(ED)) is focused on the practical application of and research in social emergency medicine. Emergency Departments (EDs) are the nation's safety nets, for medical as well as social needs. EDs remain the sole access to any medical care for those in need, 24/7, regardless of insurance status. The ED is a unique bridge to the public, and is a compelling site for community partnership, clinical and health services research geared towards impacting population health and policy. Through direct patient contact and community engagement, students help to meet the social needs of ED patients.

SURG 150. Global Humanitarian Medicine. 1-2 Unit.

Open to undergraduate students and medical students. Focus is on understanding the theory behind medical humanitarianism, the growing role of surgery in international health, and the clinical skills necessary for students to partake in global medical service. Guest speakers include world-renowned physicians and public health workers. Students enrolling for 2 units complete an additional, substantial final project.

Same as: SURG 250

SURG 199. Undergraduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

SURG 201. Basic Cardiac Life Support for Healthcare Professionals. 1 Unit.

All medical students must be certified in Basic Cardiac Life Support before the end of the first (autumn) quarter. Students who provide documentation of certification received within six months prior to the date of matriculation will be exempted from the requirement. The course teaches one- and two-rescuer CPR, management of an obstructed airway, and CPR for infants and children. Upon completion of the course, students receive an American Heart Association certificate in BLS.

SURG 203A. Clinical Anatomy. 11 Units.

Introduction to human structure and function presented from a clinical perspective. Includes clinical scenarios, frequently used medical imaging techniques, and interventional procedures to illustrate the underlying anatomy. Students are required to attend lectures and engage in dissection of the human body in the anatomy laboratory. Surgery 203A presents structures of the thorax, abdomen, pelvis, back, upper and lower limbs.

SURG 203B. Clinical Anatomy. 4 Units.

Continues the introduction to human structure and function from a clinical perspective. Includes clinical scenarios, frequently used medical imaging techniques, and interventional procedures to illustrate the underlying anatomy. Students are required to attend lectures and engage in dissection of the human body in the anatomy laboratory. Surgery 203B presents structures of the head and neck.

SURG 204. Introduction to Surgery. 1 Unit.

Designed to give pre-clinical MD students a broad overview of all the surgical specialties. Lectures by leading surgeons from General Surgery, Plastic Surgery, Neurosurgery, Orthopedic Surgery, Head and Neck Surgery, Transplantation Surgery and Cardiac Surgery highlight the array of diseases and operations performed in their disciplines. In addition, each lecture gives students a "roadmap" as to how to enter that discipline.

SURG 205. Advanced Suturing Techniques. 1 Unit.

Designed for preclinical medical students. Builds upon skills taught in the Surgical Interest Group's introductory suturing workshops. Topics include knot tying, suturing, hand-sewn anastomosis, stapled anastomosis, and laparoscopic technique. Emphasizes hands-on work with live tissue and surgical simulation. Preference to second year medical students.

SURG 208. Plastic Surgery Tutorial. 2 Units.

Diagnosis, theory, and practice of plastic and reconstructive surgery. Limited to two students per faculty member.

SURG 209. Plastic Surgery. 1-18 Unit.

Students participate in plastic and reconstructive surgery as functioning members of the clinical team. Students are exposed to operative surgery, emergency and trauma care, evaluation of operative candidates in the outpatient setting, and also attend teaching conferences. Limited to four students. Prerequisite: completion of first year or clinical experience.

SURG 210A. Managing Emergencies: What Every Doctor Should Know. 2 Units.

Reviews basic but critical concepts in evaluating and managing patients with possible life-threatening emergencies with a special focus on avoiding common errors. Topics include cardiovascular collapse, basic airway management, triage and shock. Teaches skills such as reading an ECG or a chest x-ray to aid students in developing a rapid response to patients with potentially fatal complaints. Class meets online.

Same as: Clinical Fundamentals

SURG 210B. Managing Emergencies: What Every Doctor Should Know. 2 Units.

Students learn management of various emergent and traumatic patient presentations. Some topics include advanced airway, trauma, burns, poisoning, and stroke. Key skills and common pitfalls in practice discussed. Providers completing Surg 210A and B will be better prepared to respond effectively with a challenging and urgent case. Class meets online.

Same as: High Risk Chief Complaints

SURG 211A. Emergency Medical Technician Training. 3-4 Units.

Basics of life support outside the hospital setting. Topics include emergency patient assessments for cardiac, respiratory, and neurological emergencies, as well as readiness training for emergencies on and off campus. Lectures, practicals, and applications. Students taking the class for 4 units complete additional FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Freshmen and Sophomores are highly encouraged to apply. Prerequisites: application (see <http://surg211.stanford.edu>), and consent of instructor.

Same as: SURG 111A

SURG 211B. Emergency Medical Technician Training. 3-4 Units.

Continuation of 111A/211A. Approach to traumatic injuries. Topics include head, neck, and trunk injuries, bleeding and shock, burn emergencies, and environmental emergencies. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Prerequisites: 111A/211A, CPR-PR certification, and consent of instructor.

Same as: SURG 111B

SURG 211C. Emergency Medical Technician Training. 3-4 Units.

Continuation of 111B/211B. Special topics in EMS. Topics include pediatric, obstetric, and gynecologic emergencies, EMS operations, mass casualty incidents, and assault. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT certification exam. Prerequisites: 111B/211B, CPR-PR certification, and consent of instructor.

Same as: SURG 111C

SURG 212A. Advanced Training and Teaching for the EMT. 2-3 Units.

Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include airway and stroke management, abdominal emergencies, prehospital pharmacology, and teaching skills. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent EMT Certification course), CPR-PR certification, and consent of instructor.

Same as: SURG 112A

SURG 212B. Advanced Training and Teaching for the EMT. 2-3 Units.

Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include assessment and treatment of the undifferentiated trauma patient (including airway management, monitoring, and evaluation) and prehospital care in nontraditional locations. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent EMT Certification course), CPR-PR certification, and consent of instructor.

Same as: SURG 112B

SURG 212C. Advanced Training and Teaching for the EMT. 2-3 Units.

Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include mass casualty incidents, assaults, and pediatric emergencies. Expanded scope topics may be included - ACLS, ultrasound, and suturing. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent EMT Certification course), CPR-PR certification, and consent of instructor.

Same as: SURG 112C

SURG 220. Emergency Medicine: Introduction. 1-2 Unit.

An introduction to the specialty of emergency medicine, including the emergency stabilization of patients in both the pre-hospital phase and in the emergency department. The course will include both lectures and hands on practical sessions. Topics consist of management of trauma patients and common medical emergencies, with hands on sessions including how to manage airway emergencies and suturing. 2 units includes two four-hour emergency department shadow shifts.

SURG 222. Biosecurity and Bioterrorism Response. 2-5 Units.

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. 2 unit option for once weekly attendance (Wed only); 4 unit option for twice weekly attendance (Mon and Wed); 1 additional units (for a maximum of 5 units total) for a research paper.

Same as: PUBLPOL 222, SURG 122

SURG 223. Wilderness Medicine. 2-3 Units.

Open to all students. Wilderness-related illnesses and injuries; a framework for evaluation and treatment of emergencies in the backcountry. Hands-on clinical skills. Topics include high altitude medicine, hypothermia, envenomations, search and rescue, improvisation, and a day long field trip for hands-on field work. 3 units includes participation in an Emergency Department observation shift.

SURG 224. Wilderness First Aid. 2 Units.

Provides basic introductory back country and emergency medicine skill development. Topics covered include patient assessment, addressing life threats, shock, spine safety, musculoskeletal injuries, medical emergencies, and environmental emergencies.

SURG 226. Wilderness First Responder. 4 Units.

A more advanced and intensive class building on wilderness first aid that teaches first responder skills using improvised resources in varying environmental conditions and extended-care situations. This is used as a framework for learning to respond to medical emergencies in remote wilderness settings. Examines necessary tools to make critical medical and evacuation decisions.

SURG 227. Health Care Leadership. 2 Units.

Health Care Leadership brings well-respected healthcare leaders from a variety of sectors within healthcare to share their personal reflections and insights on effective leadership. Speakers will discuss their personal core values, share their lessons learned and their recipe for effective leadership in the healthcare field, including reflection on career and life choices. Speakers will include CEOs of healthcare technology, pharmaceutical and other companies, leaders in public health, eminent leaders of hospitals, academia and other health care organizations.

SURG 230. Obesity in America. 1 Unit.

Prevalence and effects of the obesity epidemic in America and the growing prevalence of associated comorbidities such as diabetes, hypertension, hyperlipidemia, sleep apnea, and joint problems. Risk factors, multi-disciplinary treatment options, the role of food in society, patients' perspectives, and current research in the field.

SURG 231. Healthcare in Haiti and other Resource Poor Countries. 1 Unit.

Originally developed to highlight healthcare in extreme poverty in Haiti, related lectures have been added covering healthcare in resource poor environments with the objective to introduce students to the complexity and unique problems of working in the Third World's healthcare morass.

SURG 232. Social Emergency Medicine and Service Learning. 2-3 Units.

Focus on understanding the social determinants of health and exploring the relationship between emergency medicine and public health affecting the Emergency Department patient population by: 1) Discussion and critique of relevant literature; 2) Learning about community resources for patient's social needs; 3) Shadowing ED physicians. Topics include how public health initiatives can improve access to hospital and community resources, and how patients receive care in a busy, fast-paced environment. 2 Units. Service learning component (Additional 1 Unit of Credit): Requires prerequisite of Med 157 Community Health Course, a 3-quarter commitment, personal statement and faculty approval. Students conduct screening and intervention for ED patients; Service Learning option requires prerequisite of Med 157 Community Health course, and enrolling for 3 units.

SURG 242. Art and Anatomy Studio. 1 Unit.

Discusses the intersection of art and anatomy and provides the opportunity to explore one art medium in depth. Students select a medium from drawing, painting, sculpture, digital art and art appreciation, and work in small groups with a mentor artist. Class time includes art instruction, creation and feedback. May be repeated for credit. May be taken for 1-3 units; units awarded commensurate with project time. Prerequisites: SURG 203A, SURG 203B, or SURG 101.

SURG 243. Anatomy for Artists. 3 Units.

Blends human anatomy and artwork, and is aimed at artists who aspire to study human structure, shape, and form. Weekly lectures will highlight intersections and influences of human anatomy on art, and explore the role it has played in various forms of artwork. Students encouraged to use proper anatomical terminology to describe structures and their relationships. Weekly studio sessions provide an opportunity for students to immerse in anatomically inspired drawings. Plastic models, dry bones, cadaveric specimens, and live models will be used for the studio sessions.

SURG 248. Medical Scribe Training. 3 Units.

Focuses on developing knowledge of clinical documentation in order to accompany a physician in patient encounters, including documentation of patient histories, findings, procedures, results, and clinical course. Serves as prerequisite for Surgery 248A, Advanced Clinical Scribe Training.

SURG 248A. Advanced Medical Scribe Training. 3 Units.

Preparation to become a medical scribe (Information Management Specialist). Focus is on further honing skills of a clinical scribe through ongoing training and education. Demonstrating and maintaining an understanding of the team approach to patient care and enhancing skills and knowledge in the promotion of quality documentation. Prerequisite: successful completion of SURG 248 and consent of instructor.

SURG 248X. Medical Scribe Training. 3 Units.

Accelerated, three-day intensive focusing on developing knowledge of clinical documentation in order to accompany a physician in patient encounters, including documentation of patient histories, findings, procedures, results, and clinical courses. Serves as prerequisite for Surgery 248A, Advanced Clinical Scribe Training.

Same as: Accelerated Course

SURG 250. Global Humanitarian Medicine. 1-2 Unit.

Open to undergraduate students and medical students. Focus is on understanding the theory behind medical humanitarianism, the growing role of surgery in international health, and the clinical skills necessary for students to partake in global medical service. Guest speakers include world-renowned physicians and public health workers. Students enrolling for 2 units complete an additional, substantial final project.

Same as: SURG 150

SURG 251A. Imaging Anatomy. 1 Unit.

Accompanies existing clinical anatomy course for first year medical students (SURG 203A). Sessions focus on the anatomical region being taught and dissected during the same week in SURG 203A. Students revisit anatomy using a variety of basic and advanced imaging modalities. Emphasis on correlating imaging to dissection, studying anatomical variations, discussing clinical vignettes. Enrollment limited to MD students.

SURG 251B. Imaging Anatomy (Head & Neck) II. 1 Unit.

Accompanies existing clinical anatomy course for first year medical students (SURG 203B) concentrating on the head and neck region. Sessions focus on the anatomical region being taught and dissected during the same week in SURG 203B. Students revisit anatomy using a variety of basic and advanced imaging modalities. Emphasis on correlating imaging to dissection, studying anatomical variations, discussing clinical vignettes. Enrollment limited to MD students.

SURG 252. Bedside Anatomy. 1 Unit.

Provides an opportunity to revisit anatomy in a clinical context. Using case discussions, clinical vignettes, radiological imaging, and hands-on exercises, students are challenged to apply their knowledge of anatomy to explain common diagnostic maneuvers and interventional procedures performed at the bedside or in the outpatient setting. Emphasis will be on anatomical considerations in successfully performing these procedures and avoiding errors that may arise due to anatomical changes, oddities, or variations.

SURG 253. Topics in Simulation of Human Physiology & Anatomical Systems. 1 Unit.

Biweekly interdisciplinary lecture series on the development of computational tools for modeling and simulation of human physiological and anatomical systems. Lectures by instructors and guest speakers on topics such as surgical simulation, anatomical & surgical Modeling, neurological Systems, and biomedical models of human movement. Group discussions, team based assignments, and project work. Prerequisite: Medical students, residents or fellows from school of medicine, and computationally oriented students with a strong interest to explore computational and mathematical methods related to the health sciences. Same as: CME 520

SURG 254. Operative Anatomy and Techniques. 1 Unit.

For preclinical students; provides a background in and integrates knowledge of surgical anatomy and therapy. Surgical or operative anatomy differs from gross anatomy in that the area exposed during surgery may be limited, the dissection may require exposing other seemingly unrelated anatomic structures with unique landmarks, and the procedure may require unusual technical facility. Provides an opportunity for students to understand the goals of representative surgical procedures (translating pathophysiology to surgical decision making to actual incision). Students learn surgical skills and perform the dissection of a number of commonly performed operations in the bio-skills laboratory. Emphasizes hands-on participation in surgical procedures in the laboratory and is taught by attending physicians in general, cardiothoracic, vascular, plastic, head and neck, urologic, and orthopedic surgery.

SURG 256. Clinical Anatomy and Surgical Education Series. 2 Units.

Intended for second-year MD students. Builds on prior experience in the first-year medical curriculum consisting of the required Clinical Anatomy and the elective Operative Anatomy courses. Focuses on case-based didactic sessions for teaching the approach to a variety of surgical cases and their management. Students perform simulated cadaveric surgical procedures using standard operative instruments and techniques based on clinical case presentations and analysis. Covers hand surgery, vascular surgery, minimally invasive surgery, ear surgery and eye surgery specialties.

Same as: CASES

SURG 271. Anatomy of Medical Mysteries. 1 Unit.

This elective course for medical students explores areas of health and disease that are poorly understood presently. A variety of topics are covered such as placebo effect, techniques of meditation, presence of extra-sensory perception, and near death experiences. Scientific evidence for and against these topics presented and discussed. Current literature is evaluated and reading assignments are included. Pre-requisites: SURG 203A and SURG 203B.

SURG 280. Early Clinical Experience in Surgery. 1-2 Unit.

Provides an observational experience in a surgery specialty. Prerequisite: consent of instructor.

SURG 290. 3D Biomedical Visualization: Techniques, Methods, and Applications. 1 Unit.

Explores the power of digital anatomy. How 3D anatomical data sets like CT and MRI scans are created from human specimens; how they are processed, analyzed, and rendered. Focus on how digital content is best used for learning anatomy, patient education, and clinical practice.

SURG 296. Individual Work: Human Anatomy. 1-18 Unit.

Carried out under the supervision of one or more members of the staff. Prerequisite: consent of instructor.

SURG 298. Procedure-Based Specialty Capstone Course. 1 Unit.

Designed for graduating medical students entering a procedure-based internship or residency (e.g. general surgery, surgical sub-specialties, obstetrics-gynecology, anesthesia, and emergency medicine). Prepares students with practical, high-yield clinical and procedural skills. Clinical skills include fielding common calls regarding surgical patients, obtaining informed consent, completing operative dictations, discharging patients, writing prescriptions, running trauma surveys, and interpreting surgically relevant radiology studies. The hands-on portion of the course covers basic open and laparoscopic surgical skills utilizing bench models, laparoscopic box trainers, and full cadaveric simulations. Prerequisite: graduating medical student.

SURG 299. Directed Reading in Surgery. 1-18 Unit.

Consists of studies in progress, including cardiovascular and circulatory problems; gastric physiology; hemostatic disorders; homotransplantation; liver disorders; orthopedic pathology; bone growth; radiation injury; immunology, bacteriology, pathology, and physiology of the eye; physiological optics; comparative ophthalmology; neurophysiology of hearing; spatial orientation and disorientation; nasal function; and psychophysics of sensation. Prerequisite: consent of instructor.

SURG 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

SURG 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members.

Symbolic Systems Courses

SYMSYS 100. Minds and Machines. 4 Units.

An overview of the interdisciplinary study of cognition, information, communication, and language, with an emphasis on foundational issues: What are minds? What is computation? What are rationality and intelligence? Can we predict human behavior? Can computers be truly intelligent? How do people and technology interact, and how might they do so in the future? Lectures focus on how the methods of philosophy, mathematics, empirical research, and computational modeling are used to study minds and machines. Undergraduates considering a major in symbolic systems should take this course as early as possible in their program of study.

Same as: LINGUIST 144, PHIL 99, PSYCH 35

SYMSYS 122. Artificial Intelligence: Philosophy, Ethics, & Impact. 3-4 Units.

Recent advances in computing may place us at the threshold of a unique turning point in human history. Soon we are likely to entrust management of our environment, economy, security, infrastructure, food production, healthcare, and to a large degree even our personal activities, to artificially intelligent computer systems. The prospect of "turning over the keys" to increasingly autonomous systems raises many complex and troubling questions. How will society respond as versatile robots and machine-learning systems displace an ever-expanding spectrum of blue- and white-collar workers? Will the benefits of this technological revolution be broadly distributed or accrue to a lucky few? How can we ensure that these systems respect our ethical principles when they make decisions at speeds and for rationales that exceed our ability to comprehend? What, if any, legal rights and responsibilities should we grant them? And should we regard them merely as sophisticated tools or as a newly emerging form of life? The goal of this course is to equip students with the intellectual tools, ethical foundation, and psychological framework to successfully navigate the coming age of intelligent machines.

Same as: CS 122

SYMSYS 130. Research Methods in the Cognitive and Information Sciences. 3 Units.

Understanding the different methodological approaches used in disciplines that study cognition and information. Emphasis is on philosophical/analytical, formal/mathematical, empirical, and computational thinking styles, with some attention to other methods as well. What assumptions underlie these methods? How can they be combined? How do practitioners of each discipline think differently about problems, and what are the challenges involved in studying or working across them?.

SYMSYS 150. CRYPTOCURRENCIES SEMINAR. 2 Units.

A weekly seminar allowing students the opportunity to discuss and explore cryptocurrencies from a variety of domains and view points:n1) Explore the history of fiat currencies, both economically and philosophically. How does Bitcoin mesh in here? What are advantages and disadvantages compared to traditional fiat currencies? (~2 weeks) n2) Contextualize and juxtapose decentralized currencies with respect to TCP/IP, Napster, and other relevant decentralized and cloud protocols. (~2 weeks)n3) Work through and understand Satoshi's initial protocol and proof-of-work mining system. What problem did she solve? How? Why was it important? How can we prove it mathematically? What are significant game theoretic and cryptographic weaknesses? What do alternative cryptocurrencies look like? Is there a "best" alternative? (~3 weeks)n4) What does Bitcoin as a protocol mean? What can be built on top of it? What is being built around it? What does regulation look like? What are hypotheses for the future of digital currencies? How do we explain investor confidence, given regulatory hesitation? (~3 weeks).

SYMSYS 161. Applied Symbolic Systems in Venture Capital + Entrepreneurship. 2 Units.

A weekly seminar allowing students the opportunity to discuss and explore applied Symbolic Systems in technology, entrepreneurship, and venture capital. We will explore popular conventions and trends through the lens of numerous deductive and applied Symbolic Systems.

Same as: SYMSYS 261

SYMSYS 170. Decision Behavior: Theory and Evidence. 3-4 Units.

Introduction to the study of judgment and decision making, relating theory and evidence from disciplines such as psychology, economics, statistics, neuroscience, and philosophy. The development and critique of Homo economicus as a model of human behavior, and more recent theories based on empirical findings. Recommended: background in formal reasoning.

Same as: SYMSYS 270

SYMSYS 190. Senior Honors Tutorial. 1-5 Unit.

Under the supervision of their faculty honors adviser, students work on their senior honors project. May be repeated for credit.

SYMSYS 191. Senior Honors Seminar. 1 Unit.

Recommended for seniors doing an honors project. Under the leadership of the Symbolic Systems program coordinator, students discuss, and present their honors project.

SYMSYS 196. Independent Study. 1-15 Unit.

Independent work under the supervision of a faculty member. Can be repeated for credit.

SYMSYS 200. Symbolic Systems in Practice. 2-3 Units.

Applying a Symbolic Systems education at Stanford and outside. The basics of research and practice. Students develop and present a project, and investigate different career paths, including academic, industrial, professional, and public service, through interviews with alumni.

SYMSYS 201. ICT, Society, and Democracy. 3 Units.

The impact of information and communication technologies on social and political life. Interdisciplinary. Classic and contemporary readings focusing on topics such as social networks, virtual versus face-to-face communication, the public sphere, voting technology, and collaborative production.

SYMSYS 203. Cognitive Science Perspectives on Conflict, Violence, Peace, and Justice. 3 Units.

In recent years, cognitive scientists have turned more attention to questions that have traditionally been investigated by historians, political scientists, sociologists, and anthropologists, e.g. What are the sources of conflict and disagreement between people?, What drives or reduces violence and injustice?, and What brings about or is conducive to peace and justice? In this advanced seminar, we will read and discuss works by psychologists, neuroscientists, philosophers, and others, which characterize this growing research area among those who study minds, brains, and behavior. Required: Completion of a course in psychology beyond the level of Psych 1, or consent of the instructor.

SYMSYS 204. Philosophy of Linguistics. 4 Units.

Philosophical issues raised by contemporary work in linguistics. Topics include: the subject matter of linguistics (especially internalism vs. externalism), methodology and data (especially the role of quantitative methods and the reliance on intuitions), the relationship between language and thought (varieties of Whorfianism and anti-Whorfianism), nativist arguments about language acquisition, and language evolution. Same as: LINGUIST 204, PHIL 369

SYMSYS 206. Philosophy of Neuroscience. 4 Units.

Can problems of mind be solved by understanding the brain, or models of the brain? The views of philosophers and neuroscientists who believe so, and others who are skeptical of neurophilosophical approaches to the mind. Historical and recent literature in philosophy and neuroscience. Topics may include perception, memory, neural accounts of consciousness, neurophenomenology, neuroscience and physics, computational models, and eliminativism. (Not open to freshmen.). Same as: PHIL 167D, PHIL 267D

SYMSYS 209. Battles Over Bits. 3 Units.

The changing nature of information in the Internet age and its relationship to human behavior. Philosophical assumptions underlying practices such as open source software development, file sharing, common carriage, and community wireless networks, contrasted with arguments for protecting private and commercial interests such as software patents, copy protection, copyright infringement lawsuits, and regulatory barriers. Theory and evidence from disciplines including psychology, economics, computer science, law, and political science. Prerequisite: PSYCH 40, 55, 70, or SYMSYS 202.

SYMSYS 210. Learning Facial Emotions: Art and Psychology. 3 Units.

Artistic and psychological learning approaches for emotion recognition from facial expressions. The advantages of learning by image-based microexpressions, subtle expressions, macro expressions, art drawing and actor mimicry when there are cognitive deficits due to conditions such as autism. Comparative analysis uses brain studies, learning theory, and human-computer interaction. Studio component conveys the artistic and psychological approaches. Prerequisites: PSYCH 1, SYMSYS 100 or consent of instructor. Go to www.stanford.edu/~dwilkins/Symsys210Enroll.doc to sign up for a Permission Number.

SYMSYS 211. Learning Facial Emotions: Art, Psychology, Human-Computer Interaction. 3 Units.

Learning to recognize facial emotions by drawing a live model versus the psychology method of using classified images of subtle and micro expressions. Dimensions of analysis include cognitive modeling and neuroscience. The design of human-computer interaction systems for people with cognitive deficits such as autism and Aspergers, which integrate the art and psychology approaches using methods such as robot heads, avatars, and facial recognition software. Prerequisites: PSYCH 1 or consent of instructor.

SYMSYS 245. Cognition in Interaction Design. 3 Units.

Note: Same course as 145 which is no longer active. Interactive systems from the standpoint of human cognition. Topics include skill acquisition, complex learning, reasoning, language, perception, methods in usability testing, special computational techniques such as intelligent and adaptive interfaces, and design for people with cognitive disabilities. Students conduct analyses of real world problems of their own choosing and redesign/analyze a project of an interactive system. Limited enrollment seminar taught in two sections of approximately ten students each. Admission to the course is by application to the instructor, with preference given to Symbolic Systems students of advanced standing. Recommended: a course in cognitive psychology or cognitive anthropology."

SYMSYS 255. Building Digital History: Social Movements and Protest at Stanford. 3-5 Units.

A project-based course focused on developing a collaborative history website based on oral and archival history research. Thematic focus is the history of student activism at Stanford. How have political activities such as demonstrations, assemblies, educational events, and nonviolent civil disobedience been organized on campus, and how have they affected Stanford? What lessons can be drawn from the past for students interested in social change? Students will choose historical periods and/or specific social movements for research. Course will feature guest appearances by representatives from a range of social movements at Stanford the past fifty years, and the building of an online repository and community for the collaborative representation and discussion of history.

SYMSYS 255A. Building Digital History: Social Movements and Protest at Stanford. 1 Unit.

Lectures-only version of Symsys 255.

SYMSYS 261. Applied Symbolic Systems in Venture Capital + Entrepreneurship. 2 Units.

A weekly seminar allowing students the opportunity to discuss and explore applied Symbolic Systems in technology, entrepreneurship, and venture capital. We will explore popular conventions and trends through the lens of numerous deductive and applied Symbolic Systems.

Same as: SYMSYS 161

SYMSYS 270. Decision Behavior: Theory and Evidence. 3-4 Units.

Introduction to the study of judgment and decision making, relating theory and evidence from disciplines such as psychology, economics, statistics, neuroscience, and philosophy. The development and critique of Homo economicus as a model of human behavior, and more recent theories based on empirical findings. Recommended: background in formal reasoning.

Same as: SYMSYS 170

SYMSYS 280. Symbolic Systems Research Seminar. 1 Unit.

A mixture of public lectures of interest to Symbolic Systems students (the Symbolic Systems Forum) and student-led meetings to discuss research in Symbolic Systems. Can be repeated for credit. Open to both undergraduates and Master's students.

SYMSYS 290. Master's Degree Project. 1-15 Unit.**SYMSYS 291. Master's Program Seminar. 1 Unit.**

Enrollment limited to students in the Symbolic Systems M.S. degree program. May be repeated for credit.

SYMSYS 296. Independent Study. 1-15 Unit.

Independent work under the supervision of a faculty member. Can be repeated for credit.

SYMSYS 298. Peer Advising in Symbolic Systems: Practicum. 1 Unit.

Optional for students selected as Undergraduate Advising Fellows in the Symbolic Systems Program. AFs work with program administrators to assist undergraduates in the Symbolic Systems major or minor, in course selection, degree planning, and relating the curriculum to a career or life plan, through advising and events. Meeting with all AFs for an hour once per week under the direction of the Associate Director. Requires a short reflective paper at the end of the quarter on what the AF has learned about advising students in the program. Repeatable for credit. May not be taken by students who receive monetary compensation for their work as an AF.

SYMSYS 299. Curricular Practical Training. 1 Unit.

Students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of advisor.

Theater and Performance Studies Courses

TAPS 1. Introduction to Theater and Performance Studies. 4 Units.

What brings together a contemporary company such as Google and an experimental theater such as The Wooster Group? What sets them apart? Approaching theater as presentational form of organization, this class shifts study of theater from the context of literature to that of performance. It offers an overview of performance across disciplines: from theater and other performing arts, to law, management, sports, and new technologies. In this interdisciplinary exploration, performance emerges as a model that cuts across diverse branches of contemporary culture, from sports events, to social dances, to political protests, to the organization of a workplace. It is designed to serve students who may go on to major or minor in Theater and Performance Studies including the Dance division and also students for whom this knowledge is a general contribution to their liberal arts education or to their own field of study. It integrates scholarly research and practical use of performance. No previous performing arts training or skills are required.

TAPS 10AX. Acting Intensive: Theatre and Beyond, Into the World of Film. 2 Units.

Introduction to the craft of acting for film and reinforcement of basic concepts for the experienced student. Skill-building in the areas of acting, movement, voice, and speech, utilizing material from the film and theater. In-depth work on technique, utilization of action, specificity of language, personalization, emotional truth, character, and given circumstance. Blocking of scenes live performance and video recording of performances. Final performance of the two scenes in a showcase afternoon.

TAPS 10N. Arts and Ideas: 20th Century Art in Conflict. 4 Units.

The second quarter of Art & Ideas builds on the examples of Modernism students in Arts and Ideas studied in the first quarter. The Frosh Seminar iquest;20th-Century Art in Conflict; will focus on drama and film that experiments with new possibilities of form, shaping the direction of later artistic practice. We will trace how the political and aesthetic concerns of the 20th century reflect and exploit new technologies, both in theater and film, altering the position and function of author, actor, director, and audience.

TAPS 11AX. Set Design. 2 Units.

How ideas in fine art, architecture, and installation inform the practice of theatre set design. Traditional techniques of stage scenery design, basic drafting and model making guide the process of designing a set for an opera or play in this hands-on workshop.

TAPS 11N. Dramatic Tensions: Theater and the Marketplace. 4 Units.

Preference to freshmen. The current state of the American theater and its artists. Conventional wisdom says that theater is a dying art, and a lost cause, especially in an age of multi-media entertainment. But there are more young playwrights, actors, and directors entering the field today than at any other time in American history. Focus is on the work of today's theater artists, with an emphasis on an emerging generation of playwrights. Students read a cross-section of plays from writers currently working in the US and UK, covering a spectrum of subjects and styles from serious to comic, from the musical to the straight play. Hits and misses from recent seasons of the New York and London stages and some of the differences of artistic taste across the Atlantic. Hands-on exploration of the arts and skills necessary to make a play succeed. Students develop their own areas of interest, in guided projects in design, direction or performance. Conversations with playwrights, designers, and directors. Labs and master classes to solve problems posed in areas of creative production. Class meets literary managers and producers who are on the frontlines of underwriting new talent. Class trips include two plays at major Bay Area Stages.

TAPS 11SC. Learning Theater: From Audience to Critic at the Oregon Shakespeare Festival. 2 Units.

Who doesn't love going to a play: sitting in the darkened theater, an anonymous member of the audience waiting to be entertained, charmed, and challenged? But how many of us know enough about the details of the plays, their interpretation, their production, and acting itself, to allow us to appreciate fully the theatrical experience? In this seminar, we will spend 13 days in Ashland, Oregon, at the Oregon Shakespeare Festival (OSF), where we will attend these plays: Shakespeare iquest; *Much Ado About Nothing*, *Pericles*, and *Antony and Cleopatra*; the U.S. premiere of Stan Lai iquest; *Secret Love in Peach Blossom Land*; Frank Loesser iquest; *Guys and Dolls*; the world premiere of Lynn Nottage iquest; *Sweat*; Quiara Alegria iquest; *The Happiest Song Plays Last*; Charles Fechter iquest; adaptation of Alexandre Dumas iquest; *The Count of Monte Cristo*; Eugene O'neill iquest; *Long Days Journey into Night*; and the world premiere of Jeff Whitty iquest; *Head Over Heels*. (To read more about these productions, go to www.osfashland.org). We will also spend time backstage, meeting with actors, designers, and artistic and administrative directors of OSF. Students will read the plays before the seminar begins. In Ashland, they will produce staged readings and design a final paper based on one of the productions. These reviews will be delivered to the group and turned in on Thursday, September 17. Note: This seminar will convene in Ashland on Monday, August 31, and will adjourn to Stanford on Sunday, September 13. Students must arrive in Ashland by 4:00 p.m. on August 31. Room and board in Ashland and transportation to Stanford will be provided and paid for by the program. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

TAPS 12AX. Sketch Comedy and Improvisation. 2 Units.

Explore improvisation and sketch comedy in an intensive ensemble and create an original show. Pure improvisational theater techniques. Concepts covered include spontaneity, shared control, creative collaboration, narrative, and status. Students apply those skills to writing and staging scripted monologues, two-handers, and ensemble sketches. Students create an original show with the entire class.

TAPS 12N. To Die For: Antigone and Political Dissent. 4 Units.

(Formerly CLASSGEN 6N.) Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of *Antigone* by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. Same as: CLASSICS 17N

TAPS 12SC. Playwriting Lab: The Art of Dramatic Writing. 2 Units.

Workshop. Each student develops an original script which is presented in theater by the other students. How to develop, expand, and condition the creative mind. Topics including dramatic action, text and subtext, characterization, language, and style. Students function as a theatrical collective where each has the opportunity to participate in reading and serving the vision of each student-author.

TAPS 13AX. Musical Theater. 2 Units.

Have you ever seen a great musical and wondered, "How do the actors do it?" In this workshop we will explore the mechanics of acting in musicals as we practice solos and scene work from contemporary and classic musicals. Material will range from the "golden age" of musicals of the 1930s to new releases. Possible choices are: *Gypsy*, *Company*, *My Fair Lady*, *Sweeney Todd*, *Oklahoma!*, *Guys and Dolls*, *Cabaret*, *West Side Story*, *A Chorus Line*, *Ragtime*, *Urinetown*, *Dreamgirls*, *Hair*, *Avenue Q*, *South Pacific*, *Damn Yankees*, *Anything Goes*, *Hedwig and the Angry Inch*, *Caroline, or Change*, *Ain't Misbehavin'*, *Next to Normal*, *Hairspray*, and others. Students are encouraged to suggest their own material in their application for the program. The class will be accessible to both beginners and experienced actors/singers and will include in-depth work on vocal technique, utilization of action, specificity of language, personalization, emotional truth, character, and given circumstance. Students will develop an awareness of the demands of the performance experience in a safe and supportive environment. They will be encouraged to work to expand their range and will study and perform a solo and a scene from a musical. These assignments will require a minimum of 2 two-hour sessions with a scene partner during a scene rehearsal week. Commitment and responsibility to scene partners is a crucial component to successful work in the theater. In addition to required readings, students will be expected to conduct some research on the world of the playwright, librettist, and composer. We will end our workshop with a final performance of the work in a showcase for an invited audience. All levels welcome!

TAPS 13N. Law and Drama. 4 Units.

Preference to Freshmen. Beyond the obvious traits that make a good (court room) drama, theater and jurisprudence have much more in common. Just as drama is engaged not only in entertainment but also in examination of social conventions and mechanisms, so law is not only concerned with dispensing justice but with shaping and maintaining a viable human community. In this class we will read and discuss a series of plays in which court proceedings are at the center of dramatic action and concluding with an investigation of the new genre of documentary drama.

TAPS 13SC. Journeying In and Out: Creative Writing and Performance in Prison. 2 Units.

The United States imprisons more people than any other nation. Including those on probation or parole, over seven million adults are currently under correctional supervision in the U.S. - that's 1 in every 50 Americans. The United States also incarcerates more youth than all other countries. Each year approximately 500,000 young people are brought to detention centers, and an estimated 250,000 young people are tried, sentenced, or incarcerated as adults, the majority for non-violent offenses. On any given night in America, 87,000 children are housed in juvenile residential placements, and 10,000 children are held in adult jails and prisons. Despite the magnitude of these numbers, prisons and juvenile detention centers are uniquely closed and sequestered institutions. This class works collaboratively with a local juvenile hall to use literature, writing, and performance to explore the lives of incarcerated youth. In the process, students gain an understanding of incarceration on an immediate and personal scale. Stanford students will work directly with students serving sentences at Hillcrest Juvenile Hall, using collaborative writing and performance projects to share their individual experiences and voices. Stanford students will also engage in writing exercises and discussion groups on campus in order to explore their own relationship to freedom and punishment, choices, changes, and mercy. Class readings, screenings, and discussions will foreground the legal, social, and historical contexts surrounding incarceration as well as the social and behavioral changes made possible through arts programming in prisons. In addition to sustained collaborations with incarcerated youth, the class includes workshops with formerly incarcerated artists, authors, and advocates as well as visits to historic and active prison facilities. Taught jointly by a fiction writer and a dance studies historian, and using the template of the hero's journey as our guide, we will consider how writing and performance might mediate understandings of crime, punishment, and rehabilitation.

TAPS 14AX. Musical Theatre Bootcamp. 2 Units.

Spend three weeks in the world of musical theatre with guest artist instructors currently working in the industry. Learn the history of the craft through music, dance, and acting, with all training driven towards the specificity of musical theatre. Week one will be the pre-golden and golden age of musical theatre, week 2 will be spent in the 60s-90s, and the 3rd week will be 2000-the present (and maybe some tastes of musicals just now in development!). With a director/choreographer and a music director, songs/scenes will be worked on as appropriate for each week along with basic dance moves that support each era of the musical theatre canon. This course will be especially beneficial to students interested in learning more about pursuing professional careers in musical theatre. Guest artist instructors will provide feedback on theatrical resumes, review audition etiquette, and generally advise students on navigating the professional theatre industry.

TAPS 14N. Imagining India: Art, Culture, Politics in Modern India. 3 Units.

This course explores history via cultural responses in modern India. We will examine a range of fiction, film and drama to consider the ways in which India emerges through its cultural productions. The course will consider key historical events such as the partition of the subcontinent, independence from British rule, Green Revolution, Emergency, liberalization of the Indian economy, among others. We will reflect on epochal historical moments by means of artistic responses to these events. For example, Ritwik Ghatak's experimental cinema intervenes into debates around the Bengal partition; Rohinton Mistry's novel, *A Fine Balance* grapples with the suspension of civil liberties during the emergency between 1975-77; Rahul Varma's play *Bhopal* reflects on the Bhopal gas tragedy, considered the world's worst industrial disaster. Students will read, view and reflect on the aesthetic and historical texts through their thoughtful engagement in class discussions and written essays. They will also have opportunities to imaginatively respond to these texts via short creative projects, which could range from poems, monologues, solo pieces, web installations, etc. Readings will also include Mahashweta Devi, Amitav Ghosh, Girish Karnad, Jhumpa Lahiri, Manjula Padmanabhan, Salman Rushdie, Aparna Sen, among others.
Same as: FEMGEN 14N

TAPS 15N. Food and Performance: Meals, Markets, Maize and Macaroni. 3 Units.

Come hungry to learn! This course serves as an introduction to food and performance culture. We will engage ethical and aesthetic questions about factory farms, feminist performance art and futuristic cooking. Emphasis is on original research, interdisciplinary analysis and doing performance. We will attend events, have guest speakers, create our own mini-performances around the broad themes of the course, write critical reviews and conduct archival research. We begin by studying the work of anthropologists of food and then move on to contemplate the way food and performance converge in modern thought and art. We will vary our approaches to the texts and debate a broad range of topics. For example, we will discuss: foodquest; connection to sexuality, memory, race, embodiment, colonialism, violence, protest, public policy and science. The parameters of the course have been limited to food movements in the U.S. in the 20th and 21st centuries; however the opportunity to work on topics beyond this geopolitical and historical scope is possible and encouraged. Texts may include works by Yayoi Kusama, Dwight Conquergood, Mary Douglas, Karen Finley, Psyche Williams, Alice Waters, Jonathan Foer, Michael Pollan, Julia Child, Lauren Berlant, Laura Esquivel, Douglas Sirk, Coco Fusco, Nao Bustamante, Doris Witt and more.

TAPS 15SC. Courtroom Theater. 2 Units.

In the new millennium, the popularity of TV courtroom drama has been staggering: according to a weekly Nielsen ratings conducted a few years ago, 30 million people watched *CSI: Crime Scene Investigation* in one night, 70 million watched at least one of the *CSI* shows, and 40 million watched two other forensic dramas (*Without a Trace* and *Cold Case*). These widely popular shows offer a somewhat distorted image of American criminal courtroom. In this class we will go "behind the scenes" to engage in a hands-on investigation of performances in the criminal trials. We will begin by visiting Bay Area courthouses to investigate the courtroom as a "set" for powerful legal dramas that are happening there on a daily basis. In these field trips we will also observe the courtroom proceedings and talk to judges and other legal professionals. After this introduction to the real-life courtroom, we will investigate landmark theatrical court dramas. Using mock trial techniques, we will approach playtexts as legal "cases." We will try to identify weaknesses and strengths of these cases, and then use them as mock trial scenarios. Ultimately, this class engages the questions of what does it take to build a solid courtroom case and how does it differ from a powerful piece of theater. While getting acquainted with both courtroom and theater techniques, we will keep a critical eye on (mis)representations of criminal courtroom in the popular media. No previous experience in acting or mock trials is necessary. The class is under submission for Creative Expression requirement. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

TAPS 20. Acting for Non-Majors. 1-3 Unit.

Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text.

Same as: TAPS 124D

TAPS 20A. Acting for Non-Majors. 2 Units.

A class designed for all interested students. Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text.

TAPS 21. StoryCraft. 2 Units.

StoryCraft is a hands-on, experiential workshop offering participants the opportunity, structure and guidance to craft compelling personal stories to be shared in front of a live audience. The class will focus on several areas of storytelling: Mining quest; how do you find your stories and extract the richest details? Crafting quest; how do you structure the content and shape the language? Performing quest; how do you share your stories with presence, authenticity and connection? Will meet Wednesday evenings from 7-9pm.

TAPS 22. Scene Work. 1-2 Unit.

For actors who complete substantial scene work with graduate directors in the graduate workshop.

TAPS 23. Game Design: Making Play. 3 Units.

Do you want to make games? This is a project-oriented workshop course that will teach you how to apply design thinking to create new kinds of play. We'll teach you about mechanics, playtesting, drama, narrative, and more. You'll work in teams to produce a new play form in whatever medium and style you like. We want zippy mobile games. We want intensely serious board games. We want socially conscious interactive theater games. We want kinds of fun we've never even imagined.

Same as: TAPS 223

TAPS 25. Acting Short Narrative: From Shakespeare to YouTube. 2 Units.

This course will help beginning students understand basic dramatic structure for acting short scenes. Using classic models (Euripides, Shakespeare, Noel Coward, Stephen Sondheim), we will explore how compelling dramatic scenes are constructed. Students will work with the instructor and with professional actors from Stanford Repertory Theater to come to grips with what makes these scenes successful and how best to bring them to life. As a final project, students will work together to develop and write their own short dramatic scenes, suitable for posting on YouTube.

TAPS 28. Makeup for the Stage. 2 Units.

Techniques of make-up application and design for the actor and artist including corrective, age, character, and fantasy. Emphasis placed on utilizing make-up for development of character by the actor. Limited enrollment.

TAPS 29. Theater Performance: Acting. 1-3 Unit.

Students cast in department productions receive credit for their participation as actors; 1-2 units for graduate directing workshop projects and 1-3 units for major productions (units determined by instructor). May be repeated for credit. Prerequisite: consent of instructor.

TAPS 30. How Theater is Designed. 4 Units.

Team-taught. An introduction to theatrical set, costume and lighting design. Emphasis on balancing practical skill with conceptual ideas for live stage performance. Hands-on projects.

TAPS 31. Introduction to Lighting and Production. 4 Units.

How light contributes to the creation of mood and atmosphere and different kinds of visibility in theatrical storytelling. The use of controllable qualities of light including color, brightness, angle, and movement in the theatrical process of creative scenography. Hands-on laboratory time.

TAPS 32. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations.

Same as: AFRICAAM 32, AMSTUD 32, CSRE 32A, EDUC 32X, EDUC 432X

TAPS 32F. History of Costume and Fashion. 4 Units.

The evolution of fashion and costume with an emphasis on the relationship between social, cultural, and political events and clothing style. Attention to major designers and creators and their shaping of resultant fashion and artistry in clothing.

TAPS 34. Stage Management Techniques. 3 Units.

The production process, duties, and responsibilities of a stage manager. Skills needed to stage manage a production.

Same as: TAPS 334

TAPS 39. Theatre Crew. 1-3 Unit.

Under faculty guidance, working backstage on Drama Department productions. Open to any student interested in gaining back stage experience. Night and weekend time required.

TAPS 39D. Theater Performance: Prosser Stage Management. 2-4 Units.

For students stage managing a Department of Drama Senior Project or Assistant Stage managing a Department Drama production.

TAPS 41N. Inventing Modern Theatre: Georg Büchner and Frank Wedekind. 3 Units.

The German writers Georg Büchner (1813-1837) and Frank Wedekind (1864-1918). Many of the most important theater and film directors of the last century, including Max Reinhardt, G. W. Pabst, Orson Welles, Robert Wilson, and Werner Herzog, have wrestled with their works, as have composers and writers from Alban Berg and Bertolt Brecht through Christa Wolf and Thalia Field. Rock artists as diverse as Tom Waits, Lou Reed, Duncan Sheik, and Metallica have recently rediscovered their urgency. Reading these works in translation and examining artistic creations they inspired. Classroom discussions and written responses; students also rehearse and present in-class performances of excerpts from the plays. The aim of these performances is not to produce polished stagings but to creatively engage with the texts and their interpretive traditions. No previous theatrical experience required.

Same as: GERMAN 41N

TAPS 70. Intro to Directing. 3 Units.

An Intro to Directing class with a special section for directing musicals taught by Ryan Purcell, Associate Artistic Director for the Magic Theatre...more details coming soon.

TAPS 101P. Intro to Directing and Devising Theatre. 4 Units.

An introductory workshop class that explores a range of theatre exercises and techniques in order to create, perform, and compose theatre. Students will work with original texts such as Beckett, Pinter, Churchill as well as creating their own performance texts and scores to make original, devised performance. Students will be encouraged to think critically about various compositional themes and ideas including the relationship between form and content, aesthetics, proximity, audience, space. Students will work collaboratively learning how to problem solve and deal with creative challenges as they create original performance works. Students will work towards creating a short original performance piece.

TAPS 103. Beginning Improvising. 3 Units.

The improvisational theater techniques that teach spontaneity, cooperation, team building, and rapid problem solving, emphasizing common sense, attention to reality, and helping your partner. Based on TheatreSports by Keith Johnstone. Readings, papers, and attendance at performances of improvisational theater. Limited enrollment. Improv, Improvisation, creativity and creative expression.

TAPS 104. Intermediate Improvisation. 3 Units.

This class is the continued study of improvisational theater with a focus on stage skills, short and long form performance formats, and offstage applications of collaborative creativity. It is open to any students who have taken TAPS 103 or have previous onstage improv experience AND consent of the instructor.

TAPS 105V. Improv & Design. 1 Unit.

Improv & Design is a wildly practical class exploring the intersection of Improvisational Theater & Design Thinking. Spring quarter 2015, Improv & Design is about creating joyful disruption in the world around us. Students will be bringing the gift of improv out from the stage or the classroom into the world in real time, using design thinking principles to try things, iterate and gather feedback. Each week, we will cover a fundamental principle of improvisation. Topics might include playfulness, connection, resilience, collaboration, inspiration, optimism, generosity, presence, listening, accepting offers, and storytelling. Teams of students will then design small experiments to run in the real world that seek to increase ordinary people's experience of that particular mindset or improvisational principle. The class is open to undergraduate and graduate students at Stanford with a genuine desire to make the world a better place (today!) and a willingness to jump in and explore new ways of showing up in the world. No previous design or improv experience needed. Open to undergraduate and graduate students. Students must apply for this class in order to be enrolled. Accepting 12-16 students. See d.school.stanford.edu/ classes for more information.

TAPS 108. Introduction to Feminist Studies. 4-5 Units.

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives. Same as: AMSTUD 107, CSRE 108, FEMGEN 101

TAPS 112. Creative Expression: Musical Theater. 4 Units.

Students begin to create pieces that are fresh and innovative forms of musical theater that do not necessarily appeal to specifically popular audiences but perhaps to audiences more associated with high art, opera, or even contemporary independent music. Musical theater is an untapped resource of potential artistic innovation and has unfortunately become stuck in an ideal of universal accessibility. In present popular culture and the culture of contemporary art forms, musical theater almost exclusively refers to popular productions such as Phantom of the Opera, Rent, Wicked, Jesus Christ Superstar. Although excellent pieces of art in their own way, both dramaturgically and in their ability to evoke emotion through catchy melodies, for the most part each of them have their basis in popular and traditional musical idioms and theatrical forms, seldom exploring more advanced or avant-garde and experimental compositional and theatrical techniques.

Same as: MUSIC 112

TAPS 113. Creative Expression: Directing the Musical. 3 Units.

This course would teach conductors, composers, sound engineers and directors what to consider when directing the music for a musical theater production. Students would learn to efficiently schedule and conduct rehearsals, create legible scores and parts, make a checklist for all the required nuances ie: Music stands, stand lights, stools etc. Additionally, it is evident that musicians, theater artists, dancers, lighting designers, costume designers and scenic designers all have very different cultures in the way they operate: punctuality, preparation, warm ups, expectations etc. In order to have a smooth and successful working relationship with all of these important members of a theatrical production, a musical director must understand these cultures and how to communicate with them using a language they all understand.

TAPS 114. Designing Wonder: Creating "everyday audiences". 4 Units.

Flash Mobs, Concerts, Amusement Parks, Bakeries. Art and Theater does not need to be confined to a stage, and audiences do not need to be confined to comfy red velvet seats. In this course, students will explore and create unexpected and engaging experiences in everyday spaces. Sidewalks, Parks, Stanford Dining Halls. All of the work will seek to make the world a more WONDERous place in which moments of amazement and delight are possible around every corner. Class time will frequently be substituted for off-campus excursions including Great America, The Exploratorium, House of Air, Alcatraz Island, and Outdoor Movie Screenings. This is a hands-on, creative course.

TAPS 115. Musical Theater. 1-3 Unit.

In this workshop we will traverse the landscape of world of Musical Theater. It will serve as an introduction for the beginning actor and singer, and expand the more experienced performer's range in this genre. The world of Musical Theater is filled with stories of love, passion, joy, violence, heartbreak and rage. The class will include an introduction to vocal and movement skills for musical theater, beginning with exercises to build an ensemble and encourage a sense of play and relaxation in supportive environment. Our class must be a place where everyone feels safe. As ensemble members, we will be responsible for each other in this environment. Students will choose one solo song, and perform in a group number from this exciting discipline. The instructor will work with the actors on technique, utilization of action, specificity of language, personalization, and emotional truth. A professional coach from the theater community will conduct vocal coaching. Physical warm-ups and choreography will be suited for both the dancer and non-dancer. The class will culminate in the last week with live performance for friends and family. STUDENTS ARE ENCOURAGED TO BRING THEIR OWN SUGGESTIONS. (Isn't there a role you've always wanted to sing?) Required text: Broadway Musicals Show by Show: Sixth Edition - Stanley Green; Paperback.

TAPS 120A. Acting I: Scene Study. 1-3 Unit.

A substantive introduction to the basics of the craft of acting, this course gives all incoming students the foundation of a common vocabulary. Students will learn fundamental elements of dramatic analysis, and how to apply it in action. Topics include scene analysis, environment work, psychological and physical scoring, and development of a sound and serviceable rehearsal technique. Scene work will be chosen from accessible, contemporary, and realistic plays. Outside rehearsal time required.

TAPS 120B. Acting II: Advanced Scene Study. 1-3 Unit.

Learn how to expand character work, beyond what is immediately familiar. Continuing basic practices from the first part of the sequence, in this quarter they will look beyond the strictly contemporary, and may begin to approach roles drawn from more challenging dramatic texts. This might include plays chosen from mid-century American classics, World Theater, or other works with specific historic or cultural requirements. Actors begin to learn how a performing artist researches and how that research can be used to enrich and deepen performance. Prerequisite: 120A or consent of instructor.

TAPS 120D. Studio Performance. 1-5 Unit.

Rehearsal and development of a studio performance project for an end of quarter presentation. Emphasis is on development of acting skills with minimal technical support. Material chosen from classic plays, American realism, world theater, or created group ensemble pieces.

TAPS 120V. Vocal Production and Audition. 1-3 Unit.

An introductory study of the vocal mechanism and the development of voice and articulation for the stage. Students will be introduced to the actor's tools of phonetics, verbal action and text analysis. Vocal technique will then be applied to the actor's process in preparation for audition. Actors will fully participate in the audition process, from beginning to end. Emphasis will be on relaxation, selection of appropriate material, and versatility to show contrast and range.

Same as: TAPS 210V

TAPS 121C. Physical Characterization. 3 Units.

A practical course in movement, acting and character development for stage or screen. This course is appropriate for all artists; no prior movement training is required. We will explore expressive possibilities in the body in order to build characters with nuanced physicality and rich emotional life. Students will learn strategies for awakening the body, find a greater range of expression, and widen the variety of characters they can inhabit. We will conduct live observations and take inspiration from photographs, memories, dramatic texts and other sources to build vivid portraits of character in performance. Actors will work independently and together as an ensemble, learning techniques derived from Michael Chekhov, Decroux, Lecoq and others. We will also practice physical conditioning for the actor through a daily warm-up sequence that improves strength, flexibility and alignment.

TAPS 121P. Period and Style:Acting. 3 Units.

This course is designed for the actor and theater-lover who has completed 120a or an equivalent basic acting class. Students will develop their acting skills towards the ability to perform in some of the major classics of the theater, from Shakespeare's plays through the fast-paced physical comedies of twentieth-century farce. Acting in "big" plays without damaging the voice, working physically with safety, how to research like an artist, and rehearse like a professional are all topics that will be covered. Class culminates in an open Scene Showing of Period Plays.

TAPS 121S. Shakespeare Performance Intensive. 4 Units.

This course explores the unique demands of playing Shakespeare on the stage. Through deep exploration of language and performance techniques in sonnets, speeches and scenes in (an edited) full-length play, the student will learn how to bring Shakespeare's passions to life through research, analysis, and a dynamic use of voice, body and imagination. This course is designed to increase the actor's physical, vocal, emotional, and intellectual responsiveness to the demands, challenges and joys of playing Shakespeare.

TAPS 122P. Undergrad Performance Project: Hamlet/R&G are Dead. 2-9 Units.

The Undergraduate Performance Project provides students the opportunity to study and perform in major dramatic works. The Winter 2015 Undergraduate Acting Project presents Shakespeare's Hamlet alongside Stoppard's Rosencrantz & Guildenstern are Dead. Students learn to form an artistic ensemble, develop dramaturgical materials, learn professional arts protocols and practice, devise within the ensemble, and develop live performance ability. Audition required. Preference to majors/minors. Maybe repeated for credit.

TAPS 123. Speaking with Distinction. 3 Units.

Find your voice, focus your presence, stand your ground, and deliver your message with authority, clarity, and grace. **SPEAKING WITH DISTINCTION** is a course designed for anyone who has a need to speak to one person or a hundred people and make the message clear. Essential for presentations of all kinds; whether in the classroom, workplace, or marketplace; present key concepts and ideas with power and enthusiasm; Speak to large audiences; One-on-one presentations; Speak to motivate, collaborate, inspire. Learn to think on your feet so that you are not dependent on notes, slides or luck. Increase your presence and build your public speaking skills in a fun and supportive environment.

TAPS 124D. Acting for Non-Majors. 1-3 Unit.

Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text.

Same as: TAPS 20

TAPS 125. Acting Shakespeare. 3 Units.

This course explores the unique demands of playing Shakespeare on the stage. Through deep exploration of language and performance techniques in sonnets, speeches and scenes, the student will learn how to bring Shakespeare's passions to life through research, analysis, and a dynamic use of voice, body and imagination. This course is designed to increase the actor's physical, vocal, emotional, and intellectual responsiveness to the demands, challenges and joys of playing Shakespeare.

TAPS 126. Your American Life. 4 Units.

This is a small seminar designed for students interested in creating scored stories for radio/podcast or live performance; spoken, sonic stories. We will examine the main features and craft of these kinds of stories, popularized by radio programs like *This American Life* and live shows like *The Moth* and you will then write and produce your own piece, be it memoir, documentary, inquiry, or some combination of these genres. Students will have the opportunity to meet at work with some of the best storytellers in America; this term, you will get to meet and work with Julie Snyder, senior producer of *This American Life*.

TAPS 127. Introduction to Movement and Stage Combat. 4 Units.

Introductory, intensive training in movement for acting and the fundamentals of unarmed stage combat. This course is for students interested in movement and dynamic storytelling; no prior training is required. We will explore the fundamentals of contact improvisation and fight performance as a means of strengthening mind-body connection and preparing the actor for more nuanced, compelling work on the stage. Drawing from a range of practices, we will explore physical improvisation and composition, examining how these can be used to make discoveries about a text, a character, an ensemble and oneself. Our training consists of four main components: physical conditioning, practical technique, improvisation and the creation of two short performance pieces. The class will culminate in an open performance of scenes.

TAPS 127S. ACTING THROUGH SONG. 3-4 Units.

How does a singer develop the strategies to shape nuanced, emotional performances? What clues does the singer mine from lyrics and a score in order to communicate through song? This is a studio course in acting and movement techniques for vocal performers who want to expand their expressive range, refine multi-faceted performances, and cultivate compelling stage presence. This course is suitable for any vocalist; classical singers, a cappella performers, musical theater actors and others are all welcome. The three foundational underpinnings of our work will be actor personalization technique, basic movement training and text analysis strategies. We will develop flexibility, relaxation and the freedom to follow expressive impulses while also deepening our knowledge of character, narrative and theme. Students should be prepared to engage in intensive work with performance pieces, selected according to each student's preferred style and tradition. We will focus on close textual analysis and find connections between the ways performers use various written scores (for spoken dialogue, song lyrics and musical composition) as the blueprints for dynamic performances that tell a powerful story. The course will culminate in a public performance of material from a musical performance genre.

TAPS 127X. Advanced Movement for Actors: Conditioning, Improvisation and Composition. 3-4 Units.

The physical actor is ever working to develop a wider range of emotional expression, an unconscious attentiveness to fellow actors, and a compelling presence that conveys a sense of truth in action and in word. Students explore movement as a means of physical training and performance-building. For those interested in dynamic storytelling; no prior acting or physical training is required. Four main components: physical conditioning, practical technique, movement improvisation, and the creation of several short performance pieces. The fundamentals of contact improvisation for the theater, which offers actors another way to explore text and make discoveries about character. Exercises in movement composition sharpen tools necessary for creating original work and crafting strong performances on stage.

TAPS 128. Acting for Film and Video. 3 Units.

Acting techniques for working on film and with video.

TAPS 129. Advanced Acting. 4 Units.

Advanced study and practice of acting.

TAPS 130. ReDesigning Theater: Live & Digital Performance. 3 Units.

This quarter's version of ReDesigning Theater looks at Live and Digital Performance. We will examine the use of digital technology in collaboration with live performance. Students will learn and employ the design thinking process as well as improv and theatrical techniques. We aim to create user-centric, interactive experiences where technology enables the audience to become part of and/or influence the outcome of the story or its presentation. Student projects will begin with the concepts enabled by personal technology such as smart phones and expand to animation, video projection, and other media. Students will work in small groups to investigate and experiment with formats that blur the lines between live and digital, performer and audience, and physical and virtual platforms. This project-based course is accessible to students of all backgrounds interested in exploring and transforming the frontiers of technology, art, and live performance.

Same as: ME 288

TAPS 131. Lighting Design. 4 Units.

Hands-on laboratory projects in lighting and designing stage productions and other live performances. The content and format of lighting plots. Prerequisite DRAMA 31.

TAPS 132. Costume Design. 4 Units.

Process of designing costumes for the stage, covering script analysis, rendering techniques, character development and conceptual ideas. Project related work with smaller, pertinent exercises. Prerequisite: 30 or consent of instructor.

TAPS 133. Stage Scenery Design. 3-4 Units.

Craft and Theory of stage scenery design including visual research, spatial organization, basic drafting, sketching and model-building. Prerequisite: 30, or consent of instructor.

TAPS 134. Stage Management Project. 3-5 Units.

For students stage managing a Department of Drama production.

TAPS 136. Virtual Drafting for Designers. 3-5 Units.

A new course looking at virtual drafting methods and opportunities.

TAPS 137. Hand Drafting for Designers. 3 Units.

Fundamentals of hand-drafting. Standard drawing conventions; the use of line weight, color, composition, and graphic style. Creation of construction documents for real-world applications. May be repeated for credit.

TAPS 138. Sound Design. 4 Units.

This is a hands-on, workshop-oriented course in sound design with an emphasis on sound for live performance. Its focus is on rapidly developing technical skills and intuitions for crafting beautiful, meaningful sounds. These skills are potentially useful to persons with interest in the fields of technical theater and dance, electronic music, game design, interior design, and experience design. Topics include wave editing; sound and music curation; audio spatialization; the qualitative study of filters; show control; sound reinforcement; interactive audio; and the use of tone, dynamics, and timbre to create moods and impressions.

TAPS 140. Projects in Theatrical Production. 1-4 Unit.

A seminar course for students performing significant production work on Drama Department or other Stanford University student theatre projects. Students serving as producers, directors, designers or stage managers, who wish mentorship and credit for their production work sign up for this course and contact the instructor, Linda Apperson. Prerequisite: consent of instructor.

TAPS 144. Puppetry with a Twist. 3-4 Units.

Creative course is an introduction to puppetry with a survey of important styles and techniques from around the world including Twist's own. Hands on and individualized experience with the aim of each student creating or contributing to a puppet or object/figure performance. Course is as broad as the individual's creative expression.

Same as: TAPS 344

TAPS 150. British Theatre Then and Now: 1890s-present. 4-5 Units.

This introductory course covers some of the 'golden ages' of British Theatre from 1890 to the present: the stylish and witty 'New Drama' of the Edwardian era with writers such as George Bernard Shaw and Oscar Wilde exploring sex and politics in the wake of Ibsen; 'A Doll's House'; the artistic innovations of the 1950s and 60s from seminal writers such as Samuel Beckett, Harold Pinter and Tom Stoppard; and more recent works by modern legends Caryl Churchill, David Hare, Alan Ayckbourn, and immersive or interactive theatre by companies such as Punch Drunk. We will also look at the ever changing relationship with Shakespeare across generations of British theatre artists, including directors such as Peter Brook and Deborah Warner. In this class students will explore the relationship between theatre, politics and culture across fascinating eras in British history as well as thinking about the role of theatre in our own lives and social contexts. We will ask the questions: What is theatre for? What meaning does it have for a contemporary audience? How can it reflect our times? Has the communal audience experience of going to the theatre changed in an age that is dominated by social media and broadcast technology? Has this changed the way that people make theatre? What do we as audiences want from the theatre? What do we as theatre makers want from audiences? Students will read plays weekly and also see screenings of several excellent film versions of the plays as well as participating in staged readings of scenes and class discussions. The class will also attend at least one live theatre event. This is a perfect class for students who enjoy active learning, approaching the texts as scholars and historians, but also working with the plays creatively, engaging the imagination as potential actors, directors, designers and/or dramaturgs.

TAPS 151A. Theater of the Asia-Pacific Region. 4 Units.

This course offers a historical and cultural exploration of theatre forms and performance cultures from various countries that border the Pacific Ocean, as well as from island communities within Oceania. Taking the term 'Asia-Pacific' as a provocation and point of interrogation, we will assess how theatrical production from this broad area can help us think through questions of nationalism, regionalism, interculturalism, and diaspora, while deepening our appreciation of world theatre history. The first part of the course focuses on theatre in specific sites, covering classical forms from China, Japan, and Indonesia, as well as indigenous theatre and performance from several Pacific Islands, including the Cook Islands, S'moa, Aotearoa/New Zealand, and Hawai'i. The second part of the course centers on the ocean as a dynamic space of mobility, examining a range of recent plays and performances that trace identities on the move and across borders, and which reveal how various Asian and Pacific Islander communities have engaged with each other in locations from Australia to the west coast of the United States. In so doing, our course will chart connections and divergences that enable fresh insights into the geographical and cultural dimensions of global theatre.

Same as: TAPS 251A

TAPS 151C. Hamlet and the Critics. 5 Units.

Focus is on Shakespeare's *Hamlet* as a site of rich critical controversy from the eighteenth century to the present. Aim is to read, discuss, and evaluate different approaches to the play, from biographical, theatrical, and psychological to formalist, materialist, feminist, new historicist, and, most recently, quantitative. The ambition is to see whether there can be great literature without (a) great (deal of) criticism. The challenge is to understand the theory of literature through the study of its criticism.

Same as: ENGLISH 115C

TAPS 151D. The Critic as Artist. 3 Units.

Criticism is art. It therefore must aspire to reach the heights, depths and strange in-betweens it grapples with in the art of others. Yet criticism owes a singular responsibility to these others, and to the wider culture it seeks to interrogate. Our interrogation will be generated by dance and performance criticism, with possible forays into live visual art, theater, hybrid forms and whatever else we think might suit our purposes. Various methodologies will be debated and employed throughout the semester, as students are encouraged to begin (or continue) developing personal philosophies and voices through their writing. Our meetings will be hands-on affairs, guided by student experiments. *quest*; *Experimentsquest*; is a key word; *quest*; this class will function like a laboratory, an introduction to an unruly literary art form that is open to all individuals with an interest in better understanding themselves and their world through words and art.

Same as: DANCE 33

TAPS 151H. ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities. 4-5 Units.

A quarter-long exploration of improvisation in relationship to identity and race in the 21st century in which students investigate new dynamics of doing and thinking identities through the arts. Panel discussions, performances, and talks that engage critically with the theme, concept, and practice of improvising identity across a variety of contexts and genres such as jazz music, modern dance, contemporary art, race comedy, food, and hip-hop poetry/freestyle. Strategies that artists/scholars have used to overturn essentializing notions of identity in theory and practice.

Same as: AMSTUD 151H, CSRE 151H, DANCE 151H, DANCE 251H, TAPS 351H

TAPS 151T. Great Books: Dramatic Traditions. 4 Units.

The most influential and enduring texts in the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons.

Same as: COMPLIT 151B, COMPLIT 351B, TAPS 351

TAPS 152D. Introduction to Dance in the African Diaspora. 4 Units.

This course introduces students to dance as an important cultural force in the African Diaspora. From capoeira in Brazil to dance hall in Jamaica to hip hop in the United States and Ghana, we will analyze dance as a form of resistance to slavery, colonialism, and oppression; as an integral component of community formation; and as a practice that shapes racial, gendered, and national identity. We will explore these topics through readings, film viewings, and movement workshops (no previous dance experience required). Students will have the option to do a creative performance as part of their final project.

Same as: AFRICAAM 24, CSRE 24D, DANCE 24

TAPS 152H. Food and Performance: Meals, Markets, Maize and Macaroni. 4 Units.

Come hungry to learn! This course serves as an introduction to food and performance culture. We will engage ethical and aesthetic questions about factory farms, feminist performance art and futuristic cooking. Emphasis is on original research, interdisciplinary analysis and doing performance. We will attend events, have guest speakers, create our own mini-performances around the broad themes of the course, write critical reviews and conduct archival research. We begin by studying the work of anthropologists of food and then move on to contemplate the way food and performance converge in modern thought and art. We will vary our approaches to the texts and debate a broad range of topics. For example, we will discuss: *foodquest*;s connection to sexuality, memory, race, embodiment, colonialism, violence, protest, public policy and science. The parameters of the course have been limited to food movements in the U.S. in the 20th and 21st centuries; however the opportunity to work on topics beyond this geopolitical and historical scope is possible and encouraged. Texts may include works by Yayoi Kusama, Dwight Conquergood, Mary Douglas, Karen Finley, Psyche Williams, Alice Waters, Jonathan Foer, Michael Pollan, Julia Child, Lauren Berlant, Laura Esquivel, Douglas Sirk, Coco Fusco, Nao Bustamante, Doris Witt and more.

TAPS 153D. Performing Digital Technologies. 4 Units.

This class is about collaboration: between live performers and digital images, between artists and engineers, and between scholars and artists. It emphasizes conceptual work and creativity in the integration of new and old media. We will take a rigorous but fundamentally hands-on approach to the uses of a wide range of screen technologies - from smart phones to digital projections - in live performance. The class will start with a survey of successful uses of screens in recent theater and performance work, then move to finding novel solutions for particular dramatic scenes.

Same as: TAPS 253D

TAPS 153S. Japanese Theater: Noh to Contemporary Performance. 4 Units.

This course will provide a historical overview of Japanese theater from traditional (Noh, Kabuki, Bunraku) to contemporary (Angura, Butoh, and performance art). We will focus on the relationship between Japanese theaters and its audiences, exploring the contexts in which theater forms developed and how these forms themselves reflect Japanese culture and society.

TAPS 154S. Theater and Legal Regulation. 4 Units.

This course examines how legal statutes, lawsuits, and contracts police theatrical practice, particularly in Britain and the United States in the nineteenth and twentieth centuries. Three particular forms of legal intervention will concern us: ownership of theaters and plays, government censorship and authorial control, and health and safety laws. We will explore how, despite their apparently different aims, these manifestations of the law pursue closely related ends.

TAPS 155M. Dance and at the African Diaspora. 4 Units.

Same as: DANCE 26

TAPS 155T. Theatre of War. 4 Units.

Military personnel and politicians alike use the phrase *quest*;the theatre of war; *quest*; to refer to the geographical area of a military conflict and the more intangible concerns of battle. The primary concern of this class is the intersection between performance and war. Our inquiry will focus on drama, film, the media, and role-playing scenarios as a military training tool, and we will approach these objects through critical theories of justice, performance theory, and trauma.

TAPS 156. Performing History: Race, Politics, and Staging the Plays of August Wilson. 4 Units.

This course purposefully and explicitly mixes theory and practice. Students will read and discuss the plays of August Wilson, the most celebrated and most produced contemporary American playwright, that comprise his 20th Century History Cycle. Class stages scenes from each of these plays, culminating in a final showcase of longer scenes from his work as a final project.

Same as: AFRICAAM 156, TAPS 356

TAPS 156T. Movement and Digital Culture. 4 Units.

What is physical intelligence? How could we cultivate it? What technologies can extend sensory awareness, and which can suppress it? How can better understanding of human movement impact a creative/design process? The term *quest*;hybrid action; *quest*; introduces the notion of movement, expressed in both the physical and virtual worlds. Through interactive technologies, such as the Kinect and camera tracking, and literature from multiple fields, this class takes human movement as a practice-based, creative, theoretical, historical, and philosophical realm of study. The course introduces basic principles and practices of body awareness as a way to extend *quest*;s 'physical intelligence; *quest*; and asks how studying movement can inform creative practices from computer programming to engineering to choreography, as well as applications in health and rehabilitation, cognitive and neuroscience, philosophy and literature. The class emphasizes hands-on, individual and collaborative projects through research and prototyping.

Same as: DANCE 156T

TAPS 157. World Drama and Performance. 4 Units.

This course takes up a geographically expansive conversation by looking at modern and contemporary drama from nations including Ghana, Egypt, India, Argentina, among others. Considering influential texts from the Global South will also enable us to explore a range of themes and methodologies that are radically re-shaping the field of Performance Studies. We will examine the relationship between colonialism and globalization, empire and capital, cosmopolitanism and neoliberalism. Re-situating our perspective from the Global South and the non-western world, we will inquire; provincialize Europe; and probe the limits of its universalizing discourses.

Same as: TAPS 357

TAPS 158H. Proximity and Temporality in Performance. 4-5 Units.

This course considers the relationship between proximity and temporality in live performance, looking quite literally at the distance in space and time between performers and audiences. Alongside case studies of performance works, class readings will be drawn from current Performance Studies scholarship as well as discourses in postmodern geographies and anthropological studies of proxemics; as well as key philosophic works such as Lefebvre's *The Production of Space* and Heidegger's *The Concept of Time*.

Same as: TAPS 358H

TAPS 158L. The Ethics of Storytelling: The Autobiographical Monologue in Theory, in Practice, and in the World. 4 Units.

Recently a theatrical monologist gained notoriety when it was revealed that key aspects of one of his "autobiographical" stories had been fabricated. In this class another autobiographical monologist -- who has himself lied many times in his theater pieces, without ever getting caught -- will examine the ethics of telling our life stories onstage. Does theatrical "truth" trump factual truth? We will interrogate several autobiographical works, and then -- through autobiographical pieces created in class -- we will interrogate ourselves.

Same as: ETHICSOC 201R, TAPS 358L

TAPS 159. Introduction to Game Studies. 4 Units.

Games are not new; they are older than civilization. But in the past 50 years or so, we have seen an explosion of creativity in the development of new games, many of which, especially video games, complicate older understandings of what games are. This explosion of creativity has been matched by the increasing visibility and ubiquity of new games and ways of seeing games: as video games, televised professional sports, and even distributed urban events. Games are not a simple object of study. There are many ways to understand them: as social practices, as formal systems, as representative artwork, as modes of learning, and many more. We will start by considering games as a mode of performance, considering games in relation to theater and other forms of aesthetic performance. However, we will take a deeply interdisciplinary approach to the study of games, and will draw on perspectives from design, philosophy, education, and the emerging discipline of video game studies. We will also, of course, draw on a variety of games, both online and offline. As we bring in these perspectives, we will begin to consider games in at least two other fundamental ways: as designed experiences and as composed systems or artworks. This course is less an attempt to provide a survey of the entire field of games. It is more an attempt to provide a basic toolbox for critically examining and analyzing games. These tools are potentially useful for anyone who interacts with games: whether as a consumer of entertainment, a critical analyst of play, a user of serious games, or a game designer.

TAPS 159G. The Theater of War: Art, Violence, and the Technologies of Death. 4 Units.

We will read plays and study films dealing with war and the technologies of destruction, including Aeschylus' *Persians*, Sophocles' *Philoctetes*, Euripides' *Trojan Women*, Shakespeare's *Macbeth*, O'Casey's *The Plough and the Stars* and *The Silver Tassie*, Brecht's *Galileo and Mother Courage*, Kubrick's *Paths of Glory* and *Dr. Strangelove*, Bergman's *Shame*, Nichol's *Catch-22*, Wertmuller's *Seven Beauties*, Brenton's *The Genius*, Frayn's *Copenhagen*, Nottage's *Ruined*, among others.

TAPS 159M. Movement and Meaning: Dance Studies in Global Comparative Context. 4 Units.

This course introduces students to various approaches to studying dance in a humanities context. We will explore how people create meaning through dance and how dance, in turn, shapes social norms, political institutions, and cultural practices across time and space. The course's structure challenges the Western/non-Western binary that still pervades many academic disciplines by comparing dance forms across the globe on the basis of functional similarities. At the same time, we will keep in mind the unequal power hierarchies shaping our modern world, and therefore we will examine how and why certain forms have become delineated as 'Western' and others as 'world' or 'ethnic,' despite similarities in movement, meaning, or purpose.

Same as: CSRE 159M, DANCE 23, TAPS 259M

TAPS 160. Rethinking the Ballerina. 4 Units.

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries.

Same as: DANCE 160, FEMGEN 160, TAPS 260

TAPS 160N. Chican@/Latin@ Performance in the U.S.. 4 Units.

This course will introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece.

Same as: CHILATST 160N

TAPS 161H. Dance, History and Conflict. 4 Units.

This seminar investigates how moving bodies are compelling agents of social, cultural, and political change. Through readings, videos, discussions and viewings of live performances this class questions the impact of social conflict and war on selected 20th and 21st century dances and dance practices. This class asks to what extent dance, in its history as well as contemporary development, is linked to concepts of the political and conflict.

Same as: DANCE 161H

TAPS 162. Performance and the Text. 5 Units.

Formal elements in Greek, Elizabethan, Noh, Restoration, romantic, realistic, and contemporary world drama; how they intersect with the history of performance styles, character, and notions of action. Emphasis is on how performance and media intervene to reproduce, historicize, or criticize the history of drama.

Same as: TAPS 262

TAPS 162H. Baroque Modernities: Dance, Theater, Film, Political Theory. 4 Units.

What do seventeenth-century choreography and dramaturgy contribute to (mean to) choreographic and theatrical modernity? How can we explain the recurrent baroque phenomenon across the twentieth century -- becoming particularly prominent in the 1980s -- beyond the historicist accounts of theatrical reconstruction? How does the baroque locate itself within cultural modernity? This seminar asks this question of choreography at several junctures: The analysis of seventeenth century baroque spectacle that fashioned dance and theatre into political tools of monarchical sovereignty; Twentieth-century literature on the Baroque that destabilizes received notions of subjectivity and political sovereignty; Twentieth-century choreography and film that deploys baroque figures and techniques. Thus, our material shall range from seventeenth-century dance and theater to contemporary dance, film and literature.

Same as: DANCE 162H

TAPS 162L. The Idea of a Theater. 5 Units.

Examines the idea of a theater from the religious street theater of Medieval York, through Shakespeare's Globe, and onto the mental theater of the Romantic reader and the alienation effects of Brecht's radical playhouse in the 20th cent.

TAPS 163D. Shakespeare: The Ethical Challenge. 5 Units.

Was the eighteenth century right in proclaiming Shakespeare to be the greatest moral philosopher? What are the ethical challenges Shakespeare's major plays still pose for us? Can we divorce ethical decisions from the contingencies of experience? We will ask a series of normative ethical questions (to do with pleasure, power, old age, self-sacrifice, and truth telling) and attempt to answer them in relation to the dramatic situation of Shakespeare's characters on the one hand and our own cultural situation on the other. The ethical challenge of Shakespearean drama will be set against selected readings in ethical theory.

Same as: ENGLISH 163D

TAPS 164T. Queer Art and Performance. 4-5 Units.

Examines the late 19th, 20th and 21st century forms of performance-- including examples from drama, theater, cabaret, and performance art -- through the perspectives of contemporary critical gender and queer theories. Texts and movements range from early avant-garde (Dada, Futurism) to gay and lesbian drama (Lillian Hellmann, Joe Orton, Tony Kushner) to post-liberation Queer performance and video (Split Britches, Carmelita Tropicana, Kalup Linzy). Theorists include Judith Butler, Michel Foucault, and Eve Kosofsky Sedgwick.

Same as: FEMGEN 140P, TAPS 364T

TAPS 165. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: CSRE 196C, ENGLISH 172D, PSYCH 155, SOC 146

TAPS 165C. Ancient Dance and its Modern Legacy. 3-5 Units.

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.

Same as: CLASSICS 137, CLASSICS 237, TAPS 265C

TAPS 166H. Historiography of Theater. 3-5 Units.

Goal is to design an undergraduate theater history class. Standard theater history textbooks, alternative models of theater history scholarship, and critical literature engaging historiography in general.

Same as: TAPS 304

TAPS 167. Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice. 4 Units.

(Formerly CLASSGEN 110.) Gods and heroes, fate and free choice, gender conflict, the justice or injustice of the universe: these are just some of the fundamental human issues that we will explore in about ten of the tragedies of Aeschylus, Sophocles, and Euripides.

Same as: CLASSICS 112

TAPS 167H. The Avant-Garde. 4 Units.

Course description coming soon.

Same as: TAPS 267

TAPS 168. Writing for the Stage and Screen. 4 Units.

This is a script analysis and film criticism course from the vantage point of the scriptwriter -- both playwrights and screenplay writers. We will do comparative analysis of films that were adapted from plays and use published plays and/or student-authored plays to write original script adaptations. Students will also develop short video films based on a segment of such adaptations. May be repeated for credit.

Same as: FEMGEN 168

TAPS 169. Hysteria and Modern Culture. 3-5 Units.

The term "hysteria" has been used for centuries to categorize the mysterious ailments of others. This course will focus on the history of hysteria's representation and production from the late nineteenth century through WWI. Readings will include medical writings (Charcot, Bernheim, Freud), plays (Ibsen, Strindberg, Toller), and feminist theory (Cixous, Cleavage, Diamond). We will also devote some attention to the ongoing influence of the discourse of hysteria on contemporary medical and popular cultures.

Same as: GERMAN 137, HUMBIO 162H

TAPS 170. Directing and Dramaturgy: Composition and Adaptation for Theatre. 4-5 Units.

This course explores dramaturgy and directing in the research and production of theatre primarily through practical creative projects with secondary readings on dramaturgy as a discipline. In this course we will consider the role of the dramaturg in its broadest sense, running across theatrical production from research to playwriting, adaptation, choreography, devising and directing. Students will work individually and in small groups researching, adapting, crafting and workshoping material.

Same as: TAPS 370

TAPS 170B. Directing Workshop: The Actor-Director Dialogue. 4 Units.

This course focuses on the actor-director dialogue. We will work with actors and directors developing approaches to collaboration that make the actor-director dialogue in theater.

Same as: TAPS 372

TAPS 171. Performance Making. 4 Units.

A studio course focused on creative processes and generating original material. Students will be encouraged to think critically about the relationship between form and content exploring the possibilities of site specific, gallery and theatre settings. Students will reflect throughout on the types of contact and communication uniquely possible in the live moment, such as interaction or the engagement of the senses. The emphasis is on weekly experimentation in the creation of short works rather than on a final production.

Same as: TAPS 371

TAPS 172. Out of Place: (W)riting Home. 4 Units.

A creative writing workshop; all genres. This course will introduce students to the fundamentals of a productive creative writing practice, including iquest;the beginnerquest;s mindquest;(as founded in Eastern spiritual practices); and, an indigenous approach to iquest;authenticityquest; in onequest;s work and onequest;s words. Through w(riting), one returns to the body of home-knowledges, languages, and geographies to uncover what is profoundly original in us as artists, writers and thinkers.iquest;.

Same as: CSRE 172, TAPS 272

TAPS 173. Solo Performance. 4-5 Units.

Students learn how to draw from the specificity of their own unique experiences, connecting with ideas, issues and questions that resonate with race, class, gender, environmental, and global issues. The course gives students the creative and critical tools to enable them to connect the personal with the political and see the solo voice as a powerful, potent form of artistic expression. Students have the opportunity to hone their own creative talents in writing, devising, composing, producing and creating work.

Same as: TAPS 373W

TAPS 174A. Performance Making: Production. 5 Units.

A structured, creative environment for students working toward the realization of Senior Projects and 2nd year graduate productions. Instructors will work with students to develop the relationships between the content and the form of their productions using critical and creative tools to develop and reflect on the work. There will be a staged class showing at the end of the quarter followed by critiques designed to help students as they begin preparing for their final public performances (beyond the class).

Same as: TAPS 374A

TAPS 176. Living with Mindfulness, Meaning, and Compassion. 5 Units.

Living with mindfulness, meaning, and compassion is a journey of contemplation, self reflection, and guided action. We examine "the good life" through the insightful eyes and inspirational words of others as well as through the light of our own experience. We explore success, happiness, and well being through the wisdom of spiritual traditions and scientific discoveries. Our focus is on acceptance, vulnerability, humility, kindness, and courage. Our integrative learning approach creates a transformative, synergistic community through appreciative inquiry and connected knowing.

TAPS 176A. Narrative Design. 4 Units.

This class examines narrative design in performed storytelling, especially live drama, oral storytelling, and radio, and compares it to narrative design in other forms, such as print, photography, and the graphic novel. After considering what media theory, psychology and neurobiology understand about how different forms of narratives operate on us, students will create a "base narrative" in print and then versions of that narrative in two different other forms. The goal is for students to understand narrative design principles both across and specific to media forms and be able to apply them to move audiences. Students will have the opportunity to meet and work with master storytellers from the Moth and with graphic novelists Chris Ware and Marjane Satrapi.

TAPS 176S. Finding Meaning in Life's Struggles: Narrative Ways of Healing. 5 Units.

We can find meaning in life's struggles through narrative ways of healing. The self-reflective, dynamic process of finding, telling, and living our stories connects us with our whole selves as well as with others. We find our stories through vulnerability and courage; tell them with humility and honesty; and live them authentically and responsibly. Our shared stories will focus on gratitude, acceptance, reconciliation, forgiveness and compassion, empowering us to overcome personal, community, and historical traumas and wounds. In a respectful, caring community we will discover our hidden wholeness by improvising with various experiential and embodied means of finding our stories; telling our stories in diverse ways, including writing, storytelling, music, and art; and living our stories by putting values into action.

Same as: CSRE 176S

TAPS 177. Writing for Performance: The Fundamentals. 5 Units.

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: CSRE 177, FEMGEN 177, TAPS 277

TAPS 178. Page to Stage: Playwriting and Solo Performance. 3-5 Units.

Dramatic writing: scripted and solo, and as performed by actors or by the playwright. Physical and psychological theatrical action. Development of skills in dialogue, story structure, style, and personal voice. Script readings and directed staging sessions.

Same as: TAPS 278

TAPS 178B. Intensive Playwriting. 5 Units.

Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

Same as: CSRE 178B, TAPS 278

TAPS 179. Chicano & Chicana Theater: Politics In Performance. 3-5 Units.

This is a practicum course, where the basic tenets and evolving politic and philosophies of Chicano and Latin American liberationist theater are examined through direct engagement with its theatrical forms, including, social protest & agit-prop, myth & ritual, scripting through improvisation, in-depth character and solo work, collective conceptualization and more. The course will culminate in an end-of-the quarter play performance in the Nitery Theater (Old Union) and at a Mission District theater in San Francisco.

Same as: CHILATST 179, TAPS 379

TAPS 179C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what is; can offer.

Same as: CSRE 179C, CSRE 279C, FEMGEN 179C, TAPS 279C

TAPS 179F. Flor y Canto: Poetry Workshop. 3-5 Units.

Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as *flor y canto*, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlacut;n. Required 20-page poetry manuscript.

Same as: CHILATST 179F, CSRE 179F, TAPS 279F

TAPS 180P. Color. 3-4 Units.

Hands-on study of color to develop color sensitivity and the ability to manipulate color to exploit its expressive potential. Guided experimentation and observation. Topics include color relativity, color and light, color mixing, color harmony, and color and content. (lower level).

Same as: ARTSTUDI 180

TAPS 180Q. Noam Chomsky: The Drama of Resistance. 4 Units.

Preference to sophomores. Chomsky's ideas and work which challenge the political and economic paradigms governing the U.S. Topics include his model for linguistics; cold war U.S. involvements in S.E. Asia, the Middle East, Central and S. America, the Caribbean, and Indonesia and E. Timor; the media, terrorism, ideology, and culture; student and popular movements; and the role of resistance.

TAPS 181Q. Alternative Viewpoints: Black Independent Film. 4 Units. Preference to sophomores. Do you want to learn more about independent film as it was practiced in major urban centers by young filmmakers? This class focuses on major movements by groups such as the Sankofa Film Collective and the L.A. Rebellion. Learn how to analyze film and to discuss the politics of production as you watch films by Spike Lee, Julie Dash, Melvin Van Peebles, Ngozi Onwurah and more. We will discuss representation, lighting, press material, and of course the films themselves. This course includes a workshop on production, trips to local film festivals and time to critique films frame-by-frame. It matters who makes film and how they do so. When you have completed this class you will be able to think critically about "alternative viewpoints" to Hollywood cinema. You will understand how independent films are made and you will be inspired to seek out and perhaps produce or promote new visions.
Same as: AFRICAAM 181Q, FILMSTUD 181Q

TAPS 184Q. The Personal is Political: Art, Activism and Performance. 4-5 Units.

SOPHOMORE SEMINAR: This course looks at the performance quest; of personal truths in political contexts, challenging inequalities of race, gender, sexual orientation and class through performance, visual art and activism. Students will engage in seminar discussions and writing on case studies such as the Occupy Movement and the works of key artists as well as working individually and in groups to think creatively about strategies for putting their own personal truths into political/public contexts to draw attention to issues they are passionate about.

TAPS 190. Special Research. 1-5 Unit.

Individual project on the work of a playwright, period, or genre. Prerequisite: consent of instructor.

TAPS 191. Independent Study. 1-18 Unit.

Individual supervision of off-campus internship. Prerequisite: consent of instructor.

TAPS 193. Life in the Body, Performing the Self. 2 Units.

No Class on January 8th. Class meets 7:00-8:50 every Tuesday beginning January 15th through March 12th, with a 10th and final required class during finals week on March 19th from 7:00-8:50. Also, students will be joined in the classroom by Continuing Studies students. Life is a performance of gestures. Dance is any conscious movement. Based on a "choreography of the everyday," this course invites participants to experience the subtle surprise of performing oneself. Working with our own gestures, words, thoughts, and perceptions, and drawing upon the basic elements of composition in performance, music, and choreography, we will develop a performance work in the mode of a "chamber piece." Building individual movement-based portraits, and then weaving them together as a whole, this gestural performance "chamber piece" will reflect the community of class participants and the Stanford community as a whole. Considerations of time, space, and quality of motion will be at the forefront of our work together. We will investigate the cultural identity and history of our gestures, as well as trace the evolution of this type of performance work in art, dance, and performance history. Participants can expect to find inspiration, delight, refreshment, and renewal through this performance process. No experience is necessary, just a willingness to move and reflect upon having a life in a body at this moment in history. The work of this course is the springboard of a larger performance work, "The Symphonic Body," which is scheduled to be performed at the new Bing Concert Hall in May 2013. Course participants have the option to perform in the larger work.

TAPS 197. Dance in Prison: The Arts, Juvenile Justice, and Rehabilitation in America. 4 Units.

This class works collaboratively with a local juvenile hall to use civic engagement and performance to explore the aesthetic, cultural and legal issues in the lives of incarcerated youth. In the process students gain an understanding of incarceration on an immediate and personal scale. Taught jointly by a Dance Studies scholar and a lawyer specializing in Juvenile Justice, we will consider what unique understandings are possible if we position the arts as central to an exploration of punishment, rehabilitation and recidivism in America. The course will examine case studies, historical and contemporary narratives about the social, imaginative and behavioral change possible through arts programs in prison. Half of the class meetings will be in Hillcrest Juvenile Hall in San Mateo, where our class will join with a group of 13-18 year old youths currently detained there. Dance will be used to help shape their individual expressive voices, and ours, through collaborative hip hop dance classes. Books to be read are *Just Mercy: A Story of Justice and Redemption* by Bryan Stevenson, and *Last Chance in Texas* by John Hubner.
Same as: DANCE 197

TAPS 200. Senior Project. 2-9 Units.

See "Undergraduate Programs" for description. (Staff).

TAPS 201A. Honors Colloquium. 1 Unit.

See "Undergraduate Programs" for description.

TAPS 201B. Honors Colloquium. 1 Unit.

See "Undergraduate Programs" for description.

TAPS 201C. Honors Colloquium. 1 Unit.

See "Undergraduate Programs" for description.

TAPS 201D. Honors Colloquium. 1 Unit.

See "Undergraduate Programs" for description.

TAPS 202. Honors Thesis. 2-9 Units.

See "Undergraduate Programs" for description. May be repeated for credit. (Staff).

TAPS 203. Advanced Improvisation. 3 Units.

Further development of improvisational skills.

TAPS 210V. Vocal Production and Audition. 1-3 Unit.

An introductory study of the vocal mechanism and the development of voice and articulation for the stage. Students will be introduced to the actor's tools of phonetics, verbal action and text analysis. Vocal technique will then be applied to the actor's process in preparation for audition. Actors will fully participate in the audition process, from beginning to end. Emphasis will be on relaxation, selection of appropriate material, and versatility to show contrast and range.
Same as: TAPS 120V

TAPS 213. Stanford Improv Ensemble. 1-2 Unit.

By audition only, for members of the improvisation troupe. Special project work. Prerequisite: 103.

TAPS 223. Game Design: Making Play. 3 Units.

Do you want to make games? This is a project-oriented workshop course that will teach you how to apply design thinking to create new kinds of play. We'll teach you about mechanics, playtesting, drama, narrative, and more. You'll work in teams to produce a new play form in whatever medium and style you like. We want zippy mobile games. We want intensely serious board games. We want socially conscious interactive theater games. We want kinds of fun we've never even imagined.
Same as: TAPS 23

TAPS 231. Advanced Stage Lighting Design. 1-5 Unit.

Individually structured class in lighting mechanics and design through experimentation, discussions, and written reports. Prerequisite: 131 or consent of instructor.

TAPS 232. Advanced Costume Design. 1-5 Unit.

Individually structured tutorial for costume designers. May be repeated for credit. Prerequisite: 132 or consent of instructor.

TAPS 233. Advanced Scene Design. 1-5 Unit.

Individually structured workshop. May be repeated for credit. Prerequisite: 133 or consent of instructor.

TAPS 234. Advanced Stage Management Project. 2-9 Units.

For students stage managing a Department of Drama production. Prerequisite: 134.

TAPS 236. Directing Scenes: The Director's Toolkit. 4 Units.

This first half of this course, a practicum, introduces you to basic concepts in directing live theatre, such as creating strong spatial relationships on stage or in a performance space, interpreting and building a concept for a scene, and beginning to work with actors. You will then spend the second half of the course directing 2-3 modern and contemporary scenes, with actors.

TAPS 248. Family Drama: American Plays about Families. 5 Units.

Plays written by 20th century writers that concentrate on the family as the primary source of dramatic conflict and comedy. Writers include Williams, O'Neill, Wilder, Albee, Vogel, Parks, Lindsay-Abaire, and Hwang.

TAPS 251A. Theater of the Asia-Pacific Region. 4 Units.

This course offers a historical and cultural exploration of theatre forms and performance cultures from various countries that border the Pacific Ocean, as well as from island communities within Oceania. Taking the term 'Asia-Pacific' as a provocation and point of interrogation, we will assess how theatrical production from this broad area can help us think through questions of nationalism, regionalism, interculturalism, and diaspora, while deepening our appreciation of world theatre history. The first part of the course focuses on theatre in specific sites, covering classical forms from China, Japan, and Indonesia, as well as indigenous theatre and performance from several Pacific Islands, including the Cook Islands, Samoa, Aotearoa/New Zealand, and Hawai'i. The second part of the course centers on the ocean as a dynamic space of mobility, examining a range of recent plays and performances that trace identities on the move and across borders, and which reveal how various Asian and Pacific Islander communities have engaged with each other in locations from Australia to the west coast of the United States. In so doing, our course will chart connections and divergences that enable fresh insights into the geographical and cultural dimensions of global theatre.

Same as: TAPS 151A

TAPS 253D. Performing Digital Technologies. 4 Units.

This class is about collaboration: between live performers and digital images, between artists and engineers, and between scholars and artists. It emphasizes conceptual work and creativity in the integration of new and old media. We will take a rigorous but fundamentally hands-on approach to the uses of a wide range of screen technologies - from smart phones to digital projections - in live performance. The class will start with a survey of successful uses of screens in recent theater and performance work, then move to finding novel solutions for particular dramatic scenes.

Same as: TAPS 153D

TAPS 254. Stage and Spectacle : an Aesthetics of Conflict and Complementarity. 4 Units.

The aim of this class is to explore different ways in which cinema has been using theatre as an art to explore its own aesthetical, political or philosophical dimensions. For this exploration, we will use different films in which theatre plays a major role, each of them offering a different perspective on life and art. Amongst the films considered, one can expect : 'To be or not to be' by Ernst Lubitsch (1942) ; 'Children of Paradise' by Marcel Carneade; (1944) ; 'The Golden Coach' by Jean Renoir (1953) ; 'Torn Curtain' by Alfred Hitchcock (1966) ; 'The Most important thing : Love' by Andrzej Zulawski (1975) ; 'The Travelling Players' by Theodoros Angelopoulos (1975) ; 'The Last meacute;tro' by Franccedil;ois Truffaut (1980) ; 'Fanny and Alexander' by Ingmar Bergman (1982) ; 'Shakespeare in love' by John Madden (1998) ; 'Birdman' by Alejandro Intilde;aacute;rritu (2014).

TAPS 259. Game Studies. 1 Unit.

A 1-unit class for graduate students. Games are not new; they are older than civilization. But in the past 50 years or so, we have seen an explosion of creativity in the development of new games, many of which, especially video games, complicate older understandings of what games are. This explosion of creativity has been matched by the increasing visibility and ubiquity of new games and ways of seeing games: as video games, televised professional sports, and even distributed urban events. Games are not a simple object of study. There are many ways to understand them: as social practices, as formal systems, as representative artwork, as modes of learning, and many more. We will start by considering games as a mode of performance, considering games in relation to theater and other forms of aesthetic performance. However, we will take a deeply interdisciplinary approach to the study of games, and will draw on perspectives from design, philosophy, education, and the emerging discipline of video game studies. We will also, of course, draw on a variety of games, both online and offline. As we bring in these perspectives, we will begin to consider games in at least two other fundamental ways: as designed experiences and as composed systems or artworks. This course is less an attempt to provide a survey of the entire field of games. It is more an attempt to provide a basic toolbox for critically examining and analyzing games. These tools are potentially useful for anyone who interacts with games: whether as a consumer of entertainment, a critical analyst of play, a user of serious games, or a game designer.

TAPS 259M. Movement and Meaning: Dance Studies in Global Comparative Context. 4 Units.

This course introduces students to various approaches to studying dance in a humanities context. We will explore how people create meaning through dance and how dance, in turn, shapes social norms, political institutions, and cultural practices across time and space. The course's structure challenges the Western/non-Western binary that still pervades many academic disciplines by comparing dance forms across the globe on the basis of functional similarities. At the same time, we will keep in mind the unequal power hierarchies shaping our modern world, and therefore we will examine how and why certain forms have become delineated as 'Western' and others as 'world' or 'ethnic,' despite similarities in movement, meaning, or purpose.

Same as: CSRE 159M, DANCE 23, TAPS 159M

TAPS 260. Rethinking the Ballerina. 4 Units.

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries.

Same as: DANCE 160, FEMGEN 160, TAPS 160

TAPS 262. Performance and the Text. 5 Units.

Formal elements in Greek, Elizabethan, Noh, Restoration, romantic, realistic, and contemporary world drama; how they intersect with the history of performance styles, character, and notions of action. Emphasis is on how performance and media intervene to reproduce, historicize, or criticize the history of drama.

Same as: TAPS 162

TAPS 262S. The Total Work of Art. 5 Units.

Frequently associated with the work of Richard Wagner, The Total Work of Art (or Gesamtkunstwerk) is a genre that aims to synthesize a range of artistic forms into an organic unity, a unity that both models and helps to forge an ideal state. This seminar will examine the history of the Gesamtkunstwerk from its roots in German Romanticism to the present day, focusing on the genre's relations with technology and mass culture across a wide range of media. Creations we will consider include Wagner's Festival Theatre at Bayreuth, Walter Gropius' plans for a Totaltheater, Bertolt Brecht and Kurt Weill's radio-oratorio The Lindbergh Flight, Leni Riefenstahl's Triumph of the Will, Walt Disney's theme parks, Andy Warhol's Exploding Plastic Inevitable, and Bill Gates' "home of the future." Taught in English. Same as: GERMAN 262

TAPS 265C. Ancient Dance and its Modern Legacy. 3-5 Units.

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance. Same as: CLASSICS 137, CLASSICS 237, TAPS 165C

TAPS 267. The Avant-Garde. 4 Units.

Course description coming soon.
Same as: TAPS 167H

TAPS 272. Out of Place: (W)riting Home. 4 Units.

A creative writing workshop; all genres. This course will introduce students to the fundamentals of a productive creative writing practice, including iquest;the beginnerquest;s mindquest;(as founded in Eastern spiritual practices); and, an indigenous approach to iquest;authenticityquest; in onequest;s work and onequest;s words. Through w(riting), one returns to the body of home-knowledges, languages, and geographies to uncover what is profoundly original in us as artists, writers and thinkers. iquest;. Same as: CSRE 172, TAPS 172

TAPS 273. Directing & Dramaturgy: Composition and Adaptation for Theatre. 4 Units.

This course explores dramaturgy and directing in the research and production of theatre primarily through practical creative projects with secondary readings on dramaturgy as a discipline. In this course we will consider the role of the dramaturg in its broadest sense, running across theatrical production from research to playwriting, adaptation, choreography, devising and directing. Students will work individually and in small groups researching, adapting, crafting and workshopping material. Same as: TAPS 373

TAPS 277. Writing for Performance: The Fundamentals. 5 Units.

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end. Same as: CSRE 177, FEMGEN 177, TAPS 177

TAPS 278. Page to Stage: Playwriting and Solo Performance. 3-5 Units.

Dramatic writing: scripted and solo, and as performed by actors or by the playwright. Physical and psychological theatrical action. Development of skills in dialogue, story structure, style, and personal voice. Script readings and directed staging sessions. Same as: TAPS 178

TAPS 279C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what iquest;can offer. Same as: CSRE 179C, CSRE 279C, FEMGEN 179C, TAPS 179C

TAPS 279F. Flor y Canto: Poetry Workshop. 3-5 Units.

Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as *flor y canto*, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlacuten. Required 20-page poetry manuscript. Same as: CHILATST 179F, CSRE 179F, TAPS 179F

TAPS 279G. Indigenous Identity in Diaspora: People of Color Art Practice in North America. 3-5 Units.

This "gateway" core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project. Same as: CSRE 179G, CSRE 279G, FEMGEN 179G

TAPS 284. Empathy Lab. 5 Units.

This lab-based class examines the ways in which various disciplines and art forms conceive of, and tell stories about, the experiences and stories of others. With permission of instructor. Same as: ANTHRO 379, TAPS 384

TAPS 289. Buchner and Wedekind. 3-5 Units.

Modern theatre owes an incalculable debt to two German playwrights: Georg Buuml;chner (1813-1837) and Frank Wedekind (1864-1918). We will read their still-shocking portraits of sex, madness, and social brutality in plays such as Woyzeck and Spring's Awakening, and explore the international journeys these works have made from stage to film and from opera to musical theatre. Same as: GERMAN 289

TAPS 289A. Interactive Art / Performance Design. 2 Units.

This class is for those who want the experience of designing and creating interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. This is a two-quarter long commitment during which students will first learn the design, planning, story boarding, budgeting, engineering, proposal creation and concept pitching of projects for applying for grants and presenting to funders. The second quarter will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part one of a two course series: ME 289A&B. Same as: ME 289A

TAPS 289B. Interactive Art / Performance Creation. 3-4 Units.

This class is the continuation of ME289A where students experience the designing and creating of interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. During this second quarter students will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part two of a two course series : ME 289A&B. Same as: ME 289B

TAPS 290. Special Research. 1-5 Unit.

Individual project on the work of a playwright, period, or genre.

TAPS 300A. Critical Styles I. 5 Units.

Literary criticism and theory, emphasizing style as evidence of historical, cultural, and ideological concerns. Assumptions about written texts by authors such as Coleridge, Bradley, and Burke. How style reveals context. Students write in the style of authors discussed.

TAPS 300B. Critical Styles II. 5 Units.

This seminar follows on from Critical Styles I in which students were grounded in the rigors of critical writing. In this sequel seminar, the emphasis will be on the overtones and undertones of critical thought in performance making and performance analysis. Students will generate weekly critical and creative responses to readings from contemporary writers and artists such as Jacques Ranciegrave;re, Amelia Jones, Guillermo Goacute;mez-Pentilde;a and Marina Abramovic. Workshop activities and performances will take place alongside seminar discussions of readings.

TAPS 304. Historiography of Theater. 3-5 Units.

Goal is to design an undergraduate theater history class. Standard theater history textbooks, alternative models of theater history scholarship, and critical literature engaging historiography in general.

Same as: TAPS 166H

TAPS 311. Analyzing Performance. 4 Units.

Literary criticism and theory, emphasizing style as evidence of historical, cultural, and ideological concerns. Assumptions about written texts by authors such as Coleridge, Bradley, and Burke. How style reveals context. Overtones and undertones of critical thought in performance making and performance analysis. Students will generate weekly critical and creative responses to readings from contemporary writers and artists such as Jacques Ranciegrave;re, Amelia Jones, Guillermo Goacute;mez-Pentilde;a and Marina Abramovic. Workshop activities and performances will take place alongside seminar discussions of readings.

TAPS 312. The Archive in the Repertoire. 4 Units.

This course looks at recent scholarship in theater and performance studies that engages the idea of the "archive." We will also debate questions about historiography. Texts may include work by Joseph Roach, Tracy Davis, Hayden White, Jacques Derrida, Amelia Jones, Rebecca Schneider, Fred Moten, Diana Taylor, Shannon Jackson, Peggy Phelan, Akira Lippit and Susan Foster.

TAPS 313. Performance and Performativity. 1-4 Unit.

Performance theory through topics including: affect/trauma, embodiment, empathy, theatricality/performativity, specularity/visibility, liveness/disappearance, belonging/abjection, and utopias and dystopias. Readings from Schechner, Phelan, Austin, Butler, Conquergood, Roach, Schneider, Silverman, Caruth, Fanon, Moten, Anzalduacute;a, Agamben, Freud, and Lacan. May be repeated for credit.

Same as: FEMGEN 313

TAPS 314. Performing Identities. 4 Units.

This course focuses on "the performance of identities" as the concept pertains to U.S. women of color. The foundational text, *This Bridge Called My Back* (Moraga, Anzalduacute;a, eds.), in its 4th and 2015 edition, will serve as the basis for an intergenerational conversation on U.S. Third World and Transnational and Queer Feminisms with an emphasis on lived experience and the performance of everyday life. Theoretical work will revolve around the concept of iquest;Theory in the Flesh,iquest; initially introduced in *Bridge* in 1981 and its significance to performance theory, queer and feminist theory and political practice. In addition to *Bridge*, texts may include recent anthologies on women of color feminisms and the writings by a variety of scholars, e.g. Norma Alarcoacute;n, Jacqui Alexander, Alicia Arrizoacute;n, Anne Cheng, E. Patrick Johnson, Chandra Mohanty, Ann Pellegrini, Ramoacute;n Rivera-Severa, Chela Sandoval & Hortense Spillers. A final project iquest;performing identityiquest; as iquest;theory in the flesh,iquest; is required, along with a written iquest;metacommentary.iquest; As part of the class project students will help organize a campus-wide event, featuring local original contributors to *Bridge* and offering students the opportunity to exchange iquest;in the fleshiquest; with women of color performers, artists, activists and scholars. Same as: FEMGEN 314

TAPS 321. Proseminar. 3-5 Units.

Workshop. Skills needed to participate in the academic profession including abstract, conference presentation, and dissertation or book chapter.

TAPS 334. Stage Management Techniques. 3 Units.

The production process, duties, and responsibilities of a stage manager. Skills needed to stage manage a production.

Same as: TAPS 34

TAPS 336. Comprehensive 1st Year Exam. 2 Units.

Required course for first-year Ph.D. students in Theater & Performance Studies. Credits for work toward the Comprehensive 1st-year Exam taken in late February or Early March.

TAPS 341E. English Drama Before Shakespeare. 5 Units.

English dramatic and theatrical culture from the mystery cycles of the late medieval period to the establishment of professional playhouses in late sixteenth-century London. Different dramatic genres (interludes, moralities, farces, tragedies, comedies, histories, pastoral plays), performance venues (streets, households, inns, schools, universities, court, playhouses), and dramatic traditions (classical, native, continental European) will be represented. Authors (of those who have names) range from Medwall, Skelton, Heywood, Preston, and Edwards to Lyly, Kyd, Greene, Peele, and Marlowe.

Same as: ENGLISH 314E

TAPS 344. Puppetry with a Twist. 3-4 Units.

Creative course is an introduction to puppetry with a survey of important styles and techniques from around the world including Twist's own. Hands on and individualized experience with the aim of each student creating or contributing to a puppet or object/figure performance. Course is as broad as the individual's creative expression.

Same as: TAPS 144

TAPS 345. Choreography and Corporeality. 4 Units.

In this course, we explore American-derived theoretical praxes for analyzing organized movement. How has dance studies been constituted as a field? What theoretical lines of inquiry have served it, and how have they fared over time? What tools do scholars bring to bear on the study of dance, choreography, and corporeality, and where have these tools been most effective? Weekly parings of creative works and theoretical approaches to considerations of dance practice and performance. Special emphasis on practices of writing about bodies in motion and dance.

TAPS 351. Great Books: Dramatic Traditions. 4 Units.

The most influential and enduring texts in the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons.

Same as: COMPLIT 151B, COMPLIT 351B, TAPS 151T

TAPS 351H. ID21 STRATLAB: Interdisciplinary Approaches to Improvising Identities. 4-5 Units.

A quarter-long exploration of improvisation in relationship to identity and race in the 21st century in which students investigate new dynamics of doing and thinking identities through the arts. Panel discussions, performances, and talks that engage critically with the theme, concept, and practice of improvising identity across a variety of contexts and genres such as jazz music, modern dance, contemporary art, race comedy, food, and hip-hop poetry/freestyle. Strategies that artists/scholars have used to overturn essentializing notions of identity in theory and practice.

Same as: AMSTUD 151H, CSRE 151H, DANCE 151H, DANCE 251H, TAPS 151H

TAPS 353. Representation and Theatre Culture in 20th Century France. 5 Units.

This course will examine some major French playwrights such as Alfred Jarry, Eugene Ionesco, Samuel Beckett, Jean Genet, Jean Tardieu, Albert Camus or Jean Anouilh in their global cultural environment. Discussion in English; French majors read in French.

Same as: FRENCH 210

TAPS 354. The Nervous Age: Neurosis, Neurology, and Nineteenth-century Theatre. 5 Units.

The nineteenth century witnessed profound developments in neurological and psychological sciences, developments that fundamentally altered conceptions of embodiment, agency, and mind. This course will place these scientific shifts in conversation with theatrical transformations of the period. We will read nineteenth-century neuropsychologists such as Charles Bell, Johannes Müller, George Miller Beard, Jean-Martin Charcot, and Hippolyte Bernheim alongside artists such as Percy Shelley, George Büchner, Richard Wagner, Émile Zola, and August Strindberg.

Same as: GERMAN 284, HUMBIO 162

TAPS 356. Performing History: Race, Politics, and Staging the Plays of August Wilson. 4 Units.

This course purposefully and explicitly mixes theory and practice. Students will read and discuss the plays of August Wilson, the most celebrated and most produced contemporary American playwright, that comprise his 20th Century History Cycle. Class stages scenes from each of these plays, culminating in a final showcase of longer scenes from his work as a final project.

Same as: AFRICAAM 156, TAPS 156

TAPS 357. World Drama and Performance. 4 Units.

This course takes up a geographically expansive conversation by looking at modern and contemporary drama from nations including Ghana, Egypt, India, Argentina, among others. Considering influential texts from the Global South will also enable us to explore a range of themes and methodologies that are radically re-shaping the field of Performance Studies. We will examine the relationship between colonialism and globalization, empire and capital, cosmopolitanism and neoliberalism. Re-situating our perspective from the Global South and the non-western world, we will interrogate provincialize Europe; and probe the limits of its universalizing discourses.

Same as: TAPS 157

TAPS 358H. Proximity and Temporality in Performance. 4-5 Units.

This course considers the relationship between proximity and temporality in live performance, looking quite literally at the distance in space and time between performers and audiences. Alongside case studies of performance works, class readings will be drawn from current Performance Studies scholarship as well as discourses in postmodern geographies and anthropological studies of proxemics; as well as key philosophic works such as Lefebvire; The Production of Space and Heidegger; The Concept of Time.

Same as: TAPS 158H

TAPS 358L. The Ethics of Storytelling: The Autobiographical Monologue in Theory, in Practice, and in the World. 4 Units.

Recently a theatrical monologist gained notoriety when it was revealed that key aspects of one of his "autobiographical" stories had been fabricated. In this class another autobiographical monologist -- who has himself lied many times in his theater pieces, without ever getting caught -- will examine the ethics of telling our life stories onstage. Does theatrical "truth" trump factual truth? We will interrogate several autobiographical works, and then -- through autobiographical pieces created in class -- we will interrogate ourselves.

Same as: ETHICSOC 201R, TAPS 158L

TAPS 359. The Other Body/The Body Other. 4 Units.

Writing creatively through critical thinking. Writing critically through creative imagination. Advanced Creative/Critical Writing course, designed for those "other" creative writers and thinkers who want to use language in original, innovative and embodied introspective ways to respond to (and from) non-dominant cultures, themes and identities. All genres. Readings, performances, films assigned to provoke an(other) response. Permission of Instructor.

TAPS 360. Greek Tragedy. 3-5 Units.

The seminar explores the intellectual, political, and cultural background of 5th-century Athenian tragedy, with special focus on the theatrical dynamics of the major plays of Aeschylus, Sophocles, and Euripides. Although the seminar emphasizes a close reading of the tragedies themselves, secondary sources include selections from Homer, Thucydides, Aristophanes, Aristotle, Hegel, and Nietzsche, as well as modern and contemporary classical scholars (Jebb, Dodds, Segal, Taplin, Goldhill, Nussbaum, Easterling, Foley, Seidensticker, Griffiths, Rehm, Wiles, Hall, Budelmann, and others). The seminar assigns the plays in English translation, but students with ancient Greek are encouraged to enroll, and accommodations can be made to attend to their interests. Plays include Persians, Prometheus Bound, the Oresteia trilogy (Aeschylus); Antigone, Oedipus, Oedipus at Colonus, Electra, and Philoctetes (Sophocles); and Medea, Heracles, Electra, Ion, Helen, and Bacchae (Euripides).

TAPS 364T. Queer Art and Performance. 4-5 Units.

Examines the late 19th, 20th and 21st century forms of performance-- including examples from drama, theater, cabaret, and performance art -- through the perspectives of contemporary critical gender and queer theories. Texts and movements range from early avant-garde (Dada, Futurism) to gay and lesbian drama (Lillian Hellmann, Joe Orton, Tony Kushner) to post-liberation Queer performance and video (Split Britches, Carmelita Tropicana, Kalup Linzy). Theorists include Judith Butler, Michel Foucault, and Eve Kosofsky Sedgwick.

Same as: FEMGEN 140P, TAPS 164T

TAPS 368S. Understanding and Staging Molière Theatre. 3-5 Units.

Devoted to an in depth analysis of Molière's major plays, as well as a study of contemporary productions of his work. Taught in French.

Same as: FRENCH 316

TAPS 370. Directing and Dramaturgy: Composition and Adaptation for Theatre. 4-5 Units.

This course explores dramaturgy and directing in the research and production of theatre primarily through practical creative projects with secondary readings on dramaturgy as a discipline. In this course we will consider the role of the dramaturg in its broadest sense, running across theatrical production from research to playwriting, adaptation, choreography, devising and directing. Students will work individually and in small groups researching, adapting, crafting and workshopping material. Same as: TAPS 170

TAPS 371. Performance Making. 4 Units.

A studio course focused on creative processes and generating original material. Students will be encouraged to think critically about the relationship between form and content exploring the possibilities of site specific, gallery and theatre settings. Students will reflect throughout on the types of contact and communication uniquely possible in the live moment, such as interaction or the engagement of the senses. The emphasis is on weekly experimentation in the creation of short works rather than on a final production.

Same as: TAPS 171

TAPS 372. Directing Workshop: The Actor-Director Dialogue. 4 Units.

This course focuses on the actor-director dialogue. We will work with actors and directors developing approaches to collaboration that make the actor-director dialogue in theater.

Same as: TAPS 170B

TAPS 373. Directing & Dramaturgy: Composition and Adaptation for Theatre. 4 Units.

This course explores dramaturgy and directing in the research and production of theatre primarily through practical creative projects with secondary readings on dramaturgy as a discipline. In this course we will consider the role of the dramaturg in its broadest sense, running across theatrical production from research to playwriting, adaptation, choreography, devising and directing. Students will work individually and in small groups researching, adapting, crafting and workshopping material. Same as: TAPS 273

TAPS 373W. Solo Performance. 4-5 Units.

Students learn how to draw from the specificity of their own unique experiences, connecting with ideas, issues and questions that resonate with race, class, gender, environmental, and global issues. The course gives students the creative and critical tools to enable them to connect the personal with the political and see the solo voice as a powerful, potent form of artistic expression. Students have the opportunity to hone their own creative talents in writing, devising, composing, producing and creating work.

Same as: TAPS 173

TAPS 374. Practice Based Research. 4 Units.

A structured, creative environment for students working toward the realization of 2nd year graduate productions. Instructors will work with students to develop the relationships between the content and the form of their productions using critical and creative tools to develop and reflect on the work. There will be a staged class showing at the end of the quarter followed by critiques designed to help students as they begin preparing for their final public performances (beyond the class).

TAPS 374A. Performance Making: Production. 5 Units.

A structured, creative environment for students working toward the realization of Senior Projects and 2nd year graduate productions. Instructors will work with students to develop the relationships between the content and the form of their productions using critical and creative tools to develop and reflect on the work. There will be a staged class showing at the end of the quarter followed by critiques designed to help students as they begin preparing for their final public performances (beyond the class).

Same as: TAPS 174A

TAPS 375. Main Stage Production. 3-5 Units.

Production of a full-length play as part of the Department of Drama season. Public performance.

TAPS 376. Projects in Performance. 4 Units.

Creative projects to be determined in consultation with Drama graduate faculty and production advisor.

TAPS 377. Graduate Directors' Staged Reading Project. 2 Units.

Presentation of a new or newly adapted work for the stage, in a mode employed in professional theater for the development of new plays. Two to four rehearsals. Public performance.

TAPS 379. Chicano & Chicana Theater: Politics In Performance. 3-5 Units.

This is a practicum course, where the basic tenets and evolving politic and philosophies of Chicano and Latin American liberationist theater are examined through direct engagement with its theatrical forms, including, social protest & agit-prop, myth & ritual, scripting through improvisation, in-depth character and solo work, collective conceptualization and more. The course will culminate in an end-of-the quarter play performance in the Nitery Theater (Old Union) and at a Mission District theater in San Francisco.

Same as: CHILATST 179, TAPS 179

TAPS 381. Instantaneous, Incessant, Infinite: Time and Performance. 4 Units.

Time is the most fundamental and elusive aspect of performance. In this graduate seminar we will investigate time in performance from various perspectives: while getting acquainted with some of the most prominent recent conceptualizations of temporality (Henri Bergson, Marin Heidegger, Gilles Deleuze) we will also explore questions of politics of temporality, ethnographic and sociological study of time, and its peculiar place within literary studies. Most of all, we will investigate complex temporality of performance: from performances of great magnitude, to micro performances, to performance as a medium of time;quest;s commodification. While drawing on questions that emerge from PSi 19: Performance and Temporality, we will explore some aspects of this theme that were insufficiently addressed in the conference.

TAPS 382. Brecht. 3-5 Units.

Arguably the most influential theatrical artist of the twentieth century, Bertolt Brecht continues to be a lightning rod for debates over art and politics. This course will consider Brecht as playwright, director, and theorist. Alongside reading and discussing texts such as Threepenny Opera, Mother Courage, and Galileo, students will also be expected to participate in occasional in-class performances in order better to grapple with his plays and theories. No previous theatrical experience is necessary.

Same as: GERMAN 283

TAPS 383. Performance and Transnationalism. 4 Units.

Coming soon.

TAPS 384. Empathy Lab. 5 Units.

This lab-based class examines the ways in which various disciplines and art forms conceive of, and tell stories about, the experiences and stories of others. With permission of instructor.

Same as: ANTHRO 379, TAPS 284

TAPS 390. Directed Reading. 1-6 Unit.

(Staff) Students may take directing reading only with the permission of their dissertation advisor. Might be repeatable for credit twice for 6 units total.

TAPS 399. Dissertation Research. 1-9 Unit.

(Staff).

TAPS 801. TGR Project for MA students. 0 Units.

(Staff).

TAPS 802. TGR Dissertation. 0 Units.

(Staff).

Thinking Matters Courses

THINK 1. The Science of MythBusters. 4 Units.

How do scientists actually go about answering practical questions? How does science function as a way of understanding our world, and importantly how does it differ from other approaches? As its point of departure, this course will examine and critique selected episodes of the television series, *MythBusters* (Discovery Channel), which tests the validity of many popular beliefs in a variety of imaginative ways, including myths, rumors, traditions, and stories. We will take the opportunity to delve more deeply into the applicability of the scientific method in understanding a vast range of real-world problems, and into the practical acquisition of fact-based knowledge, which together form the cornerstone of all science. The intellectual framework of this course will be based, first and foremost, on skeptical inquiry, combined with the other key ingredients of good science, which include: framing the question well, careful experimental design, meticulous observation and measurement, quantitative analysis and modeling, the evaluation of statistical significance, recovery from failure, disseminating findings, and the continuous cycle of hypothesis and testing. Note: This course is taught at an introductory level, but it pays serious attention to the quantitative treatment of experimental data and associated tests of statistical significance. All students taking the course will be expected to learn, and to work a series of problems in, basic probability and statistics. There is also a hands-on, "dorm lab" component that involves some fabrication and a significant amount of individual testing and measurement. The final course project will involve developing and writing a scientific grant proposal to test a myth. We hope to inculcate in our students "a taste for questioning, a sense of observation, intellectual rigor, practice with reasoning, modesty in the face of facts, the ability to distinguish between true and false, and an attachment to logical and precise language." (Yves Queaacute;reacute;, 2010 *Science* 330:605).

THINK 2. The Art of Living. 4 Units.

Where do our ideals for living come from, and how should they be structured? How do we justify them in the face of criticism? What role do great works of art play in this creative process? Our lives are not simply given to us, but also something we make: as we examine the circumstances of our existence, recognizing certain facts as immutable and others as subject to our control, each of us faces the challenge of fashioning out of them a way of living that is both meaningful and justifiable. The *Art of Living* will explore different ways to think about the nature of that challenge; how to accommodate conflicting demands and values, how to make our choices; artfully; how we might use works of imaginative literature to inspire us. We will read important works of literature and philosophy, each of which implies a different value by which to live, whether reason, authenticity, community, art, or faith. In each case, you will be presented with different perspectives and asked to work out for yourself what you find most persuasive, thereby fine-tuning skills essential to your own lifelong project of self-construction.

THINK 3. Breaking Codes, Finding Patterns. 4 Units.

Why are humans drawn to making and breaking codes? To what extent is finding patterns both an art and a science? Cryptography has been used for millennia for secure communications, and its counterpart, cryptanalysis, or code breaking, has been around for just slightly less time. In this course we will explore the history of cryptography and cryptanalysis including the Enigma code, Navajo windtalkers, early computer science and the invention of modern Bayesian inference. We will try our own hand at breaking codes using some basic statistical tools for which no prior experience is necessary. Finally, we will consider the topic of patterns more generally, raising such questions as why we impute meaning to patterns, such as Biblical codes, and why we assume a complexity within a pattern when it's not there, such as the coincidence of birthdays in a group.

THINK 5. Justice and the Constitution. 4 Units.

How does justice incorporate the ideals of liberty, equality, and security? How are these ideals balanced against each other? How are they made concrete in the US Constitution and law? What is the relationship between justice and the law? In this course we consider three core ideals that animate the idea of liberty: freedom, equality and security. We explore the relationship between these different ideals through an interdisciplinary inquiry that includes political philosophy, history and law. In your reading, writing and thinking, you will move between the realm of abstract ideas and actual legal cases. We begin with the philosophical roots of the ideals of liberty, equality and security and then focus on their articulation in the US Constitution and the overarching US legal framework and public policy. Students will learn to analyze the distinctive challenges posed to the ideals of liberty, equality and security by twenty-first century developments such as the emergence of the internet and the rise of non-state warfare.

THINK 6. Everyday Life: How History Happens. 4 Units.

To what extent can individuals' daily actions influence world events, and to what extent are individuals influenced by world events? This course investigates the relationship between private lives and public affairs. We will trace how small acts contribute to global change and, in turn, how global change can shape one's sense of self. We will explore the shifting mentalities of individuals during the most dramatic transformations in 20th century Europe: World War I, communist revolution, the rise of Nazism, World War II, the Holocaust, and the Cold War. Through analysis of memoirs, diaries, essays, novels, and state documents, you will examine how social and political developments can reveal the very boundaries between self and society. To make this exploration more personal, you will develop a fictional persona that you will keep throughout the quarter through which you explore the everyday workings behind momentous change.

THINK 7. Journeys. 4 Units.

Is death final or only the beginning of another journey? How do the mysteries of destination give rise to our most basic questions of purpose, meaning, and faith, and challenge us to consider our proper relation to others? Journeys will examine works written across a span of some 2,300 years, from Chinese philosophy to American short stories. Each of these forms and genres presents some essential aspect of the journey we all share, and of the various passages we make within that one great journey that relentlessly challenge and transform us even as we advance toward what the poet Thomas Gray called our "inevitable hour." By reading, discussing, and interpreting these works, we will ask you to consider how each text compels us, by the penetration of its vision and the power of its art, to make part of our own journey in its company.

THINK 8. Sustainability and Collapse. 4 Units.

What does it mean to live sustainably? How do our different definitions of nature; scientific, literary, cultural, and historical; shape the way we answer that question? Sustainability and Collapse will explore what people in different places and periods of time have envisioned as successful ways of living with nature and how such ways of life have come under pressure. We will focus particularly on the interface between scientific and humanistic approaches to questions of environmental sustainability through a study of novels, historical texts, and works of biogeography. You will learn to ask how textual and visual images inform our ideas about what it means to live sustainably. We will then consider whether those ideas are in accordance with or in conflict with scientific understandings of human uses of nature. This course takes on some of the fundamental problems that presently confront our global community.

THINK 9. Technological Visions of Utopia. 4 Units.

How do science and technology shape the frameworks for imagining utopian or dystopian societies? Sir Thomas More gave a name to the philosophical ideal of a good society - a word that is now a part of common language: utopia. In the almost 500 years since More's Utopia appeared, changes in society - including enormous advances in science and technology - have opened up new possibilities for the utopian society that More and his predecessors could not have envisioned. At the same time science and technology also entail risks that suggest more dystopian scenarios - in their most extreme form, threats to humanity's very survival. We will look at several works that consider how literary visions of society have evolved with the progress of science and technology. The readings begin with More and include examples of more technologically determined visions of the late 20th century, as imagined in works of fiction.

THINK 10. Voyages and Visionaries. 4 Units.

How did cross-cultural contact between Europe and Asia in the pre-modern era produce our modern concept of civilization? In this course we examine five moments of intellectual encounter in the pre-modern era among civilizations of the eastern hemisphere, including India and China and what we now call the Middle East. Through the eyes of scholars, pilgrims, and missionaries, you will learn to map the itineraries of early travelers and to analyze their experiences from a comparative perspective. We will focus on reconstructing the worldviews and geographical imaginations that inform each text with reference to historical maps and images.

THINK 11. Bioethical Challenges of New Technology. 4 Units.

How might we apply ideas from ethical theory to contemporary issues and debates in biotechnology? This course will provide critical encounters with some of the central topics in the field of bioethics, with an emphasis on new technologies. Controversies over genetic engineering, stem cell research, reproductive technologies, and genetic testing will provide an opportunity for you to critically assess arguments and evidence. We will begin with an overview of the field and the theoretical approaches to bioethics that have been derived from philosophy. You will then have the opportunity to engage in debate and learn how to identify underlying values and how to apply ideas from ethical theory to contemporary problems.

THINK 12. Century of Violence. 4 Units.

What is modern about modern mass violence? This course explores the evolution, varieties, and logic of mass violence from the early 20th century to the present day. You will engage with and analyze primary accounts of such violence by victims, observers, perpetrators, and courts. We will then consider the effectiveness of various efforts to confront genocides and crimes against humanity in international courts and institutions, past and present. We start with the emergence of genocide as a modern, international issue; proceed with colonial massacres in early 20th century Africa; move to the Armenian genocide in the Ottoman Empire and WWI; Nazi and Nazi-inspired racial murder; communist-induced mass violence in the Soviet Union and Asia; ethnic cleansing in former Yugoslavia; and end with an examination of the recent genocides in Rwanda, Sudan, and the Middle East.

THINK 13. Epic Journeys. 4 Units.

What makes an epic hero? How does the epic poem externalize our quest for identity and self-definition? The human quest for identity and self-knowledge is the oldest story of human culture. It almost always involves a confrontation with death. As the epic hero journeys across the physical world and descends into the underworld to visit the dead and seek counsel from them, he gradually comes to understand himself in a deeper, more meaningful way than before he set out on his journey. In this course, you will learn to engage in depth with some of the great epics of the Western tradition, beginning with The Epic of Gilgamesh and ending with Dante's masterpiece, The Divine Comedy. In each case, we will consider the unique goals of each hero's journey and the obstacles he must confront in order to reach his destination, with particular attention to the themes of violence in self and society, exile and alienation, the encounter with ancestors, the female voice, and divine guidance. We will focus on how the hero's search for a moral identity in relation to his community connects to current definitions of the ethical life in relation to political violence, war, honoring the dead, and confronting our mortality.

THINK 15. How Does Your Brain Work?. 4 Units.

How do the biology and chemistry of the brain create the mind that lets us talk, walk, laugh, love, learn, remember, and forget? What can neuroscience say about what makes us human? How can we ask questions about the brain that are observable, testable, and answerable? The human brain is the most complex organ we know. To understand the biology of brain function, this course will use highly interactive lectures and discussions to examine the validity of common beliefs about the brain, discuss how the brain and the nervous system are organized, how individual elements of the brain function, and how together these units produce action. The brain, like all other biological structures, has evolved over time in response to natural selection by adapting to diverse behavioral and environmental constraints. We use evolutionary comparisons to illuminate important questions about brain function, including what the origins and consequences of brain damage are, how and where drugs act, and how you collect, interpret, and understand information about the world. You will learn both how the science of the brain has emerged through understanding important experiments and observations and how you can formulate and test your own experimental questions about the brain.

THINK 16. Is the Universe Just? Explorations in the Classics. 4 Units.

What can the Classics teach us about understanding justice and injustice? Do you ask yourself whether your life is controlled more by your own free choices or by your genetic code? Do you worry whether a superpower can function without hubristic arrogance? Do you ponder what constitutes the Good Life? If these sorts of issues are central to your intellectual and personal growth, this course will demonstrate to you that the ancient Mediterranean world was equally consumed with questions about the nature of human society and human existence. We will explore certain recurring themes within classical text such as the relationship between power and gender; gods and humans; innocence and evil. We will read a wide and deep selection of important and influential literary texts from the Near East, Greece, and Rome, spanning from c.2000 BCE to the first century BCE. The readings will include creation texts, epic, lyric, tragedy, and philosophy.

THINK 17. The Poet Re-Making the World. 4 Units.

Can poetry change the world? Poets use form and language to hold up a mirror to the events that change the world and the making of a poem can also be the re-making of a world. We will read and study poetry from different historical, cultural, and poetic traditions, and explore whether something as individual as artistic expression can help us cope with the social and political events that bring suffering and destruction. The course follows the adventures of the individual poet: from a young man caught in the trenches of the First World War, to a Japanese haiku master of the 17th century, to an American Beat, to an English woman trapped in the conventions of her time, to a contemporary U.S. soldier in Iraq. Poets show us the many similarities, as well as rich cultural differences, between us all.

THINK 18. Rebellious Daughters and Filial Sons of the Chinese Family. 4 Units.

How has the family been broken, preserved, and reinvented in the fast-changing world of revolution and modernization? *Rebellious Daughters and Filial Sons of the Chinese Family* follows the theme of the Chinese family in fiction and film to investigate the core values that hold it together in the midst of great historical change. You will learn to interpret both fiction and film as visual and textual narratives that illuminate the multiple aspects of family and community. We will explore how modernization, colonialism, revolution, war, and immigration disrupt traditional home and family. Through film and text, we will discover the various poignant attempts to rebuild family relations in the midst of such dislocation. As you embark on your college education and take leave of your own families, you might start to consider how your familial ties shape your concept of self, your emotional attachment to community, social relationships with society, and political consciousness.

THINK 19. Rules of War. 4 Units.

When, if ever, is war justified? How are ethical norms translated into rules that govern armed conflict? Are these rules still relevant in light of the changing nature of warfare? We will examine seminal readings on just war theory, investigate the legal rules that govern the resort to and conduct of war, and study whether these rules affect the conduct of states and individuals. We will examine alternative ethical frameworks, competing disciplinary approaches to war, and tensions between the outcomes suggested by ethical norms, on the one hand, and legal rules, on the other. Students will engage actively with these questions by participating in an interactive role-playing simulation, in which they will be assigned roles as government officials, advisors, or other actors. The class will confront various ethical, legal, and strategic problems as they make decisions about military intervention and policies regarding the threat and use of force in an international crisis.

THINK 21. Folklore and Literature in Russia and Beyond: Vampires, Talking Cats, and Frog Princesses. 4 Units.

What is 'folklore' and what is its purpose? How do we decide if something is authentically 'folk' and does it matter? Why are Eastern Europe and Russia associated with the idea of folklore? For the past two centuries, writers, composers, and artists have found inspiration in folklore: the stories, songs, and beliefs of their grandparents, their servants (or their slaves), and their neighbors. This class asks what folklore means and what purposes - political and philosophical as well as artistic - it can serve. We begin with examples from around the world: the German Brothers Grimm as well as the Americans John and Alan Lomax. Then we turn to Eastern Europe and the role it has played in the Western European and American imagination as the home of the archaic and the authentic, from the vampires of Transylvania to the oral epics of the Bosnian Serbs to the nostalgic idea of the Jewish shtetl to the fantasy of Soviet communism as a survival of a pre-capitalist order. Students will analyze both folk and elite texts, and will experiment with gathering oral texts and transforming them just like the writers we studied.

THINK 22. Who Owns the Past? Archaeology, Heritage and Global Conflicts. 4 Units.

Who owns the past? Is cultural heritage a universal right? This course interrogates the relationship between the past and the present through archaeology. Increasingly, heritage sites are flash points in cultural, economic, and religious conflicts around the globe. Clearly history matters; but how do certain histories come to matter in particular ways, and to whom? Through close study of important archaeological sites, you will learn to analyze landscapes, architecture, and objects, as well as reflect on the scholarly and public debates about history and heritage around the world. Far from being a neutral scholarly exercise, archaeology is embedded in the heated debates about heritage and present-day conflicts.

THINK 23. The Cancer Problem: Causes, Treatments, and Prevention. 4 Units.

How has our approach to cancer been affected by clinical observations, scientific discoveries, social norms, politics, and economic interests? Approximately one in three Americans will develop invasive cancer during their lifetime; one in five Americans will die as a result of this disease. This course will expose you to multiple ways of approaching the cancer problem, including laboratory research, clinical trials, population studies, public health interventions, and health care economics. We will start with the 18th century discovery of the relationship between coal tar and cancer, and trace the role of scientific research in revealing the genetic basis of cancer. We will then discuss the development of new treatments for cancer as well as measures to screen for and prevent cancer, including the ongoing debate over tobacco control. Using cancer as a case study, you will learn important aspects of the scientific method including experimental design, data analysis, and the difference between correlation and causation. You will learn how science can be used and misused with regard to the public good. You will also learn about ways in which social, political, and economic forces shape our knowledge about and response to disease.

THINK 24. Evil. 4 Units.

What is evil? Are we naturally good or evil? How should we respond to evil? There are many books and courses that focus on the good life or the virtues. Yet despite their obvious apparent presence in our life and world, evil and the vices are rarely taken as explicit topics. We will read philosophical and literary texts that deal with the question of evil at an abstract level and then use other readings that help us focus on more practical implications of the meaning and consequences of evil. By exploring the issue of evil, we will confront larger questions about the nature of humans, the responsibility to address evil as a society, and the moral and ethical ways we might begin to define what is evil.

THINK 26. How Do You Build a Nation? Inclusion and Exclusion in the Making of Modern Iran. 4 Units.

Why were minority religious groups excluded from the majority's vision of a Shi'i Iranian nation? How and when were women included as citizens of a new Iran? In this course, specific attention will be paid to key events of the 20th century that shaped modern Iran: the Constitutional Revolution (1905-11), the 1953 coup, the White Revolution (1963), the Islamic Revolution (1978-79), the Iran-Iraq War (1980-1988), and the post-revolutionary period in general. Through a close reading of key poems, short stories, and films created in this period, this course will identify major inclusionary and exclusionary forces in the process of nation-building in 20th-century Iran. Specific attention will be paid to issues of ethnicity, religion, and gender. In addition to reading texts (poetry and prose) and watching films, students will be called on to present critiques of these literary and cinematic products in the form of brief oral presentations and short writing assignments. The final project will involve interviewing Iranian expatriates on issues covered in the lectures. Students will work in small groups to produce short videos of these interpersonal encounters.

THINK 27. Human Rights and Humanitarianism. 4 Units.

Why do certain governments and citizens feel obliged to ease the suffering of distant people in need? How did the humanitarian sensibilities and human rights discourses that now define global politics come into being? In this course, you will consider how contemporary ethical motivations for human rights and humanitarianism have developed. We will investigate the emergence and transformation of these ideas through the study of key historical events in the modern world: slavery and its abolition, colonialism, the World Wars, apartheid, decolonization, and the Cold War. We will then consider how this longer history has influenced the ways activists, NGOs, and governments today draw attention to global crises and abuses. Our ultimate objective is to gain an understanding of how the language and ideals of human rights and humanitarianism emerged from the context of liberalism, capitalism, and imperialism.

THINK 29. Networks: Ecological, Revolutionary, Digital. 4 Units.

Why is the word network used to describe the behavior of computers, ants, and people? Do all these networks share certain properties? What might we learn by comparing them? We like to think of social networks as a contemporary phenomenon. But before Facebook, individuals organized themselves in social networks; before Twitter, revolutionaries used media to communicate and coordinate their messages. In fact, even animal societies are networked. Through project-based exercises, you will learn to study, analyze, and write about networks from the perspectives of a biologist, a computer scientist, and a historian. We will retrace social networks in the 18th and 21st centuries, observe the organization of animal networks, and investigate the structure of online networks. Our goal is to use the concept of the network to deepen our understanding of the natural world, historical change, and our own social lives.

THINK 30. Race Matters. 4 Units.

What are race and ethnicity? How do they shape society and individual experience? What role do they play in identity formation? Going to school and work, renting an apartment, going to the doctor, watching television, voting, reading books and newspaper, or attending religious services are all activities that are influenced, consciously and unconsciously, by race and ethnicity. In this course, we will draw on scholarship from psychology, genetics, history, and cultural studies to understand contemporary racial formations and cultural representations. We will look at how recent research on the human genome has reinvigorated biological conceptions of race and ethnicity, engage in activities that highlight the psychological consequences of race and ethnicity, and analyze selected race-relevant memes that appear in popular media.

THINK 31. Reimagining America. 4 Units.

How have Americans remembered the Civil War - what it meant, what it accomplished, and what it failed to accomplish? How did Americans reimagine the United States as a nation after the war? Who belonged in the national community and who would be excluded? In 1865, the peace treaty was signed at Appomattox and the Thirteenth Amendment outlawed slavery, but the battle over memory and national identity had just begun. The questions that the Civil War addressed - and failed to address - continue to affect our lives today. We will focus on how Americans negotiated issues of cultural memory and national identity through a close analysis of historical texts, novels, poems, films, paintings, cartoons, photographs, and music. Our interpretations will foreground the particular themes of race and nationhood, freedom and citizenship, and changing notions of individual and collective identity. Our assumption in this course is that history is not available to us as a set of events - fixed, past, and unchanging. Rather, history is known through each generation's interpretations of those events, and these interpretations are shaped by each generation's lived experience. What stories get told? Whose stories? And in what ways? The stories we choose to tell about the past can shape not only our understanding of the present, but also the kind of future we imagine and strive to realize.

THINK 32. Subversive Acts: Invention and Convention in the 20th Century. 4 Units.

Can art subvert social practice and politics? In this course, we will learn how to "read" art and analyze the ways aesthetic objects can raise larger conceptual questions about culture, society, and change. We will do this by investigating the broad range of artistic, social, and political meanings of the term "avant-garde" in the 20th century. The course looks at some of the key moments in avant-garde art in Europe, including Dadaism and Futurism, with a particular emphasis on Russia. Through an examination of various aesthetic case studies, we will be able to ask the larger question of whether art can actually challenge social conventions and established political ideologies.

THINK 33. The Water Course. 4 Units.

How can we balance all the competing, and growing, demands for freshwater? When you turn on your tap, where does the water come from? Water is essential for life. But, around the world, governments and citizens are challenged to balance the human demands on our freshwater resources, while protecting the integrity of natural ecosystems. At the core of the challenge is our limited understanding, in many parts of the world, of the watershed-scale hydrologic cycle; the course that the water follows from rainfall, to river, to groundwater, to ocean, to atmosphere, and back again. The Water Course takes students along that course, exploring the role that natural systems and human systems play in impacting both the quantity and quality of our freshwater. We will consider questions surrounding decisions about water allocation, and discuss new scientific methods that provide support for science-based decision making in the management of freshwater resources. You will connect global-scale issues to your personal experiences with water through a quarter-long project investigating both water quantity and water quality for a city or watershed in the western U.S. You will produce a numerical model, and make approximations, to describe a complex natural system. Using online resources you will explore the pathway that water takes from rainfall to your tap.

THINK 39. Energy? Understanding the Challenge, Developing Solutions. 4 Units.

How much energy do we need to run the world and what energy resources can we use? How do we convert those resources into energy services? What are the economic, environmental, and security costs of energy services? How will energy markets address the challenges of reducing greenhouse gas emission? Energy is the lifeblood of human societies. Energy use is intricately woven through the fabric of the productive (and comfortable) lives we live in the developed world. We use energy to move and sometimes make fresh water, grow food, transport it to markets, heat, cool, and light our dwellings and workplaces, communicate and compute, and travel the world. We worry about energy security and fret about the cost of gasoline. And as world population continues to grow and the developing world seeks to use energy for the services we enjoy, the challenge of supplying the energy the world needs will grow commensurately. Energy is also a primary way human activities interact with global air, water, and biological systems that provide essential services to us and the planet. Balancing our interactions with those systems will require dramatic changes to the world's energy systems in the decades to come. This course examines the energy challenges, opportunities, and choices that lie ahead.

THINK 40. Meeting the Global Sustainability Challenge. 4 Units.

What are the most critical sustainability challenges facing us in this century? How can natural and social sciences, humanities, and technology fields interact to contribute to their solution? How do we balance the needs and desires of current generations with the needs of future generations? The term sustainability seems to be everywhere. Businesses, cities, non-governmental organizations, individuals, and universities such as Stanford use the term to characterize decisions that make sense for the well-being of people as well as the environment. Beyond the popular use of the term is an emerging field of study that focuses on the goals of sustainable development - improving human well-being while preserving Earth's life support systems (air, water, climate, ecosystems) over the long run - and explores how science and technology can contribute to the solution of some of the most critical problems of the 21st Century. The goal of this course is to engage you in critical thinking and analysis about complex sustainability challenges and to encourage you to consider the need for integrative solutions that draw on different disciplines. We will examine some of the major problems of sustainable development (including issues related to food, water, and energy resources, climate change, and protection of ecosystem services), grapple with the complexities of problem solving in complex human-environment systems, and participate in the design of effective strategies and policies for meeting sustainability goals. You will learn to develop policy briefs addressing sustainability issues in the university, local communities, state and the nation as well as work on team projects with decision makers that address real-life challenges in your local area.

THINK 41. The Conscious Mind: The Philosophy and Biology of Consciousness, Memory, and Personal Identity. 4 Units.

How do our common-sense conceptions of the mind and of ourselves hold up against the growing body of psychological and neurobiological knowledge of the brain? How is your mental life anchored to your physical self? You wake up from a dreamless sleep and suddenly everything's buzzing with color and sound. Somehow your brain sustains this rich landscape of experience, integrating it with a repertoire of memories to constitute yourself. This course probes the neurobiological bases of these familiar yet miraculous facets of the mind. You'll learn to analyze primary philosophical and scientific texts, using basic knowledge of the brain to assess and even innovate experiments that could shed light on the nature of consciousness and personal identity.

THINK 42. Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being. 4 Units.

What is human well-being? How do we define it? How do we measure it? What do we mean when we talk about certain parts of the world as "developed" and others as "underdeveloped" or "developing"? How do improvements in human well-being come about? What happens when some people become much better off and others do not? In this course, we will use African experiences, past and present, to think critically and reflectively about concepts whose meaning we all too often take for granted: not only well-being and development, but also wealth and health, equality and inequality. Using the tools and techniques of four different disciplines -- history, anthropology, public health, and engineering -- we will tackle essential questions about the meaning of well-being and the indices by which we measure it, the role of politics in the development process, the importance of historical and cultural contexts, and the sometimes unanticipated challenges that individuals, institutions, and societies face when they seek to promote development and improve human well-being.

THINK 43. What is love?. 4 Units.

Is love a spiritual or a bodily phenomenon? Is the concept of love timeless or ever changing? How does thinking about love lead us to ask other important philosophical and social questions? In this course we will examine the classical roots, medieval developments, and contemporary permutations of Western ideas of romantic love. With an eye to thinking about representations of love in our own culture, we consider some of the foundational love books of the Western tradition. From Plato's Symposium to Chester Brown's graphic novel *Paying For It*, we ask the fundamental question of whether and how we might distinguish between spiritual and physical desire. We consider how medieval and contemporary writers dealt with the relation of love to sex, power, money, marriage, and gender. We discuss these works of the past, for example the illicit love in the courtly romance *Tristan*, in tandem with representations of clandestine love from the present day, such as the portrayal of same-sex love in *Brokeback Mountain*.

THINK 44. Belief. 4 Units.

Why do people believe in God? What does it mean for people to experience the supernatural? How do we understand belief in God? How do people convey experiences that are by definition extra-ordinary to others? In this course we ask the big (and unanswerable) question why people believe in God. Some scholars argue that belief results from direct experience, such as visions or moments of transcendence, that testify to God's existence. Others suggest that belief in the supernatural is better explained by the way the human mind has evolved or people's experience of the social world. In this class, we will pair medieval literature on Christian mysticism and magic with readings from modern psychology and anthropology. We will look at the dominant answers provided by each discipline. For example, belief might result from our sensory experience of the world, or it might have developed as part of our cognitive apparatus in response to fear. Our aim is to show how different disciplines can work together to cast light on a basic question of human existence.

THINK 45. Thinking About the Universe: What do we know? How do we know it?. 4 Units.

What is the origin and ultimate fate of the universe? Can we know what came before the universe? Are there ultimate limits to human knowledge about the universe and are we reaching them? Cosmology (the study of the universe) raises profound questions about us, our place in the universe, and about the limits of our knowledge. It was only in the 20th century that cosmology developed from metaphysical and theological speculation to become an observational science and a recognized part of physics. In this course, students will explore questions about the Universe, its beginnings, its structure, its extent, its fate, from several perspectives - philosophical, experimental, and theoretical. We will discuss current research and the ongoing debates about the laws of nature on subatomic scales and the perplexing questions they raise regarding the universe and the limits of scientific inquiry.

THINK 46. Why So Few? Gender Diversity and Leadership. 4 Units.

Why there are so few women leaders and what is the cost to society for women's underrepresentation in positions of power? How can organizations and individuals increase women's leadership and be more inclusive of the diverse people that make up our society? Women make up half the population and have earned more than half of all the undergraduate degrees in the U.S. since the early 1980s; yet women comprise only 17% of US Congress, 4% of Fortune 500 CEOs, 16% of the board of directors of major corporations, 22% of tenured faculty at Stanford, and less than a fifth of law firm partners. For women of color, these numbers are considerably lower. Yet, research shows that gender diversity increases the creativity and innovation of groups. In this course, we will directly address the questions of why there are so few women leaders and what can be done, at an organizational and individual level, to increase their representation. Using the lens of sociology, we will think critically about leadership, influence, power, status, gender stereotypes, mentorship, and negotiation. Once we understand the mechanisms underpinning the lack of women leaders, we will discuss and critique potential interventions. A unique aspect of this course will be to apply some of the scholarly research on gender and leadership to our lives outside the classroom. We will be using modules based on those used in business schools and corporate executive training. Students will develop practical, real-world skills to increase their own leadership capacities by working on projects and taking part in interactive sessions on negotiation and team dynamics.

THINK 47. Inventing Government: Ancient and Modern. 4 Units.

How might the study of the successes and failures of democratic and republican government in ancient Greece and Rome help us to fix what is broken in our own political systems? Democracy and republic are ancient names for revolutionary approaches to government of, by, and for citizens. Today, almost every state proclaims itself to be a democracy, a republic -- or both. Democratic and republican revolutions transformed ancient Greece and Rome - and later transformed the modern world. We explore how political thinkers, from Machiavelli to Madison and Mill, used the lessons of ancient politics to design bold new systems of government. Ancient politics may still hold lessons for us. We analyze what is broken in modern government (corruption, polarization, gridlock), how it broke, and how the tool kit of ancient political history might help us to analyze and repair the damage.

THINK 48. Reading the Body: How Medicine and Culture Define the Self. 4 Units.

How have our perceptions of what is considered normal/abnormal; beautiful/ugly; infected/uninfected changed over time? How do these changing medical and cultural representations of the body reflect larger societal shifts? How does illness change our perceptions of our bodies and our identities? Viewed through the lens of medicine, the body is a text that offers clues to health and illness, yet clinical readings are never entirely objective. Culture informs and distorts how we discern, accept, reject, and analyze our bodies. Looking at literary, medical, ethical, and anthropological texts, we ask how representations of the body affects the way we experience illness, embody gender and racial identities, and understand our rights (or lack of rights) to control our own bodies. We will critically examine our perceptions about the body and debate some of the most complex and sensitive issues surrounding the body, from the ethics of medical research trials to end of life decisions.

THINK 49. Stories Everywhere. 4 Units.

Do we perceive the world through stories? Are we made of stories? Can we make sense of the world without narrative? The telling of stories is not just a form of entertainment but an essential human activity that moves and persuades us, compelling us to action and reflection. In this course, we will probe how moral, cognitive and historical forces give stories their power. You will be introduced to the basic theory and art of storytelling, enabling you to understand and master the fundamentals of narrative structure, plot, and character. This will allow you to practice producing your own stories through both interpretative and creative writing assignments. The class will also give students the chance to participate in various story-making activities and work with the Stanford Storytelling Project, San Francisco StoryCorps, School of the Arts and the Stanford Innocence Project to create assignments that would be useful to both private and nonprofit organizations.

Tibetan Language Courses

TIBETLNG 1. First-Year Tibetan, First Quarter. 4 Units.

Grammar, reading, and composition. Tibetan culture and the Tibetan view of reality.

TIBETLNG 2. First Year Tibetan, Second Quarter. 4 Units.

Continuation of 1.

TIBETLNG 3. First Year Tibetan, Third Quarter. 4 Units.

Continuation of 2. Fulfills the University Foreign Language Requirement.

TIBETLNG 13. Intermediate Tibetan, Third-Quarter. 4 Units.

Continuation of 12.

TIBETLNG 21. Intermediate/Advanced Tibetan, First Quarter. 4 Units.

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TIBETLNG 23. Intermediate/Advanced Tibetan, Third Quarter. 4 Units.

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TIBETLNG 199. Individual Work. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

TIBETLNG 395. Graduate Studies in Tibetan. 1-5 Unit.

May be repeated for credit. Prerequisite: consent of instructor.

Undergraduate Advising and Research Courses

UAR 10. Intellectual Journeys. 1 Unit.

Stanford speakers share their research as well as their intellectual and life paths, including how they chose their undergraduate major, how they found mentors, and what their field offers undergraduates.

UAR 42A. LSP First Year Seminar. 1 Unit.

For freshmen who participated in the Leland Scholars Program. This seminar supports LSP students in the first year in the areas of institutional engagement, academic empowerment, their sense of belonging to Stanford, and builds their cohort identity.

UAR 42B. LSP First Year Seminar B. 1 Unit.

For freshmen who participated in the Leland Scholars Program. This seminar supports LSP students in the first year in the areas of institutional engagement, academic empowerment, their sense of belonging to Stanford, and builds their cohort identity.

UAR 46. Challenges Facing First-Gen Students In Their Transition To College. 2 Units.

This course will focus on the multiple perspectives relating to why women and first generation students experience challenges to successfully navigating paths in Science, Technology, Engineering, and Mathematics (STEM) professions and majors. Students will explore how such constructs as power, privilege, and identity play a role in their academic and future careers. Connections to theoretical works of stereotype threat, cultural capital, and belonging will also be emphasized. Throughout the course, students will learn and enhance foundational skills aimed at supporting their trajectory in STEM majors and ultimately, STEM careers.

UAR 56. Building a Successful Academic Career. 1 Unit.

For freshmen in expanded advising programs. Techniques for honing academic skills for college, and applying those skills to better define intellectual identity in academic pursuits. May be repeated for credit.

UAR 60. Engaging, Exploring, and Reflecting on Alumni Career Worlds. 1 Unit.

This course helps students access and navigate the professional world with tools such as e-Portfolios, Strengths Quest, and alumni shadow visits. Assignments and discussions will encourage deep reflection on the values, philosophies, and backgrounds that can help shape each student's long term goals.

Urban Studies Courses

URBANST 25Q. The Origins of the Modern American City, 1865-1920. 3 Units.

Are we living in a new Gilded Age? To answer this question, we go back to the original Gilded Age, as well as its successor, the Progressive Era. How did urban Americans around the turn of the twentieth century deal with stark inequalities of class, race, ethnicity, gender, and sexuality? And what can we learn from their struggles for our own time? Students use primary and secondary sources in digital and print formats. Possible field trip to San Francisco.

Same as: AMSTUD 25Q, HISTORY 55Q

URBANST 100A. Pre-field Course for Urban Studies Alternative Spring Break. 1 Unit.

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more information.

URBANST 101. Community-Based Internship Preparation Seminar. 1 Unit.

Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do all assignments for 1 unit of credit. Students planning to take a community-based internship in future years are welcome to enroll.

Same as: EARTHSYS 9

URBANST 102. Social and Urban Development in Beijing: Field Observation & Service Learning. 4 Units.

In this course, we explore China's urban and social development through the lens of Beijing. We investigate issues such as land use and land rights, housing, education, migrants in cities, and the repercussions of unequal development and a frayed social safety net. BOSP students will communicate and share their unique perspective with students at the Stanford home campus who are also studying China's urbanization. While in Beijing, BOSP students will also have the opportunity to participate in documentary fieldwork: observing the city and its patterns of life, participating in field trips, and completing a service project with a Beijing community organization. Students will come away with an up-close view of the social implications of China's rapid economic and urban growth, and the ability to put a human face on the challenges of development. Note: Course is open to Stanford-in-Beijing students.

URBANST 103. Social Movements, Hip-hop & Heroes in the City: From Greensboro to Ferguson. 1 Unit.

The focus of this workshop is on the social and cultural histories and present conditions relating to social movements and the role of leaders and heroes in urban settings. The workshop seeks to foster historical consciousness of past struggles for justice through collective action as well as to introduce students to a diverse range of leaders of contemporary social justice movements. Additionally, as an underpinning concept, the course explores the changing meaning and importance of social and cultural heroes through history, literature, and music. Workshop activities will be divided between sessions with guest speakers and classes held to discuss background concepts and material.

URBANST 106. City, Society, Literature- 19th Century Histories. 4 Units.

This course examines the rise of modern cities through an analysis of urban society and the imaginative literature of the 1800s.

Same as: HISTORY 206A, HISTORY 306A

URBANST 107. Introduction to Urban and Regional Planning. 3 Units.

An investigation into urban planning as a democratic practice for facilitating or mitigating change in society and the built environment. We will engage in professional planning practices in focused sessions on transportation, design, housing, environmental policy, demographic research, community organizing and real estate development. Strong emphasis on developing an understanding of the forces that shape urban and regional development, including cultural trends, real estate and labor economics, climate change and the environment, and political organizing and power dynamics.

URBANST 110. Utopia and Reality: Introduction to Urban Studies. 4 Units.

Designed for freshmen and sophomores. Introduction to the study of cities and urban civilization focusing on the utopias that have been produced over time to guide and inspire city-dwellers to improve and perfect their urban environments. History of urbanization and the urban planning theories inspired by Ebenezer Howard, Le Corbusier, Frank Lloyd Wright, the New Urbanists and Smart Growth advocates that address current issues such as urban community dynamics, suburbanization, sustainability, and globalization. Public policy approaches designed to address these issues and utopian visions of what cities could be, or should be, in the future. Topic of the final paper chosen by the student, with consent of instructor, and may be a historical research paper, a policy-advocacy paper, or a proposal for an urban utopia that addresses the challenges and possibilities of urban life today.

URBANST 111. Political Power in American Cities. 5 Units.

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

Same as: AMSTUD 121Z, POLISCI 121, PUBLPOL 133

URBANST 112. The Urban Underclass. 4 Units.

(Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor.
Same as: SOC 149, SOC 249

URBANST 113. Introduction to Urban Design: Contemporary Urban Design in Theory and Practice. 5 Units.

Comparative studies in neighborhood conservation, inner city regeneration, and growth policies for metropolitan regions. Lect-disc and research focusing on case studies from North America and abroad, team urban design projects. Two Saturday class workshops in San Francisco: Jan 19 and Feb 2. Terms: Win | Units: 5 | UG Reqs: GER:DBSocSci | Grading: Letter (ABCD/NP).

URBANST 114. Urban Culture in Global Perspective. 5 Units.

Core course for Urban Studies majors. We will study urban space both historically and cross-culturally. Urban Studies, by definition, is an interdisciplinary field, where the methodological approaches draw upon a diverse set of analytic tools. Disciplines that occupy a prominent place in this class are geography, cultural anthropology, sociology, history, media studies, and literature. In this context, we will discuss the importance of cities around the world to the economic, cultural, and political well-being of modern societies and examine how forces such as industrialization, decentralization, and globalization affect the structure and function of cities.
Same as: ANTHRO 126

URBANST 119. Ancient Urbanism. 5 Units.

(Formerly CLASSART 112/212.) Archaeology of Greek, Roman and early Islamic cities and urbanism in the Mediterranean and western Asia. Comparison and contrast of the shaping role of religion and politics; definitions of public and private space, monumental buildings, houses, streets, infrastructure. Special themes are city and country connections; the problems of giant cities; cities in the longue dureacute;e. Case studies include Athens, Olynthos, Rome, Pompeii, Constantinople, Damascus and Cairo.
Same as: ARCHLGY 153, CLASSICS 153

URBANST 121. Public Scholarship & Social Change. 2 Units.

Introduces students to the diverse ways of iquest;doingiquest; public/community-engaged scholarship, including public interest and public policy-oriented research, design research, social entrepreneurship, activist/advocacy and community-based research models. Through a multidisciplinary set of case studies of actual research/action projects in the US and abroad, students will compare and assess research models in terms of methodological approach, academic rigor, control and ownership of the research process, means and modes of data dissemination, researcher subjectivity, depth of community partnership, and relative potential for sustainable, long-term community impact. The course material is designed to provide students with a broad framework and context to imagine how to produce their own scholarship/research as a form of public service and social transformation.

URBANST 122. Ethics and Politics of Public Service. 5 Units.

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. [This class is capped but there are some spaces available with permission of instructor. If the class is full and you would like to be considered for these extra spaces, please email sburbank@stanford.edu with your name, grade level, and a paragraph explaining why you want to take the class.].

Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D

URBANST 123. Approaching Research and the Community. 2-3 Units.

Comparative perspective on research with communities and basic overview of research methodologies, with an emphasis on the principles and practices of doing community-based research as a collaborative enterprise between academic researchers and community members. How academic scholarship can be made useful to communities. How service experiences and interests can be used to develop research questions in collaboration with communities and serve as a starting point for developing senior theses or other independent research projects.

URBANST 123B. Approaching Research in the Community: Design and Methods. 3 Units.

(Taught concurrently with CSRE 146; you may enroll in either course.) This course focuses on issues of research design and how to select specific methodological strategies to assure ethical and effective partnership-based research. In this course, students will plan for their own participation in a CB(P)R project. Topical themes will include best practice strategies for (a) defining and selecting community problems or issues to be addressed, (b) generating relevant and useful research questions, (c) choosing specific means and methods for data collection [e.g., surveys, interviews, focus groups, etc.], (d) storing, organizing and analyzing data, (e) reflecting on and critiquing research findings, and (f) carrying out dissemination in ways that can be expected to enhance community power and advance community development. Students will be provided with opportunities to workshop their respective projects-in-development, (e.g., developing and sharing research questions, data collection instruments, strategies for engaging community constituents as co-researchers, etc.). Students will leave the course with a plan for participating in a CBPR project.

URBANST 124. Spatial Approaches to Social Science. 5 Units.

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.
Same as: ANTHRO 130D, ANTHRO 230D, POLISCI 241S

URBANST 126. Spirituality and Nonviolent Urban and Social Transformation. 3 Units.

A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, Ceacute;sar Chaacute;vez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center).

Same as: CSRE 162A, RELIGST 162

URBANST 127. Community Planning Workshop. 4-5 Units.

Students work in teams to conduct research, analyze and evaluate alternatives, and make recommendations for possible solutions to local community development issues. Students work with community partners to blend theory and practice to accomplish a community based project.

URBANST 128. Community Mapping Practicum. 4 Units.

Students will use mapping techniques to explore community planning and policy issues in Redwood City. Focusing on building other skills including teamwork, writing, and oral communication. GIS is not a prerequisite.

URBANST 131. VIP: Very Impactful People - Social Innovation & the Social Entrepreneur. 1 Unit.

Invited lecture series. Perspectives and endeavors of entrepreneurs and thought leaders who address social needs in the U.S. and internationally through private, for-profit and nonprofit organizations or public institutions.

URBANST 132. Concepts and Analytic Skills for the Social Sector. 4 Units.

How to create and grow innovative, not-for-profit organizations and for-profit enterprises which have the primary goal of solving social and environmental problems. Topics include organizational mission, strategy, communications/marketing, financing and evaluation. Opportunities and limits of methods from the for-profit sector to meet social goals. Perspectives from the field of social entrepreneurship. Focus is on integrating theory with practical applications. Enrollment limited to 20. Prerequisite: consent of instructor. Email lalitvak@stanford.edu.

URBANST 133. Social Entrepreneurship Collaboratory. 4 Units.

Interdisciplinary student teams create and develop U.S. and international social entrepreneurship initiatives. Proposed initiatives may be new entities, or innovative projects, partnerships, and/or strategies impacting existing organizations and social issues in the U.S. and internationally. Focus is on each team's research and on planning documents to further project development. Project development varies with the quarter and the skill set of each team, but should include: issue and needs identification; market research; design and development of an innovative and feasible solution; and drafting of planning documents. In advanced cases, solicitation of funding and implementation of a pilot project. Enrollment limited to 20. May be repeated for credit. Prerequisites: 131 and 132, or consent of instructor.

Same as: MSE 174

URBANST 137. Innovations in Microcredit and Development Finance. 3 Units.

The role of innovative financial institutions in supporting economic development, the alleviation of rural and urban poverty, and gender equity. Analysis of the strengths and limits of commercial banks, public development banks, credit unions, and microcredit organizations both in the U.S. and internationally. Readings include academic journal articles, formal case studies, evaluations, and annual reports. Priority to students who have taken any portion of the social innovation series: URBANST 131, 132, or 133. Recommended: ECON 1A or 1B.

Same as: PUBLPOL 137

URBANST 138SI. Scaling Impact with VIP. 2 Units.

Social entrepreneurship is innovating new ways to create social value. This course will focus on the challenges of scaling social enterprises during the many stages of maturity. This class will act an adjunct (auxiliary, complementary) class to VIP: Very Impactful People Speaker Series (URBANST 131). VIP speakers will stay after their lectures to provide insight on their experience in scaling, be it through detailed case studies or structured Q&A discussion. Note: students do not need to separately register for Urban Studies 131. The two credit units for this course is inclusive of the one credit unit a student would otherwise receive for Urban Studies 131.

URBANST 139. Urban Africa. 5 Units.

This course explores the production of urban space and the social, cultural, and political significance of cities in sub-Saharan Africa. Topics include: architecture and the built environment; urban planning and colonial public health; migration and rural-urban dynamics; youth, politics, and popular culture; violence, policing, and the privatization of public space; (in)formality in housing, transportation, and employment; class, gender, and mobility in the public sphere; urban citizenship and "right to the city"; movements; gentrification, tourism, and the commodification of poverty; and efforts to (re)theorize postcolonial African cities. Readings are drawn from anthropology, history, urban studies, and geography. Discussion will situate struggles over urban forms and the contours of everyday life within broader trends in the political economy of the region from the late colonial period to the present.

Same as: AFRICAST 138B, ANTHRO 138B

URBANST 140. Urban Ethnography. 5 Units.

Ethnographic research and writing focuses on the ways our lives are shaped by interacting forces such as history, political economy, and creative cultural practices. In the last fifty years, more and more cultural anthropology has been carried out in urban contexts, due to both urbanization around the world and changes in anthropology as a field. This seminar focuses on careful reading and analysis of book-length ethnographies about urban cultures, people and dynamics to consider what the theory and methodological tools of anthropology have to offer us as we seek to better understand the city. Readings include a variety of approaches to ethnographic research in and/or about cities, with a mix from different eras and about different cities around the world. Same as: ANTHRO 102

URBANST 142. Paris: The Making of a Modern Icon. 3-5 Units.

Few places have been as heavily romanticized and mythologized as Paris. To many observers, Paris and its attractions serve as icons of modernity itself. By engaging with fiction, film, journalism, painting, photography, poetry, song, and other media, we'll trace how different people at different times have used Paris as both backdrop and main protagonist, and we'll consider how the city itself has incorporated and rebelled against such representations. The scope of our inquiry will stretch from the late 18th century to the present, covering a host of topics, figures, and sites: from the French Revolution to the protests of May '68, from Baudelaire to Hemingway, from the Impressionists to the Situationists. Taught in English. Same as: FRENCH 227, HISTORY 239E

URBANST 144. Cities and Citizens in the Middle East. 4 Units.

This course will explore historical formation of cities and citizens in the Eastern Mediterranean since the 19th century. We will explore urban development, economy, social classes and local politics with a focus Egypt and Turkey and in particular two world-historical cities, Cairo and Istanbul. Drawing on history, cultural anthropology, geography and sociology disciplines, we will examine how urban space in Egypt and Turkey have reconfigured through histories of colonialism, nationalism, developmentalism and globalization. Rural to urban immigration, informality, gendered places, consumption, urban regeneration, local politics and branding the city will be the themes of our discussion. We will study these themes in relation to two main questions: How do spatial changes engender new social practices and redefine cultural difference?; How do power struggles at the intersection of local and global interests shape urban change? It will be of interest for urban studies majors and other students at all levels who would like to study urban struggles and change in Turkey, Egypt, the Middle East and the Global South.

Same as: ANTHRO 149A

URBANST 145. International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development. 4-5 Units.

Comparative approach to sustainable cities, with focus on international practices and applicability to China. Tradeoffs regarding land use, infrastructure, energy and water, and the need to balance economic vitality, environmental quality, cultural heritage, and social equity. Student teams collaborate with Chinese faculty and students partners to support urban sustainability projects. Limited enrollment via application; see internationalurbanization.org for details. Prerequisites: consent of the instructor(s).

Same as: EARTHSYS 138, IPS 274

URBANST 150. From Gold Rush to Google Bus: History of San Francisco. 5 Units.

This class will examine the history of San Francisco from Native American and colonial settlement through the present. Focus is on social, environmental, and political history, with the theme of power in the city. Topics include Indians and Spanish settlers, the Gold Rush, immigration and nativism, earthquake and fire, progressive reform and unionism, gender, race and civil rights, sexuality and politics, redevelopment and gentrification.

Same as: AMSTUD 150X, HISTORY 152E

URBANST 160. Environmental Policy and the City in U.S. History. 5 Units.

Looks at the historical backgrounds of current issues in urban environmental policy, including waste, transportation, air pollution, and other major issues. Covers the period 1800 to the present. Explores the relevance of historical scholarship.

URBANST 161. U.S. Urban History since 1920. 5 Units.

The end of European immigration and its impact on cities; the Depression and cities; WW II and the martial metropolis; de-industrialization; suburbanization; African American migration; urban renewal; riots, race, and the narrative of urban crisis; the impact of immigration from Asia, Latin America, and Africa; homelessness; the rise of the Sunbelt cities; gentrification; globalization and cities. Final project is history of a San Francisco neighborhood, based on primary sources and site visit.

URBANST 162. Managing Local Governments. 4 Units.

In-the-trenches approach. Issues in leading and managing local governments in an era of accelerating and discontinuous change. Focus is on practical strategies related to financing, public services impacted by increasing demand and revenue constraints, the politics of urban planning, private-public partnerships, public sector marketing, entrepreneurial problem solving, promoting a learning and risk-taking organizational culture, and developing careers in local government. Enrollment limited to 25; preference to Urban Studies majors.

URBANST 163. Land Use Control. 4 Units.

Methods of land use control related to the pattern and scale of development and the protection of land and water resources. Emphasis is on the relationship between the desired land use goal and geographical landscape, physical externalities, land use law, and regulatory agencies. Topics include the historical roots of modern land use controls; urban reforms of the 19th century; private ownership of land; zoning; local, state, and federal land use regulation; and land trusts preservation. Smart growth, environmental impact consideration, private property rights, and special purpose agencies are related to current issues.

URBANST 164. Sustainable Cities. 4-5 Units.

Service-learning course that exposes students to sustainability concepts and urban planning as a tool for determining sustainable outcomes in the Bay Area. Focus will be on the relationship of land use and transportation planning to housing and employment patterns, mobility, public health, and social equity. Topics will include government initiatives to counteract urban sprawl and promote smart growth and livability, political realities of organizing and building coalitions around sustainability goals, and increasing opportunities for low-income and communities of color to achieve sustainability outcomes. Students will participate in team-based projects in collaboration with local community partners and take part in significant off-site fieldwork. Prerequisites: consent of the instructor. Same as: EARTHSYS 160

URBANST 165. Sustainable Urban and Regional Transportation Planning. 4-5 Units.

Environmental, economic, and equity aspects of urban transportation in 21st-century U.S. Expanded choices in urban and regional mobility that do not diminish resources for future generations. Implications for the global environment and the livability of communities.

URBANST 166. East Palo Alto: Reading Urban Change. 5 Units.

Examines the changes in East Palo Alto's built environment, economy, and civil society since the 1990s. Focus on environmental activism, sustainability, and environmental justice issues. Students use archived film footage to analyze the history.

URBANST 167. The Automobile and the City. 4 Units.

This course will examine the impact of the automobile on urban development and the social life of the modern city from three perspectives. First, as Auto-Utopia: a look at the golden age of automobiling during the early and late 20th century when the private car and the truck expanded the full range of opportunities for the economy and for both urban and rural residents of the modern world. Second, Auto-Dystopia: an examination of the negative impacts of the automobile that emerged in the late 20th and early 21st centuries in regard to safety, congestion, pollution, sustainability, and the development of a monoculture of the automobile in urban transportation. And third, Auto-Futures: a look at the ways that urban society -- both in the developed world and in the emerging economies of Asia, Africa, and Latin America -- will plan for and manage a multi-modal transportation system (walking, cycling, transit, and the achievement of a better jobs/housing balance) in which the automobile will be one of many options and will serve both private and public needs.

URBANST 168. Housing & Community Development--Policy and Practice. 3 Units.

How federal, state and local governments have worked with private and nonprofit sector actors in creating housing, as well as downtown, waterfront and neighborhood development. Legal and financial mechanisms, tax policy, reuse of historic structures, affordable shelter.

URBANST 171. Urban Design Studio. 5 Units.

The practical application of urban design theory. Projects focus on designing neighborhood and downtown regions to balance livability, revitalization, population growth, and historic preservation.

URBANST 173. The Urban Economy. 4 Units.

Applies the principles of economic analysis to historical and contemporary urban and regional development issues and policies. Explores themes of urban economic geography, location decision-making by firms and individuals, urban land and housing markets, and local government finance. Critically evaluates historical and contemporary government policies regulating urban land use, housing, employment development, and transportation. Prerequisite: Econ 1A or permission of instructor. Same as: PUBLPOL 174

URBANST 181. Urban Agriculture in the Developing World. 3-4 Units.

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application. Same as: EARTHSYS 181, EARTHSYS 281, EESS 181, EESS 281

URBANST 190. Urban Professions Seminar. 1 Unit.

Workshop. Contemporary practice of urban design and planning, community development, urban education, public service law, and related fields. Topics depend partly on student interests. Bay Area professionals lecture and respond to questions concerning their day-to-day work, impressions of their field, and the academic background recommended for their work.

URBANST 194. Internship in Urban Studies. 2-4 Units.

For Urban Studies majors only. Students organize an internship in an office of a government agency, a community organization, or a private firm directly relevant to the major. Reading supplements internship. Paper summarizes internship experience and related readings.

URBANST 195. Special Projects in Urban Studies. 1-5 Unit.

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URBANST 197. Directed Reading. 1-5 Unit.**URBANST 198. Senior Research in Public Service. 1-3 Unit.**

Limited to seniors approved by their departments for honors thesis and admitted to the year-round Public Service Scholars Program sponsored by the Haas Center for Public Service. What standards in addition to those expected by the academy apply to research conducted as a form of public service? How can communities benefit from research? Theory and practice of research as a form of public service readings, thesis workshops, and public presentation of completed research. May be repeated for credit. Corequisite: 199.

URBANST 199. Senior Honors Thesis. 1-10 Unit.**URBANST 201. Preparation for Senior Project. 5 Units.**

First part of capstone experience for Urban Studies majors pursuing an internship-based research project or honors thesis. Assignments culminate in a research proposal, which may be submitted for funding. Students also identify and prepare for a related internship, normally to begin in Spring Quarter in URBANST 201B or in Summer. Research proposed in the final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research. Service Learning Course (certified by Haas Center). Same as: SOC 201

URBANST 201A. Capstone Internship in Urban Studies. 3 Units.

Restricted to Urban Studies majors. Students work at least 80 hours with a supervisor, establish learning goals, and create products demonstrating progress. Reflection on service and integration of internship with senior research plans. Must be completed by start of Winter Quarter senior year. May continue for additional quarter as 194. Service Learning Course (certified by Haas Center). Corequisite: URBANST 201 or consent of instructor.

URBANST 201B. Capstone Internship Seminar. 3-4 Units.

Students carry out an internship of at least 80 hours with a community organization or government agency. Class meets weekly to discuss related issues, including ethics of service, combining service and research, navigating organizational dynamics, and setting and accomplishing internship goals. Students submit internship agreement and internship-related deliverables, and give in-class presentations.

URBANST 202. Preparation for Senior Research. 5 Units.

Required of all juniors in Urban Studies and those juniors in Sociology planning on writing an honors thesis. Students write a research prospectus and grant proposal, which may be submitted for funding. Research proposal in final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research. Same as: SOC 202

URBANST 203. Senior Seminar. 5 Units.

Conclusion of capstone sequence. Students write a substantial paper based on the research project developed in 202. Students in the honors program may incorporate paper into their thesis. Guest scholar chosen by students. Same as: SOC 204

Urology Courses

UROL 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

UROL 280. Early Clinical Experience in Urology. 1-2 Unit.

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

UROL 299. Directed Reading in Urology. 1-18 Unit.

Prerequisite: consent of instructor.

UROL 310W. Advanced Surgery/Urology Clerkship. 6 Units.**UROL 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

UROL 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

Wellness Ed Courses

WELLNESS 18. Strengthening the Heart through Compassion. 1 Unit.

Guided practices and simple evidence based strategies to develop self-compassion, experience genuine happiness, reduce stress and negative thoughts, resolve differences with difficult others and take compassionate action that makes a difference in the world. Sponsored by Stanford's Center for Compassion and Altruism Research and Education (CCARE) and following the Stanford Compassion Training program. Each week includes: meditation, group discussion, current research and its real world application.

WELLNESS 187. Analysis of Human Movement. 1 Unit.

This course covers the basic principles governing human movement with an emphasis on sports applications. The course spends roughly equal amounts of time on anatomy and biology (large- and small-scale structure and function). Applied anatomy: Anatomy (body structure) and mechanics (force, torque, etc) together describe macroscopic movement. Applied biology: The molecular and cellular basis of movement, including: muscles contraction, nerves signals, and related topics such as exercise damage, cramping, muscle memory, DOMS and fatigue.

WELLNESS 188. The Athlete and Personal Identity Development. 1 Unit.

Overview of identity development theory related to religious/spiritual identity development, gender, and sexuality identity development, racial and cultural identity development, ethical and moral development, and the development of meaning and purpose. The ways in which athletic participation affects and contributes to each of these developmental areas. This course also examines each of these topics in a larger context by discussing relevant current issues and events in sport.

WELLNESS 190. Introduction to Nutrition. 1 Unit.

How to optimize nutrition for health and performance. Topics include macronutrients, fad diets, sugar addiction, low-calorie sweeteners, caloric restriction, disease prevention, and nutrition.

WELLNESS 191. Ignite: The Power of Motivation. 1 Unit.

Motivation is often misunderstood as a force driven by a system of rewards and punishments. However, the latest research shows it's much more dependent on cultivating meaning, purpose, task mastery, and freedom of choice. In this course students will uncover the keys inside themselves to ignite the power of their motivation at school and their life. Research on motivation from the fields of psychology, behavioral economics, and neuroscience is discussed and then tools are provided that enhance the drive to achieve in a balanced and healthy manner. Students will learn how to cultivate the psycho-physiological factors that increase motivation, while reducing those aspects that depress it.

WELLNESS 192. Mindful Nourishment: Training for Healthy Nutrition and Wellbeing. 1 Unit.

Intuitive Eating entails the scientific study and the application of mindfulness applied to nutrition, health, and eating through contemplative and applied practices. Mindfulness is a way of being engaged in our lives with greater emotional and mental balance. This course involves: 1) Participating in dialogue that cultivates shared mindfulness 2) Develop inner and outer wisdom applied to your health and eating. 3) Apply mindfulness skills to your emotional and physical health and greater well-being. These practices aim to develop greater insight, self-awareness, emotional regulation, and skillful responding. 4) Use mindfulness as way to create collaborative learning. Collaborative learning at its best is when we can listen deeply, suspend judgment, and speak authentically. When we do these, we create the conditions for meaningful dialogue and learning.

WELLNESS 193. Lifestyle Fitness Challenge. 2 Units.

This course teaches students how to stay active by engaging in a variety of workouts (indoor cycling, interval training, weight training, walking/jogging, etc.). This course utilizes a variety of workout equipment to target all major muscle groups. This course will utilize class discussions, class assignments and student participation to enable students to: (1) Understand basic components of health-related physical fitness, cardiovascular fitness, muscular strength and endurance and flexibility (2) Develop physical fitness and motor skills, and (3) Develop a positive attitude toward wellness and physical activity which will facilitate a healthy lifestyle.

WELLNESS 194. Healthy Cooking: Food as Medicine. 1 Unit.

The class will explore the basics in healthy nutrition and the essentials for a healthy balanced plate. Classes will focus on recipes in East Asia & India, the benefits of foods for certain ailments, super-foods, plant based diets and phyto-nutrients, cleansing foods, the use of foods for skin care and aromatherapy, understanding the link between the foods we eat and the soil they grow in, and lastly healthy comfort foods. This interactive and experiential class will help one to develop a healthy relationship with food and develop some practical cooking skills.

WELLNESS 195. Wellness: Mind, Body, Spirit. 2 Units.

An introduction to wellness focusing on emotional health and the cultivation of happiness. Managing stress and enhancing productivity while remaining centered are the primary learning objectives. Class will be lecture and discussion with time for guided practice in skill development.

WELLNESS 196. Practice of Happiness. 1 Unit.

This class is for each student to explore personal happiness thru applying research-based principles to enhance everyday life. The goal of the class is to position happiness as the cornerstone of personal wellness, purpose and fulfillment. Sessions will combine lecture, guided practice, conversation and readings.

WELLNESS 197. Sport Psychology. 1 Unit.

The psychological skills that athletes and other performers apply in training, preparation, and competition have a significant influence on performance. Students will learn an overview of concepts and theories in sports psychology research (e.g., motivation, arousal regulation, self-confidence, team dynamics, mental skills training, etc.) and apply psychological techniques to enhance performance, enjoyment, and self-satisfaction in sports and life.

WELLNESS 198. Stress Less, Sleep Better. 1 Unit.

This course helps students better manage their stress and sleep more soundly. It does so by presenting the latest findings in the science of stress and sleep. Functional definitions of stress and perceived stress are given, student stress levels are assessed, and tools are given to manage stress more effectively. Students learn about the sleep cycle and its effect on the brain, understand the causes of insomnia, track their sleep behaviors, and practice getting a better night's sleep by using cognitive-behavioral interventions rooted in the latest findings of sleep research. By the end of the course students will be more empowered to work effectively with stress and sleep so they have more clarity, focus, and energy in their day-to-day lives.

WELLNESS 200. Emotional Intelligence: Tools for Productivity and Thriving. 1 Unit.

This class is designed to help high achieving, intellectually competent Stanford students develop their Emotional Intelligence. This class will use lecture, discussion, peer coaching and guided practice to help students assess, understand and utilize their EI strengths and weaknesses. Goals for class are improved stress management and resilience, greater self awareness and enhanced productivity.

WELLNESS 201. Flourishing. 2 Units.

An introduction to wellness focusing on physical well being and the importance of that in leading a happy and successful life. Topics covered are proper diet and nutrition, exercise, sleep, brain fitness and the concept of flow or engagement. Woven throughout the class will be the need to manage stress and remain productive and centered.

WELLNESS 202. Wellness: Mind, Body, Spirit. 1 Unit.

An introduction to wellness focusing on emotional health and the cultivation of happiness. Managing stress and enhancing productivity while remaining centered are the primary learning objectives. Class will be lecture and discussion with time for guided practice in skill development.

WELLNESS 204. Resilience: How to Bounce Back. 1 Unit.

Resilience is the ability to bounce back in the face of life's challenges, whether these challenges are getting a poor test grade, breaking-up with a significant other, battling illness, or taking on any number of other tough events. In this course students study insights from the emerging field of resilience to learn about and practice the skills that allow them to bounce back more quickly and effectively from life's setbacks. Models of resilience will be presented and students will learn about the cognitive, emotional, and social aspects that allow them to enhance their capacity to rise above life adversity and thrive, even in the midst of tough times.

WELLNESS 205. Meditation. 1 Unit.

A comprehensive introduction to the art of meditation, this course provides the opportunity to learn and practice meditation in a supportive setting. Meditation includes practices that help us become more easeful, less distracted, and more emotionally positive and creative, so that we can see ourselves clearly and experience life directly.

WELLNESS 207. Meaningful Work: Finding a Career You Love. 1 Unit.

Finding work that is meaningful and a career that actualizes our potential is essential to our success and well-being. Philosophical traditions and psychological science converge on the conclusion that doing the work we both love and are good at leads to professional success, positive relationships, and improved health. This course will help you develop the skills that lead to the choice of a meaningful career; one that optimizes both your future achievement and your lasting happiness. Class lecture and discussions will be supplemented by reading, writing, video clips, quotes, and jokes.

WELLNESS 208. Behavior Change: Building A Better You. 1 Unit.

This course presents the latest scientific evidence on how to change behavior. We will cover ways to decrease procrastination and enhance productivity, address addictive processes involving technology and substances, and tackle many other simple, yet confounding life challenges. Drawing from the latest insights in neuroscience and psychology, we use the practices of motivational interviewing, peer coaching, cognitive reframing, and mindfulness meditation, to change unwanted behaviors and create desired new ones. Course topics include: the neuroscience of desire, addiction patterns, intrinsic vs. extrinsic motivation, intentionality, the habit cycle, and many others. Join us and build a better behavioral toolkit that will build a better you.

WELLNESS 215. WISE DECISION MAKING. 1 Unit.

Being wise makes us happier and more successful. Our relationships, bodies, health, school, and work can be either stressful or fulfilling. Wisdom skills are practical and effective in these areas, and you can learn how to apply them sooner rather than later. This course will help you develop wisdom through guided practice in skills such as mindfulness, emotional intelligence, cognitive reframing, humility, empathy, gratitude, and courage. Entertaining video clips, quotes, and jokes will supplement our discussions.

WELLNESS 220. Applying Wellness Practicum. 2 Units.

This class offers guided practice for students to put the skills they've learned into practical application. Students will work in a collaborative, peer-coaching model, under the mentorship of the course professors, to design, deliver, and evaluate a wellness initiative at Stanford. They will also create and implement and evaluate a wellness goal for themselves and support that of a partner. The course consists of a seminar emphasizing self-directed student learning. The seminar will offer professor and peer support and some didactic education. Any student who has previously completed one or more of the core WellnessEd courses is welcome to enroll. This class is required for the Stanford Wellness Certificate.

Woods Institute for the Environment Courses

ENVRINST 109. Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision. 2 Units.

Examination of program-based local actions that promote resource conservation and an educational environment for sustainability. Examination of building-level actions that contribute to conservation, lower utility costs, and generate understanding of sustainability consistent with Stanford's commitment to sustainability as a core value. Overview of operational sustainability including energy, water, buildings, waste, and food systems. Practical training to enable students to become sustainability coordinators for their dorms or academic units.

Same as: CEE 109, EARTHSYS 109

ENVRINST 177. Interdisciplinary Research Survival Skills. 2 Units.

Learning in interdisciplinary situations. Framing research questions. Developing research methods that benefit from interdisciplinary understanding. Writing for multiple audiences and effectively making interdisciplinary presentations. Discussions with interdisciplinary experts from across campus regarding interdisciplinary research projects.

Same as: EARTHSYS 177, EARTHSYS 277, ENVRINST 277

ENVRINST 198. Prehonors Seminar. 1 Unit.

Seminar for students admitted to the Goldman Honors Program. Students will begin work on honors projects. Enrollment by consent of instructor.

ENVRINST 199. Interschool Honors Program in Environmental Science, Technology, and Policy. 1-9 Unit.

Students from the schools of Humanities and Sciences, Engineering, and Earth Sciences analyze important problems in a year-long small group seminar. Combines research methods, oral presentations, preparation of an honors project by each student, and where relevant, field study. May be repeated for credit.

ENVRINST 220. The Social Ocean: Ocean Conservation, Management, and Policy. 1-2 Unit.

This interdisciplinary seminar examines current ocean issues and ideas through a series of readings, discussions, and guest lecturer presentations of seminal works about ethical, physical, and emotional relationships of human beings to the marine world. Through the lenses offered by several classic readings, we will examine and reinterpret the challenges of fisheries collapse, climate change, shipping, marine spatial planning, biodiversity conservation, and the management of land-sea interactions. Though the seminar is open to all undergraduate and graduate students, our course is designed especially for those with a particular interest in studying and solving key issues of ocean policy and management, from coastal adaptation to fisheries management to cumulative impacts assessments. In addition to this interest, students must be willing to take the time to dig deeper into the foundations of environmental thinking about the relationship of human beings and the sea.

ENVRINST 260. Water in the West: Challenges and Opportunities. 2-3 Units.

This 3-unit course explores challenges and opportunities in the management of water resources to protect the economic, ecological, and social values of the American West. Lectures and readings will cover a wide array of subjects and take an interdisciplinary approach to issues affecting water supply, water quality, and ecosystems with an emphasis on applications to policy and practice. Invited speakers from Stanford, other universities, government agencies, business, and non-governmental organizations will discuss relevant topics such as climate change, agricultural and urban water demand, impacts on business, management of freshwater ecosystems, markets and pricing, and other topics to be determined. Class discussion will focus on potential solutions in the areas of policy, markets, technology, and other interventions. Assignments will require students to apply knowledge from readings, lectures, and discussions to practical, real-world scenarios in the form of public comments, editorials, plans, or proposals. Through this course, students will gain an understanding of the complex water landscape of the American West, how decisions affecting water resources in the West are made and may be influenced, and be able to discuss the trade-offs between different various solutions. Limited enrollment. Prerequisite: consent of instructor.

ENVRINST 277. Interdisciplinary Research Survival Skills. 2 Units.

Learning in interdisciplinary situations. Framing research questions. Developing research methods that benefit from interdisciplinary understanding. Writing for multiple audiences and effectively making interdisciplinary presentations. Discussions with interdisciplinary experts from across campus regarding interdisciplinary research projects.

Same as: EARTHSYS 177, EARTHSYS 277, ENVRINST 177

Writing Rhetoric, Program in Courses

PWR 1AH. Writing & Rhetoric 1: The Rhetoric of American Multicultural Experience. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of multicultural experience and cultural assimilation, focusing on the theme of social acceptance. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1AO. Writing & Rhetoric 1: Visual Rhetoric Across the Globe: Capturing Culture in Images. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1AOA. Writing & Rhetoric 1: Music and Making Meaning. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1AT. Writing & Rhetoric 1: A Mountain for Itself: The Rhetoric of Wilderness. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1BR. Writing & Rhetoric 1: Healthy or Cutthroat: The Rhetoric of Competition. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1BRA. Writing & Rhetoric 1: Growing Up Millennial: The Rhetoric of Coming of Age. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1CA. Writing & Rhetoric 1: The Rhetoric of Gaming. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include how gameplay in a variety of genres operates as argument about cultural values and how games function as sites of community building, social networking, and learning. Students produce research-based arguments on these issues and merge practice and production in storyboarding rhetorically persuasive games. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1CG. Writing & Rhetoric 1: Mixtapes & Meetups: The Interactive Rhetoric of Media and Relationships. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1CGA. Writing & Rhetoric 1: Popular Science to Girl Talk: Writing as Adaptation and Remix. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1CK. Writing & Rhetoric 1: Investigating the News: Journalism, Technology & the Future. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1CL. Writing & Rhetoric 1: The Politics of Difference, Identity, and Harm: The Rhetoric of Hate Crimes. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1CR. Writing & Rhetoric 1: Writing Nature: Discourses in Ecology, Culture, and Technology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Inquiry into human relationships with nature and how these influence ethical choices and social justice. See http://ual.stanford.edu/AP/univ_req/PWR/Courses.html.

PWR 1CS. Writing & Rhetoric 1: Debating the Environment. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1CW. Writing & Rhetoric 1: Sporting Rhetoric: Power, Performance, Profit and Politics. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 1D. Writing Well: An Introduction to College Writing. 3 Units.

Offered only to participants in the Summer College for High School Students. Develops critical reading, writing, and research skills applicable to any area of study. Emphases include close reading, analysis of varied texts, development of strong theses, revision strategies, and introduction to research-based argument. Classes are small, encouraging extensive interaction between students and instructors. Discussions of readings, peer work, and individual conferences with instructors. Each section has a thematic emphasis developed by the instructor; students choose sections based on their individual interests. Does not meet the Stanford first-year writing requirement.

PWR 1DC. Writing & Rhetoric 1: Is This What a Feminist Looks Like? Race/Gender in the Obama Age. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the coverage of and activism in a post-racial U.S., including evaluation of the debate over the intersections of racial activism and feminist activism in U.S. politics. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1DH. Writing & Rhetoric 1: The Virtue of Vice and the Vice of Virtue: The Rhetoric of Criminality. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students investigate language and images that construct criminals, analyzing how these representations shape personal and cultural beliefs. Analysis of the costs and benefits of retributive, restorative, and transformative justice systems. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1DW. Writing & Rhetoric 1: Gangsters, Glamour Girls & Gold-diggers: Dialectic of Am. Culture & Hollywoo. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of American film and its conversation with American culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1EC. Writing & Rhetoric 1: From the Galleries to the Streets: The Rhetoric of Public Space Art. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1EE. Writing & Rhetoric 1: Prowling Toward Certainty: Exploration as Argument. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1EL. Writing & Rhetoric 1: Propaganda: The Dark Side of Rhetoric. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1EP. Writing & Rhetoric 1: The Rhetoric of Global Development and Social Change. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1EV. Writing & Rhetoric 1: The Rhetoric of Globalization. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GAA. Writing & Rhetoric 1: Writing Rites: The Rhetoric of Ritual. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GAC. Writing & Rhetoric 1: Protest Art!: The Rhetoric of Art as Social Activism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of art in drawing our attention to social issues such as racism, poverty, sexism, and homophobia and in moving us to social action. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GAD. Writing & Rhetoric 1: Display Cases and Databases: The Rhetoric of Collection. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GAF. Writing & Rhetoric 1: Little Boxes: The Rhetoric of the American Suburb. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the suburbs as a site of cultural debate through investigation of the ways that authors and artists imagine the physical landscape of the suburb and the inner lives of suburbanites. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GAJ. Writing & Rhetoric 1: The Rhetoric of Eating. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GAK. Writing & Rhetoric 1: No Filter: The Rhetoric of Young Adulthood. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GAL. Writing & Rhetoric 1: The Rhetoric of Disgust. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GAR. Writing & Rhetoric 1: Rhetoric of Frost. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GAT. Writing & Rhetoric 1: Size Matters: The Writing and Rhetoric of Short Stories. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GAU. Writing & Rhetoric 1: Mind vs. Brain: The Rhetoric of Consciousness. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GAW. Writing & Rhetoric 1: Global Exchange: Intercultural Communication. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. The American cultural apparatus, its limitations, and development of other world views. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GAZ. Writing & Rhetoric 1: From Cradle to Grave: The Rhetoric of Age and Aging. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the history of aging in America; developments in reproductive science; the proverbial mid-life crisis; and how people cope with the ultimate horizon of death. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GBJ. Writing & Rhetoric 1: The Rhetoric of Cultural Memories of Violence. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GBR. Writing & Rhetoric 1: Spill: The Rhetoric of Confessions and Self-Revelations. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GBW. Writing & Rhetoric 1: Deathbeds: Art and the Rhetoric of Disease. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GCA. Writing & Rhetoric 1: AH! Real Monsters: The Rhetoric of Monstrosity in Popular Culture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GCD. Writing & Rhetoric 1: Domsdays: The Rhetoric of Apocalypse. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GCJ. Writing & Rhetoric 1: El Otro Lado / The Other Side: The rhetoric of real and imagined borders. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. The physical border between the United States and Mexico is the focus of the examination of the artistic, scholarly, and political rhetoric of real and imagined borders. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GCL. Writing & Rhetoric 1: Rhetoric of Ledbetter. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GCO. Writing & Rhetoric 1: To Boldly Go: The Rhetoric of Travel. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GCX. Writing & Rhetoric 1: "I Do": The Rhetoric of Consent. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the idea of consent and the underlying principles of free will and autonomy in the fields of law, intellectual property, marriage contracts, political philosophy, medical ethics, and sex. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GCZ. Writing & Rhetoric 1: "It Never Got Weird Enough For Me": The Rhetoric of Intoxication. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GDA. Writing & Rhetoric 1: Rhetoric of Murray. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the ways in which online life intersects with real life around issues including privacy, authorship, and morality. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GDM. Writing & Rhetoric 1: Revolution and Revolt: Political Writing for Political Action. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GDS. Writing & Rhetoric 1: From Trash Talk to Toxic Discourse: Rhetorics of Waste. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GEM. Writing & Rhetoric 1: The Rhetoric of Foodie Culture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GER. Writing & Rhetoric 1: The Rhetoric of Social Media. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the multifaceted and hypertextual rhetoric of social media, the intersection between rhetoric and social media, and how new types of online media have heightened participation, openness, and a sense of community. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GEV. Writing & Rhetoric 1: All the World's a Stage: The Rhetoric of Theater. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students investigate the role theater plays in the rhetorical strategies of various literary and non-literary texts as well as visual materials such as films and cartoons. See http://ual.stanford.edu/AP/univ_req/PWR/Req.html.

PWR 1GFL. Writing & Rhetoric 1: From Con Artists to Catfish: The Rhetoric of Trickery. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GGH. Writing & Rhetoric 1: Understanding American Political Speeches of the 20th and 21st Centuries. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Rhetorical analyses of speeches by a range of 20th-century American political figures and the political rhetoric of the present day. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GGK. Writing & Rhetoric 1: Ladies, Tramps, and Other Furry Friends: The Rhetoric of Pets. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GGZ. Writing & Rhetoric 1: The Rhetoric of Race in American Cinema. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GIF. Writing & Rhetoric 1: Dark Humor: A Rhetoric of Social Taboos. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of dark humor as it deals with the most delicate subject matter, topics we designate as sacred and beyond criticism: violence and bodily damage, illness, aging and death, race and ethnicity, and gender and sexuality. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GIY. Writing & Rhetoric 1: Jekylls and Hydes: The Rhetoric of the Scientist. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GJE. Writing & Rhetoric 1: Gay Ghettos, Queer Hoods: The Rhetoric of Race and Urban Sexual Subcultures. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the rhetoric of urban sexual subcultures, and how the rhetoric in medical science, journalism, and popular entertainment defines queers of color in intellectual thought and pop culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GJH. Writing & Rhetoric 1: Invention and Imagination in the Nineteenth Century. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GJM. Writing & Rhetoric 1: The Rhetoric of California. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. iquest; See http://ual.stanford.edu/AP/univ_req/PWR/Courses.html.

PWR 1GJN. Writing & Rhetoric 1: Speaking of Dreams. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GJS. Writing & Rhetoric 1: Our Warded World: The Rhetoric of Conservation. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GJU. Writing & Rhetoric 1: 'Surface of Past Time': The Rhetoric of Nostalgia. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GJW. Writing & Rhetoric 1: I Know It When I Hear It: The Rhetoric of the Unspeakable. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GKL. Writing & Rhetoric 1: The Use and Abuse of Civil Debate: The Rhetoric of Collective Thinking. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GLA. Writing & Rhetoric 1: Code Orange: Post-9/11 America and the Rhetoric of Alarm. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GLB. Writing & Rhetoric 1: In Poor Taste: The Rhetoric of Catastrophe Comedy. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GLD. Writing & Rhetoric 1: The Cyborg Body: The Rhetoric of Disability. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of iquest;disability,iquest; using the analogy of the cyborg, in an era when the human body has become plastic, digitized and surgically manipulated. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GLL. Writing & Rhetoric 1: Wow, that's so postcard: The Rhetoric of Tourism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of tourism as a way of seeing and representing the rest of the world and oneself, touching on some of the most pressing political, economic, and cultural questions facing an increasingly globalized world. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GLR. Writing & Rhetoric 1: Are you Fuzzy and Techie?: The Rhetoric of Art and Science. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GM. Writing & Rhetoric 1: Writing for the Wild and the Tame. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the tension between reverence and science, language and feeling, natural and unnatural in the interrelationship of rhetoric and nature. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GMA. Writing & Rhetoric 1: A Thousand Words: When Art is Not Enough. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GMG. Writing & Rhetoric 1: Love to Hate: The Rhetoric of Misanthropy. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GMH. Writing & Rhetoric 1: Transformative Turns: The Rhetoric of Revolution. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GMK. Writing & Rhetoric 1: Pure and Unadulterated: The Rhetoric of Contamination. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GML. Writing & Rhetoric 1: The Rhetoric of Migrant Protest. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GMR. Writing & Rhetoric 1: Fearful Symmetry: The Rhetoric of the Double. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the fictions of the double and the philosophies of personal identity, and how both anticipate and condition contemporary responses to the twin issues of human cloning and intellectual property. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GMT. Writing & Rhetoric 1: The Shape of Things: The Rhetoric of Design. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GMV. Writing & Rhetoric 1: Don't Take it Personally!: The Rhetoric of The Insult. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of how insults function rhetorically in specific situations and how they have catalyzed prolonged confrontations around race, education, politics, sexual orientation, and national standing. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GMX. Writing & Rhetoric 1: 'Too Much Information?': The Rhetoric of Social Networking & Online Privacy. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the ways in which online life intersects with real life around issues including privacy, authorship, and morality. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GMZ. Writing & Rhetoric 1: The Rhetoric of Institutional Power. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GNA. Writing & Rhetoric 1: Talking Baseball. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GNL. Writing & Rhetoric 1: Punk Rock and Rhetoric of Protest Music. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GNV. Writing & Rhetoric 1: Rhetoric of Bioethics and Biopolitics. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GPS. Writing & Rhetoric 1: The Rhetoric of English. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GRA. Writing & Rhetoric 1: Millions Like Us: The Rhetoric of Crowds. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include symbolic meaning of rock, sports, and political events; virtual crowds online; and use of crowds to shape ideology. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GRH. Writing & Rhetoric 1: 2012 & the Rhetoric of Apocalypse. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of apocalypse as a cultural phenomenon. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GRK. Writing & Rhetoric 1: Plugged In: The Rhetoric of Networks. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GRL. Writing & Rhetoric 1: Queer Rhetoric: The Language of Sex, Gender, and Identity. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GRN. Writing & Rhetoric 1: Lasting Only One Day: The Rhetoric of Ephemera and Other Discarded Things. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of ephemera and how they argue for their meaning as they collect and preserve the past while reflecting humantransience. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GRY. Writing & Rhetoric 1: Fashionable Fables: The Rhetoric of Modern Mythology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GRZ. Writing & Rhetoric 1: Decisions, Rhetoric, and the Art of Choosing. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GSD. Writing & Rhetoric 1: Masters of Style - The Rhetoric of Sophistication. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of how style is mastered and deployed in a range of genres. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GSG. Writing & Rhetoric 1: From Cowboys to Computers: Rhetoric of the American West. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GSO. Writing & Rhetoric 1: The Varieties of Conservative Experience. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GTA. Writing & Rhetoric 1: What Lies Beneath: The Rhetoric of the Underworld. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GTJ. Writing & Rhetoric 1: Rhetoric of the Unruly: Iconoclasts and Their Controversies. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GTL. Writing & Rhetoric 1: Love at First Sight and Forever: The Rhetoric of Romance. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GTM. Writing & Rhetoric 1: The Rhetoric of Taste. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the rhetoric of taste as the luxurious product of a sophisticated society and as tedious, stultifying, snobby, or outright offensive. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GTX. Writing & Rhetoric 1: 'Making My Way Downtown': The Rhetoric of the City. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Through historic, literary, journalistic, and film portrayals of city life, we will analyze the idea of 'the city' as constructed through media and in the imaginations of its residents, and the way life in cities is really lived. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GVC. Writing & Rhetoric 1: The Rhetoric of Circus. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GVG. Writing & Rhetoric 1: The Way of the Dodo: Rhetoric of Extinction. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1GVN. Writing & Rhetoric 1: Noise Machines: The Rhetoric of Sound and Technology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the ways in which online life intersects with real life around issues including privacy, authorship, and morality. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GWI. Writing & Rhetoric 1: Rhetoric of Winkler. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GWS. Writing & Rhetoric 1: Body Politics: The Rhetoric of Transhumanism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1GWT. Writing & Rhetoric 1: Money for 'Nothing' : The Rhetoric of Silicon Valley. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1HJ. Writing & Rhetoric 1: Not Just Art: The Rhetoric of Museums. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1HR. Writing & Rhetoric 1: Fake News and the Rhetoric of "Truthiness". 4 Units.

Development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the fake news phenomenon, considering its impact on the political process and how we discuss important issues of the day. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1JA. Writing & Rhetoric 1: The Rhetoric of Number One. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1JD. Writing & Rhetoric 1: Frog Princes and Ugly Ducklings: The Rhetoric of Self-Transformation. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1JH. Writing & Rhetoric 1: Lies and the Lying Liars Who Tell Them: Rhetoric and Deception. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of untruth, misrepresentation, and deception in journalistic and scientific rhetoric. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1JJK. Writing & Rhetoric 1: The Rhetoric of Futility. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1JL. Writing & Rhetoric 1: 'Saving Strangers': Rhetoric and Humanitarian Intervention. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of how media representations of world crises are crafted to persuade us to action, appealing to our senses of justice, pragmatism, outrage, and compassion. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1JM. Writing & Rhetoric 1: Rhetoric of the Startups. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1JP. Writing & Rhetoric 1: The Rhetoric of Consumer Culture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students explore what consumerism says about the larger culture and the segmented groups within it, analyzing popular and scholarly texts as well as current trends in pop culture, to research how the activities of consumerism shape culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1JPA. Writing & Rhetoric 1: The Rhetoric of Liberal Arts Education. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Engagement with debates and issues related to liberal arts education, including the tension between education as training for a career and as a venue for developing the life of the mind. See http://ual.stanford.edu/AP/univ_req/PWR/Courses.html.

PWR 1JS. Writing & Rhetoric 1: Beyond DNA: The Omics Revolution. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1JT. PWR 1: RHETORIC HEALTH CARE. 4 Units.

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PWR 1KB. Writing & Rhetoric 1: Authentic Experience: The Rhetoric of Tourism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KBA. Writing & Rhetoric 1: On Display: The Rhetoric of Museums and Exhibition Spaces. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KC. Writing & Rhetoric 1: The Rhetoric of Gender and Sexuality in Popular Culture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1KD. Writing & Rhetoric 1: The Feature Article: Writing and Change. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. How various feature article writers argue the issues of soaring energy and food prices, serious market volatility, climate change, an ongoing war in the Middle East, and how terms like *iquest*; *crisisiquest*; or *iquest*; *changeiquest*; impact the discussion. See http://ual.stanford.edu/AP/univ_req_PWR/Courses.html.

PWR 1KE. Writing & Rhetoric 1: The Science of Sports. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include sports at the level of cells and psychology, the science of sports equipment and sports spaces, the ethics of performance enhancement, and sports-related research projects on the Stanford campus. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KJ. Writing & Rhetoric 1: The Rhetoric of Film. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1KM. Writing & Rhetoric 1: If These Walls Could Talk: The Rhetoric of Places and Spaces. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Explores the *iquest*; *languageiquest*; of man-made environments such as universities, theme parks, monuments, shopping malls, museums, and public buildings. Students analyze space through physical exploration and critical inquiry and discover the applications of rhetoric not only to traditional texts but to physical structures and spaces as well. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KMA. Writing & Rhetoric 1: Metaphor and Motion: The Rhetoric of Sacred Space. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KMB. Writing & Rhetoric 1: Cradle to Cradle: the Rhetoric of Sustainability. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KMC. Writing & Rhetoric 1: Staying Cool on a Hot Planet: Environmental Rhetoric for a Changing World. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1KS. Writing & Rhetoric 1: Imagining Others: 21st Century Cosmopolitanism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of cosmopolitanism, questions related to globalization, nationalism, citizenship, cultural values, aesthetics, and identity. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KSA. Writing & Rhetoric 1: Constructing Childhood. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KSB. Writing & Rhetoric 1: Health Matters: Health Innovation and Communication. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1KT. Writing & Rhetoric 1: The Emperor's New Clothes: The Rhetoric of Modern Mythology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1LH. Writing & Rhetoric 1: Ask What You Can Do: The Rhetoric of Public Leadership. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1LM. Writing & Rhetoric 1: Two Truths and a Lie: The Rhetoric of Authenticity. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1LP. Writing & Rhetoric 1: Crafting Credibility: Rhetoric and Authority. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1MD. Writing & Rhetoric 1: Heavenly Bodies: The Rhetoric of Sanctity and Martyrdom. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1MF. Writing & Rhetoric 1: Writing about Cities: Exploration, Observation, Research, Analysis. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1MFA. Writing & Rhetoric 1: Shades of Green: The Rhetoric of Contemporary Environmentalism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1MG. Writing & Rhetoric 1: The Rhetoric of the American West. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1MN. Writing & Rhetoric 1: Liberation or Occupation?: The Rhetoric of War. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1MS. Writing & Rhetoric 1: Seeing Nature: The Power of Environmental Visual Rhetoric. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1PB. Writing & Rhetoric 1: Supreme Court Rhetoric. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of Supreme Court opinions, *iquest*; *amicus curiae* *iquest*; briefs, editorials about Court opinions, and pertinent lower court decisions. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1PH. Writing & Rhetoric 1: He Said, She Said: The Rhetoric of Gender Politics. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the ways in which news articles, movie clips, magazine advertisements, television commercials, and other texts present gender roles, and how the roles and bodies of both sexes are presented as objects open to scrutiny, critique, exploitation, abuse, and awe. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1PHA. Writing & Rhetoric 1: Sisterhood, Brotherhood, Solidarity: The Rhetoric of Greek Life. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1RC. Writing & Rhetoric 1: Domestication: How Humans Shape the Natural World. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1RL. Writing & Rhetoric 1: The Rhetoric of Happiness. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1RP. Writing & Rhetoric 1: The Rhetoric of Archaeology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1RT. Writing & Rhetoric 1: The War Between Wars: the "isms" of modernism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of modernism in art, literature, and thought between the two world wars. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1RTA. Writing & Rhetoric 1: Modernism and the Wreck of Education. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SB. Writing & Rhetoric 1: Machine Dreams: The Rhetoric of Technology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the arguments we make about technology, the arguments various technologies produce about us, and the ways in which rhetoric itself might be productively viewed as a technology for producing arguments. Students explore the social, economic, political, and psychological consequences of rapidly developing technologies. See http://ual.stanford.edu/AP/univ_req/PWR/Req.html.

PWR 1SG. Writing & Rhetoric 1: Body and Mind: The Rhetoric of Gesture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SH. Writing & Rhetoric 1: Strange Art, Stranger Politics: Absurdism and the Rhetoric of Social Action. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the benefits and drawbacks of deploying strange art as artistic and political protest, how breaking the aesthetic rules sometimes serves to argue for social change, and how absurdist protests succeed or fail to gain social traction. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SI. Writing & Rhetoric 1: Super-Storms, Polar Bears, and Droughts: The Rhetoric of Climate Change. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1SK. Writing & Rhetoric 1: Rhetoric of Perkins. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1SL. Writing & Rhetoric 1: New Media Rhetoric and Web 2.0. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students define new media and debate the ideas of web 2.0; the virtue of Web 2.0 in digital game modifications and the potential subversive effects of web 2.0 on advertising restrictions; and look into the possibilities and limitations of democracy 2.0. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SLA. Writing & Rhetoric 1: "Advertising R Us": The Rhetoric of Advertising. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SM. Writing & Rhetoric 1: The Elephant, the Tiger, and the Cellphone: Rhetoric of India and Indian Film. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the rhetoric of the India of the new millennium, including issues of gender, caste, class, religion, sexuality, nationalism, diaspora, outsourcing, and globalization. Service Learning Course (certified by Haas Center). See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SMA. Writing & Rhetoric 1: Humans and Things: The Rhetoric of Commodities and Commodification. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SMB. Writing & Rhetoric 1: The Jewel in the Crown: The Rhetoric of (Post)Colonialism. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SP. Writing & Rhetoric 1: Growing Up Global: The Rhetoric of Children's Culture Today. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SS. Writing & Rhetoric 1: The Page and the Stage: Writing and Performance. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students explore identity as a social, political, and cultural performance; how different situations call for particular styles of rhetorical performance; and how people evaluate and analyze different types of performances, including artistic and political performances, as well as the performances of everyday life. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SSA. Writing & Rhetoric 1: Real and Imagined Lives: Narrative, Rhetoric, and Identity. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of identity as constructed in a range of narrative forms including fiction, memoirs, political campaigns, and social media. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1ST. Writing & Rhetoric 1: The Rhetoric of Biomedical Ethics. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SU. Writing & Rhetoric 1: The World According to Bollywood: Indian Cinema and its Representations. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of representations of India's culture through Indian film and how such representations have coincided with India's economic success over the last two decades of the twentieth century, giving rise to a new trend in global popular culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SUA. Writing & Rhetoric 1: Such a Long Journey: South Asian Diaspora in the World. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1SW. Writing & Rhetoric 1: Scandals, Private Lives, and Public Faces: The Rhetoric of Stanford. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the early history and rhetoric of the public face of Stanford University, from the post-Gold Rush and Big Four railroad era to the building of the University. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1TS. Writing & Rhetoric 1: White Mice and White Coats: The Rhetoric of Biomedical Science. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 1VS. Writing & Rhetoric 1: Eating-Animals: The Rhetoric of Animals, Food, and the Environment. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1WG. Writing & Rhetoric 1: Reading Minds: The Rhetoric of Consciousness. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of states of mind ranging from the radical self-possession cultivated through practice to altered states induced through drugs and trauma, illness, and religion. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 1ZS. Writing & Rhetoric 1: On Cages, Boxes & Boundaries: The Rhetoric of Limits. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

PWR 2AH. Writing & Rhetoric 2: Ethnic Narratives and the Rhetoric of American Identity. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how race and ethnicity in America have become subjects of personal negotiations and public perception. Addresses various topics such as biracial and bicultural identity, acculturation, and stereotyping. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2AO. Writing & Rhetoric 2: Rhetoric and Global Leadership. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2AT. Writing & Rhetoric 2: House Red, Hot Bellies, and High Velocity Lead Therapy: The Rhetoric of Trauma. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2BR. Writing & Rhetoric 2: "I Feel Your Pain": The Rhetoric of Sympathy. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CA. Writing & Rhetoric 2: Networked Rhetoric: Social Networks, Participatory Media and the Future of Wr. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the issues surrounding participatory media and social networking in contemporary digital culture from the perspective of both theory and practice. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CAB. Writing & Rhetoric 2: The Rhetoric of Gender and Technology. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2CG. Writing & Rhetoric 2: Sounds of Stanford: Authoring, Archiving, and Podcasting. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CGA. Writing & Rhetoric 2: Stories, Jokes, and Anecdotes: How to Engage an Audience. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CK. Writing & Rhetoric 2: Speaking Out: Claiming Citizenship, Demanding Rights. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CKA. Writing & Rhetoric 2: Rhetoric of Distraction. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the message, performance, and construction of identity, electronic renditions of the self, and the constant or changing nature of identity. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CL. Writing & Rhetoric 2: Invisible Crimes, Masked Vices: The Rhetoric of Violence. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2CR. Writing & Rhetoric 2: Communicating Science. 4 Units.

Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Examination of the motivations and appeals of environmental arguments, considering underlying assumptions and contexts of time, culture, audience, purpose, and mode of delivery. Participation in Community Writing Project, working with local nonprofit environmental organizations to produce real-world writing, multimedia, and/or speaking projects on these organizations' behalf. Work in the community will form the basis of the major research project. Service Learning Course (certified by Haas Center). Prerequisite: PWR 1. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CRA. Writing & Rhetoric 2: The State of California: Rhetoric of a Dream. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Service Learning Course (certified by Haas Center). See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2CW. Writing & Rhetoric 2: Rhetorical Games: Sport (for) Development Policy in the 21st Century. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2DC. Writing & Rhetoric 2: The Popular Science of Sex. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the intersection between social debate and scientific research about sex and gender; how social debates draw on, represent, respond to, and influence scientific studies; and how the process shapes our knowledge and beliefs about sex and gender. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2DCA. Writing & Rhetoric 2: Race/Gender in the "Obama Age". 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of perceptions of race and gender seen through the political lens of the 2008 presidential campaign. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2DH. Writing & Rhetoric 2: I Post Therefore I Am: 21st Century Identity?. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the message, performance, and construction of identity, electronic renditions of the self, and the constant or changing nature of identity. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2DHA. Writing & Rhetoric 2: Action Research: Making Time for Social Change. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2EC. Writing & Rhetoric 2: 'Like' this Class: The Rhetoric of Public Relations. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2EE. Writing & Rhetoric 2: Once Upon a Cause: Producing Picture Books for Local Children. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2EL. Writing & Rhetoric 2: Rhetoric of Silence. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2EP. Writing & Rhetoric 2: Global Protest and Civil Unrest: The Rhetoric of Resistance. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2EPA. Writing & Rhetoric 2: Slacktivism to Hacktivism: The Rhetoric of Technology and Social Change. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2GAW. Writing & Rhetoric 2: 'Don't Stand so Close to Me': Cross-cultural Communication. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of how rhetoric functions in various cultures, considering body language, symbols, visual media, and the Internet. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2GM. Writing & Rhetoric 2: Unpredictable Dialogue: Art of the Interview, Art of the Essay. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the rhetorical craft of the interview, exploring structure, language, timing, and development in a range of forums, including documentaries, radio, transcription, campus conversations, and television. Research of a Stanford professor's work, including interview. Presentation of findings from research and interview to the class. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2GMA. Writing & Rhetoric 2: Breaking News, Making News 1.0. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2GMB. Writing & Rhetoric 2: The Life and Death and Life of Objects. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2GMC. Writing & Rhetoric 2: A Thousand Words: When Art is Not Enough. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JA. Writing & Rhetoric 2: Rhetoric of Archer. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of how rhetoric functions in various cultures, considering body language, symbols, visual media, and the Internet. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JB. Writing & Rhetoric 2: Rhetoric of Ethics in Research and Technology. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the rhetoric of ethical discourse, including the ethical standards guiding research at Stanford and examples of ethical misconduct. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JH. Writing & Rhetoric 2: Cred: Rhetoric and Credibility in Research, Politics, and Everyday Life. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Work on making students more effective researchers and communicators in their areas of interest, with a focus on gaining and projecting credibility. Exploration of how speakers and writers gain and lose credibility, how people evaluate the credibility of others, and how the rules of credibility are different in politics, in scholarship, and in popular culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JL. Writing & Rhetoric 2: Doomsday Rhetoric. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Investigation of how the doomsday epic expresses real concerns emerging from fields like technology, environmental studies, pathobiology, and politics. Consideration of apocalypticism as a mode of argument. Examination of how belief in the imminent destruction of the present world order influences our political decisions and personal behavior. Topics in religious eschatology and apocalypticism illuminate the genre's origins. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JLA. Writing & Rhetoric 2: Speaking About Art: Narrating the Collections of the Cantor Art Center. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration and theory of successful strategies of oral communication, considering how words and images (in this case works of art) work together to create meaning, culminating in creation of an audio guide for the Cantor Arts Center. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JLB. Writing & Rhetoric 2: Rhetoric and Education Reform. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of social, ideological, and pedagogical perspectives on education reform. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JLC. Writing & Rhetoric 2: Illness Narratives: Attention, Empathy, and Storytelling. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2JM. Writing & Rhetoric 2: Criminal Matters: Evidence, Detection, Expertise. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JP. Writing & Rhetoric 2: The Rhetoric of Art and Commerce. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Examination of unspoken rules regarding the separation of creativity and commerce and arguments about how consumer culture influences the work of the artist. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2JS. Writing & Rhetoric 2: Eureka!: The Rhetoric of the Scientist. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2KC. Writing & Rhetoric 2: Technology and the Rhetoric of Embodiment. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2KD. Writing & Rhetoric 2: Un-Performing Ourselves: The Design and Craft of Presentations. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the application of performance techniques makes academic or professional presentations more compelling. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KDA. Writing & Rhetoric 2: DJ's, Django and Drones: Mashups and Popular Culture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2KEB. Writing & Rhetoric 2: Sports Appeal: Packaging and Promoting Stanford Athletics. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KEC. Writing & Rhetoric 2: It's About Time: Seizing Opportunity in Rhetoric, Writing, and Performance. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KM. Writing & Rhetoric 2: A Planet on the Edge: The Rhetoric of Sustainable Energy. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Focus on the rhetoric and ethics of sustainable energy, investigating both the alarmism and optimism which fuel this debate. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KMA. Writing & Rhetoric 2: Natural Enemies: The Rhetoric of Invasion Biology. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the use of metaphors and argument in the context of invasion biology and species conservation, especially the effects those metaphors and claims have on practice and policy outcomes. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KS. Writing & Rhetoric 2: Happy Now? The Anatomy of Happiness. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. How the emerging field of happiness studies involves psychologists, economists and policy-makers in defining what happiness is and determining how society might create the conditions in which it can flourish. Exploration of how happiness studies can uncover happiness at the heart of arguments about democracy, religion, and personal lifestyles, exploring what makes people happy across cultural, social, and national contexts. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KSA. Writing & Rhetoric 2: The Rhetoric of Childhood and Children's Culture. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KSB. Writing & Rhetoric 2: Design Thinking: Bringing d.thinking to Research, Writing & Presentation. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2KT. Writing & Rhetoric 2: The Great and Powerful Oz: The Rhetoric of Spokespersons. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2LK. Writing & Rhetoric 2: Rhetoric in Crisis!. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2LM. Writing & Rhetoric 2: Rhetoric of Mantoan. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2MF. Writing & Rhetoric 2: Speaking About Art: Narrating the Cantor's Collections. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of strategies for developing museum audio guides, including analysis of existing guides and behind-the-scenes work in the Cantor Arts Center. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2MFA. Writing & Rhetoric 2: Searching for San Jose: Urban Studies Audio Walking Tours. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2MFB. Writing & Rhetoric 2: Sustainability: Making an Impact with Research and Rhetoric. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2MR. Writing & Rhetoric 2: Technology and the Demonic: Rhetoric Against the Machine. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2MS. Writing & Rhetoric 2: Laughter as Message: The Rhetoric of Humor. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2PB. Writing & Rhetoric 2: The Power of Political Photography. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Topics include the role of photographers and photo-journalists in helping viewers see the world differently and the political implications of fashion photography, environmental photography, music photography, and fashion photography. Traditional readings as well as archival and field research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2PH. Writing & Rhetoric 2: Equal Treatment: The Rhetoric of Public Health. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of how public health discourses influence policymaking, practitioners, and community members, how the public understands the rhetoric of public health, and how that understanding affects public and government support of health-related research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2PHA. Writing & Rhetoric 2: You Go Girl: The Rhetoric of Gender Equality. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2PHB. Writing & Rhetoric 2: Indecision 2012: The Rhetoric of Politics. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2RC. Writing & Rhetoric 2: Red Pill or Blue Pill? : The Rhetoric of Drugs. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 2RS. Writing & Rhetoric 2: The Rhetoric in Memoir. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2RT. Writing & Rhetoric 2: Stepping Out of the Shadows: Music, Bass Guitar, and the Rhetoric of Revoluti. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of how the emergence of the electric bass in the fifties helped usher in a revolution that challenged commonplace assumptions concerning nationality, race, gender, and sexuality. Exploration of the history of the electric bass as a case study of musical revolutions, focusing on how music revolutions reflect emerging ideologies in any given culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2RTA. Writing & Rhetoric 2: Postmodernism and the Rhetoric of Uncertainty. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Inquiry into major theories of the postmodern and analysis of postmodernism's effect on culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2RTB. Writing & Rhetoric 2: The Language and Style of Virginia Woolf. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SB. Writing & Rhetoric 2: Writing 'Science': Fact, Fiction, and Everything Between. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of science fiction and popular writing about science and technology as arguments about where we are headed, where we are, who we are, and what we value. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SBA. Writing & Rhetoric 2: Building a Better Human: Arguing Enhancement/Enhancing Arguments. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of science fiction and popular writing about science and technology as arguments about where we are headed, where we are, who we are, and what we value. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SG. Writing & Rhetoric 2: Bodies of Knowledge: The bodily foundations of human thought and reason. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SGA. Writing & Rhetoric 2: Lie Detection and the Social Functions of Deception. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SH. Writing & Rhetoric 2: The Ugly American: Tourism and the Rhetoric of Power. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of the Ugly American in aesthetics and culture, in films and novels, tourist locations and business conferences, to illuminate America's complex role in the world. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SL. Writing & Rhetoric 2: Got Ads: Visual Design in Print Advertising. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Introduction to the rhetorical interplay of visuals, text, and design layout in print advertising, and narrative, classificatory, and dynamic patterns in print advertisement campaigns. Culminates in design and presentation of an original ad campaign. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SLA. Writing & Rhetoric 2: Information Design: The Visual Language of Graphic Communication. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SM. Writing & Rhetoric 2: Dirty, Pretty Things: The Rhetoric of Objects and Objectification. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of objects and objectification, from the relationships shared by cultures, objects, and people to how human beings have been objectified through colonialism, enslavement, sex-trafficking, and organ trade. Material objects discussed in terms of staging, collecting, design, location, inheritance, and cultural meaning. Service Learning Course (certified by Haas Center). See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SMA. Writing & Rhetoric 2: Love and Longing in Bombay: Romance and Rebellion in Indian Film. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SPA. Writing & Rhetoric 2: Other Selves: The Art & Science of Friendship. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SS. Writing & Rhetoric 2: Mass Audiences and Modern Communication. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the ability to reproduce a work for increasingly large audiences has fundamentally changed the nature of art and its effect on culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SSA. Writing & Rhetoric 2: Rhetoric of Reality Culture. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SSB. Writing & Rhetoric 2: Superfans and Scholars: Writing Fan Culture. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2ST. Writing & Rhetoric 2: Science, Democracy and Social Media. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SU. Writing & Rhetoric 2: Hollywood Bollywood: Rhetoric of India in Global Cinema. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the rhetoric of India is constructed for an international audience through films and how such representations have coincided with India's recent economic success to give rise to a new trend in global popular culture. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2SW. Writing & Rhetoric 2: Propaganda of World War II: Strategies of Persuasion. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Through work with the Hoover Archives, exploration of how written, visual, and film sources were used by a variety of countries to influence their citizens during WWII. Topics include the rhetoric of eugenics, political speeches, war posters, and how advertising during WWII pursued clear agendas to support government goals. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2WG. Writing & Rhetoric 2: All That Jazz: The Rhetoric of American Musical Theater. 4 Units.

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the conventions and strategies that define the genre of American musical theater. Analysis of how contemporary musicals mirror, revise, and even subvert traditional rules while addressing a range of current issues. See http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html.

PWR 2ZS. Writing & Rhetoric 2: Designing Memorials: Building Rhetoric into Commemoration. 4 Units.

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

PWR 4. Directed Writing. 3-4 Units.

Further work on developing writing. Analysis and research-based argument, writing for a range of audiences and in varied disciplinary contexts. Workshops and individual conferences. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

PWR 5. Independent Writing. 1-5 Unit.

Individual writing project under the guidance of a PWR instructor. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

PWR 6. Writing Workshop. 3 Units.

Writing workshop for collaborative, group, and individual projects guided by a specific theme or genre.

PWR 91. Intermediate Writing. 3 Units.

For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 91B. Intermediate Writing: Digital Rhetoric, New Media, and Transformations in Writing. 3 Units.

Writing operates in multiple modes (word, image, sound) in the new media environment. Examples of texts - invention, drafting, revision, and communication - governed by the evolving conditions of a new, digital rhetoric. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 91C. Intermediate Writing: The Stanford Daily Show. 3 Units.

Class will study fake news programs such as the Daily Show, the Colbert Report and the Onion, and will produce The Stanford Daily Show, our own version of a fake news program. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 91CG. Intermediate Writing: Science and Technology Writing for Popular Audiences. 3 Units.

Whether you're a fuzzy or a techie, chances are you've had to explain the content of the classes you've taken to outside audiences. You've had to explain to your parents how your/their tuition dollars are at work, or you've advocated for your well-rounded background during a job interview. Your access to Stanford has granted you a certain expert label, even if it doesn't always feel that way. This course leverages your growing expertise by introducing you to writing styles and genres that will allow you to communicate your technical interests to a non-expert, or popular, audience. We'll talk about stylistic points including story ledes and anecdotes, metaphor, and organizing familiar and non-familiar language in our writing. We'll also experiment with different genres that accomplish these translation goals by experimenting with writing abstracts, journalism pieces, provocative podcasts, first-person narratives, visual essays, and creative non-fiction essays. Our ultimate goal will be to not only better understand these styles and genres in order to communicate more effectively with a wide variety of audiences, but to also seek publication in local newspapers, blogs, and sources such as *Salon*, *Slate*, *The Huffington Post*, *The Atlantic*, and even *Wired* or *Radiolab*.

PWR 91CL. Intermediate Writing: Creative Inquiry: New Genres for Science Writing. 3 Units.

Despite the widespread assumption that scientists are weak communicators, many of today's most celebrated essayists hail from backgrounds in the hard sciences. Physician, poet and essayist, Lewis Thomas inspires readers to delve into the etymology of scientific discovery, and, in doing so, prompts radical reconsiderations of the cultural significance of innovation. Similarly, neurologist and writer, Oliver Sacks' compassionate ruminations on mental disability advance fresh thinking on the nature of difference. Inversely, many essayists hailing from iquest;fuzzyquest; backgrounds, deploy techniques usually associated with scientific observation to electrify their prose: To wit, the works of brilliant stylists like Annie Dillard, Chang-rae Lee, and Mark Doty are characterized by the kind of deep observation that underpins scientific inquiry. These writers, like scientists, are first and foremost good at really looking. In this course, we will delve into a fluid, yet rigorous, research process based on the art of observation. Each student will begin the quarter by posing a question of personal or professional significance about how some aspect of the natural, social, technological or cultural world works. Using these questions as a starting point, students will then design a research process to first complicate, and then perhaps also answer, their initial question. The end product of the inquiry will be a self-fashioned experimental essay that can engage a discerning public audience. This is the perfect class for techies, wonks, and data junkies who want to cultivate the poet's cherished sensibilities.

PWR 91D. Intermediate Writing: Your American Life. 3 Units.

In this course, you'll read and listen to some of the most moving and insightful pieces of the last decade, explore the important differences between print and oral storytelling, and then script and record your own full-length audio piece. Along the way, we will explore many craft elements that apply equally to print and audio pieces. You will learn, for example, how to organize your material, choose an effective structure, blend dramatization and reflection, ground insights in concrete scenes, create a strong narrative arc, and manage elements such as characterization, description, and dialogue. We will also, of course, explore craft elements unique to the audio form and you will learn how to use your voice and other sonic elements to craft the kind of piece you might hear on *This American Life*. Through a special arrangement with the Stanford Storytelling Project, in the spring of 2012 this course will feature special sessions with prominent contributors to *This American Life*. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 91E. Intermediate Writing: The Oral Tradition: Myth, Folklore, and Fairy Tale. 3 Units.

Contemporary storytelling covers a variety of media - from movies to novels, theatre and beyond. What this course offers is an in depth study of the roots of that practice - the oral tradition. Over the course we will explore many different motifs and structures that arise in the oral tradition, myth, folklore and fairy tale. What universal themes do we detect, and what separates the progression of a Pacific Northwest Trickster story from an Arthurian romance? Why is it that in the early twenty first century many of our most acclaimed art forms carry narrative forms that are thousands of years old? *Star Wars*, *Lord of the Rings* and the recent Broadway show *Jerusalem*, all follow scenic progressions informed by myth. The first encounter with the story will be an oral narrative - the myth told unscripted in the classroom. The stories, which range from the Arthurian romance *Parzival* to Trickster folk tales, will be told in several sections - with a running exegesis and student response alongside. Many of these stories are now transcripts and have become works of literature. We will explore both the complementary aspects of this development, and areas of tension. During the course each student will embark on a project that demonstrates a thorough understanding of the topics covered, and utilizes those elements in their wider practice of writing and rhetoric. The project will be to research a story handed down within the family - an adventure of some distant relative, or a family migration from one country to another. Factoring in elements from the taught class, the student will mythologize the story: by writing an in depth commentary on its implications - factoring in contemporary, psychological and metaphorical associations. The second element will be to tell the story to the class. In these ways we experience myth as a living principle, not something just from a long time ago.

PWR 91F. Intermediate Writing: Finding Your Story. 3 Units.

Life challenges us to become aware of the stories that shape us: family stories, cultural mythologies, even popular movies, television shows, and songs; and then create and live our own story. We face this challenge throughout our lives but perhaps most acutely as we move into adulthood; this is the period when we most need to become conscious of stories and their power, to gather wisdom, practices, and resources for finding our own story. This class, designed with seniors in mind, will illuminate and explore these resources and give you the opportunity to reflect deeply, in discussion and writing, on what truly calls to you in this life. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 91JS. Intermediate Writing: Stanford Science Podcast. 3 Units.

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

PWR 91KS. Intermediate Writing: Design Thinking and Science Communication. 3 Units.

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

PWR 91RS. Intermediate Writing: Communicating Bioinformation. 3 Units.

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

PWR 91S. Intermediate Writing: Communicating Science. 3 Units.

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 99A. Portfolio Preparation I. 1 Unit.

A 1-unit course introducing ePortfolios and folio thinking for students in the Notation in Science Communication (NSC). The course will assist students in designing a rhetorical ePortfolio and in selecting and reflecting on writing samples that represent student learning in science communication. This is the first of a two-part ePortfolio requirement for the NSC. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

PWR 99B. Portfolio Preparation II. 2 Units.

A 2-unit culminating course on ePortfolios for students in the Notation in Science Communication (NSC). In this course, students will continue building, revising, and editing a portfolio of documents, slides, and videos that will demonstrate development as a science communicator. This is the second of a two-part ePortfolio requirement for the NSC. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

PWR 191. Advanced Writing. 3 Units.

Open to undergraduates and graduate students. Crafting nonfiction prose in a range of genres. Focus is on the relationship of genre and form; attention to developing stylistic versatility. Individual conferences with instructor. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

PWR 192. Projects in Research, Writing, and Rhetoric. 1-5 Unit.

Advanced work on research projects, early drafts of theses, proposals. Shared work, discussions, and examination of methods, rhetorics, and styles in all disciplines. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

PWR 193. Writing the Honors Thesis. 1-5 Unit.

For students from all majors in the process of writing an honors thesis. Review of key elements of thesis process, including literature reviews, structure, argumentation, style, and documentation. Group and individual workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

PWR 194. Topics in Writing and Rhetoric. 4 Units.

Understanding rhetoric as readers and interpreters of texts and to develop skills as writers and speakers. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 194B. Advanced Writing. 4 Units.

Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For details, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr.

PWR 194C. Make Them Laugh: Comedy as Persuasion and Argument. 4 Units.

Exploration of major theories of comedy and application of these theories to historical and contemporary comedic practice, with particular attention to comedy as a form of argument in a range of contexts. For more information, see http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr. Prerequisite: first two levels of the undergraduate writing requirement or equivalent transfer credit. Not repeatable for credit.

PWR 194KD. Topics in Writing and Rhetoric: Technology and Human Values. 4 Units.

Understanding rhetoric as readers and interpreters of texts and to develop skills as writers and speakers. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>.

PWR 194SB. Topics in Writing and Rhetoric: Rhetoric of Science. 4 Units.

Understanding rhetoric as readers and interpreters of texts and to develop skills as writers and speakers. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>.

PWR 195. Writing Center Peer Tutor Seminar. 3 Units.

For students selected to serve as peer writing tutors in the Stanford Writing Center and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work. Same as: ENGLISH 195W, PWR 295

PWR 295. Writing Center Peer Tutor Seminar. 3 Units.

For students selected to serve as peer writing tutors in the Stanford Writing Center and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work. Same as: ENGLISH 195W, PWR 195

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